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HIGHLIGHTS

- Question on Debatable Topic for Self-paced Preparation
- Analysis of Controversial Topics & Tips to handle
- DAF Analysis
- 1 Mock Interview
- Mock Feedback
- Video Recording

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TEST
DAY - 16

Time Allowed: 30 mins **Maximum Marks: 50**

1. Which of the following statements is/ are correct?

1. Claudius Ptolemy was the first to put forward the heliocentric view of the Universe.
2. Copernicus was the first to propose the size of the Universe.
3. According to Hubble, the diameter of the observable universe is 2.5 billion light-years.

Select the correct option using the codes given below:

(a) 3 only
(b) 2 and 3 only
(c) 1 and 2 only
(d) 1, 2, and 3

2. Consider the following statements regarding Earth:

1. Earth is the largest of the terrestrial planets.
2. Earth is exactly one astronomical unit away from the Sun.
3. Earth's axis of rotation is tilted exactly 23 degrees.

Which of the above statements is/are correct?

(a) 1 only
(b) 1 and 2 only
(c) 2 and 3 only
(d) None of the above

3. Which of the following pairs of the scientists proposed the modern theory of "Origin of Life"?

(a) Miller and Urey
(b) Richter and Arrhenius
(c) Oparin and Haldane
(d) Spallanzani and Redi

4. Baryosphere includes which of the following regions of the Earth?

1. Mantle
2. Inner Core
3. Outer Core
4. Asthenosphere
5. Lithosphere

Select the correct option using the codes given below:

(a) 1 only
(b) 4 and 5 only
(c) 1, 2, and 3 only
(d) 2 and 3 only

5. In which of the following region is the Kuiper belt found?

(a) Between Mars and Jupiter
(b) Between Jupiter and Saturn
(c) Between Saturn and Neptune
(d) Between Neptune and Pluto

6. If a clock at 15^0N 60^0W shows 12 AM, then what will it show at 65^0S 60^0E at the same time?

(a) 6 PM
(b) 8 PM
(c) 6 AM
(d) 8 AM

7. Arrange the following countries into the decreasing number of their time zones?

1. Russia
2. France
3. United Kingdom
4. China

Select the correct order using the codes given below:

(a) 3-1-4-2

(b) 1-2-3-4

(c) 2-1-3-4

(d) 2-4-1-3

8. Consider the following statements:

1. Comets are found in the asteroid belt of the solar system.
2. Some of the life-supporting materials were delivered by these comets.
3. When a meteoroid survives a trip through the atmosphere and hits the ground, it's called the meteor.

Which of the above statements is/are correct?

(a) 2 only

(b) 1 and 2 only

(c) 3 only

(d) 2 and 3 only

9. Consider the following statements regarding our solar system:

1. Neptune is the only planet in our solar system not visible to the naked eye.
2. Earth is the only planet that has a single moon.
3. Our moon is the smallest moon in the solar system.

Which of the above statements is/are correct?

(a) 3 only

(b) 2 and 3 only

(c) 1 and 2 only

(d) 1, 2 and 3

10. Match the following lists:

List-I (Astronomers)	**List-II (Works)**
A. Galileo	1. Saturn ring
B. Cassini	2. Distance of Mars from Earth
C. Huygens	3. Comets
D. Messier	4. Moons of Jupiter

Select the correct match using the codes given below:

	A	B	C	D
(a)	1	2	3	4
(b)	4	2	1	3
(c)	2	3	4	1
(d)	3	4	1	2

11. Which of the following statements regarding the "Great Red Spot" is correct?

(a) It is a persistent anticyclonic storm on Jupiter.

(b) It is the largest volcano on Mars.

(c) It is the most powerful hurricanes ever recorded on Earth

(d) It is the largest sunspot.

12. Which of the following evidences prove the sphericity of the Earth?

1. Lunar eclipse
2. Sunrise and sunset
3. Shape of the horizon
4. Spherical Planetary bodies

Select the correct option using the codes given below:

(a) 1, 2, and only

(b) 1, 3, and 4 only

(c) 2, 3, and 4 only

(d) 1, 2, 3 and 4

13. Through which of the following states the Standard Meridian of India passes?

1. Andhra Pradesh
2. Telangana

3. Madhya Pradesh
4. Odisha

Select the correct option using the codes given below:

(a) 3 and 4 only

(b) 2 and 3 only

(c) 1, 3 and 4 only

(d) 1, 2, 3 and 4

14. Consider the following statements regarding the apparent movement of the Sun:

1. The sun is vertically overhead at the equator always.
2. The Sun is never overhead at any time of the year beyond the tropics
3. At the poles, the days and nights are never equal.

Which of the above statements is/are correct?

(a) 2 only

(b) 3 only

(c) 1 and 2 only

(d) 1, 2 and 3

15. In the context of dawn and twilight, consider the following statements:

1. Dawn and twilight occur when the sun is below the horizon.
2. The period of dawn and twilight is longer at the equator as compared to the poles.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

16. Which of the following statement is *incorrect* regarding Oort cloud?

(a) The Oort cloud is an extended shell of icy objects that exist in the outermost reaches of the solar system.

(b) The Oort Cloud is very distant from the Sun and it can be disrupted by the nearby passage of a star.

(c) The Oort cloud is roughly circular, and is thought to be the origin of most of the long-period comets that have been observed

(d) Objects in the Oort cloud are also referred to as Trans-Neptunian objects.

17. Consider the following statements:

1. The Equator is halfway between the North and South Poles, and divides the Earth into the Northern and Southern Hemispheres.
2. As the earth is slightly flattened at the poles, the linear distance of a degree of latitude at the pole is a little smaller than that at the equator.

Which of the following statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

18. Which of the following is not a direct source of information regarding the earth's interior?

1. Volcanic Eruption
2. Gravitational Field
3. Mining
4. Falling Meteors

Select the correct answer from the codes given below:

(a) 4 only

(b) 2 and 4 only

(c) 2, 3 and 4 only

(d) 1, 2, 3 and 4

19. Regarding the seismic waves, consider the following:

1. Love waves are the fastest surface waves and move on ground side to side.
2. Rayleigh waves rolls along the ground just like a wave roll across a lake or an ocean.
3. Secondary waves are longitudinal or compressive in nature

Which of the following statements is/are correct?

(a) 1 and 2 only

(b) 2 only

(c) 2 and 3 only

(d) 1 and 3 only

20. Consider the following discontunities:

1. Repetti discontinuity
2. Conrad discontinuity
3. Lehmann discontinuity
4. Gutenberg discontinuity

What is the correct order from top to bottom?

(a) 1-2-3-4

(b) 2-1-3-4

(c) 1-4-2-3

(d) 2-1-4-3

21. Consider the following statements regarding "Ansupa Lake" which has been recently in news.

1. Ansupa Lake is one of the largest fresh water lake of Odisha
2. It was created by Mahanadi and got a shape like the hoof of a horse.
3. The lake is surrounded with high hills.

Which of the statements given above is/are correct?

(a) 1 and 3 only

(b) 2 only

(c) 2 and 3 only

(d) 1,2 and 3

22. Consider the following statements.

1. This animal has been accorded protection from trade for the first time.
2. There is currently only one recognized species, with nine sub-species of this particular animal.
3. They have been listed as 'vulnerable' on the International Union for Conservation of Species Red List, with some sub-species classified as 'endangered" or 'critically endangered'.

The above statements are related to which one of the following animal?

(a) Giraffe

(b) Rhino

(c) Monkey

(d) Tardigrade

23. Consider the following statements regarding "KALIA scheme" which has been recently in news.

1. Scheme is been started by the Odisha government
2. Financial assistance of Rs.25, 000/- per farm family over five seasons will be provided to small and marginal farmers.
3. Life insurance cover of Rs. 2.00 lakh at a very nominal premium of Rs.330/- will be provided to all savings bank account holder of age between 18-50 years.

Which of the statements given above is/are correct?

(a) 1 and 3 only

(b) 2 only

(c) 2 and 3 only

(d) 1,2 and 3 only

24. "siRNAs" term seen recently in news is related to which of the following?

(a) It is a new technique found to develop pesticide alternative to protect plants form viral infection.

(b) It is a new missile system developed by DRDO

(c) It is a new asteroid recently discovered by NASA

(d) It is an invasive species recently found in India which is damaging the crops of south India.

25. Which of the following state has not declared a State Butterfly yet?

(a) Tamil Nadu

(b) Karnataka

(c) Kerala

(d) Andhra Pradesh

ANSWER HINTS

DAY - 16

1. Correct Option: (a)

Explanation:

Universe

- Claudius **Ptolemy** was the first to put forward the **geocentric view** of the Universe. He postulated that the Earth is in the center of the universe and all the celestial bodies are moving around it.
- Nicolaus **Copernicus** shattered the long-held notion that the Earth was the center of the solar system, proposing a **heliocentric** (sun-centered) model instead.
- In the early 1920s, Edwin **Hubble** detected Cepheid variables in the nearby Andromeda galaxy and discerned that it was just under a million light-years away. **He also said that the diameter of the universe is 2.5 billion light-years.** Today, the best estimate is that the galaxy is actually 2.54 million light-years away.

2. Correct Option: (b)

Explanation:

Earth

- Our solar system consists of our star, the Sun, and everything bound to it by gravity - the planets Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune, dwarf planets such as Pluto, dozens of moons and millions of asteroids, comets and meteoroids.
- The inner, rocky planets are Mercury, Venus, Earth, and Mars. These are also called the terrestrial planets. **The Earth is the largest terrestrial planet.**
- The outer planets are gas giants Jupiter and Saturn and ice giants Uranus and Neptune. Jupiter is the largest gas giant.
- An astronomical unit (AU) is the average from Earth to the Sun, about 93 million miles (150 million km). **Thus, the earth is exactly one AU away from the sun.**
- **Earth's mean obliquity is currently 23°26′12.1″ (or 23.43668°).**

3. Correct Option: (c)

Explanation:

Theories of Origin of Life

- Six major theories are proposed to explain the origin of life on earth. These theories are as follows:
  - ➤ Theory of Special Creations: It proposes that life on earth is created by a supernatural power, the GOD. It also proposes that all the living organisms, in present form, were created the same day.
  - ➤ Theory of spontaneous generations: It assumes that non-living material in a spontaneous manner gives rise to life. This theory was criticized by Lazzaro Spallanzani, Francisco Redi and Louis Pasteur.
  - ➤ Theory of catastrophism: It assumes that life is originated by the special creation and it is followed by catastrophe due to geographical disturbances.
  - ➤ Theory of cosmozoic: This theory was put forward by Richter and strongly supported by Arrhenius. The theory assumes that life was present in the form of resistant spores and appeared on earth from other planets. Since the condition of earth was supporting the life, these spores grew and evolved into different organisms. This theory was also known as "theory of panspermia or spore theory".
  - ➤ The modern theory/ Chemical Theory/ Theory of primary abiogenesis: In the modern theory, the hypothesis of abiogenesis was proposed with a condition that the non-living materials can give rise to life in the condition

of primitive earth. The condition of the primitive earth is different from the present conditions which do not permit abiogenesis. **The idea of chemical theory was put forward by two scientists, A.I. Oparin and J.B.S Haldane.**

- It has made the following assumptions:
  - Spontaneous generation of life under the present environment is not possible.
  - Earth's atmosphere ~1 billion years is very different from the current conditions.
  - Primitive earth's atmosphere was reducing in nature.
  - Under these conditions, the chemical molecules (inorganic molecules) react with each
  - other through a series of reactions to form organic substances and other complex
  - biomolecules.
  - The solar energy and UV radiation provided the energy for the chemical reactions.
- The hypothesis proposed by Haldane didn't find much support without scientific experimentation. To conclusively support the chemical theory**, Miller and Urey conducted a successful experiment** in mimicking primitive earth environment.
- As per the hypothesis, the origin of life have four major steps:
  - Formation of Inorganic molecules
  - Spontaneous formation of monomeric organic compounds
  - Spontaneous formation of complex organic compounds
  - Spontaneous formation of molecular aggregates
- After this, the first protocells and first cell were formed.

4. Correct Option: (d)

Explanation:

Parts of Earth

- The Earth consists of three parts as follows:
  - **Baryosphere: it is the central core of the earth. It is filled with molten magma with a large quantity of iron and nickel. Baryosphere has two zones: the inner core region (~800 miles radius) and the outer core region (~1400miles radius).**
  - Pyrosphere: it is the middle part of the earth, also known as mantle. It is ~1800 miles in thickness and mainly consists of silica, manganese, and magnesium.
  - Lithosphere: it is the outermost region of the earth, also known as crust. It is 20-25 miles in thickness and mainly has silica and aluminum.

5. Correct Option: (d)

Explanation:

Kuiper belt

- **It is a donut-shaped region of icy bodies beyond the orbit of Neptune.**
- There may be millions of these icy objects, collectively referred to as Kuiper Belt objects (KBOs) or trans-Neptunian objects (TNOs), in this distant region of our solar system.
- Similar to the asteroid belt, the Kuiper Belt is a region of leftovers from the solar system's early history. Like the asteroid belt, it has also been shaped by a giant planet, although it's more of a thick disk (like a donut) than a thin belt.

6. Correct Option: (d)

Explanation:

Latitude and longitude

- The time difference is due to the longitudinal difference. 1 Degree = 4 minutes i.e. 15 degrees= 1 hour.
- There is a difference of 120 degrees (between 60^0E and 60^0W) in the longitudes between the two places i.e. 8 hours.
- Now, at 60^0E, there is a gain of 8 hours as East is earlier to the West (geographically).

7. Correct Option: (c)

Explanation:

Tim zones

- A time zone is a region or area that observes the same standard time. The world is divided longitudinally into time zones, with each hour difference roughly 15 degrees apart.
- Most countries, having smaller longitudinal expanse, have only one time-zone. There

are 23 countries with at least two time zones.

- **The top 10 countries having the most number of time zones are France(12), United States(11), Russia(11), United Kingdom(9), Australia(8), Canada(6), Denmark(5), New Zealand(5), Brazil(4), and Mexico(4).**
- **Despite France and UK are small countries they have more time zones as they have a number of overseas territories esp. in all three Oceans.**
- **China despite being the third-largest country, has only one time-zone due to its political ideology.**

8. Correct Option: (a)

Explanation:

Asteroids, Comets and Meteors

- Asteroids, sometimes called minor planets, are rocky, airless remnants left over from the early formation of our solar system about 4.6 billion years ago. Most of this ancient space rubble can be found orbiting the Sun between Mars and Jupiter within the main asteroid belt.
- Meteoroids are objects in space that range in size from dust grains to small asteroids. Think of them as "space rocks." When meteoroids enter Earth's atmosphere (or that of another planet, like Mars) at high speed and burn up, the fireballs or "shooting stars" are called meteors. **When a meteoroid survives a trip through the atmosphere and hits the ground, it's called a meteorite.**
- Comets are cosmic snowballs of frozen gases, rock and dust that orbit the Sun. When frozen, they are the size of a small town. When a comet's orbit brings it close to the Sun, it heats up and spews dust and gases into a giant glowing head larger than most planets. The dust and gases form a tail that stretches away from the Sun for millions of miles. **There are likely billions of comets orbiting our Sun in the Kuiper Belt and even more distant Oort Cloud.**
- **Comets and asteroids probably delivered some of the water and other ingredients that allowed the complex chemistry of life to begin on Earth. The amino acid glycine was discovered in the comet dust returned to Earth by the Stardust mission. Glycine is used by living organisms to make proteins. The discovery supports the theory that some of life's ingredients formed in space and were delivered to Earth long ago by meteorite and comet impacts**
- **The Oort Cloud is an extended** shell of icy objects that exist in the outermost reaches of the solar system. It is named after astronomer Jan Oort, who first theorized its existence.

9. Correct Option: (c)

Explanation:

Solar System

- Dark, cold and whipped by supersonic winds, ice giant Neptune is the eighth and most distant planet in our solar system. More than 30 times as far from the Sun as Earth**, Neptune is the only planet in our solar system not visible to the naked eye** and the first predicted by mathematics before its discovery.
- When Earth was a young planet, a large chunk of rock smashed into it, displacing a portion of Earth's interior. The resulting chunks clumped together and formed our Moon. With a radius of 1,080 miles (1,738 kilometers), **the Moon is the fifth largest moon in our solar system (after Ganymede, Titan, Callisto, and Io).**
- **Earth is the only planet which has a single moon (so far).** Other planets have either zero or multiple moons.
- However, the scientists have claimed that Earth has two extra 'moons' – made entirely of dust and nine times wider than our planet. After more than half a century of speculation and controversy, Hungarian astronomers and physicists finally confirmed the existence of these moons.

10. Correct Option: (b)

Explanation:

Famous Astronomers

- Galileo experimented with and refined telescopes. **He is perhaps best known for discovering the four most massive moons of Jupiter, now known as the Galilean moons.**
- **Dutch astronomer Christiaan Huygens proposed that a thin, flat ring circled Saturn. He also discovered the first moon of Saturn, Titan.** He made the first known drawing of the Orion Nebula.
- **In 1672, Cassini and colleague Jean Richer used the parallax method to determine the distance of Mars from Earth,** permitting the first estimations of

the dimensions of the solar system. Using a method outlined by Galileo, Cassini was also the first to make successful measurements of longitude. Cassini made the first observations of four of Saturn's moons: Iapetus, Rhea, Tethys, and Dione. In addition, he discovered the Cassini Division in the rings of Saturn in 1675.

- **Charles Messier (1730-1817) of France developed an interest in astronomy at an early age, having witnessed a 6-tailed comet at age 14 in 1744.**

11. Correct Option: (a)

Explanation:

Great Red Spot

- **The Great Red Spot is a persistent anticyclonic storm on the planet Jupiter, 22 degrees south of the equator.**
- With tumultuous winds peaking at about 400 mph, the Great Red Spot has been swirling wildly over Jupiter's skies for the past 150 years or maybe even much longer than that.
- The storm is large enough to be visible through Earth-based telescopes.
- It was probably first observed by Cassini, who described it around 1665.
- It is large enough to contain two or three planets of Earth-size.

12. Correct Option: (d)

Explanation:

Evidence of the Earth's Sphericity

- There are many ways to prove that the earth is spherical. The following are some of them.
  - Circum-navigation of the earth
  - **The circular horizon**
  - Ship's visibility over the distant horizon
  - **The sun rises and sets at different times in different places**
  - **The shadow cast by the earth on the moon during the lunar eclipse is always circular**
  - **Planetary bodies are spherical**
  - Driving poles on level ground on a curved earth
  - Aerial photographs, etc.

13. Correct Option: (d)

Explanation:

Standard Meridian of India

- The standard meridian of India is 82.5 degrees east of the Greenwich Meridian.
- In 1905, this longitude was selected as the meridian to create the Indian Standard Time.
- It passes through Uttar Pradesh, Madhya Pradesh, Chattisgarh, Odisha, and Andhra Pradesh.

14. Correct Option: (a)

Explanation:

Apparent movements of the Sun

- In the course of the year, the earth's revolution around the sun, with its axis inclined at 66.5 degrees to the plane of the ecliptic, changes the apparent altitude of the midday sun.
- **The sun is vertically overhead at the equator on two days each year.** These are usually 21 March and 21 September though the date changes because of year is not exactly 365 days. These two days are termed **equinoxes** meaning 'equal nights' **because on these two days all parts of the world have equal days and nights.**
- After the March equinox, the sun appears to move north and is vertically overhead at the Tropic of Cancer (23.5 degrees North) on about 21 June. This is known as the June or summer solstice when the northern hemisphere will have its longest day and night.
- By about 22 December, the sun is overhead at the Tropic of Capricorn (23.5 degrees South). This is the winter solstice when the southern hemisphere will have its longest day and shortest night.
- **The tropics thus mark the limits of the overhead sun, for, beyond these, the sun is never overhead at any time of the year.**

15. Correct Option: (a)

Explanation:

Dawn and Twilight

- The brief period between sunrise and full daylight is called dawn, and that between sunset and complete darkness is termed twilight.

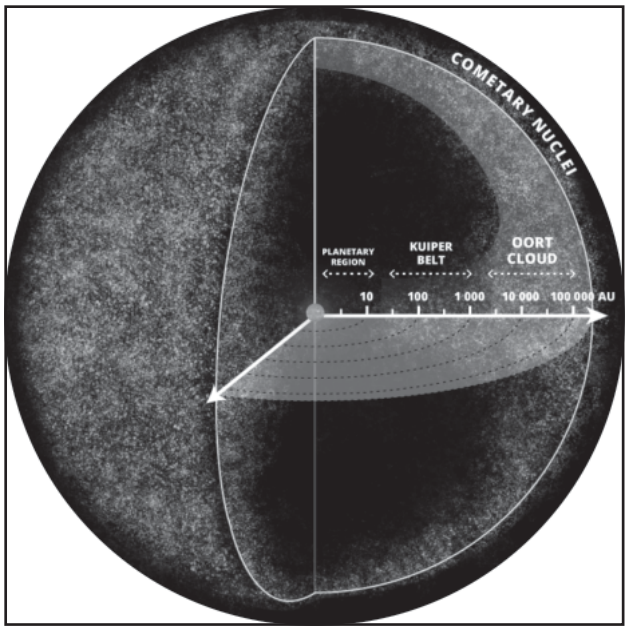
- **This is caused by the fact that during the periods of dawn and twilight the earth receives diffused or refracted light from the sun whilst it is still below the horizon.**
- **Since the sun rises and sets in a vertical path at the equator the period during which refracted light is received is short.**
- **But in temperate latitudes, the sun rises and sets in an oblique path and the period of refracted light is longer.** It is much longer still at the poles so that the winter darkness is really the only twilight most of the time.

16. Correct Option: (c)

Explanation:

Oort Cloud

- The Oort Cloud is an extended shell of icy objects that exist in the outermost reaches of the solar system. It is named after astronomer Jan Oort, who first theorised its existence. The Oort Cloud is roughly spherical, and is thought to be the origin of most of the long-period comets that have been observed.
- This cloud of particles is theorized to be the remains of the disc of material that formed the Sun and planets. Astronomers now refer to those primeval objects as a protoplanetary disk.



- The most likely theory is that the material now in the Oort Cloud probably formed closer to the young Sun in the earliest epochs of solar system formation. As the planets grew, and in particular as Jupiter coalesced and migrated to its present position, its gravitational influence is thought to have scattered many icy objects out to their present position in the Oort cloud.
- Objects in the Oort Cloud are also referred to as Trans-Neptunian objects. This name also applies to objects in the Kuiper Belt.
- The Oort Cloud is very distant from the Sun and it can be disrupted by the nearby passage of a star, nebula, or by actions in the disk of the Milky Way. Those actions knock cometary nuclei out of their orbits, and send them on a headlong rush toward the Sun.

17. Correct Option: (a)

Explanation:

Latitudes:

- The Equator is an imaginary line around the middle of the Earth. It is halfway between the North and South Poles, and divides the Earth into the Northern and Southern Hemispheres.
- The Earth is widest at its Equator. The distance around the Earth at the Equator, its circumference, is 40,075 kilometers (24,901 miles).
- Orbital plane is the plane formed by the orbit. The axis of the Earth is an imaginary line that makes an angle of 66½° with its orbital plane.
- Latitudes and Longitudes are imaginary lines used to determine the location of a place on earth. Parallels of Latitudes are the angular distance of a point on the earth's surface, measured in degrees from the center of the Earth.
- As the earth is slightly flattened at the poles, the linear distance of a degree of latitude at the pole is a little longer than that at the equator.
- Besides the equator (0°), the north pole (90°N) and the south pole (90°S), there are four important parallels of latitudes–
  - ➤ Tropic of Cancer (23½° N) in the Northern Hemisphere.
  - ➤ Tropic of Capricorn (23½° S) in the Southern Hemisphere.
  - ➤ Arctic Circle at 66½° North of the Equator.
  - ➤ Antarctic Circle at 66½° South of the Equator.

18. Correct Option: (b)

Explanation:

Direct Sources

- The most easily available solid earth material is surface rock or the rocks we get from mining areas.
- Volcanic eruption forms another source of direct information. As and when the molten material (magma) is thrown onto the surface of the earth, it becomes available for laboratory analysis. However, it is difficult to ascertain the depth of the source of such magma.
- Direct sources include rock materials from **mining** areas and molten magma from **volcanic eruptions**.

Indirect Sources

- Analysis of properties of matter provides indirect information about the interior of the Earth.
- Another source of information is the meteors that at times reach the earth.
- Indirect sources include meteors that at times reach the earth, gravitation, magnetic field, and seismic activity.

19. Correct Option: (a)

Explanation:

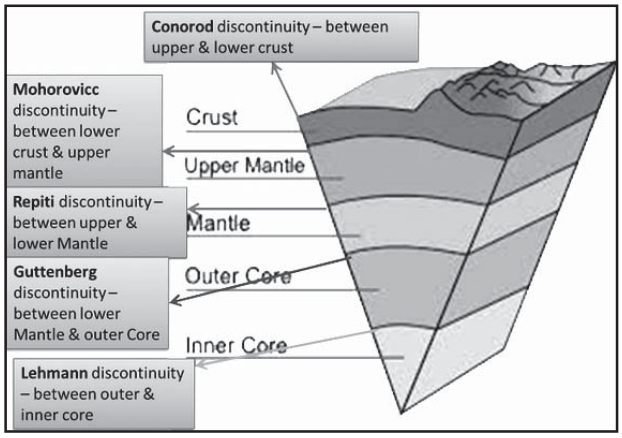
- **Surface waves:** These waves travel through the surface of the earth. Due to their amplitude, they are most destructive waves causing extensive damage on the surface of the earth.
- **Types of Surface Waves:**
  - **Love waves (L-waves)** - its fastest surface waves and move on ground side to side. It is confined to surface of the crust love wave is wounded by Seismograph.
  - **Rayleigh waves-** Rayleigh waves rolls along the ground just like a wave roll across a lake or an ocean.
- **Body waves:** These waves travel through the interiors of the earth. While travelling through interiors, their characteristics such as velocity and wavelength changes according to the density of the medium in which they are travelling. The body waves are recorded at different seismograph stations located at different places throughout the surface of earth. Body waves can be further categorized into
  - **Primary Waves:** Also known as P-waves. These are longitudinal or compressive in nature. These waves can pass through solid as well as liquid medium. The velocity of these waves increases with increasing density and rigidity of the medium. (They travel faster in solid than in liquids)
  - **Secondary waves:** Also known as S-waves. These are transverse or distortional in nature. These waves cannot pass through liquid medium. Their velocity also increases with increasing rigidity of the medium.
- **Nature of Body Waves:**
  - These waves (both P and S waves) travel faster in rigid medium.
  - Among P and S waves the velocity of P waves is more.
  - These waves while passing from one medium to another medium of different density experiences refraction (bending from original path) similar to the light waves.

20. Correct Option: (d)

Explanation:

- **Conrad discontinuity:** The Conrad discontinuity corresponds to the sub-horizontal boundary in continental crust at which the seismic wave velocity increases in a discontinuous way. This boundary is observed in various continental regions at a depth of 15 to 20 km, between **outer and inner crust** however it is not found in oceanic regions.
- **Mohorovicic discontinuity:** The Mohorovicic Discontinuity, or "Moho," is the boundary between the **crust and the mantle**.
- **Repetti discontinuity:** This discontinuity is found between upper and lower Mantle. This is marked by general decrease in velocity of seismic waves between **upper and lower mantle.**
- **Gutenberg discontinuity:** The Gutenberg discontinuity occurs within Earth's interior at a depth of about 1,800 mi (2,900 km) below the surface, generally between **mantle and core** ,where there is an abrupt change in the seismic waves (generated by earthquakes or explosions) that travel through Earth.
- **Lehmann discontinuity:** The Lehmann discontinuity is an abrupt increase of P-wave and S-wave velocities at the depth of 220±30 km, discovered by seismologist Inge Lehmann. It appears beneath continents, but not usually beneath oceans, and does

not readily appear in globally averaged studies. It is generally found between **outer and inner core.**



21. Correct Option: (d)

Explanation:

- **All the above statements are correct**

Supplementary notes:

Ansupa Lake

- The Odisha Wetland Authority has approved implementation of an integrated management plan for Chilika, country's largest brackish water lagoon, and Ansupa, State's largest freshwater lake.
- The five-year management of lakes is intended at strengthening livelihood of thousands of fishermen relying on the two water-bodies. Besides, tourism promotion and conservation of ecology will be taken up.
- **Ansupa Lake is one of the largest fresh water lake of Odisha situated in Banki, Cuttack.**
- **It was created by Mahanadi and got a shape like the hoof of a horse.**
- It spreads over a vast area of 141 hectare, and surrounded by Saranda Hills in its length.
- **The lake is surrounded with high hills. One can have a view of high hills around the lake.**

22. Correct Option: (a)

Explanation:

- **Option (a) is correct.**

Supplementary notes:

Giraffe

- The giraffe has been placed in Appendix II of CITES, which places prohibitions on uncontrolled trade in a species. The Conference of Parties (CoP) to the Convention on International Trade in Endangered Species or CITES in Geneva passed a resolution to place the giraffe in Appendix II of CITES.
- Giraffes, those tall, stately and graceful animals of Africa's savannahs, have been accorded protection from unregulated trade as the world finally woke up to their 'silent extinction'.
- The Appendix II listing was proposed by Central African Republic, Chad, Kenya, Mali, Niger and Senegal.
- "Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival,"
- Giraffes once ranged over much of the semi-arid savannah and savannah woodlands of Africa. But their numbers have plummeted dramatically — by up to 40 per cent over the last 30 years — due to threats including international trade in their parts, as well as habitat loss, civil unrest and illegal hunting.
- While giraffes fall prey to poaching for bush meat, bones, skin and tail hair, there is also a significant amount of international trade in their bone carvings and trophies.
- There is currently only one recognized species of giraffe, with nine sub-species. They have been listed as 'vulnerable' on the International Union for Conservation of Species Red List since 2016, with some sub-species classified as 'endangered" or 'critically endangered'.
- Five of the nine sub-species have only a small wild population, while four have a decreasing population trend. All are affected by trade.
- While the Appendix II listing will not stop all trade in giraffe parts, it will ensure this is not contributing to further population declines and provide global scale data that could not otherwise be obtained.

23. Correct Option: (d)

Explanation:

- **All the above statements are correct**

Supplementary notes:

KALIA scheme

- **Proposed by the Government of Odisha**, KALIA scheme brings under its

umbrella 92% of cultivators of the state and almost all needy landless cultivators, who can avail the benefits of this scheme through Direct Benefit Transfer Mode.

- Financing agriculture and insuring the cultivators is essential to eradicate poverty and to boost shared prosperity.
- Through the implementation of Krushak Assistance for Livelihood and Income Augmentation - KALIA Scheme, the State Government aims to lend farmers with an all inclusive and flexible support system, ensuring accelerated agricultural prosperity.
- At the heart of a progressive scheme like KALIA lies the motivation to empower the farmers of the state with finance options that will enable the growth and development of agriculture in Odisha.
- **Financial assistance of Rs.25,000/- per farm family over five seasons will be provided to small and marginal farmers so that farmers can purchase inputs like seeds, fertilizers, pesticides and use assistance towards labour and other investments.**
- Financial Assistance of Rs.12,500/-will be provided to each landless Agricultural Household for Agricultural allied activities like for small goat rearing unit, mini-layer unit, duckery units, fishery kits for fisherman, mushroom cultivation and bee-keeping, etc. This will particularly benefit to SC & ST population of the State.
- Vulnerable cultivators/landless agricultural laborers will get financial assistance of Rs. 10,000/- per family per year to enable them to take care of their sustenance. The vulnerable cultivator/landless Agricultural Laborers who are in old age, having disability/ disease and are vulnerable for any other reason.
- **Life insurance cover of Rs. 2.00 lakh at a very nominal premium of Rs.330/- will be provided to all savings bank account holder of age between 18-50 years**.
- Vulnerable landless laborers, cultivators, share croppers and agricultural families identified by Gram Panchayats will be provided with cop loans up to Rs 50,000 made available at 0% interest.

24. Correct Option: (a)

Explanation:

- **Option (a) is correct:** Researchers develop pesticide alternative to protect plants form viral infection. The programme first triggers plants' cells to multiply the virus, which creates viral ribonucleic acid molecules (RNAs). Using special enzyme scissors, the plants then detect these molecules and cut them — a process which produces 'small interfering RNAs' (siRNAs).

Supplementary notes:

Small interfering RNAs' (siRNAs)

- A novel approach to vaccinate plants against viruses can be used as an alternative to toxic pesticides that is harmful both to insects and the environment.
- During a virus attack, plants initiate a two-stage molecular defense programme which protects them "both at the site of the infection and throughout its structure.
- The programme first triggers plants' cells to multiply the virus, which creates viral ribonucleic acid molecules (RNAs). Using special enzyme scissors, the plants then detect these molecules and cut them — a process which produces 'small interfering RNAs' (siRNAs).
- The siRNAs spreads throughout the plant and attach them to a protein called Argonaute. The siRNAs then leads the protein to RNAs viruses to kill them.
- After six weeks, 90 per cent of the vaccinated plants did not show any signs of infection, but all the untreated plants were killed by the virus.

25. Correct Option: (d)

Explanation:

- **Option (d) is correct:** Tamil Nadu Becomes Fifth Indian State to Declare a State Butterfly, after Maharashtra (Blue Mormon), Uttarakhand (Common peacock), Karnataka (Southern birdwings) and Kerala (Malabar banded peacock) to bestow a state emblem status to one of its colorful insects.

Supplementary notes:

- Tamil Nadu Becomes Fifth Indian State to Declare a State Butterfly.
- Tamil Nadu has recently declared Tamil Yeoman (Cirrochroa thais) as its state butterfly to symbolize its rich natural and cultural heritage, in a move aimed at boosting the conservation efforts of the attractive insects.

- Locally known as Tamil Maravan meaning 'Tamilian Warrior', the canopy butterfly, belongs to the family of brush-footed butterflies or the Nymphalid.
- This is the latest addition to Tamil Nadu's existing symbols from the natural world – palmyra as the state tree, gloriosa lily as the state flower, emerald dove as the state bird, and jackfruit as the state fruit and Nilgiri tahr as the state animal.
- This butterfly species is endemic to Western Ghats.
- Once the species is declared as a state butterfly, this will help channelizing government funds towards a particular environmental cause.
- Tamil Nadu has a total of 32 species of butterflies endemic to the state.
- It has become the fifth India state after Maharashtra (Blue Mormon), Uttarakhand (Common peacock), Karnataka (Southern birdwings) and Kerala (Malabar banded peacock) to bestow a state emblem status to one of its colorful insects.
- Both southern bird wings, which is the largest butterfly species found in India, and Malabar banded peacocks are, like the Tamil Yeoman, endemic to the Western Ghats as well.

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TEST
DAY - 17

Time Allowed: 30 mins **Maximum Marks: 50**

1. Consider the following sources:

1. Magma obtained from a volcanic eruption.
2. Materials obtained from the meteors.
3. Materials collected at different depths during the "Deep Ocean Drilling Project".

Which of the above is/are not a direct source(s) of information about the interior of the Earth?

(a) 2 only
(b) 1 and 3 only
(c) 2 and 3 only
(d) 1 and 2 only

2. Consider the following statements regarding geomagnetism:

1. Geomagnetic dipole does not coincide with the Earth's axis of rotation rather it is parallel to it.
2. The Earth has more than two magnetic poles.
3. Currently, the magnetic north pole is in Siberia.
4. The north and the south poles swap places on a geological time scale.

Which of the above statements are correct?

(a) 1 and 4 only
(b) 1 and 3 only
(c) 2 and 4 only
(d) 1, 3, and 4 only

3. Consider the following statements regarding the interior of the Earth:

1. Barysphere includes both mantle and core.
2. The asthenosphere is present entirely in mantle.
3. Mohorovicic discontinuity forms the boundary between the outer core and the mantle.

Which of the above statements is/are ***incorrect***?

(a) 1 only
(b) 1 and 3 only
(c) 2 and 3 only
(d) 1, 2 and 3

4. Which of the following statements is/are correct?

1. Aluminium is the most abundant metal in the crust.
2. Oxygen is the most abundant element in the Earth.

Select the correct option using the code given below:

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

5. Which of the following statements is/are correct?

1. 'Lithification' is a process of porosity destruction.
2. Both weathering and erosion are covered under 'Denudation'.

Select the correct option using the codes given below.

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

6. Consider the following statements:

1. Nearly 90% of the crust is made up of igneous rocks.
2. Graphite is a sedimentary rock.
3. Sedimentary rocks are formed by the lithification of denuded rocks.

Which of the above statements is/are correct?

(a) 1 only

(b) 3 only

(c) 1 and 3 only

(d) 1 and 2 only

7. How is Feldspar different from Pyroxene?

1. Pyroxene has a larger share than the Feldspar in the composition of the earth's crust.
2. Pyroxene is green or black in color, while Feldspar is light cream or salmon pink.

Select the correct answer using the code given below:

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

8. Which of the following is/are correct in the context of the 'rock cycle'?

1. Metamorphic rocks through continuous denudation change into igneous rocks.
2. Sedimentary rocks upon melting in the interior changes into metamorphic rocks.
3. Igneous rocks under high pressure and heat transformed into metamorphic rocks.

Select the correct answer using the code given below:

(a) 1 only

(b) 2 and 3 only

(c) 3 only

(d) None

9. Which of the following characteristics can be associated with metamorphic rocks?

1. Recrystallization
2. Foliation
3. Abundant fossil presence
4. Banding

Select the correct answer using the code given below.

(a) 1 and 2 only

(b) 3 and 4 only

(c) 1, 2 and 4 only

(d) 1, 3 and 4 only

10. Consider the following statements about minerals.

1. There is no single element mineral found on the planet.
2. Minerals can be organic as well as inorganic.
3. They have an orderly atomic structure but lack a definite chemical composition.

Which of the above statements is/are Incorrect?

(a) 1 and 3 only

(b) 1 only

(c) 3 only

(d) 1, 2 and 3

11. Which of the following are the causes of the physical weathering?

1. Repeated wetting and drying
2. Frost action
3. Hydration
4. Biotic factors

Select the correct option using the codes given below:

(a) 1 and 4 only

(b) 2, 3 and 4 only

(c) 1, and 2 only

(d) 1, 2, 3 and 4

12. Consider the following pairs regarding the processes of erosion:

1. Corrasion: wear and tear of the transported materials
2. Attrition: mechanical grinding of the large materials
3. Corrosion: chemical reaction by water with the materials

Which of the above pairs is/are correctly matched?

(a) 1 only
(b) 2 only
(c) 1 and 2 only
(d) 3 only

13. Which of the following statements regarding cryosols is/are correct?

1. These types of soils are found in the region of the brackish water.
2. They are rich in Nitrogen and Phosphorous.

Select the correct option using the codes given below:

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

14. Which of the following soil develops because of intense leaching?

(a) Black Soil
(b) Red and Yellow Soil
(c) Laterite Soil
(d) Forest Soil

15. Consider the following features of the Red and Yellow soil found in India:

1. It develops on crystalline igneous rocks.
2. It develops a reddish color when it is in a hydrated form.
3. They are found in the Western Ghats only.

Which of the above statements is/are ***incorrect***?

(a) 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 3 only

16. Consider the following statements regarding the Alluvial soil in India:

1. Khadar is the new alluvium and is deposited by floods annually.
2. Bhangar represents a system of older alluvium, deposited near from the flood plains.
3. Both the Khadar and Bhangar soils contain calcareous concretions (Kankars).

Which of the following statements is/are correct?

(a) 1 and 2 only
(b) 1 and 3 only
(c) 3 only
(d) 1 only

17. Which of the following statement is *incorrect* regarding the soils in India?

(a) The black soils are generally clayey, deep and impermeable
(b) Red and Yellow soils are generally poor in nitrogen, phosphorous and humus
(c) The sand content in Alluvial soil decreases from the east to west.
(d) Laterite Soil are the result of intense leaching due to tropical rains.

18. Rice, Ragi, Sugarcane and Cashew nuts are cultivated mainly on which of the following soils?

(a) Laterite Soil
(b) Black Soil
(c) Red Soil
(d) Peaty Soil

19. Consider the following features:

1. These soils are found in the drier parts of Bihar, Uttar Pradesh, Haryana, Punjab, Rajasthan, etc.
2. These soils are known by different names such as reh, kallar, usara etc.
3. They have more salts, largely because of dry climate and poor drainage.

4. Seawater intrusions in the deltas promote their occurrence.

The following are the feature of which Soil?

(a) Peaty and Marshy soils

(b) Arid and Desert Soils

(c) Laterite and Lateritic soils

(d) Saline and Alkaline Soils

20. Based on the presence of acid forming radical, silicon, igneous rocks are divided into Acid Rocks and Basic Rocks. Consider the following statements regarding this:

1. Acid Rocks are characterized by high content of silica.
2. Acid rocks constitute the SiMa portion of the crust.
3. Basic rocks flows and spreads far away and gives rise to Plateaus.

Which of the following statements is/are ***incorrect***?

(a) 2 only

(b) 2 and 3 only

(c) 3 only

(d) 1 only

21. Kajin Sara Lake is located in which neighbouring country of India?

(a) Nepal

(b) Bangladesh

(c) Sri Lanka

(d) Myanmar

22. Arrange the following shrines of the Char Dham in the west to east order:

1. Gangotri
2. Yamunotri
3. Kedarnath
4. Badrinath

Select the correct answer using the code given below:

(a) 2-3-1-4

(b) 3-2-4-1

(c) 1-2-3-4

(d) 4-3-2-1

23. Match List I (States of India) with List II (Major Mountain passes) and select the correct answer using the codes given below the lists:

List-I	**List-II**
A. Sikkim	1. Lipulekh Pass
B. Himachal Pradesh	2. Nathu La Pass
C. Jammu and Kashmir	3. Shipki La
D. Uttarakhand	4. Zoji La

Codes:

	A	B	C	D
(a)	1	4	3	2
(b)	2	4	3	1
(c)	2	3	4	1
(d)	1	3	4	2

24. Consider the following statements regarding Chilika Lake:

1. It is the largest coastal lagoon in India and the second largest coastal lagoon in the world.
2. The Nalaban Island within the lagoon is classified as a Bird Sanctuary under the Wildlife Protection Act.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

25. Strait of Gibraltar connects which two water bodies?

(a) Mediterranean Sea and Black Sea

(b) Atlantic Ocean and Mediterranean Sea

(c) Black Sea and Caspian Sea

(d) North Sea and Baltic Sea

ANSWER HINTS

DAY - 17

1. Correct Option: (a)

Explanation:

Sources of information about the interior of the Earth

- There are two types of sources of information about the interior of the Earth viz. Direct and Indirect.

Direct sources

- The sources which are obtained directly from Earth's interior are called Direct sources.
- These include materials obtained from Mining or from scientific projects such as **"Deep Ocean Drilling Project" &** "Integrated Ocean Drilling Project" and the **Magma/Lava obtained from a volcanic eruption,** etc.
- The drilling projects provide better sources of information than mining because they can provide materials from the depth as far as 12 km while in mining, going beyond 3-4 km depth is not possible due to high temperature and pressure at this depth.

Indirect sources

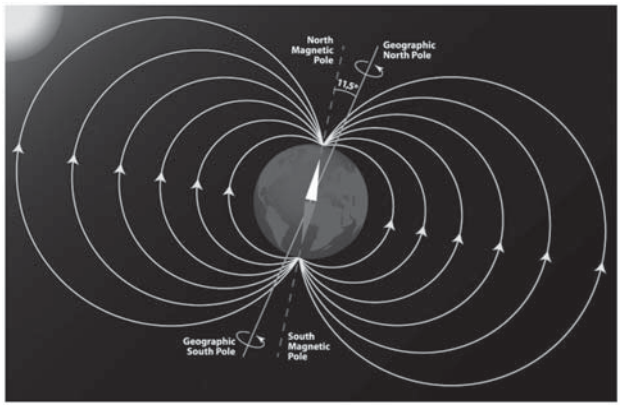
- These are the sources that are not obtained directly from the Earth's interior but help in the understanding of the same.
- These include earthquake waves; **materials obtained from meteors;** earth's gravitation, magnetic & seismic activities and the variability of temperature, pressure, and density of the Earth, etc.
- **Although the materials obtained from meteors are not from the Earth these are similar to the Earth hence, they provide valuable information.**

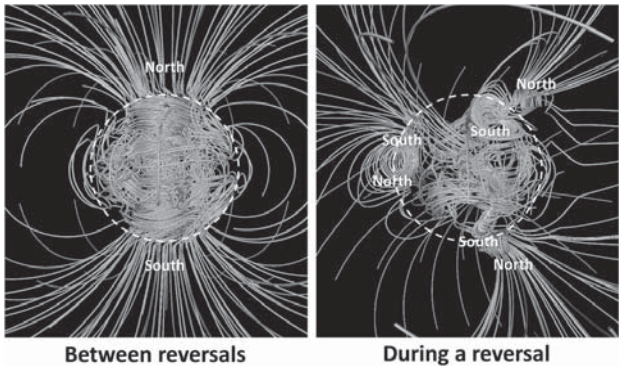
2. Correct Option: (c)

Explanation:

Geomagnetism

- Earth's magnetic field comes from this ocean of iron, which is an electrically conducting fluid in constant motion. Sitting atop the hot inner core, the liquid outer core seethes and roils like water in a pan on a hot stove. The outer core also has "hurricanes"-whirlpools powered by the Coriolis forces of Earth's rotation. These complex motions generate our planet's magnetism through a process called the dynamo effect.
- **The Earth has two dominant magnetic poles, and several very weak 'quadrupolar' poles of which there are, at least mathematically, about 8 in number.** These poles are far weaker than the dipole field and measure only weak departures of the local geographic field strength from the basic dipolar North-South field.
- **Approximately, geomagnetic dipole is currently tilted at an angle of about 11 degrees to Earth's rotational axis. At the moment it's located in northern Canada.**
- Earth's polarity is not a constant and it keeps changing. Compass needles in Africa, for instance, are drifting about 1 degree per decade. And globally the magnetic field has weakened 10% since the 19th century.
- **Sometimes the field completely flips. The north and the south poles swap places.** Such reversals, recorded in the magnetism of ancient rocks, are unpredictable. They come at irregular intervals averaging about 300,000 years.
- A new study examines the periodicity of geomagnetic field reversals on Earth back to 375 million years ago.





3. Correct Option: (b)

Explanation:

Earth's layers

- The earth is made up of several concentric layers viz. lithosphere, mesosphere, and barysphere.
- The lithosphere contains crust and upper mantle.
- The mesosphere contains lower mantle. ***In the mesosphere, the upper part of the mantle is in a molten state, called asthenosphere.***
- ***Barysphere contains both the outer and inner cores.***
- Parts of the earth's crust are immersed by oceans and seas. These form the hydrosphere.
- Extending skywards for over fifteen miles, the earth is enveloped by a mass of gases that make up the atmosphere.
- In geology, the word "discontinuity" is used for a surface at which seismic waves change velocity.
- The discontinuity in density between the upper crust and lower crust is known as Conrad discontinuity.
- The boundary between lower crust and upper mantle, where there is a sudden increase in density and velocity of seismic waves decreases is called Moho-discontinuity.
- The discontinuity in density between upper mantle and lower mantle is known as Repetti discontinuity.
- ***Gutenberg discontinuity lies between the mantle and the outer core.***

4. *Correct Option: (a)*

Explanation:

Composition of Earth's Crust

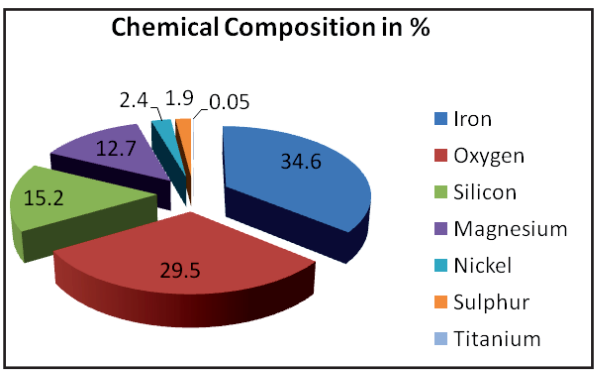
- The earth is composed of various kinds of elements. These elements are in solid form in the outer layer of the earth and in hot and molten form in the interior.
- About 98 percent of the total crust is composed of eight elements.
- Oxygen is the most abundant element and **Aluminium is the most abundant metal in the Earth's crust.**

Chemical composition of Earth's crust

S. No.	Elements	Weight(%)
1.	Oxygen	46.60
2.	Silicon	27.72
3.	Aluminium	8.13
4.	Iron	5.00
5.	Calcium	3.63
6.	Sodium	2.83
7.	Potassium	2.59
8.	Magnesium	2.09
9.	Others	1.41

Chemical composition of Earth

- Iron, oxygen, silicon and magnesium make up more than 90 percent of the Earth's mass.
- ***Iron is the most abundant element in the Earth.*** Iron makes up an estimated 35 percent of the Earth's mass.



5. Correct Option: (c)

Explanation:

Exogenetic geomorphic process

- Denudation is a broad term that includes both weathering and erosion.
- Sediments are a result of denudation as well as lithification.
- Lithification is the process that turns loose, unconsolidated sediment into solid sedimentary rock through compaction, cementation, and recrystallization.
- Essentially, lithification is a process of porosity destruction through compaction and cementation.

6. Correct Option: (c)

Explanation:

Rocks

- Rocks are an aggregate of one or more minerals held together by chemical bonds.
- Based on the mode of formation three major groups of rocks are defined: igneous, sedimentary, and metamorphic.

Igneous Rocks

- These rocks are formed by cooling, solidification and crystallization of hot and molten magma found below the earth's crust. These are also known as Parent, Primary or Basic Rocks.
- Igneous rocks are much less affected by chemical weathering but physical and mechanical weathering affects them resulting in their disintegration and decomposition.
- Nearly 90% of the crust is made up of igneous rocks.

Sedimentary rocks

- Sediments are a result of denudation (weathering and erosion) of all types of rocks.
- Sedimentary rocks are formed by the lithification of sediments.
- Hence, they are layered or stratified of varying thickness. Example: sandstone, shale etc.
- Metamorphic rocks
- All rocks whether igneous or sedimentary may become metamorphic or changed rocks under great heat and pressure.
- Their original character and appearance may be greatly altered by such forces, particularly during intense earth movements.
- In this manner, clay may be metamorphosed into slate, limestone into marble, sandstone into quartzite granite into gneiss, shale into schist and coal into graphite.

7. Correct Option: (b)

Explanation:

Feldspar

- Silicon and oxygen are common elements in all types of feldspar and sodium, potassium, calcium, aluminum, etc. are found in specific feldspar variety.
- Half of the earth's crust is composed of feldspar.
- It has a light cream to salmon pink color.
- Feldspar is used in ceramics and glassmaking.

Pyroxene

- It consists of calcium, aluminum, magnesium, iron, and silica.
- Pyroxene forms 10 percent of the earth's crust. It is commonly found in meteorites.
- It is green or black in color.

8. Correct Option: (c)

Explanation:

Rock Cycle

- Rocks do not remain in their original form for long but may undergo a transformation. The rock cycle is a continuous process through which old rocks are transformed into new ones.
- Igneous rocks are primary rocks and other rocks (sedimentary and metamorphic) form from these primary rocks. Igneous rocks can be changed into metamorphic rocks.
- The fragments derived out of igneous and metamorphic rocks form into sedimentary rocks.
- Sedimentary rocks themselves can turn into fragments and the fragments can be a source for the formation of sedimentary rocks.
- The crustal rocks (igneous, metamorphic and sedimentary) once formed may be carried down into the mantle (interior of the earth) through subduction process (parts or whole of crustal plates going down under another plate in zones of plate convergence) and the same meltdown due

to increase in temperature in the interior and turn into molten magma, the original source for igneous rocks.

9. Correct Option: (c)

Explanation

Metamorphic rocks

- Metamorphic rocks form under the action of pressure, volume and temperature (PVT) change.
- Metamorphism occurs when rocks are forced down to lower levels by tectonic processes or when molten magma rising through the crust comes in contact with the crustal rocks or the underlying rocks are subjected to great amounts of pressure by overlying rocks. In Metamorphism consolidated rocks undergo recrystallization and reorganization of materials within original rocks.
- In the process of metamorphism in some rocks grains or minerals get arranged in layers or lines. Such an arrangement of minerals or grains in metamorphic rocks is called foliation or lineation.
- Sometimes minerals or materials of different groups are arranged into alternating thin to thick layers appearing in light and dark shades. Such a structure in metamorphic rocks is called banding and rocks displaying banding are called banded rocks.
- Metamorphic rocks have been put under great pressure, heated, squashed or stretched. So fossils do not usually survive these extreme conditions. Generally, it is only sedimentary rocks that contain fossils.

10. Correct Option: (a)

Explanation

Minerals:

- A mineral is composed of two or more elements. But, sometimes, single element minerals like Sulphur, Gold, Copper, Silver, Graphite, etc are found.
- A mineral is a naturally occurring organic and inorganic substance, having an orderly atomic structure and definite chemical composition and physical properties.
- The elements in the earth's crust are rarely found exclusively but are usually combined with other elements to make various substances. These substances are recognized as minerals.

11. Correct Option: (c)

Explanation:

Physical weathering

- Physical weathering involves mechanical disintegration of rocks due to temperature changes, freeze-thaw cycles, wet-dry cycles, crystallization of salts, animal and plant activity, etc.
- It involves mechanical disintegration of rocks due to:
  - ➤ Repeated temperature changes,
  - ➤ Freeze-thaw cycles,
  - ➤ Repeating wet-dry cycles,
  - ➤ Crystallization of salts,
  - ➤ Animal and plant activity, etc.

12. Correct Option: (d)

Explanation:

Process of Erosion

- Large scale transportation of the weathered materials is termed erosion. It can be done through Corrasion, Attrition, Corrosion, Hydraulic Action, Plucking, etc.
- Corrasion or abrasion. This is the mechanical grinding of the river's traction load against the banks and bed of the river'. The rock fragments are hurled against the sides of the river and also roll along the bottom of the river.
- Attrition. This is the wear and tear of the transported materials themselves when they roll and collide into one another.
- Corrosion or solution. This is the chemical or solvent action of water on soluble or partly-soluble rocks with which the river comes into contact. For example, calcium carbonate in limestones is easily dissolved and removed in solution.

13. Correct Option: (d)

Explanation:

Cryosols

- These are the frost-affected soils of a wide variety of unconsolidated materials, including glacial till and aeolian, alluvial, colluvial and residual materials.
- Almost all Cryosols contain accumulations of ice such as ice crystals, ice lenses, ice layers (vein ice), ice wedges or massive ground ice, often to a thickness of several meters.

- Cryosols contain much organic carbon and act as carbon sinks under the present climate.
- The nitrogen, potassium and phosphorus contents of Cryosols are generally low. Most plant nutrients are locked into the surface organic matter
- Geographically, Cryosols are circumpolar in both the northern and southern hemispheres. They cover about 13% of the global surface area. Cryosols occur in the permafrost regions of the Arctic and are also widespread in the sub-arctic zone, discontinuous in the boreal zone and sporadic in more temperate mountainous regions.
- Major areas with Cryosols are found in Russia, Canada, China and Alaska and parts of Mongolia. Smaller occurrences have been reported from permafrost regions in northern Europe, Greenland and the ice-free areas of Antarctica.

14. Correct Option: (c)

Explanation:

Laterite Soil

- Laterite has been derived from the Latin word 'Later' which means brick. The laterite soils develop in areas with high temperatures and high rainfall. These are the result of intense leaching due to tropical rain.
- With rain, lime and silica are leached away, and soils rich in iron oxide and aluminum compounds are left behind. The humus content of the soil is removed fast by bacteria that thrive well in high temperatures. These soils are poor in organic matter, nitrogen, phosphate, and calcium, while iron oxide and potash are in excess.
- Hence, laterites are not suitable for cultivation; however, the application of manures and fertilizers are required for making the soil fertile for cultivation.
- Red laterite soils in Tamil Nadu, Andhra Pradesh, and Kerala are more suitable for tree crops like cashew nuts.
- Laterite soils are widely cut as bricks for use in house construction. These soils have mainly developed in the higher areas of the peninsular plateau. The laterite soils are commonly found in Karnataka, Kerala, Tamil Nadu, Madhya Pradesh and the hilly areas of Odisha and Assam.

15. Correct Option: (b)

Explanation:

Red and Yellow soil

- Red soil develops on crystalline igneous rocks in areas of low rainfall in the eastern and southern part of the Deccan Plateau.
- Along the piedmont zone of the Western Ghat, the long stretch of area is occupied by red loamy soil.
- Yellow and red soils are also found in parts of Odisha and Chhattisgarh and in the southern parts of the middle Ganga plain.
- The soil develops a reddish color due to a wide diffusion of iron in crystalline and metamorphic rocks.
- It looks yellow when it occurs in a hydrated form. The fine-grained red and yellow soils are normally fertile, whereas coarse-grained soils found in dry upland areas are poor infertility. They are generally poor in nitrogen, phosphorous and humus.

16. Correct Option: (b)

Explanation:

Alluvial Soils

- Alluvial soils are widespread in the northern plains and the river valleys.
- These soils cover about 40 per cent of the total area of the country.
- They are depositional soils, transported and deposited by rivers and streams.
- Through a narrow corridor in Rajasthan, they extend into the plains of Gujarat.
- In the Peninsular region, they are found in deltas of the east coast and in the river valleys. The alluvial soils vary in nature from sandy loam to clay.
- They are generally rich in potash but poor in phosphorous.
- In the Upper and Middle Ganga plain, two different types of alluvial soils have developed, viz. Khadar and Bhangar.
- Khadar is the new alluvium and is deposited by floods annually, which enriches the soil by depositing tine silts.
- Bhangar represents a system of older alluvium, deposited away from the flood plains.
- Both the Khadar and Bhangar soils contain calcareous concretions (Kankars).

- These soils are more loamy and clayey in the lower and middle Ganga plain and the Brahamaputra valley.
- The sand content decreases from the west to east.
- The colour of the alluvial soils varies from the light grey to ash grey.
- Its shades depend on the depth of the deposition, the texture of the materials, and the time taken for attaining maturity. Alluvial soils arc intensively cultivated.

17. Correct Option: (c)

Explanation:

Soils in India

- Black soil covers most of the Deccan Plateau which includes parts of Maharashtra, Madhya Pradesh, Gujarat, Andhra Pradesh and some parts of Tamil Nadu.
- The black soils are generally clayey, deep and impermeable. They swell and become sticky when wet and shrink when dried. So, during the dry season, these soil develop wide cracks. Thus, there occurs a kind of 'self ploughing'.
- The sand content in Alluvial soil decreases from the west to east.
- Red soil develops on crystalline igneous rocks in areas of low rainfall in the eastern and southern part of the Deccan Plateau.
- They are generally poor in nitrogen, phosphorous and humus.
- Laterite has been derived from the Latin word 'Later' which means brick.
- These are the result of intense leaching due to tropical rains.
- With rain, lime and silica arc leached away, and soils rich in iron oxide and aluminium compound are left behind.

18. Correct Option: (a)

Explanation:

Laterite Soil

- Laterite has been derived from the Latin word 'Later' which means brick.
- The laterite soils develop in areas with high temperature and high rainfall:-
- These are the result of intense leaching due to tropical rains.
- With rain, lime and silica arc leached away, and soils rich in iron oxide and aluminium compound are left behind.
- Humus content of the soil is removed fast by bacteria that thrive well in high temperature.
- These soils are poor in organic matter, nitrogen, phosphate and calcium, while iron oxide and potash are in excess.
- Hence, laterites are not suitable for cultivation; however, application of manures and fertilisers are required for making the soils fertile for cultivation.
- Red laterite soils in Tamil Nadu, Andhra Pradesh and Kerala are more suitable for tree crops like cashewnut, Sugarcane, ragi, etc.
- Laterite soils are widely cut as bricks for use in house construction.
- These soils have mainly developed in the higher areas of the Peninsular plateau.
- The laterite soils are commonly found in Karnataka, Kerala, Tamil Nadu, Madhya Pradesh and the hilly areas of Odisha and Assam.

19. Correct Option: (d)

Explanation:

Saline and Alkaline Soils

- These soils are found in the drier parts of Bihar, Uttar Pradesh, Haryana, Punjab, Rajasthan, etc. These soils are liable to saline and alkaline efflorescence's and are known by different names such as reh, kallar, usara etc.
- Some of the salts are brought by the river, which percolates in the sub-soils of the plains. In canal irrigated areas and in areas of high sub soil water table, the injurious salts are transferred from below to the top soil by capillary action. The accumulation of these salts makes the soil infertile and renders it unfit for agriculture.
- The Canal irrigated areas are most affected because of this.

20. Correct Option: (a)

Explanation:

- **Acid Rocks:**
  - ➤ These are characterized by high content of silica—up to 80 per cent, while the rest is divided among aluminum, alkalis, magnesium, iron oxide, lime etc.
  - ➤ These rocks constitute the Sial portion of the crust.

- Due to the excess of silicon, acidic magma cools fast and it does not flow and spread far away.
- High mountains are formed of this type of rock.
- These rocks have a lesser content of heavier minerals like iron and magnesium and normally contain quartz and feldspar.
- Add rocks are hard, compact, massive and resistant to weathering.

- **Basic Rocks:**
  - These rocks are poor in silica (about 40 per cent); magnesia content is up to 40 per cent and the remaining 40 per cent is spread over iron oxide, lime, aluminum, alkalis, potassium etc.
  - Due to low silica content, the parent material of such rocks cools slowly and thus, flows and spreads far away.
  - This flow and cooling gives rise to plateaus. Presence of heavy elements imparts to these rocks a dark color.
  - Basalt is a typical example, others being gabbro and dolerite. Not being very hard, these rocks are weathered relatively easily.

21. Correct Option: (a)

Explanation:

- **Option (a) is correct:** It is a recently discovered lake in Manang district of Nepal

Supplementary notes:

Kajin Sara Lake

- It is a recently discovered lake in Manang district of Nepal
- It is likely to earn the distinction of the world's highest lake, which is currently held by Tilicho lake (also in Manang)
- It is located at an altitude of 5,200 metres (yet to be confirmed)
- The lake, called Singar locally, have formed out of the water melted from the Himalayas.

22. Correct Option: (a)

Explanation:

- **Option (a) is correct:** Correct order is Yamunotri, Kedarnath, Gangotri and Badrinath.

23. Correct Option: (c)

Explanation:

Option (c) is correct.

- Lipu Lekh - Trijunction of Uttarakhand (India), Tibet (China) and Nepal borders.
- Shipki La - Himachal Pradesh and Tibet.
- Zoji La - Important road link between Srinagar on one side and Kargil and Leh on the other side. (Jammu and Kashmir)
- Nathu La - Sikkim with Tibet.
- Kailash Mansarovar Yatra is organized by Ministry of External Affairs through two different routes - Lipulekh Pass (Uttarakhand), and Nathu La Pass (Sikkim).

24. Correct Option: (c)

Explanation:

- Both the statements are correct

Supplementary notes:

Chilika Lake

- Chilika Lake is a brackish water lagoon, spread over the Puri, Khurda and Ganjam districts of Odisha state on the east coast of India, at the mouth of the Daya River, flowing into the Bay of Bengal.
- It is the largest coastal lagoon in India and the second largest coastal lagoon in the world.
- It is the largest wintering ground for migratory birds on the Indian sub-continent. The lake is home to a number of threatened species of plants and animals. Chilika Lake is an important habitat and breeding ground for both resident and migratory and aquatic birds, most notably flamingos.
- The Nalaban Island within the lagoon is classified as a Bird Sanctuary under the Wildlife Protection Act.
- In 1981, Chilika Lake was designated the first Indian wetland of international importance under the Ramsar Convention.
- The lagoon is also home to 14 types of raptors. Around 152 rare and endangered Irrawaddy dolphins have also been reported. It supports about 37 species of reptiles and amphibians.
- Microalgae, marine seaweeds, sea grasses, fish and crab also flourish in the brackish water of the Chilika Lagoon.

25. Correct option: (b)

Explanation:

- **Option (b) is correct:** Strait of Gibraltar connects Atlantic Ocean and Mediterranean Sea.

Supplementary notes:

- Gibraltar is a British Overseas Territory located at the bottom of Spain on the narrow gap between Europe and Africa.
- Known as the Gib or the Rock, it is a small 2.5-mile-squared area with a population of just 30,000 - but it has huge strategic importance.
- This is because from this spot a navy can potentially control shipping in and out of the Mediterranean - much of it coming from Asia having travelled through the Suez Canal.
- The UK, a key member of NATO, has a naval and military base there for this reason.

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TEST
DAY - 18

Time Allowed: 30 mins **Maximum Marks: 50**

1. Which of the following statements regarding diastrophism is/are correct?

1. Diastrophism refers to the deformation of the Earth's crust due to diastrophic movements.
2. Diastrophic movements are sudden movements.

Select the correct option using the codes given below:

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

2. Consider the following statements regarding the geomorphic process:

1. Both endogenic and exogenic forces are required to shape the landform on the Earth's surface.
2. Exogenic forces cause aggradation whereas, the endogenic forces, degradation.
3. The source of energy for the exogenic process is atmosphere whereas, that for the endogenic process is the Earth herself.

Which of the above statements is/are ***incorrect***?

(a) 2 only
(b) 1 and 2 only
(c) 3 only
(d) 2 and 3 only

3. Consider the following pairs regarding intrusive landforms:

1. Lacoliths: dome-shaped intrusive landforms
2. Sills: vertical intrusive landforms
3. Lapoliths: saucer-shaped landforms

Which of the above pairs is correctly matched?

(a) 1 only
(b) 1 and 3 only
(c) 2 only
(d) 1, 2 and 3

4. Consider the following statements regarding Earthquake Waves:

1. All the natural earthquakes take place in the asthenosphere.
2. Like light waves, they too reflect and refract.
3. The point where these waves originate is called the epicenter of the earthquake.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) 1 and 2 only
(d) 1, 2 and 3

5. Consider the following statements regarding types of earthquake waves:

1. Body waves are faster and more damaging than the surface waves.
2. P-waves propagation reveals that the outer core of the Earth is in liquid form.
3. P- waves propagate longitudinally while S-waves transversally.
4. Rayleigh waves are the slowest of all the seismic wave type.

Which of the following statements are ***incorrect***?

(a) 1 and 2 only

(b) 1 and 3 only

(c) 2 and 4 only

(d) 3 and 4 only

6. Consider the following statements regarding measurement of Earthquakes:

1. Richter scale unlike the Mercalli scale is open-ended.
2. While the Mercalli scale measures the intensity of an earthquake based on its actual impacts, the Richter scale measures the earthquake's magnitude by measuring the energy released during the earthquake.
3. The Mercalli scale is linear and the Richter scale is logarithmic based on 10.

Which of the above statements is/are correct?

(a) 3 only

(b) 1 and 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

7. Which of the following is *not* an extrusive volcanic landform?

(a) Caldera

(b) Crater

(c) Mid-Ocean Ridges

(d) None of the above

8. Match the following pairs regarding distribution of volcanoes:

List-I	**List-II**
A. Ring of fire	1. Caribbean Islands
B. No volcanoes	2. Pacific Ocean rim
C. Mauna Loa	3. Intra-plate volcanoes
D. Island arc	4. Himalayas

Select the correct match using the codes given below:

	A	B	C	D
(a)	2	4	3	1
(b)	1	2	4	4
(c)	2	4	1	2
(d)	4	1	2	3

9. Consider the following list:

1. Jig-Saw-Fit
2. Placer Deposits
3. Convectional Current Theory

Which of the above list supports the continental drift theory?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 only

(d) 1, 2 and 3 only

10. Alfred Wegner's continental drift theory was rejected. Which of the following reasons were the cause of its rejection?

1. Coastlines are a temporary feature and are liable to change.
2. Forces such as tidal and pole fleeing are too weak to be able to move continents.
3. The theory of sea-floor spreading started a revolution in the Earth Sciences.
4. Plate tectonics explains that the position of the poles constantly drifted.

Select the correct option using the codes given below:

(a) 2 and 4 only

(b) 3 and 4 only

(c) 1, 2 and 3 only

(d) 1, 2, 3 and 4

11. With reference to seafloor spreading, consider the following statements:

1. The age of the rocks increases as one moves away from the crest due to continuous volcanic eruptions.
2. The deep trenches have deep-seated earthquakes while in the mid-oceanic ridge areas, the quake foci have shallow depths.

Which of the above list is/are the correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

12. The caroline plate is located between__

(a) Central America and Pacific plate

(b) Philippine and Indian plates

(c) Between the Eurasian and Pacific plates

(d) Between South America and Pacific plates

13. Which of the following statements regarding plate tectonics is correct?

1. It's not continent rather the continental plates move over the ocean.
2. Both continental and oceanic plates are formed as well as consumed over a period.

Select the correct option using the codes given below

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

14. With reference to the plate movement, consider the following statements:

1. Different plates move with different rates.
2. Indian Plate moves northwards at 1.2 cm/yr.

Which of the following statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

15. Consider the following pairs:

1. Ural: young fold mountains
2. Rockies: old fold mountains
3. The Himalayas: Alpine mountains

Which of the following pairs is/are correctly matched?

(a) 1 only

(b) 3 only

(c) 1 and 3 only

(d) 2 only

16. Consider the following regions:

1. Baikal Rift Zone
2. Aden Ridge
3. Juan de Fuca Ridge
4. East Pacific Rise

Which of the following are the regions of Divergent Plate Boundaries?

(a) 1 and 4 only

(b) 2, 3 and 4 only

(c) 1, 2, 3 and 4 only

(d) 2 and 3 only

17. Consider the following pairs:

1. Monoclinal Fold: one limb makes a right angle with the surface but the other limb is ordinarily inclined.
2. Recumbent Fold: In this fold the two limbs are so much inclined that they become horizontal.
3. Isoclinal Fold: the axis of the fold is not parallel to the horizontal but makes an angle with it.

Which of the following pairs is/are incorrectly matched?

(a) 1 only

(b) 1 and 2 only

(c) 2 and 3 only

(d) 3 only

18. Which of the following statements is correct regarding the Types of Lava?

(a) Basic lavas are are highly fluid.

(b) Basic lavas are light-coloured, of low density, and have a high percentage of silica

(c) Acidic lavas rich in iron and magnesium but poor in silica.

(d) Acidic lavas form a flattened shield or dome.

19. Which of the following regions does not fall under the Circum Pacific Belt?

1. Kamchatka
2. Alpine Mountain Chain
3. St. Helens
4. Solomon Islands

Select the correct option from the codes given below:

(a) 1 and 2 only
(b) 2 and 4 only
(c) 3 and 4 only
(d) 2 and 3 only

20. Consider the following statements regarding Earthquake:

1. The point where the energy is released is called the focus or hypocentre of an earthquake.
2. Body waves are generated at the focus and move in all the directions through the body of the Earth.
3. The propagation and vibration of the P-waves are in a same direction similar to the light waves.

Which of the above statements is/are ***incorrect***?

(a) 1 and 3 only
(b) 1 and 2 only
(c) 3 only
(d) 2 only

21. Consider the following Statements regarding International Fund for Animal Welfare (IFAW)

1. The International Fund for Animal Welfare is a global non-profit helping animals and people thrive together.
2. Work is to Rescue, rehabilitate and release animals, and to restore and protect their natural habitats.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both of them
(d) None of the above

22. Consider the following Statements regarding recently released RBI's annual report

1. The report, is released every 2 years
2. The central bank has forecast India's GDP to grow at 6.9% for FY20

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both of them
(d) None of the above

23. Consider the following Statements regarding CAMPA

1. State Governments will utilize this fund for the enhancement of forestry activities to achieve the objectives of the Nationally-Determined Contributions (NDCs).
2. The objective of the NDCs is to increase its forest and tree cover.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both of them
(d) None of the above

24. 90:90:90 targets are related to which of the following diseases?

(a) AIDS
(b) H1N1
(c) Tuberculosis
(d) Diabetes

25. Consider the following statements about desertification in India

1. Almost a quarter of country's total area is undergoing land degradation.
2. The biggest reason for desertification in India is wind erosion.

Which of the statements given above is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

ANSWER HINTS

DAY - 18

1. Correct Option: (a)

Explanation:

Diastrophism

- Endogenic movements are divided into diastrophic movements and sudden movements.
- **Diastrophism refers to the deformation of the Earth's crust.**
- All processes that move, elevate or build up portions of the earth's crust come under diastrophism.
- **Diastrophic movements are gradual and might stretch for thousands of years**.
- On the other hand, sudden movements like earthquakes and volcanic eruptions occur in a very short period.
- Diastrophic movements are further classified into epeirogenic movements and orogenic movements.

2. Correct Option: (a)

Explanation:

Geomorphic process

- Geomorphic processes are the physical and chemical processes that take place on the earth's surface (folding, faulting, weathering, erosion, etc.) due to endogenic and exogenic forces.
- Earth's crust and its surface are constantly evolving (changing) due to various forces emanating from below (endogenic forces) as well as above the surface of the earth (exogenic forces).
- Endogenic processes include folding, faulting, warping, volcanism thus, they cause upliftment. Exogenic processes include weathering and erosion hence, degradation. **But, both of them are needed to shape the landforms on the Earth.**
- **The ultimate source of energy behind forces that drive endogenic movements is the Earth's internal heat** due to radioactive decay and the gravitation.
- **The exogenic processes derive their energy from the atmosphere and ultimately from the Sun.**

3. Correct Option: (a)

Explanation:

Volcano

- A volcano is a place where gases, ashes and/or molten rock material – lava – escape to the ground through fissures and faults, etc.
- It is from the asthenosphere that the molten rock materials find their way to the surface.
- If the materials remain below the surface, it is called magma.
- If the materials find a way to come out on the surface, it is called lava.
- These magma and lava forms different types of structure, called Volcanic Landforms. These landforms can be extrusive, or intrusive.

Intrusive landforms

- When the magma remains within the lithosphere, cools over there and forms different types of structure, are called **intrusive landforms**. These include **Lacoliths, Phacoliths, Lapoliths, Sills, Dykes and Batholiths,** etc.
- Large bodies of magmatic material that cools in the deeper depth of the crust and develop in the form of large domes are Batholiths. These are the cooled portion of magma chambers.

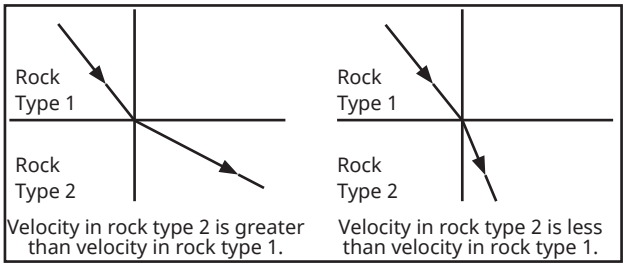
- **Lacoliths** are large dome-shaped intrusive bodies with a level base and connected by a pipe-like conduit from below.
- When the lava makes its way through cracks and the fissures developed in the land, it solidifies almost perpendicular to the ground. **It gets cooled in the same position to develop a wall-like structure. Such structures are called dykes**. These are the most commonly found intrusive forms in the western Maharashtra area.
- Sills unlike dykes are thin horizontal intrusive igneous landform.
- **Lapoliths are intrusive volcanic landforms having saucer shape and concave to the sky.**

4. Correct Option: (b)

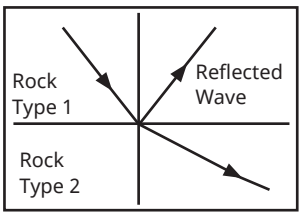
Explanation:

Earthquake

- An earthquake in simple words is shaking of the Earth.
- It is a natural event, caused due to release of energy, which generates waves that travel in all directions.
- **All the natural earthquakes are originated in the lithosphere.**
- The release of energy occurs along a fault, a sharp break in the crustal rocks.
- The point where the energy is released is called the **focus or hypocentre** of an earthquake. The energy waves traveling in different directions reach the surface. The point on the surface, nearest to the focus, is called **epicenter**. It is the first one to experience the waves.
- This release of energy is propagated as waves or simply saying Earthquake Waves.
- Several types of interaction between waves and the subsurface geology (i.e. the rocks) are commonly observable on seismograms such as:
  - **Refraction**
  - **Reflection**
  - Dispersion
  - Diffraction
  - Attenuation
- **Refraction**
  - The change in direction depends on the ratio of the wave velocities of the two different rocks.



- **Reflection**
  - A seismic reflection occurs when a wave impinges on a change in rock type. Part of the energy carried by the incident wave is transmitted through the material (that's the refracted wave described above) and part is reflected back into the medium that contained the incident wave.



5. Correct Option: ()

Earthquake Waves

- The Earthquakes Waves are recorded on the seismograph.
- There are basically two types of Earthquake Waves – **body waves and surface waves.**

Body Waves

- Body waves are generated at the focus and move in all the directions through the body of the Earth (3-dimensional). They are the **fastest in reaching to the surface.**
- They are of two types viz. **Primary waves/ P-waves and Secondary waves/S-waves.**

Primary waves/P-waves

- **P-waves move longitudinally** i.e. the propagation and vibration are in the same direction similar to the sound waves. They are the fastest of all the earthquake waves. They travel through gaseous, liquid and solid materials.

Secondary waves/S-waves

- S-waves are second to reach the surface after P-waves. **As they can travel only through solid materials of the Earth, they cannot pass through Earth's outer core, therefore their shadow zone is broader than that of P-waves.**

This reveals that the outer core of the Earth is not in solid form.

- **S-waves propagate transversally** i.e. the direction of propagation and the direction of vibration is perpendicular to each other.

Surface waves

- Surface waves are generated when the body waves interact with the surface rocks. As they move along the surface and the direction of the vibration is perpendicular to the propagation, **these waves are considered as the most damaging one.**
- **There are two types of Surface waves viz. Love Waves and Rayleigh Waves.**
- Love waves are transverse waves that vibrate the ground in the horizontal direction perpendicular to the direction that the waves are traveling. They are formed by the interaction of S waves with Earth's surface and shallow structure and are dispersive waves.
- Rayleigh waves are similar to water waves in the ocean. **They are the slowest of all the seismic wave types.** As a Rayleigh wave passes, a particle moves in an elliptical trajectory that is counterclockwise.

6. Correct Option: (d)

Explanation:

Measurement of Earthquakes

- Although the curve of Earthquake Waves is recorded at Seismograph, the intensity and magnitude of the Earthquakes are measured by two different scales namely Richter Scale and Mercalli Scale.

Richter Scale

- This scale, developed by Charles Richter, **measures the magnitude as related to the energy released during the Earthquake.**
- **This scale is open-ended i.e. there is not any end of the scale but, it has never measured any Earthquake of magnitude greater than 8.9.**
- **The Richter-scale, in nature, is logarithmic based on 10.** That is, the Earthquake at magnitude 5 is **10 times** more powerful than the Earthquake at magnitude 4 and **100** times more than the earthquake at magnitude 3.

Mercalli Scale

- The Mercalli Intensity Scale, developed by Giuseppe Mercalli, and expanded to include 12 degrees of intensity Adolfo Cancani. It was further modified again by Harry O. Wood and Frank Neumann and today known as Modified Mercalli Intensity Scale.
- **It measures the intensity of an earthquake based on its actual impacts on people, the environment and the Earth's surface.**
- **It is a linear close-ended linear Scale, scaled from 1-12 or I-XII with zero effect in Intensity 1 Earthquake and total destruction in Intensity 12 Earthquake.**

7. Correct Option: (d)

Explanation:

Extrusive Landforms

- Extrusive landforms are formed from material thrown out to the surface during volcanic activity.
- The materials thrown out include lava flows, pyroclastic debris, volcanic bombs, ash, dust, and gases such as nitrogen compounds, sulfur compounds and minor amounts of chlorine, hydrogen and argon.
- Some of the extrusive landforms are as follows:
- Fissure vent: A narrow, linear volcanic vent through which lava erupts, usually without any explosive activity.
- Conical vent: A narrow cylindrical vent through which magma flows out violently.
- **Mid-Ocean Ridges:** The system of mid-ocean ridges stretches across all the ocean basins. Here, the lava is basaltic and causes the spreading of the seafloor. The central portion of the mid-ocean ridges experiences frequent eruptions.
- The Shield Volcanoes: They are formed if the lava has low viscosity. Hence, they are not steep. After the Basalt province, the shield volcanoes are the largest of all the volcanoes. Examples are Mauna Loa, Hawaiian Islands, USA and Galapagos Islands.
- Composite Volcanoes: They are formed in many years after multiple eruptions. These volcanoes contain pyroclastic materials and ashes other than the thick and highly viscous magmatic lava. Examples are Mount Kilimanjaro and Mount St. Helens.
- **Caldera**: When a large amount of magma erupts in a short time the rock underlying the magma collapses. This result in depressions, called Caldera. These are the most explosive in nature.

- Flood basaltic province: A Highly fluid lava, made of basalt when erupt on the surface, it forms a flood basaltic province. The Deccan Trap is one such example.
- **Crater**: A crater is an inverted cone-shaped vent through which the magma flows out. When the volcano is not active the crater appears as a bowl-shaped depression. When water from rain or melted snow gets accumulated in the crater, it becomes a crater lake. Lake Toba (Indonesia) is the largest crater lake in the world.
- Cinder cone: A cinder cone is a steep circular or oval-shaped hill of loose pyroclastic fragments that have been built around a volcanic vent.

8. Correct Option: (a)

Explanation:

Distribution of volcanoes

Continent-Continent convergent boundaries: Where two plates containing continental crust at their margins collide, there is **little or no volcanism (such as at the Himalaya).**

Ocean-ocean or ocean-continent convergent boundaries:

- These plate margins are the sites of most violent and active volcanoes.
- Example- **Ring of Fire which is at the rim of Pacific ocean as under a number of plates such as North American plate, Eurasian plate, South American plate, etc.**

Transform boundaries:

- Occasionally, plate boundaries where plates are mostly sliding by each other can experience small amounts of volcanism as well if there is a component of extension across this boundary.

Intra-plate volcanoes:

- Intra-plate volcanoes are thought to be associated with **hot spots** in the mantle, which remain stationary as plates move over them.
- Example- **Mauna Loa and Kilauea in Hawaii.**

Oceanic/oceanic: the Caribbean islands

- The South American Plate is moving westwards due to seafloor spreading at the Mid Atlantic Ridge.
- When it meets the Caribbean Plate, it descends (subducts) beneath it.
- The subduction causes low-density ocean floor sediment to be scraped off the surface of the South American Plate and thrust onto the Caribbean Islands as accretionary wedges, in a process called obduction.
- The line of subduction is marked by the deep sea Puerto Rico Trench.
- **The Caribbean volcanic islands form a curved linear chain or 'volcanic island arc' parallel and to the west of the Puerto Rico Trench.**

9. Correct Option: (a)

Explanation:

Continental Drift Theory

- Close examination of a globe often results in the observation that most of the continents seem to fit together like a puzzle i.e. the West African coastline seems to snuggle nicely into the east coast of South America and the Caribbean Sea, and a similar fit appears across the Pacific. The fit is even more striking when the submerged continental shelves are compared rather than the coastlines.
- In 1912 Alfred Wegener (1880-1930) noticed the same thing and proposed that the continents were once compressed into a single proto continent which he called Pangaea surrounded by a single mega ocean Panthalassa and over time they have drifted apart into their current distribution.
- He argued that, around 200 million years ago, Pangaea began to split. Pangaea first broke into two large continental masses as Laurasia and Gondwanaland forming the northern and southern components respectively. Subsequently, Laurasia and Gondwanaland continued to break into various smaller continents that exist today.
- A variety of evidence was offered in support of the continental drift. These were The Matching of Continents (Jig-Saw-Fit); Rocks of Same Age Across the Oceans; Tillite glacial rocks; Placer Deposits and Distribution of Fossils etc.

The Matching of Continents (Jig-Saw-Fit)

- The shorelines of Africa and South America facing each other have a remarkable and unmistakable match even by using a computer program.

Rocks of Same Age across the Oceans

- The radiometric dating facilitated correlating the rock formation from different continents across the vast ocean. The belt of ancient rocks of 2,000 million years from Brazil coast matches with those from western Africa. The earliest marine deposits along the coastline of South America and Africa are of the Jurassic age.

Tillite glacial rocks

- It is the sedimentary rock formed out of deposits of glaciers in the form of consolidated masses of unweathered blocks.
- The Gondwana system of sediments from India is known to have its counterparts in landmasses of the Southern Hemisphere viz. Africa, Falkland Island, Madagascar, Antarctica, and Australia.

Placer Deposits

- The occurrence of rich placer deposits of gold in the Ghana coast with the absence of source rock in the region.
- The gold-bearing veins are in Brazil and it is obvious that the gold deposits of Ghana are derived from the Brazil plateau.

Distribution of Fossils

- Fossils of some exotic animals such as Lemurs, Mesosaurus, etc must have been at the contiguous lands. Etc.

10. Correct Option: (d)

Explanation:

Reasons for rejection

- The pieces of evidence he presented were all observational, which supported his hypothesis but didn't prove it to certainty.
- **Coastlines are a temporary feature and are liable to change.** Several other combinations of fitting in of unrelated landforms could be attempted.
- **Both the tidal and pole fleeing forces he suggested are believed to be inadequate.**
- **Plate Tectonics and seafloor spread theory revealed later that crusts are formed and consumed regularly** while as per Drift theory, continents and ocean must non-consumable.
- As per Drift Theory, Ocean and Continents must be of the same age but later it was found out that Oceans are much younger than the Continents. Etc.

11. Correct Option: (c)

Explanation:

Seafloor spreading

- Post Continental drift theory many studies were done which revealed the following facts.
  - ➤ It was realized that all along the mid-oceanic ridges, volcanic eruptions are common and they bring huge amounts of lava to the surface in this area
  - ➤ The rocks equidistant on either side of the crest of mid-oceanic ridges show remarkable similarities in terms of the period of formation, chemical compositions, and magnetic properties.
  - ➤ **The age of the rocks increases as one moves away from the crest of the Ridges.**
  - ➤ The ocean crust rocks are much younger than the continental rocks. The age of rocks in the oceanic crust is nowhere more than 200 million years old while some of the continental rock formations are as old as 3,200 million years.
  - ➤ The sediments on the ocean floor are unexpectedly very thin.
  - ➤ **The deep trenches have deep-seated earthquake occurrences while in the mid-oceanic ridge areas, the quake foci have shallow depths.**
- These facts led Harry Hess to propose his hypothesis, known as the "seafloor spreading". The force of the Seafloor spreading was found to be Convective current as postulated by Arthur Holmes.
- Magma continuously wells upwards at the mid-oceanic ridges producing currents of magma flowing in opposite directions and thus generating the forces that pull the seafloor apart at the mid-oceanic ridges.
- As the ocean floor is spread apart, cracks appear in the middle of the ridges allowing molten magma to surface through the cracks to form the newest ocean floor. Here, new crust is generated.
- As the ocean floor moves away from the mid-oceanic ridge eventually comes into contact with a continental plate at a convergent boundary, subducted underneath the continent and the crustal mass is consumed here.

- Finally, the lithosphere drives back into the asthenosphere where it returns to a heated state.

12. Correct Option: (b)

Explanation:

Some important minor plates are listed below

- **Cocos plate:** Between Central America and Pacific plate
- **Nazca plate:** Between South America and Pacific plate
- **Arabian plate:** Mostly the Saudi Arabian landmass
- **Philippine plate:** Between the Eurasian and Pacific plate
- **Caroline plate:** Between the Philippine and Indian plates
- **Fuji plate:** North-east of Australia.

13. Correct Option: (b)

Explanation:

Postulates of the Plate Tectonic Theory

- The Earth's surface is covered by a series of some 25 major and minor crustal plates.
- **Both continental and oceanic plates move, form and destroyed.**
- The ocean floors are continually moving, spreading from the center, sinking at the edges, and being regenerated. Convection currents beneath the plates move the crustal plates in different directions.
- **These lithospheric plates have been constantly moving over the globe throughout the history of the earth.**
- **It is not the Continent that moves as believed by Wegener rather, continents are part of a plate and what moves is the plate.**
- All the plates, without exception, have moved in the geological past and shall continue to move in the future period as well.
- Thus, there is no such thing as supercontinent Pangaea or superocean Panthalassa and continental masses, resting on the plates, have been wandering all through the geological period, and Pangaea was a result of converging of different continental masses that were parts of one or the other plates.
- There have been many forms, structure, shape, and location of Pangaea and what Wegner suggested is just one example of it.
- Crusts are formed as well as consumed over a period (though geological).
- Wegner's idea about Tethys Sea was right only with some modification that the sea was not shifted but consumed in the process of plate tectonic by Indo-Australian plate and the Tethys' convergent boundary interaction.
- More modifications will occur such as-breaking of African plate as there is seafloor spreading happening around East Africa rift valley system, consumption of the Mediterranean Sea, etc.

14. Correct Option: (c)

Explanation:

Rate of plate movement

- The strips of the normal and reverse magnetic field that parallel the mid-oceanic ridges help scientists determine the rates of plate movement.
- **These rates vary considerably.**
- The majority of the research shows that the plates move at the average rate of between approximately 0.60 cm/yr to 10 cm/yr.
- The Eurasian Plate is moving away from the North American Plate at a rate of about 3cm per year.
- The Arctic Ridge has the slowest rate (less than 2.5 cm/yr.), East Pacific Rise near Easter Island, in the South Pacific about 3,400 km west of Chile, has the fastest rate (more than 15 cm/yr.).
- **Indian Plate moves northwards at 1.2 cm/yr.**

15. Correct Option: (b)

Explanation:

Types of Fold mountains

- On the basis of the period of origin, fold mountains are divided into very old fold mountains, old fold mountains and Alpine(young) fold mountains.
- Very Old Fold Mountains are more than 500 million years old. They have rounded features (due to denudation) and are of low elevation. Example: Laurentian mountains, Algoman mountains, etc.

- **Old Fold Mountains** had their origin before the Tertiary period(66 mya). The Appalachians in North America, Aravalli Range in India, and the **Ural Mountains** in Russia are examples.
- **Alpine or young fold** mountains are formed after the Tertiary period. Examples are the **Rockies**, the Andes, the Alps, the **Himalayas**, etc.

16. Correct Option: (c)

Explanation:

Divergent Plate boundaries

- These are areas where plates move away from each other, forming either mid-oceanic ridges or rift valleys. These are also known as constructive boundaries.
- Regions of Divergent Boundaries:
  - East African Rift (Great Rift Valley) in eastern Africa
  - Mid-Atlantic Ridge system separates the North American Plate and South American Plate in the west from the Eurasian Plate and African Plate in the east
  - Gakkel Ridge is a slow spreading ridge located in the Arctic Ocean
  - East Pacific Rise, extending from the South Pacific to the Gulf of California
  - Baikal Rift Zone in eastern Russia
  - Red Sea Rift
  - Aden Ridge along the southern shore of the Arabian Peninsula
  - Carlsberg Ridge in the eastern Indian Ocean
  - Gorda Ridge off the northwest coast of North America
  - Explorer Ridge off the northwest coast of North America
  - Juan de Fuca Ridge off the northwest coast of North America
  - Chile Rise off the southeast Pacific

17. Correct Option: (b)

Explanation:

Types of Folds

- According to the shape, the folds are of many types:
- **Symmetrical Folds:** These are ordinary folds. The limbs of the folds are equally inclined on either side.
- **Asymmetrical Fold:** One of the limbs is more inclined than the other.
- **Monoclinal Fold:** In this fold, one limb makes a right angle with the surface but the other limb is ordinarily inclined.
- **Isoclinal Fold:** The two limbs are so much inclined in such a way that they appear equally inclined and parallel to each other.
- **Recumbent Fold:** In this fold the two limbs are so much inclined that they become horizontal.
- **Overturned Fold:** In this fold one limb is overturned over the other limb. The difference between the overturned and recumbent folds is that the overturned limbs are not horizontal like those of recumbent fold.
- **Plunging Fold:** If the axis of the fold is not parallel to the horizontal but makes an angle with it, it is known as Plunging Fold.
- **Fan Fold:** It is a great anticline which has many small anticlines and synclines. It is also known as Anticlinorium. A great syncline having many small anticlines and synclines is called Synclinorium.
- **Open Fold:** If the angle between the limbs of a fold is obtuse, the fold is called Open Fold.
- **Closed Fold:** If the angle between the limbs of a fold is acute, it is called Closed Fold.

18. Correct Option: (a)

Explanation:

Volcanism

- A volcano is an opening in the earth's crust through which gases, molten rocks materials (lava), ash, steam etc. are emitted outward in the course of an eruption.
- Such vents or openings occur in those parts of the earth's crust where the rock strata are relatively weak.
- Volcanic activity is an example of endogenic process. Depending upon the explosive nature of the volcano, different land forms can be formed such as a plateau (if the volcano is not explosive) or a mountain (if the volcano is explosive in nature).
- **Types of Lava:**
- Basic lavas: There are highly fluid. They are dark coloured like basalt, rich in iron and magnesium but poor in silica. They are affect extensive areas, spreading out as thin sheets. The resultant volcano is gently

sloping with a wide diameter and form a flattened shield or dome.

- Acidic lavas: There lavas are highly viscous with a melting point. They are light-coloured, of low density, and have a high percentage of silica. They flow slowly and seldom travel far. The resultant cone is therefore steep sided.

19. Correct Option: (d)

Explanation:

The Circum Pacific Belt:

- Due to subduction of the Pacific plate below the Asiatic plate, the large number of volcanic eruptions are found circling Pacific Ocean known as Ring of Fire, which extends through the Andes of South America, Central America, Mexico, the Cascade Mountains of Western United States, the Aleutian Islands, Kamchatka, the Kuril Isles, Japan, the Philippines, Celebes, New Guinea, the Solomon Islands, New Caledonia and New Zealand where about 80 active volcanoes are found.
- The Circum-Pacific belt meets the mid-continental belt in the East Indies. This belt is characterised by high volcanic cones and volcanic mountains.
- The volcanoes of the Aleutian Island, Hawaii Island and Japan are found in Chains.
- Cotapaxi is the highest volcanic mountain (6035m) in the world.
- Other important volcanoes found in this belt are Fuziyama, Shasta, Rainer and Hood.
- Volcanic eruptions occur in this belt because of the subduction of the Pacific plate below the Asiatic plate.

The Mid-Continental Belt:

- Having various volcanoes of the Alpine Mountain Chain, Mediterranean Sea (Stromboli, Vesuvius, Etna etc.), volcanoes of the Aegean Sea, Mt. Ararat, Elburz and Hindukush. There are several volcanic free zones found along the Alps and the Himalayas, come under this belt. Kilimanjaro, Elgon, Birunga and Rungwe etc. are the volcanoes found in the Rift Valleys of Africa.
- In the region where the boundaries of Persia, Afghanistan, and Baluchistan meet, there are several volcanic cones of large size, and one or two of them emit steam and other gases. This region has also a few extinct volcanoes.

The Mid Atlantic Belt:

- It includes the volcanoes of the Mid-Atlantic Ridge which are associated with the Atlantic Ocean and are located either on swells or ridges rising from the sea floor or on or near the edge of the continent where it slopes abruptly into the deep oceanic basins.
- The volcanoes formed along the Mid-Atlantic Ridge actually represent the splitting zone of the American plate moving towards west and the Eurasian plate moving towards east representing the zones of crystal movement.
- In the splitting zone there is constant upwelling of Magma hence known as crustal weakness.
- Volcanoes in this belt are generally of fissure-eruption type such as Volcanoes of Lesser Antilles, Azores, and St. Helens etc.

20. Correct Option: (c)

Explanation:

Earthquake

- An earthquake in simple words is shaking of the Earth.
- It is a natural event, caused due to the release of energy, which generates waves that travel in all directions.
- The release of energy occurs along a fault, a sharp break in the crustal rocks.
- **The point where the energy is released is called the focus or hypocentre of an earthquake.** The energy waves traveling in different directions reach the surface. The point on the surface, nearest to the focus, is called epicenter. It is the first one to experience the waves.
- This release of energy is propagated as waves or simply saying Earthquake Waves.

Earthquake Waves

- The Earthquakes Waves are recorded on the seismograph.
- There are basically two types of Earthquake Waves – Body waves and surface waves.

Body Waves

- **Body waves are generated at the focus and move in all the directions through the body of the Earth** (3-dimensional). They are the fastest in reaching to the surface.

- They are of two types viz. Primary waves/ P-waves and Secondary waves/S-waves.

Primary waves/P-waves

- P-waves moves longitudinally i.e. **the propagation and vibration are in a same direction similar to the sound waves.** They are the fastest of all the earthquake waves. They travel through gaseous, liquid and solid materials.
- **Secondary waves/S-waves**
- **S-waves are second to reach at the surface after P-waves. As they can travel only through solid materials of the Earth, they cannot pass through Earth's outer core, therefore their shadow zone is broader than that of P-waves. This reveals that the outer core of the Earth is not in solid form.**
- **S-waves propagate transversally** i.e. the direction of propagation and the direction of vibration is perpendicular to each other.

Surface waves

- Surface waves are generated when the body waves interact with the surface rocks. As they move along the surface and the direction of the vibration is perpendicular to the propagation, these waves are considered as the most damaging one.

21. Correct Option: (c)

Explanation:

- **Both the statements are correct**

Supplementary notes:

International Fund for Animal Welfare (IFAW)

- The International Fund for Animal Welfare is a global non-profit helping animals and people thrive together.
- Experts and everyday people, working across seas, oceans and in more than 40 countries around the world.
- Rescue, rehabilitate and release animals, and we restore and protect their natural habitats.
- Partner with local communities, governments, non-governmental organizations and businesses.

22. Correct Option: (b)

Explanation:

- **Statement 1 is incorrect:** The report, which is released every year, analyses the working and operations of the RBI and suggests measures to improve the economic performance.

Supplementary notes:

RBI annual report

- The report, which is released every year, analyses the working and operations of the RBI and suggests measures to improve the economic performance.
- Release of the new economic capital framework under which RBI will transfer 1.76 trillion surplus to the government.
- Reviving consumption demand and private investment remains the top priority in the current fiscal.
- RBI, cautioned that a broad-based cyclical downturn is underway in several sectors—manufacturing, trade, hotels, transport, communication and broadcasting, construction, and agriculture.
- The delayed onset and skewed distribution of the south-west monsoon may pose downside risks to crop production and rural consumption demand.
- The central bank has forecast India's GDP to grow at 6.9% for FY20—in the range of 5.8-6.6% during the first half of the year and 7.3-7.5% in the second half.
- The annual report pointed out that throughout the year, protectionist policy pronouncements and actions dominated the global political arena.
- Another conduit through which trade wars and other sources of global spillovers impacted India during 2018-19 is the intertwining of the finance and confidence channels.
- Viable external financing can become an additional consideration for holding adequate precautionary buffers.
- One of the recommendations of Bimal Jalan committee report is that the central bank should align its accounting year to the Arpil-March fiscal year for better understanding.

23. Correct Option: (c)

Explanation:

- **Both the statements are correct**

Supplementary notes:

CAMPA: the fund manager to manage proper Afforestation

- To promote forestry activities and boost afforestation across the nation, the central government on Thursday released a fund of Rs 47,436 crore.
- Union Minister for Environment, Forest and Climate Change, Prakash Javadekar handed over the CAMPA funds to various states.
- These funds are meant to be used by states to implement agro-forestry in non-forest land to compensate for felled forest.

More on the topic:

- State Governments will utilize this fund for the enhancement of forestry activities to achieve the objectives of the **Nationally-Determined Contributions (NDCs).** The objective of the NDCs is to increase its forest and tree cover. This will help in an additional carbon sink equivalent to 2.5 to 3 billion tonnes of carbon dioxide by the year 2030.
- **The top four states** that received the highest CAMPA fund are Odisha, Chhattisgarh, Madhya Pradesh, and Jharkhand.
- **The fund will be utilised in important activities which will include** the Compensatory Afforestation, Catchment Area Treatment, Assisted Natural Regeneration, Forest Fire Prevention, Wildlife Management, and Control Operations, Soil and Moisture Conservation Works in the forest, Improvement of Wildlife Habitat, Management of Biological Diversity and Biological Resources, Research in Forestry and Monitoring of CAMPA works, etc.

24. Correct Option: (a)

Explanation:

- **Option (a) is correct:** 90-90-90 is an ambitious treatment target to help end the aids epidemic.

Supplementary notes:

UNAIDS '90-90-90' targets

- The targets propose that to end the HIV epidemic by 2030, 90% of persons living with HIV (PLWH) worldwide should know their diagnosis, 90% of diagnosed PLWH should be on antiretroviral therapy (ART) and 90% of PLWH on ART should be virally suppressed by 2020.
- **In news:** Chief of **International AIDS Vaccine Initiative (IAVI**) has said that India is pivotal to the global fight back against AIDS.

25. Correct Option: (a)

Explanation:

- **Statement 2 is incorrect:** The biggest reason for desertification in India is **water erosion.**

Supplementary notes:

- UNCCD defines desertification as "**land degradation in arid, semi-arid and dry sub-humid** areas resulting from **various factors**, including **climatic variations and human activities**".

Desertification in India

- According to Desertification and Land Degradation of Selected Districts of India, an atlas published by the **Indian Space Research Organisation's Space Application Centre (SAC),** Ahmedabad in 2018, **some 96.40 million ha, or about 30 per cent of the country's total area, is undergoing degradation.**This means almost **a quarter of India** is under desertification.
- Of India's total geographical area of 328.72 million hectares (MHA), **96.4 MHA is under desertification**.
- In eight states—Rajasthan, Delhi, Goa, Maharashtra, Jharkhand, Nagaland, Tripura and Himachal Pradesh—around **40 to 70 per cent of land has undergone desertification**.
- More to it, 26 of 29 Indian states have reported an increase in the area undergoing desertification in the past 10 years.
- **Major Reasons**
  - Loss of soil cover, mainly due to **rainfall and surface runoff**, is one **of the biggest reasons** for desertification. It is responsible for **10.98 per cent of desertification in the country**.
  - Water erosion is observed **in both hot and cold desert areas**, across various land covers and with varying levels of severity.
  - The next big reason is wind erosion.

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TEST
DAY - 19

Time Allowed: 30 mins **Maximum Marks: 50**

1. Consider the following Landforms:

1. Cirque
2. Moraines
3. Barchans
4. Stalagmites
5. Hanging valleys

Which of the above are the Erosional Landforms?

(a) 1 and 5 only
(b) 1, 3 and 5 only
(c) 1 and 4 only
(d) 2, 3, and 4 only

2. Consider the following pairs:

1. River capture: wind gap
2. Ox-Bow lakes: Lower course
3. River Rejuvenation: Due to the rise in the sea level

Which of the above pairs is/are correctly matched?

(a) 2 only
(b) 1 and 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

3. Match the following lists regarding the types of deltas:

Rivers	Types of Delta
A. Nile	1. Estuarine
B. Mississippi	2. Arcuate
C. Yellow	3. Cuspate
D. Tiber	4. Bird's foot

Select the correct match using the codes given below:

	A	B	C	D
(a)	1	2	3	4
(b)	3	4	2	1
(c)	2	4	1	3
(d)	2	3	1	2

4. Which of the following statements is/ are *incorrect*?

1. When several alluvial fans get combined, it forms the Terai region.
2. When several alluvial cones get combined, it forms the Bhabhar region.

Select the correct option using the codes given below:

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

5. Which of the following are the prerequisites for the groundwater to form the Karst topography?

1. Hard parent rocks
2. High rainfall
3. Presence of joints in the rocks

Select the correct option using the codes given below:

(a) 3 only
(b) 1 and 3 only
(c) 2 and 3 only
(d) 1, 2 and 3

6. Consider the following statements about lagoons:

1. It forms when barrier bars and spits form at the mouth of a bay and block it.
2. It got filled up by sediments from the land and giving rise to a coastal plain.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

7. Consider the following statements regarding Beaches:

1. Beaches are deposited by breaker waves between high and low tidewaters.
2. These are formed when the winds are of high velocity.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

8. Consider the following statements regarding snow line:

1. Snow line is a zone between the parent rock and seasonal snow.
2. Moving equator to polewards, the height of the snowline keeps decreasing.
3. The average temperature is always below freezing point at the snow line.

Which of the above statements is/are ***incorrect***?

(a) 1 and 3 only

(b) 3 only

(c) 1 and 2 only

(d) 2 and 3 only

9. Consider the following statements:

1. Barchans are types of sand dunes.
2. The plain formed by the deposition of very thin soil particles is playa.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

10. Consider the following three types of coral reefs:

1. Barrier reefs
2. Fringing reefs
3. Atolls

Arrange these reefs chronologically in their evolution, as per Charles Darwin:

(a) 1-2-3

(b) 2-3-1

(c) 2-1-3

(d) 3-1-2

11. Consider the following statements regarding the Course of a River:

1. Waterfalls and rapids disappear during the old stage.
2. During the youth stage streams are plenty with good integration.
3. The valleys in the matured stage are still V-shaped but deep.

Which of the following statements is/are ***incorrect?***

(a) 1 and 2 only

(b) 2 only

(c) 3 only

(d) 1 and 3 only

12. Consider the following statements regarding the Depositional landforms of Groundwater:

1. Stalagmites form due to dripping water from the surface or through the thin pipe, of the stalactite, immediately below it.
2. The stalagmite and stalactites eventually fuse to give rise to columns and pillars of same diameters.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

13. Consider the following statements regarding the Depositional Landforms:

1. Alluvial fans are formed when streams flowing from higher levels break into foot slope plains of low gradient.
2. As the delta grows, the river distributaries continue to decrease in length and delta continues to build up into the sea.
3. Meander is not a landform but is only a type of channel pattern.

Which of the above statements is/are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

14. Which of the following statement is *incorrect* regarding the Erosional Landforms?

(a) Yardangs are narrow, streamlined ridges that are usually three to four times longer than they are wide.

(b) A zeugen is a tabular mass of resistant rock, standing prominently in the deserts.

(c) The playa plain covered up by salts is called alkali flats.

(d) In zeugen the harder rock layer usually lies beneath a surface layer of more softer rock.

15. Consider the pairs regarding the following depositional landforms:

1. **Dunes:** These are collections of loose sand built piece meal by the wind
2. **Ripples:** These are the smallest Aeolian bed form.
3. **Loess:** These are the terrestrial sediment composed largely of windblown silt particles made of quartz.

Which of the following is/are correctly matched?

(a) 1 only

(b) 1 and 2 only

(c) 1, 2 and 3

(d) 2 and 3 only

16. Consider the following statements with respect to the factors and forces leading to the formation of coastal landforms:

1. Waves help to move eroded debris and deposit it as silt, sand, and gravel along the coasts.
2. Small waves cause sediment to be transported toward the coast and to become deposited on the beach.
3. Longshore drift is a geological process that consists of the transportation of sediments along a coast parallel to the shoreline.

Which of the above statements is/are correct?

(a) 3 only

(b) 1 and 2 only

(c) 2 and 3 only

(d) 1, 2 and 3

17. Which of the following statements is/are correct regarding the landforms created by Ground Water?

1. Physical or mechanical removal of materials by moving groundwater is significant in developing landforms.
2. Karst topography in Balkan developed by groundwater through the process of deposition.

Select the correct answer using the code given below:

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

18. Consider the following glacial landforms:

1. Horns
2. Drumlins
3. Cols
4. Kettle

Which of the following is/are depositional landforms?

(a) 1 and 3 only

(b) 2 and 4 only

(c) 1 and 4 only

(d) 2 and 3 only

19. Consider the following:

Types of Moraines	*Characteristics*
1. Terminal moraine	When mater deposited at either of the sides of the glacier
2. Lateral moraine	Material dropped at the end of valley glacial in the form of a ridge
3. Ground moraine	Excessive glacier deposited on its own bed

Which of the above pairs are correctly matched?

(a) 1 and 2 only

(b) 2 only

(c) 1 and 3 only

(d) 3 only

20. Which of the following statements regarding the low sedimentary coasts is/are *incorrect*?

1. The land slopes gently into the water.
2. Marshes and swamps abound away from the coasts.
3. The rivers extend their length by building coastal plains and deltas.

Select the correct answer using the code given below:

(a) 2 only

(b) 1 and 3 only

(c) 1 only

(d) None of the above

21. Consider the following statements about food fortification in India:

1. It is the addition of key vitamins and minerals to staple foods such as rice, milk and salt.
2. The manufacturers of the fortified food are required to provide a quality assurance undertaking.
3. Packaging and labelling of the fortified food must state the food fortificant added, logo and the tagline "Sampoorna Poshan Swasth Jeevan".

Which of the statements given above is/are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

22. Consider the following statements about coral reefs:

1. Coral species that build reef and look like colourful plants or graceful trees are called soft corals.
2. The Great Barrier Reef, located off New Zealand's East Coast is the largest coral reef in the world.

Which of the statements given above is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

23. Consider the following statements about desertification in India

1. Almost a quarter of country's total area is undergoing land degradation.
2. The biggest reason for desertification in India is wind erosion.

Which of the statements given above is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

24. 90:90:90 targets are related to which of the following diseases?

(a) AIDS

(b) H1N1

(c) Tuberculosis

(d) Diabetes

25. Recently, a creature known as Tardigrade was discovered on an Israeli spacecraft. What is the unique characteristic of this creature?

(a) It changes its colour very frequently.

(b) It can survive in vacuum conditions

(c) It can kill almost all drug resistant bacteria

(d) None of the above

****

ANSWER HINTS

DAY - 19

1. Correct Option: (a)

Explanation:

Landforms by Running water

- The erosional landforms are V-shaped valleys, waterfalls, rapids, terraces, meanders, etc.
- The depositional landforms are alluvial fans and cones, natural levees, deltas, etc.

Landforms by Glaciers

- The erosional landforms are U-shaped Valley, hanging valley, **cirques**, aretes, horns, etc.
- The depositional landforms are **moraines**, drumlins, eskers, outwash plain, etc.

Landforms by Wind

- The erosional landforms are Mushroom rocks, Zeugens, Yardang, Dreikanters, etc.
- The depositional landforms are Sand dunes, Ripple marks, **Barchans**, etc.

Landforms by Ground Water

- The erosional landforms are Lapies, Solution holes, Sinkholes, etc.
- The depositional landforms are Stalactites, **Stalagmites**, etc.

2. Correct Option: (b)

Explanation:

Landforms by running water

- **River capture**: It is a geomorphological phenomenon occurring when a stream or river drainage system or watershed is diverted from its own bed and flows instead down the bed of a neighboring and more powerful stream. It can be due to many reasons such as Tectonic earth movements, Headward erosion, etc. The now-dry valley of the original stream is known as a **wind gap.** The beheaded stream is called misfit. Example- Yamuna captured the Saraswati river(used to flow into the Arabian Sea).
- **Ox-bow lakes**: In the **lower course** of a river, a meander becomes very much more pronounced. The outside bend or concave bank is so rapidly eroded that the river becomes almost a complete circle. There comes a time when the river cuts through the narrow neck of the loop, abandoning an ox-bow lake. The river then flows straight.
- **River Rejuvenation:** When there is a sudden **fall in the sea level or upliftment of the land,** the slow and old rivers, the disturbance enables a rise in the river's potential energy, increasing its erosion rate of the erstwhile slow and old river, called river rejuvenation.
- If rejuvenation occurs in the upper course, the river valleys are deepened and steep-sided gorges are formed. In the middle and lower course vertical corrasion replaces lateral corrasion and the existing meanders are vertically eroded by the rejuvenated stream.

3. Correct Option: (c)

Explanation:

Types of Deltas

- A delta is a depositional landform that occurs at the mouth of a river.
- There are two major ways of classifying deltas. One considers the influence that creates the landform, while the other considers its shape.

On the basis of Influence

- There are four main types of deltas classified by the processes that control the build-up of silt: wave-dominated, tide-dominated, Gilbert deltas, and estuarine deltas.
- In a wave-dominated delta, the movement of waves controls a delta's size and shape. Example- Nile delta

- The tide-dominated deltas usually form in areas with a large tidal range or area between high tide and low tide. Example- Ganga-Brahmaputra delta.
- Gilbert deltas are formed as rivers deposit large, coarse sediments.
- **Estuarine deltas** form as a river does not empty directly into the ocean but instead forms an estuary. Example- **Yellow river(china),** St. Lawrence(USA)

On the basis of Shape

- They are various types such as Arcuate, Cuspate, Bird's foot, etc.
- Deltas with this triangular or fan shape are called **arcuate deltas**. Example-Ganga delta, **Nile** delta, etc.
- Stronger waves form **a cuspate delta**, which is more pointed than the arcuate delta and is tooth-shaped. Example- **Tiber River**(Rome).
- **A bird-foot delta** has few, widely spaced distributaries, making it look like a bird's foot. Example- **Mississippi River**.

4. Correct Option: (d)

Explanation:

Alluvial cones and fans

- Alluvial cones: When rivers leave the mountains and enter the plains, their channel gradient drops substantially, resulting in a drop in the load-carrying capacity of the river. Consequently, load consisting of finer to coarser and big sized materials coming from the upstream are deposited at the point of break, in slope of foothill zone and thus alluvial cones are fonned. **When several alluvial fans get combined, it forms the Bhabhar region.**
- Alluvial Fans: When the river descends from the bills, it spreads the load in a vast area. This results in the formation of fan shaped plains called alluvial fans. **When several alluvial fans get combined, it forms foothill plains or Terai region.**

5. Correct Option: (c)

Explanation:

Karst Topography

- The landforms formed by the action of the groundwater on the rocks of limestone, dolomite, and Gypsum referred to as Karst Topography after the characteristic landforms produced by the chemical erosion of limestones of the Karst region of Yugoslavia
- The essential conditions for the development of karst topography are:
  - Presence of soluble, highly jointed, dense and thinly bedded rocks such as Limestones, Gypsum, chalk, etc. and
  - Sufficient rainfall,
- Some of the landforms are Cavern, Sink Hole, Stalactite and Stalagmite, etc.

6. Correct Option: (c)

Explanation:

Lagoons

- A lagoon is a shallow body of water separated from a larger body of water by barrier islands or reefs and divided into coastal lagoons and atoll lagoons.
- When barrier bars and spits form at the mouth of a bay and block it, a lagoon forms.
- The lagoons would gradually get filled up by sediments from the land giving rise to a coastal plain.

7. Correct Option: (a)

Explanation:

Beaches

- The areas composed of temporary or short-lived deposits of marine sediments, consisting of sands, shingles, cobbles etc, on the seashore are called beaches.
- **Beaches are deposited by breaker waves between high and low tidewaters.**
- **These are fonned when the sea is calm and winds are of low velocity.**

8. Correct Option: (c)

Explanation:

Snow Line

Snow line is generally defined as a zone between permanent and seasonal snow.

The snow line denotes that height above which there is a permanent snow cover and thus it corresponds to the level where average temperature is always below freezing point even during the warmest month of the year.

The snowline keeps on changing due to seasonal variations.

As we move from equator to polewards, the height of the snowline keeps decreasing and that in the polar region, it is almost equal to the mean sea level. On the equator, the height of the snowline is 6,000m, whereas in the Himalayas it is 5,500m.

9. Correct Option: (a)

Explanation

Aeolian landforms

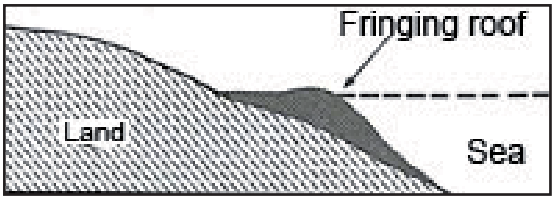
- The heaps or mounds of sand deposited by wind, are called sand dunes. They keep changing their position in the direction of wind. Sand dunes of crescent shape having two horns are called Barchans.
- The deposition of very thin soil particles brought by the wind in the outskirts of the desert region is called Loess plain.
- Playa, or dry lake, is a flat-bottom depression found in interior desert basins and adjacent to coasts within arid and semiarid regions.
- It is periodically covered by water that slowly filtrates into the groundwater system or evaporates into the atmosphere, causing the deposition of salt, sand, and mud along the bottom and around the edges of the depression.

10. Correct Option: (c)

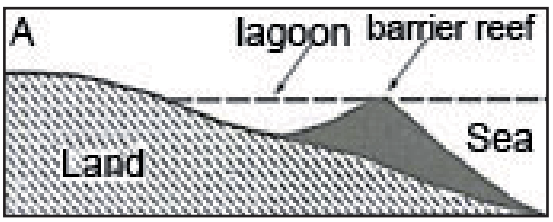
Explanation:

Coral reefs and their probable evolution

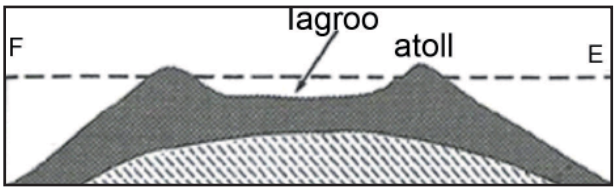
- A fringing reef is a coralline platform lying close to the shore extending outwards from the mainland, sometimes separated from the shore by a shallow lagoon.



- A barrier reef is separated from the coast by a much wider and deeper channel or lagoon. The reef is partially submerged.



- Atolls are similar to barrier reefs except that they are circular in shape, enclosing a shallow lagoon without any land in the center. The encircling ring is usually broken in a few places to allow the free flow of water.



- The most widely accepted theory is that put forward by Charles Darwin.
- He assumed that **all coral reefs began as fringing reefs** around an island or the topmost portions of extinct volcanoes that stood above the ocean bed. Due to a general down warping of the earth's crust, the islands gradually subsided.
- The corals continued to grow upwards to keep pace with the subsidence. The growth was more vigorous at the outward edge than the landward edge because of the more favorable living conditions for corals, so the encircling reef widened. **It then formed a barrier reef**, with a lagoon between the island and the reef.
- Eventually, when the land completely submerged, only the outer rims of the reefs were seen, forming an atoll. The submerged island was covered by a layer of sediment so that the characteristic circular lagoon is generally shallow. Thus atolls mark the position of the former islands
- R.A. Daly's glacial control theory put forward in 1910 is another important contribution in this regard. He believed that during the height of the Ice Ages, the water was too cold for any coral growth to take place. With the absence of a coral barrier, marine erosion was able to attack and lower the islands. With the return of the warmer climate, the water that was locked up in the ice sheets melted. Consequently, there was a rise in the sea level which in some cases, submerged these lower islands. On these platforms, corals began to grow upwards at the rate of a foot in a decade to keep pace with the rising water level. Coral reefs, where islands still project above sea level, and atolls were thus formed.
- The combination of these two theories accounts for all the important features of coral reefs and atolls.

11. Correct Option: (a)

Explanation:

The Course of a River

- **Youth**
  - ➤ Streams are few during this stage with poor integration and flow over original slopes showing shallow V-shaped valleys with no floodplains or with very narrow floodplains along trunk streams. Streams divides are broad and flat with marshes, swamp and lakes. Meanders if present develop over these broad upland surfaces. These meanders may eventually entrench themselves into the uplands. Waterfalls and rapids may exist where local hard rock bodies are exposed.
- **Mature**
  - ➤ During this stage streams are plenty with good integration. The valleys are still V-shaped but deep; trunk streams are broad enough to have wider floodplains within which streams may flow in meanders confined within the valley. The flat and broad inter stream areas and swamps and marshes of youth disappear and the stream divides turn sharp. Waterfalls and rapids disappear.
- **Old**
  - ➤ Smaller tributaries during old age are few with gentle gradients. Streams meander freely over vast floodplains showing natural levees, oxbow lakes, etc. Divides are broad and flat with lakes, swamps and marshes. Most of the landscape is at or slightly above sea level.

12. Correct Option: (a)

Explanation:

Depositional Landforms by Groundwater

- Many depositional forms develop within the limestone caves.
- The chief chemical in limestone is calcium carbonate (calcite) which is easily soluble in carbonated water (carbon dioxide absorbed rainwater). This calcium carbonate is deposited when the water carrying it in the solution evaporates or loses its carbon dioxide as it trickles over rough rock surfaces.
- Stalactites hang as icicles of different diameters. Normally they are broad at their bases and taper towards the free ends showing up in a variety of forms.
- Stalagmites rise up from the floor of the caves. In fact, **stalagmites form due to dripping water from the surface or through the thin pipe, of the stalactite, immediately below it**.
- Stalagmites may take the shape of a column, a disc, with either a smooth, rounded bulging end or a miniature crater-like depression.
- The **stalagmite and stalactites eventually fuse to give rise to columns and pillars of different diameters.**

13. Correct Option: (c)

Explanation:

Depositional Landforms

Alluvial fans

- **Alluvial fans are formed when streams flowing from higher levels break into foot slope plains of low gradient**.
- Normally very coarse load is carried by streams flowing over mountain slopes.
- This load becomes too heavy for the streams to be carried over gentler gradients and gets dumped and spread as a broad low to high cone shaped deposit called alluvial fan.
- Usually, the streams which flow over fans are not confined to their original channels for long and shift their position across the fan forming many channels called distributaries.
- Alluvial fans in humid areas show normally low cones with gentle slope from head to toe and they appear as high cones with steep slope in arid and semi-arid climates.

Deltas

- Deltas are like alluvial fans but develop at a different location.
- The load carried by the rivers is dumped and spread into the sea. If this load is not carried away far into the sea or distributed along the coast, it spreads and accumulates as a low cone.
- Unlike in alluvial fans, the deposits making up deltas are very well sorted with clear stratification.
- The coarsest materials settle out first and the finer fractions like silts and clays are carried out into the sea.
- **As the delta grows, the river distributaries continue to increase in length and delta continues to build up into the sea.**

Floodplains

- Deposition develops a floodplain just as erosion makes valleys.

- **Floodplain** is a major landform of river deposition. Large sized materials are deposited first when stream channel breaks into a gentle slope.
- Thus, normally, fine sized materials like sand, silt and clay are carried by relatively slow moving waters in gentler channels usually found in the plains and deposited over the bed and when the waters spill over the banks during flooding above the bed.
- A river bed made of river deposits is the active floodplain. The floodplain above the bank is inactive floodplain.
- Inactive floodplain above the banks basically contain two types of deposits — flood deposits and channel deposits.
- In plains, channels shift laterally and change their courses occasionally leaving cut-off courses which get filled up gradually.
- Such areas over flood plains built up by abandoned or cut-off channels contain coarse deposits.
- The flood deposits of spilled waters carry relatively finer materials like silt and clay.
- The flood plains in a delta are called **delta plains.**

Meanders

- In large flood and delta plains, rivers rarely flow in straight courses.
- Loop-like channel patterns called meanders develop over flood and delta plains.
- **Meander is not a landform but is only a type of channel pattern**.
- This is because of (i) propensity of water flowing over very gentle gradients to work laterally on the banks; (ii) unconsolidated nature of alluvial deposits making up the banks with many irregularities which can be used by water exerting pressure laterally; (iii) coriolis force acting on the fluid water deflecting it like it deflects the wind.
- When the gradient of the channel becomes extremely low, water flows leisurely and starts working laterally.
- Slight irregularities along the banks slowly get transformed into a small curvature in the banks; the curvature deepens due to deposition on the inside of the curve and erosion along the bank on the outside.
- If there is no deposition and no erosion or undercutting, the tendency to meander is reduced. Normally, in meanders of large rivers, there is active deposition along the concave bank and undercutting along the convex bank.
- The concave bank is known as cut-off bank which shows up as a steep scarp and the convex bank presents a long, gentle profile. As meanders grow into deep loops, the same may get cut-off due to erosion at the inflection points and are left as ox-bow lakes.

14. Correct Option: (d)

Explanation:

Erosional Landforms

Yardangs:

- Yardangs are narrow, streamlined ridges that are usually three to four times longer than they are wide. They are made up of long ridges of hard resistant rocks alternating with narrow furrows of soft rocks. Here, both the bands of hard and soft rocks aligned vertically to the direction of the blowing prevailing winds. The process of abrasion is accelerated in the course of the blowing prevailing winds, assisting in wearing the soft bands of rocks into narrow corridors between the hard layers. Eventually, the bands of hard rocks remain standing high above the soft bands that have been worn into narrow corridors.

Zeugen:

- A zeugen is a tabular mass of resistant rock, standing prominently in the desert. It is usually composed of alternating layers of hard and soft rocks. These alternating bands of rock usually lie horizontal on top of one and another. The softer rock layer usually lies beneath a surface layer of more resistant rock. The sculpturing effects of wind abrasion wear them into a furrow and ridge looking landscape. Insolation weathering enhances this activity.

Playas:

- Playas are by far the most prominent landforms in the deserts. In basins with mountains and hills around and along, the drainage is towards the centre of the basin and due to gradual deposition of sediment from basin margins, a nearly level plain forms at the centre of the basin. In times of suffcient water, this plain is covered up by a shallow water body. Such types of shallow lakes are called as playas where water is retained only for short duration due to evaporation and quite often the playas contain good deposition of salts. The playa plain covered up by salts is called alkali flats.

15. Correct Option: (c)

Explanation:

Depositional Landforms

- Wind is a good sorting agent. Depending upon the velocity of wind, different sizes of grains are moved along the floors by rolling or Saltation and carried in suspension and in this process of transportation itself, the materials get sorted. When the wind slows or begins to die down, depending upon sizes of grains and their critical velocities, the grains will begin to settle. So, in depositional landforms made by wind, good sorting of grains can be found. Sand accumulations come in a range of sizes and forms. Deposition may occur as sheets of sand (dune fields and sand seas) or loess or as characteristic dunes.
- **Ripples:** Wind ripples are the smallest Aeolian bed form. They are regular, wave like undulations lying at right-angles to the prevailing wind direction.
- **Loess**: Loess is terrestrial sediment composed largely of windblown silt particles made of quartz. It covers some 5-10 per cent of the Earth's land surface, much of it forming a blanket over pre-existing topography that may be up to 400 m thick. Loess requires three things:
  - ➤ a source of silt;
  - ➤ wind to transport the silt; and
  - ➤ a suitable site for deposition and accumulation
- **Dunes:** Dunes are collections of loose sand built piece meal by the wind. They usually range from a few metres across and a few centimetres high to 2 km across and 400m high. Sand dunes form where there is a source of sand. Dune sand is usually composed of quartz, which is extremely hard and doesn't easily decay. Dune sand grains are beautifully rounded by abrasion.

16. Correct Option: (c)

Explanation:

Coastal landforms

- The coastline, under the constant action of the waves, tides, and currents, is undergoing changes from day to day.
- Tides affect marine erosion mainly by extending a line of erosion into a zone of erosion. **Currents help to move eroded debris and deposit it as silt, sand, and gravel along the coasts.**
- The most powerful agents of marine erosion are waves. Their origin is due to the sweeping of winds over the water surface, which sets a series of undulating swells surging forward.
- **Sand and gravel loosened from the land are moved by waves to be deposited along the shore as beaches.** This is the most dominant form of constructive work of the sea. The eroded material is transported along the shore of the sea.
- Longshore drift is a geological process that consists of the transportation of sediments (clay, silt, sand and shingle) along a coast parallel to the shoreline, which is dependent on oblique incoming wind direction. Oblique incoming wind squeezes water along the coast, and so generates water current which moves parallel to the coast. **Spits are formed when longshore drift travels past a point (e.g. river mouth or re-entrant) where the dominant drift direction and shoreline do not veer in the same direction.**

17. Correct Option: (b)

Explanation:

Ground Water

- Any limestone or dolomitic region showing typical landforms produced by the action of groundwater through the processes of solution and deposition is called Karst topography after the typical topography developed in limestone rocks of Karst region in the Balkans adjacent to Adriatic sea.
- It is this downward and horizontal movement of water that causes the rocks to erode. Physical or mechanical removal of materials by moving groundwater is insignificant in developing landforms.

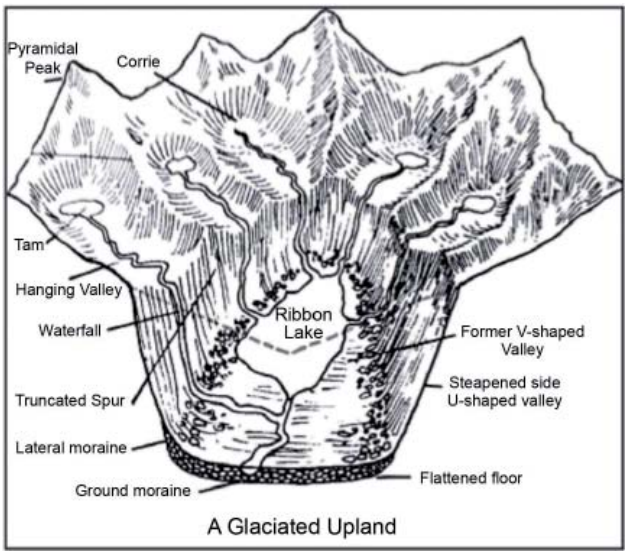
18. Correct Option: (b)

Explanation:

Depositional Landforms

- The unassorted coarse and fi ne debris dropped by the melting glaciers is called glacial till. Most of the rock fragments in till are angular to sub angularin form. Streams form by melting ice at the bottom, sides or lower ends of glaciers. Some amount of rock debris small enough to be carried by such melt water streams is washed down and deposited. Such Glaciofluvial deposits are called outwash deposits.
- Unlike till deposits, the outwash deposits are roughly stratified and assorted. The

rock fragments in outwash deposits are somewhat rounded at their edges. Some of the depositional landforms are discussed below:



A Glaciated Upland

Moraines

- They are long ridges of deposits of glacial till. Terminal moraines are long ridges of debris deposited at the end (toe) of the glaciers.
- Lateral moraines form along the sides parallel to the glacial valleys. The lateral moraines may join a terminal moraine forming a horse-shoe shaped ridge.
- There can be many lateral moraines on either side in a glacial valley.
- These moraines partly or fully owe their origin to glaciofluvial waters pushing up materials to the sides of glaciers.
- Many valley glaciers retreating rapidly leave an irregular sheet of till over their valley floors. Such deposits varying greatly in thickness and in surface topography are called ground moraines.
- The moraine in the centre of the glacial valley flanked by lateral moraines is called medial moraine. They are imperfectly formed as compared to lateral moraines. Sometimes medial moraines are indistinguishable from ground moraines.

Drumlins

- These are elongate hills of lodgement till that are typically wider and higher in the direction from which the glaciers fl owed. The elongation direction is parallel to the glacial flow direction.

Eskers

- When glaciers melt in summer, the water flows on the surface of the ice or seeps down along the margins or even moves through holes in the ice.
- These waters accumulate beneath the glacier and flow like streams in a channel beneath the ice. Such streams flow over the ground (not in a valley cut in the ground) with ice forming its banks.
- Very coarse materials like boulders and blocks along with some minor fractions of rock debris carried into this stream settle in the valley of ice beneath the glacier and after the ice melts can be found as a sinuous ridge called esker.

Outwash Plains

- The plains at the foot of the glacial mountains or beyond the limits of continental ice sheets are covered with glacio-fluvial deposits in the form of broad flat alluvial fans which may join to form outwash plains of gravel, silt, sand and clay.

Kettle

- When glaciers are rapidly retreating, numerous blocks of ice can become detached from the main body of the glacier. If glacial drift is then placed around the ice, a depression on the surface called a kettle hole can be created when the ice melts.
- Kettle holes are commonly found on moraine and outwash plain deposits. Large kettle holes that reach below the water table can form into lakes.

19. Correct Option: (d)

Explanation:

Moraine

- It is a general term applied to rock fragments, gravel, sand, etc. carried by a glacier.
- Depending on its position, the moraine can be ground, lateral, medial or terminal moraine.
- The material dropped at the end of valley glacial in the form of a ridge is called the terminal moraine.
- Each time a glacier treats, a fresh terminal moraine is left at a short distance behind the first one. The mater deposited at either of its sides is known as lateral moraine.
- When two glaciers join, the lateral moraines also join near their confluence and are called a medial moraine. Many Alpine pastures in the Himalayas like the Marge Kashmir occupy the sites of moraine deposits of old river valleys.

- The excessive load cannot be carried forward by a glacier deposited on its own bed or at the base appears as what is known as ground moraine.

20. Correct Option: (a)

Explanation:

Low Sedimentary Coasts

- Along low sedimentary coasts, **the rivers appear to extend their length by building coastal plains and deltas**.
- The coastline appears smooth with occasional incursions of water in the form of lagoons and tidal creeks. **The land slopes gently into the water**.
- **Marshes and swamps may abound along the coasts**. Depositional features dominate.

21. Correct Option: (d)

Explanation:

- **All the statements are correct.**

Supplementary notes:

Food fortification in India

- Fortification is the **addition of key vitamins and minerals** such as iron, iodine, zinc, Vitamin A & D **to staple foods** such as rice, milk and salt to improve their nutritional content. These nutrients may or may not have been originally present in the food before processing.
- India's National Nutritional strategy, 2017, had listed food fortification as one of the interventions to address anaemia, vitamin A and iodine deficiencies apart from supplementation and dietary diversification.
- Malnutrition is a prominent issue in India — 38 per cent of children under five years are stunted i.e. too short for their age, 36 per cent are underweight and 21 per cent are wasted i.e. too thin for their height, which is a sign of acute under-nutrition.
- 59 per cent women and 53 per cent children are anaemic.
- The **Food Safety and Standards Authority of India (FSSAI)** made standards for fortification in the Food Safety and Standards (Fortification of Foods) Regulations, 2018, for five staples — **wheat, rice, milk, oil and salt.**
- The standards are given for **wheat and rice fortification with iron, folic acid, and vitamin B12**, the deficiency of which cause anaemia. Besides, **other B vitamins** are also added.
- Standards are provided for **oil and milk fortification with vitamin A and vitamin D**, the deficiency of which cause night blindness and rickets respectively; **and salt fortification** with iron along with iodine to prevent goitre.
- The food companies who wish to add micronutrients to these staples sold in the packages will also have to follow the standards set by FSSAI. If the product is fortified according to the standards, the package **will carry an F+ label**.
- The Union Ministries of Women and Child Development, Human Resource Development and Consumer Affairs, Food and Public Distribution have mandated the **distribution of fortified wheat flour, rice, oil and double fortified salt in their schemes** — Integrated Child Development Services (ICDS) and Mid-Day Meal (MDM) and Public Distribution System (PDS) respectively.

22. Correct Option: (d)

Explanation:

- Statement 1 is incorrect: Soft corals are flexible organisms often resembling plants and trees and are not reef-building.
- Statement 2 is incorrect: The Great Barrier Reef, located off Australia's East Coast is the largest coral reef in the world.

Supplementary notes:

Coral reefs

- Coral reefs are large underwater structures composed of the skeletons of colonial marine invertebrates called coral.
- The **coral species that build reefs are known as hermatypic, or "hard," corals** because they extract calcium carbonate from seawater to create a hard, durable exoskeleton that protects their soft, sac-like bodies.
- Hard corals rely on **symbiotic algae (zooxanthellae) living within their tissues** for nutrition and energy to build their skeleton.
- Soft corals **look like colourful plants or graceful trees** and **are not reef-building** since they do not produce the hard calcified skeleton of many reef-building corals.

- These types of corals are **flexible organisms often resembling plants and trees and include** species such as sea fans and sea whips
- These types of corals are flexible organisms often resembling plants and trees and include species such as sea fans and sea whips.
- Each individual coral is referred to as a polyp. Coral polyps live on the calcium carbonate exoskeletons of their ancestors, adding their own exoskeleton to the existing coral structure.
- As the centuries pass, the coral reef gradually grows one tiny exoskeleton at a time, until they become massive features of the marine environment.
- **In News -** Australia has downgraded the outlook for Great Barrier Reef to 'very poor' for the first time.

23. Correct Option: (a)

Explanation:

- **Statement 2 is incorrect:** The biggest reason for desertification in India is **water erosion.**

Supplementary notes:

- UNCCD defines desertification as "**land degradation in arid, semi-arid and dry sub-humid** areas resulting from **various factors**, including **climatic variations and human activities**".

Desertification in India

- According to Desertification and Land Degradation of Selected Districts of India, an atlas published by the **Indian Space Research Organisation's Space Application Centre (SAC),** Ahmedabad in 2018, **some 96.40 million ha, or about 30 per cent of the country's total area, is undergoing degradation.**This means almost **a quarter of India** is under desertification.
- Of India's total geographical area of 328.72 million hectares (MHA), **96.4 MHA is under desertification**.
- In eight states—Rajasthan, Delhi, Goa, Maharashtra, Jharkhand, Nagaland, Tripura and Himachal Pradesh—around **40 to 70 per cent of land has undergone desertification**.
- More to it, 26 of 29 Indian states have reported an increase in the area undergoing desertification in the past 10 years.
- **Major Reasons**
  - ➤ Loss of soil cover, mainly due to **rainfall and surface runoff**, is one **of the biggest reasons** for desertification. It is responsible for **10.98 per cent of desertification in the country**.
  - ➤ Water erosion is observed **in both hot and cold desert areas**, across various land covers and with varying levels of severity.
  - ➤ The next big reason is wind erosion

24. Correct Option: (a)

Explanation:

- **Option (a) is correct:** 90-90-90 is an ambitious treatment target to help end the aids epidemic.

Supplementary notes:

UNAIDS '90-90-90' targets

- The targets propose that to end the HIV epidemic by 2030, 90% of persons living with HIV (PLWH) worldwide should know their diagnosis, 90% of diagnosed PLWH should be on antiretroviral therapy (ART) and 90% of PLWH on ART should be virally suppressed by 2020.
- **In news:** Chief of **International AIDS Vaccine Initiative (IAVI**) has said that India is pivotal to the global fight back against AIDS.

25. Correct Option: (b)

Explanation:

- **Option (b) is correct:** Tardigrade can survive even in the **vacuum of space.**

Supplementary notes:

Tardigrades

- They often called **water bears** - are creatures under a millimetre long that can survive being heated to 150C and frozen to almost absolute zero.
- They can survive even in the vacuum of space.
- They were discovered aboard an Israeli spacecraft that crashed on the moon's surface.
- Theoretically be possible for the tardigrades to be collected, brought back to earth, reanimated, and studied to see the effects of being on the moon.

TEST
DAY - 20

Time Allowed: 30 mins **Maximum Marks: 50**

1. Consider the following statements regarding climate and weather:

1. Climate is the average atmospheric conditions of an area over a long time.
2. The weather varies tremendously whereas, the climate is always constant in a region.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

2. Consider the following statements regarding the forces affecting wind:

1. The Coriolis force acts perpendicular to the pressure gradient force
2. More the Coriolis force, the more will be the speed of wind.
3. Pressure Gradient Force is parallel to the isobars.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

3. Consider the following statements:

1. Atmospheric Pressure is the force per unit area exerted against a surface by the weight of the air above that surface.
2. If the surface Atmospheric Pressure is 1,000 Mb, then the Air Pressure at 1 km above the surface will be 900 Mb.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

4. Consider the following statements regarding ionosphere:

1. It is composed of free electrons and positively charged ions.
2. Its size is not fixed.
3. The electron density is higher in the F region than that in the D region of the ionosphere.

Which of the above statements are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

5. Consider the following statements regarding the thermosphere:

1. Despite here the temperature can rise up to 4,500 degrees Fahrenheit, there is no convectional heat transfer in this layer.
2. It is home to the International Space Station.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

6. Consider the following list:

1. Evaporation
2. Transpiration
3. Condensation
4. Volcanic Eruption

Which of the above processes/agent facilitate the redistribution of water across the Planet?

(a) 1,3 and 4 only

(b) 1, 2 and 3 only

(c) 2 and 4 only

(d) 1, 2, 3 and 4

7. Match the following:

	List-I	**List-II**
(A)	Clouds having a feathery appearance, formed at high altitudes	1. Cumulus Cloud
(B)	Clouds look like cotton wool, formed at mid altitudes	2. Cirrus Cloud
(C)	Black or dark gray clouds, formed very near to the surface	3. Nimbus Cloud
(D)	Layered clouds covering large portions of the sky	4. Stratus Cloud

Select the correct answer using the code given below:

	A	B	C	D
(a)	1	2	3	4
(b)	2	3	1	4
(c)	2	1	3	4
(d)	4	1	3	2

8. With reference to the cloud formation and precipitation, consider the following statements:

1. Condensation takes place only when the temperature of air is below the dew point.
2. Condensation takes place only when the temperature of air is lower than the freezing point.
3. Frost forms on cold surfaces when the dew point is at or below the freezing point.

Which of the above statement is/are correct?

(a) 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1 and 2 only

9. Which of the following pairs regarding types of rainfall is/are correct?

1. Convectional: Rain of short duration
2. Cyclonic: Occurs at polar fronts
3. Orographic: Relief rain

Select the correct option using the code given below:

(a) 3 only

(b) 2 and 3 only

(c) 1 and 2 only

(d) 1, 2 and 3

10. Which among the following are the factors controlling temperature distribution on the earth?

1. Latitude
2. Longitude
3. Ocean currents
4. Continentality

Select the correct answer using the code given below:

(a) 1, 2 and 4 only

(b) 2, 3 and 4 only

(c) 1, 3 and 4 only

(d) 1, 2, 3 and 4

11. Consider the following statements regarding atmospheric layers:

1. The homosphere is above the heterosphere.
2. Unlike ionosphere, charged particles are absent in the exosphere.

Which of the above statements is/are ***incorrect***?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

12. Consider the following statements:

1. Inversion of temperature occurs only in the Troposphere.
2. The inversion ceases to exist once the Sun comes out in the troposphere.
3. Over polar areas, a temperature inversion is normal throughout the year.

Which of the above statements are correct?

(a) 1 and 3 only

(b) 2 and 3 only

(c) 1 and 2 only

(d) 1, 2 and 3

13. Which of the following is the reason for the seasons on the Earth?

(a) Earth's rotation

(b) Earth's sphericity

(c) Ellipticity of the Earth's orbit around the Sun

(d) Earth's tilting on its axis

14. Which of the following statements is/ are correct?

1. The average albedo of the Earth is 30–35%.
2. Increasing the forest areas decreases the albedo of the Earth.

Select the correct option using the codes given below:

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

15. Consider the following statements regarding the Composition of Earth's atmosphere:

1. The layer where the composition of atmosphere is uniform in terms of three major gases is called homosphere.
2. Water Vapour goes on decreasing towards the pole from equator.
3. Carbon and Oxygen comprise 99% of the total volume of the atmosphere.

Which of the following statements is/are correct?

(a) 1 only

(b) 1 and 2 only

(c) 3 only

(d) 1 and 3 only

16. Consider the following factors:

1. Continentality
2. Cloud Cover
3. Axial tilt of the earth
4. Direction of mountain chains

Which of the following factors affect the climate?

(a) 1, 2 and 4 only

(b) 2, 3 and 4 only

(c) 1 and 4 only

(d) 1, 2, 3 and 4

17. Upper air inversion is of two type's viz. thermal upper air inversion and mechanical upper air inversion. Which of the following statements is *incorrect* regarding these?

(a) The thermal upper air inversion is caused by the presence of ozone layer lying between the heights of 15 to 35 km.

(b) The mechanical inversion of temperature is caused at higher heights in the atmosphere due to subsidence of air and turbulence.

(c) Mechanical inversion caused by the subsidence of air currents is generally associated with the anticyclonic conditions.

(d) The temperature inversion causes instability in the atmosphere.

18. Which of the following statement is correct regarding Atmospheric Humidity?

(a) Dew is formed when dew point is below freezing point.

(b) Condensation is indirectly related to the relative humidity and the rate of cooling.

(c) When the relative humidity of an air is high, a slight cooling is required to bring the temperature down below dew point.

(d) Smog only occurs in large cities and industrial centres.

19. Bergeron-Findeisen process is related to which of the following processes?

(a) Temperature inversion

(b) Smog formation

(c) Occurrence of Precipitation

(d) Ozone layer formation

20. Consider the following statements regarding the Gases in the Atmosphere:

1. Oxygen combines with all the elements and is most combustible.Carbon Dioxide is transparent to the incoming shortwave but is capable of trapping long wave solar radiation.
2. Plants convert the nitrogen into various usable forms through the process of nitrogen fixation.

Which of the following is are correct?

(a) 1 and 2 only

(b) 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

21. Consider the following statements about Measles:

1. It is a highly contagious bacterial disease.
2. There is vaccine available for it.
3. Cough, Runny nose and Conjunctivitis are its symptoms.

Which of the above statements is/are correct regarding Measles?

(a) 1 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

22. White Sea recently seen in news is surrounded by which of the following countries?

1. Russia
2. Norway
3. Finland
4. Sweden

Select the correct answer using the code given below:

(a) 1 only

(b) 1 and 2only

(c) 2 and 3 only

(d) 1 and 4 only

23. Port of Douala is located in which one of the following country?

(a) Nigeria

(b) Cameroon

(c) Gabon

(d) Republic of the Congo

24. Palani Hills are situated in which among the following states?

(a) Karnataka

(b) Andhra Pradesh

(c) Kerala

(d) Tamil Nadu

25. Strait of Gibraltar connects which two water bodies?

(a) Mediterranean Sea and Black Sea

(b) Atlantic Ocean and Mediterranean Sea

(c) Black Sea and Caspian Sea

(d) North Sea and Baltic Sea

****

ANSWER HINTS

DAY - 20

1. Correct Option: (a)

Explanation:

The difference between weather and climate

- Weather is the state of the atmosphere at a particular place and time as regards heat, cloudiness, dryness, sunshine, wind, rain, etc. Whereas, the average weather conditions, prevalent from one season to another in the course of a year, over a large area is known as climate. The average of these weather conditions is calculated from the data collected for several years (about 35 years) for a larger area.
- The weather or climate can or cannot change in a region.
- Generally, the climate of temperate latitudes is far more variable than that of the tropics. For instance, The climate of the British Isles is so changeable that many people have said that 'Britain has no climate, only weather'. Conversely, the climate of Egypt is so static that it makes a good deal of sense when people say that 'Egypt has no weather, only climate'.

2. Correct Option: (a)

Explanation:

Forces Affecting the speed and Direction of Wind

- The movement of air in the horizontal direction is called wind.
- The wind are under influence of the pressure gradient force(PGF), the frictional force and the Coriolis force.

Pressure Gradient Force (PGF)

- It is the rate of change of pressure with respect to distance.
- It is **perpendicular** to the **isobars** (parallel lines connecting the same atmospheric level). Hence, PGF is strong where the isobars are close to each other and it is weak where the isobars are apart.
- If PGF is high, wind speed will be more.

Coriolis force

- The rotation of the earth about its axis affects the direction of the wind.
- This force is called the Coriolis force (a pseudo force exerted on a moving object i.e. wind by the rotating non-inertial frame observer).
- It is maximum at the poles and is zero at the equator because it is directly proportional to the angle of latitude.
- **The Coriolis force acts perpendicular to the pressure gradient force. Hence, it does not have a role in wind speed.**
- **It has a role only in the direction of wind.** In doing so, it deflects the wind to the right direction in the northern hemisphere and to the left in the southern hemisphere.

Frictional force

- It is due to friction between the features (natural and man-made both) of the Earth and wind.
- It affects the speed of the wind.
- It is greatest at the surface and over the sea surface, it is minimal.

3. Correct Option: (c)

Explanation:

Atmospheric Pressure

- **It is the force per unit area exerted against a surface by the weight of the air above that surface.**
- In other words, it is the **weight of a column of air contained in a unit area from the mean sea level to the top of the atmosphere.**

- Therefore, at a place, if the air is dense for instance near the Earth's surface (due to Gravity), the atmospheric pressure will be more.
- It is expressed in atm (Atmosphere), Mb (millibar) and Pa (Pascal).
- It is measured with the help of a mercury barometer or the aneroid barometer.
- At sea level, the average atmospheric pressure is 1 atm or 1,013.2 Mb or 1,013.2 hPa(kilo Pascal).

Variations of Atmospheric Pressure

- As the Pressure depends on the number of air molecules present at any place, it varies both vertically as well as horizontally.
- This variation of the Atmospheric Pressure has been playing a very important role in Weather and Climate.
- Its variation is the main cause of air motion/wind.

Vertical variation

- The pressure decreases with height because air gets thinner.
- **The average decrease is about 1 Mb per 10m increase in elevation**, subject to other factors such as Temperature, local topography, continentality, etc.
- **Therefore, if the surface Atmospheric Pressure at any place is 1,000 Mb, then the Pressure at 1 km above the surface will be (1000 – 100) Mb i.e. 900mb.**
- Despite the high vertical pressure gradient, there is weak upward wind because the pressure gradient gets weakened by Gravitational force.

Horizontal Variation

- The horizontal variation of the Pressure depends on the differential heating (insolation) of the surface which causes the differential air volumes.
- These variations are highly significant in terms of wind direction and speed. Though the direction and speed depend also on Frictional force and Coriolis force.
- Horizontal distribution of pressure is studied by drawing isobars (lines connecting places having equal pressure) at constant levels.

4. Correct Option: (d)

Explanation:

Ionosphere

- The ionosphere is a very active part of the atmosphere, and it grows and shrinks depending on the energy it absorbs from the Sun. The name ionosphere comes from the fact that gases in these layers are excited by solar radiation to form ions, which have an electrical charge.
- Because of the high energy from the Sun and from cosmic rays, the atoms in this area have been stripped of one or more of their electrons, or "ionized," and are therefore **positively charged**. The **ionized electrons behave as free particles**. The Sun's upper atmosphere, the corona, is very hot and produces a constant stream of plasma and UV and X-rays that flow out from the Sun and affect, or ionize, the Earth's ionosphere. Only half the Earth's ionosphere is being ionized by the Sun at any time.
- It is not a separate layer, but is present in both the layers of the mesosphere and the thermosphere.
- The ionosphere is composed of three main parts viz. the D, E, and F regions. **The electron density is highest in the upper, or F region.** The F region exists during both daytime and nighttime. During the day it is ionized by solar radiation, during the night by cosmic rays. The D region disappears during the night compared to the daytime, and the E region becomes weakened.
- During the night, the ionosphere has only the F and E layers. During the daytime, the Sun's X-ray and UV light increase the ionization of the ionosphere, creating the D and enhancing the E layers, and splitting the F region into 2 layers. **Thus, the size of the ionosphere is not fixed.**

5. Correct Option: (c)

Explanation:

Thermosphere

- The thermosphere lies between the exosphere and the mesosphere. "Thermo" means heat, and the temperature in this layer can reach **up to 4,500 degrees Fahrenheit**.
- There **aren't enough gas molecules to convectional transfer the heat in this layer**.
- This also means there aren't enough molecules for sound waves to travel through.
- The **thermosphere is home to the International Space Station** and the low Earth orbit satellites.

6. Correct Option: (d)

Explanation:

Redistribution of water

- Water, essential for life on the Earth, is present in all of its forms viz. Solid, liquid and gas.
- Likewise, its redistribution is also necessary.
- **It is redistributed by various processes such as evaporation, precipitation, transpiration, condensation, Earth's rotation, volcanic eruption, etc. and by various agents including wind.**

Evaporation

- **It is the process by which water is vaporized that occurs on the surface of a liquid as it changes into the gas phase. Heat** is the main cause of this process.

Transpiration

- It is essentially an evaporation of water from plant leaves surface.

Condensation

- **It is the process by which water vapor transforms into liquid form.**
- The **cloud making** is a kind of condensation.

Volcanic Eruption:

- It is a process by which the magma along with various gases including water vapor from the asthenosphere comes out on the Earth's surface.

Wind

- It is the horizontal movement of air along the decreasing Pressure Gradient Force (PGF).
- Wind facilitates the movement of water vapor.
- Further, Wind the most important factor of the Ocean Current.

7. Correct Option: (c)

Explanation:

Clouds

- Cloud is a mass of minute water droplets or tiny crystals of ice formed by the condensation of the water vapor in free air at considerable elevation.
- As the clouds are formed at some height over the surface of the earth, they take various shapes.
- According to their shape, density, opaqueness, etc. clouds are of four types viz. cirrus, cumulus, stratus and nimbus.

Cirrus Clouds

- These clouds are formed at high altitudes (8,000 - 12,000m).
- They are thin and detached clouds having a feathery appearance.

Cumulus Clouds

- Cumulus clouds look like cotton wool.
- They are generally formed at middle height of 4,000- 7,000 m.

Stratus Clouds

- **These clouds are layered clouds covering large portions of the sky.**
- These clouds are generally formed either due to loss of heat or the mixing of air masses with different temperatures.

Nimbus Clouds

- **Nimbus clouds are black or dark gray.**
- **They form at middle levels or very near to the surface of the earth.**
- **These are extremely dense and opaque to the rays of the sun.**

8. Correct Option: (c)

Explanation:

Cloud formation

- The formation of cloud starts from evaporation. By this, the humidity of the air increases.
- After this, the condensation takes place.
- First, air filled with moisture (due to evaporation) rise up to a point where its relative humidity should be more than the surrounding air.
- **Then, if the temperature of air is below the dew point (at that place), the moisture present in the air gets condensed around condensation nuclei (suspended microparticles).**
- Condensation takes place when the dew point is lower than the freezing point as well as higher than the freezing point. That is, **the condensation does not depend on the freezing point. Rather, it depends on the condition that the temperature of the air must be below**

the Dew point.

- After this, the condensation can take various forms like clouds, dew, frost, etc.
- **Frost forms on cold surfaces when the dew point is at or below the freezing point.**
- **For the formation of dew, it is necessary that the dew point is above the freezing point.**

9. Correct option: (d)

Explanation:

Types of Precipitation

- **Conventional Rain:** The, air on being heated, becomes light and rises up in convection currents. As it rises, it expands and loses heat and consequently, condensation takes place and cumulous clouds are formed. With thunder and lightning, **heavy rainfall takes place but this does not last long.** Such rain is common in the summer or in the hotter part of the day. It is very common in the equatorial regions and interior parts of the continents, particularly in the northern hemisphere.
- **Orographic Rain**: When the saturated air mass comes across a mountain, it is forced to ascend and as it rises, it expands; the temperature falls, and the moisture is condensed. The chief characteristic of this sort of rain is that the windward slopes receive greater rainfall. After giving rain on the windward side, when these winds reach the other slope, they descend, and their temperature rises. Then their capacity to take in moisture increases and hence, these leeward slopes remain rainless and dry. The area situated on the leeward side, which gets less rainfall is known as the rain-shadow area. **It is also known as the relief rain.**
- **Cyclonic Rain:** This type of precipitation occurs along the frontal zones of convergence particularly, at the Inter-Tropical Convergence Zone and at the polar fronts.

10. Correct Option: (a)

Explanation:

Factors Controlling Temperature Distribution

- The temperature of the air at any place is influenced by the following factors:
  - The **Latitude**: The temperature of a place depends on the insolation received. Since the insolation varies according to the latitude, the temperature also varies accordingly.
  - The **Altitude**: The atmosphere is indirectly heated by terrestrial radiation from below. Therefore, the places near the sea-level record a higher temperature than the places situated at higher elevations. In other words, the temperature generally decreases with increasing height.
  - **Distance from the Sea or, the continentality**: Compared to land, the sea gets heated slowly and loses heat slowly. Land heats up and cools down quickly. Therefore, the variation in temperature over the sea is less compared to land. The places situated near the sea come under the moderating influence of the sea and land breezes which moderate the temperature.
  - **Air-Mass and Ocean Currents:** The places, which come under the influence of warm air-masses experience higher temperature and the places that come under the influence of cold air masses experience low temperatures. Similarly, the places located on the coast where the warm ocean currents flow record higher temperatures than the places located on the coast where the cold currents flow.

11. Correct Option: (c)

Explanation:

Atmosphere

- **Up to the height of 80 km in the atmosphere, the homogeneity of the proportion of various gases is present. Hence, this layer is called the homosphere. Beyond the homosphere, there are atomic layers of nitrogen, oxygen, helium, and hydrogen. The region of heterogeneity is called heterosphere.**
- The exosphere extends from 640 km to 1000 km of height from the sea level. **Electrically charged particles are found abundantly in this layer too** and there are separate layers of N_2, O_2, He and H_2. The atmosphere becomes rarefied at the height of 1000 km and it ultimately merges with the space beyond the height of 1000 km.

12. Correct option: (b)

Explanation:

Inversion of Temperature

- Ideally, with an increase in height, temperature decreases. However, there are certain conditions when the temperature increases with height instead of decreasing which is contrary to the ideal situation. This contradictory phenomenon is called temperature inversion.
- It occurs in the troposphere, stratosphere and thermosphere.
- Under normal situations, in the troposphere, the temperature of the atmosphere decreases with an increase in the altitude at the rate of 1 degree for every 165 meters which are called the normal lapse rate.
- In the troposphere, a long winter night with clear skies and still air is an ideal situation for inversion. The heat of the day radiated off during the night, and by early morning hours, the earth is cooler than the air above. Over polar areas, a temperature inversion is normal throughout the year.
- Smoke and dust particles get collected beneath the inversion layer and spread horizontally to fill the lower strata of the atmosphere. Dense fogs in the mornings are common occurrences, especially during the winter season. This inversion commonly lasts for a few hours until the sun comes up and beings to warm the earth.
- In the stratosphere and thermosphere, the temperature increases with height due to the presence of the ozone layer and ions in these layers correspondingly.

13. Correct option: (d)

Explanation:

Reasons for the Season

- A season is a period of the year that is distinguished by special climate conditions. The four seasons-spring, summer, fall, and winter-follow one another regularly. Each has its own light, temperature, and weather patterns that repeat yearly.
- **The seasons are caused by the tilt of the Earth's rotational axis away or toward the sun as it travels through its year-long path around the sun.** All the other reasons are there but they have only supplementary effects.
- In June, when the Northern Hemisphere is tilted toward the sun, the sun's rays hit it for a greater part of the day than in winter. This means it gets more hours of daylight. In December, when the Northern Hemisphere is tilted away from the sun, with fewer hours of daylight. This causes the seasons on the Earth.

14. Correct option: (c)

Explanation:

Albedo of the Earth

- Albedo is a measure of the reflectivity of a surface. The albedo effect when applied to the Earth is a measure of how much of the Sun's energy is reflected back into space. Overall, the Earth's albedo has a cooling effect. **About one-third of that energy from the Sun is reflected by the Earth back into space.**
- **If Earth was completely covered in ice, its albedo would be about 0.84, meaning it would reflect most (84 percent) of the sunlight that hit it. On the other hand, if Earth was covered by a dark green forest canopy, the albedo would be about 0.14 (most of the sunlight would get absorbed). Thus, increasing green cover decreases the albedo of the Earth.**
- Changes in ice cover, cloudiness, airborne pollution, or land cover (from forest to farmland, for instance) all have subtle effects on global albedo.

15. Correct Option: (b)

Explanation:

Composition of the Atmosphere

- The atmosphere is a mixture of many gases, water vapour and dust particles. It also contains huge amount of solid and liquid particles collectively known as "aerosols". Pure dry air consists mainly of Nitrogen, Oxygen, Argon, and Carbon dioxide, Hydrogen, Helium and Ozone. Besides, water vapour, dust particles, smoke, salts are also present in air in varying quantities. The composition of atmosphere upto an altitude of about 90 km is uniform in terms of three major gases - Nitrogen, Oxygen and Argon. This layer is generally, called homosphere. Above 90 km, the composition begins to change with progressive increase in the lighter gases. This layer is known as heterosphere.

Gases

- **Nitrogen and Oxygen comprise 99% of the total volume of the atmosphere.** But they are climatically of little consequences. Nitrogen doesn't easily enter into chemical union with other substances but gets fixed into the soil. It serves mainly as diluents and regulates combustion.

- It is available to the organisms through plants. Plants convert the nitrogen into various usable forms through the process of nitrogen fixation. Various industries like fertilizer industries, explosive industries, etc. use the nitrogen available in atmosphere as raw material. So, it is of great biological and economical importance.
- Oxygen combines with all the elements and is most combustible.
- Carbon dioxide constitutes a small percentage of the atmosphere. It is transparent to the incoming shortwave but is capable of trapping long wave solar radiation. It can absorb heat and allow the lower atmosphere to be warmed up by heat radiation coming from the sun and from the earth's surface. It is largely responsible for the greenhouse effect.
- However increase in its concentration culminates to rise in temperature thus global warming.
- It is equally important in supporting the life as well as deterring it. CO2 is found in the atmosphere as free gas as well as in the dissolved from.

Water Vapour

- Water vapor is a variable factor which ranges from 0 to 4% depending on various factors of the region like, atmospheric circulation of wind, temperature, supply of moisture, vegetation, concentration of population, and human activities, etc. Water vapour controls to a great extent the climatic condition of the area. Temperature is the primary factor which controls the presence of water vapour. **So, it goes on decreasing towards the pole from equator**. It's concentration is in the lower strata of the atmosphere upto the height of 5 km. The moisture content of the atmosphere creates several forms of condensation and precipitation e.g. clouds, fogs, dew, rainfall, frost, hailstorm, ice, snowfall, etc.

Particulate Matter

- The particulate matters present in the atmosphere includes dust particles, salt particles, pollen, smoke and soot, volcanic ashes, etc. They are kept in suspension in the atmosphere. When the smoke is mixed with the fog it forms smog. It persists in the atmosphere for longer time than the fog and reduces the visibility of the region to a great extent, sometimes even to few metres bringing the tra□cs to a standstill and is responsible for fatal accidents. They are the main cause of haze formation.

16. Correct Option: (a)

Explanation:

Factors Affecting Climate

- **Latitude or Distance from the Equator:** The places near the equator are warmer than the places which are far away from it. This is because the rays of the sun fall vertical on the equator and slanting in the temperate and polar regions. Therefore, lower the latitude higher is the temperature and vice versa.
- **Altitude or the Height from the mean sea level:** The temperature decreases with increase in height as atmosphere is heated from below.
- **Continentality or the Distance from the Sea:** The water is a bad conductor of heat i.e. It takes longer time to heat and longer time to cool. Due to this moderating effect of the sea, places near the coast have low range of temperature and high humidity. The places in the interior of the continent do not experience moderating effect of the sea. These places have extreme temperatures. Mumbai has relatively lower temperature and higher rainfall than Nagpur, although both are almost situated on the same latitude.
- **Nature of the Prevailing Winds:** The on-shore winds bring the moisture from the sea and cause rainfall on the area through which they pass. The off -shore winds coming from the land are dry and help in evaporation. In India, the on-shore summer monsoon winds bring rains while off -shore winter monsoon winds are generally dry.
- **Cloud Cover:** In areas generally of cloudless sky as in deserts, temperature even under shade is very high because of the hot day time sunshine. At night this heat radiates back from the ground very rapidly. It results in a large diurnal range in temperature. On the other hand under cloudy sky and heavy rainfall at Thiruvananthapuram the range of temperature is very small.
- **Ocean Currents:** Ocean waters move from one place to another partly as an attempt to equalize temperature and density of water. The warm ocean currents raise the temperature of the coast and sometimes bring rainfall, while the cold currents lower the temperature and create fog near the coast. Port Bergen in Norway is free from ice even in winter due to warm North Atlantic Drift while Port Quebec

in Canada remains frozen during winter months due to chilling effect of the Cold Labrador Current in spite of the fact that Port Quebec is situated in much lower latitude than Port Bergen.

- **Direction of Mountain Chains:** The mountain chains act as natural barrier for the wind. The on-shore moisture laden winds are forced to rise after striking against the mountain; and give heavy rainfall on the windward side. These winds descending on the leeward side cause very low rainfall. The great Himalayas check the moisture laden monsoon winds from crossing over to Tibet. This mountain chain also checks biting polar cold winds from entering into India. This is the reason for which northern plains of India get rains while Tibet remains a perpetual rain shadow area with lesser amount of rainfall.
- **Slope:** The concentration of heat being more on the gentler slope raises the temperature of air above them. Its lesser concentration along steeper slopes lowers the temperature. At the same time, mountain slopes facing the sun are warmer than the slopes which are away from the sun's rays. The southern slopes of Himalaya are warmer than the northern slopes.
- **The Nature of the Soil and Vegetation Cover:** The nature of soil depends upon its texture, structure and composition. These, qualities vary from soil to soil.

17. Correct Option: (d)

Explanation:

Upper Air Inversion

- Upper air inversion is of two type's viz. (i) thermal upper air inversion and (ii) mechanical upper air inversion.
- The thermal upper air inversion is caused by the presence of ozone layer lying between the heights of 15 to 35 km (even up to 80 km) in the stratosphere.
- The mechanical inversion of temperature is caused at higher heights in the atmosphere due to subsidence of air and turbulence and convertible mechanisms. Mechanical inversion caused by the subsidence of air currents is generally associated with the anticyclones conditions. This type of inversion of temperature is very common in the middle latitude where high pressures are characterized by sinking air.
- The pole wards regions of the winds are also characterized by high pressure caused by the subsidence of air resulting into mechanical inversion of temperature.
- **The temperature inversion causes stability in the atmosphere**. This is the reason that the poleward parts of trade winds are characterized by arid conditions.

18. Correct Option: (c)

Explanation:

Atmospheric Humidity & Rainfall

Condensation

- Condensation is the process by which atmospheric water vapour changes into water or ice crystals. It is just reverse of the process of evaporation. When the temperature of saturated air falls below dew point, the air cannot hold the amount of humidity which it was holding earlier at a higher temperature. This extra amount of humidity changes into water droplets or crystals of ice depending upon the temperature at which condensation takes place.
- The temperature of the air falls in two ways. Firstly, cooling occurs around very small particles of freely floating air when it comes in contact with some colder object. Secondly, loss in air temperature takes place on a massive scale due to rising of air to higher altitudes.
- The condensation takes place around the smoke, salt and dust particles which attract water vapour to condense around them. They are called hygroscopic nuclei. When the relative humidity of an air is high, a slight cooling is required to bring the temperature down below dew point.
- But when the relative humidity is low and the temperature of the air is high, a lot of cooling of the air will be necessary to bring the temperature down below dew point. Thus, **condensation is directly related to the relative humidity and the rate of cooling.**
- Condensation takes place in two situations, firstly, when dew point is below freezing point or below 0°C and secondly, when it is above freezing point. In this way, the forms of condensation may be classified into two groups:
  - ➤ Frost, snow and some clouds are formed when dew point is below freezing point.
  - ➤ Dew, mist, fog, smog and some clouds are formed when dew point is above freezing point

- The forms of condensation may also be classified on the basis of place where it is occurring, for example, on the ground or natural objects such as grass blades and leaves of the plants or trees, in the air close to the earth's surface or at some height in the troposphere.
- **Dew:** When the atmospheric moisture is condensed and deposited in the form of water droplets on cooler surface of solid objects such as grass blades, leaves of plants and trees and stones, it is termed as dew. Condensation in dew form occurs when there is clear sky, little or no wind, high relative humidity and cold long nights. These conditions lead to greater terrestrial radiation and the solid objects become cold enough to bring the temperature of air down below dew point. In this process the extra moisture of the air gets deposited on these objects. **Dew is formed when dew point is above freezing point.**
- **Frost:** When the dew point is below freezing point, under above mentioned conditions, the condensation of extra moisture takes place in the form of very minute particles of ice crystals. It is called frost. In this process, the air moisture condenses directly in the form of tiny crystal of ice. This form of condensation is disastrous for standing crops such as potato, peas, pulses, grams, etc. It also creates problems for road transport system.
- **Mist and Fog:** When condensation takes place in the air near the earth's surface in the form of tiny droplets of water hanging and floating in the air, it is called mist. In mist the visibility is more than one kilometer and less than two kilometers. But when the visibility is reduced to less than one kilometer, it is called fog. Ideal conditions for the formation of mist and fog are clear sky, calm and cold winter nights.
- **Smog:** Smog is a fog that has been polluted and discoloured by smoke, dust, carbon monoxide, sulphur dioxide and other fumes. **Smog frequently occurs in large cities and industrial centres**. It causes respiratory illness.
- **Clouds:** Clouds are visible aggregates of water droplets, ice particles, or a mixture of both along with varying amounts of dust particles. A typical cloud contains billions of droplets having diameters on the order 0.01 to 0.02 mm; yet liquid or solid water accounts for less than 10 parts per million of the cloud volume. Clouds are generally classified on the basis of their general form or appearance and altitude.

19. Correct Option: (c)

Explanation:

Conditions of Occurrence of Precipitation

- Precipitation is the result of a complex series of micro-physical processes within a cloud.
- Precipitation may form as a result of collision and coalescence within a cloud.
- Precipitation may form where ice crystals and water droplets coexist within a cloud; this precipitation mechanism is known as the **Bergeron-Findeisen process**.
- Precipitation-size droplets do not form instantly. It takes time for the droplets to grow in size. Only if the conditions favorable to droplet growth last for a su□cient length of time then only precipitation will reach the ground.

20. Correct Option: (d)

Explanation:

Gases

- Nitrogen and Oxygen comprise 99% of the total volume of the atmosphere. But they are climatically of little consequences. Nitrogen doesn't easily enter into chemical union with other substances but gets fixed into the soil. It serves mainly as diluents and regulates combustion.
- It is available to the organisms through plants. **Plants convert the nitrogen into various usable forms through the process of nitrogen fixation.** Various industries like fertilizer industries, explosive industries, etc. use the nitrogen available in atmosphere as raw material. So, it is of great biological and economical importance.
- **Oxygen combines with all the elements and is most combustible**.
- Carbon dioxide constitutes a small percentage of the atmosphere. **It is transparent to the incoming shortwave but is capable of trapping long wave solar radiation**. It can absorb heat and allow the lower atmosphere to be warmed up by heat radiation coming from the sun and from the earth's surface. It is largely responsible for the greenhouse effect.
- However increase in its concentration culminates to rise in temperature thus global warming.
- It is equally important in supporting the life as well as deterring it. CO2 is found in the atmosphere as free gas as well as in the dissolved from.

21. Correct option: (b)

Explanation:

- **Statement 1 in incorrect:** Measles is a highly contagious **viral disease**.

Supplementary notes:

- Measles is a **childhood infection caused by a virus**. Also called rubeola, it can be serious and even fatal for small children.
- Once quite common, measles can now almost always be **prevented with a vaccine**.
- **Causes:**
  - Measles is a highly contagious illness caused by a virus that replicates in the nose and throat of an infected child or adult. Then, when someone with measles coughs, sneezes or talks, infected droplets spray into the air, where other people can inhale them.
  - The infected droplets may also land on a surface, where they remain active and contagious for several hours. We can contact the virus by putting our fingers in our mouth or nose or rubbing oour eyes after touching the infected surface.
- **Symptoms**: Measles signs and symptoms appear around **10 to 14 days after exposure** to the virus. Signs and symptoms of measles typically include:
  - Fever
  - Dry cough
  - Runny nose
  - Sore throat
  - Inflamed eyes (conjunctivitis)
  - Tiny white spots with bluish-white centers on a red background found inside the mouth on the inner lining of the cheek
  - A skin rash made up of large, flat blotches that often flow into one another
- **In news**: World Health organization recently said that the number of measles cases reported have almost tripled in the first seven months this year.

22. Correct option: (a)

Explanation:

- **Option (a) is correct:** White Sea is surrounded by Russia only.

Supplementary notes:

- The whole of the White Sea is under Russian sovereignty and considered to be part of the internal waters of Russia.

- The major port of Arkhangelsk of Russia is located on the White Sea.
- For much of Russia's history this was Russia's main centre of international maritime trade, conducted by the Pomors ("seaside settlers") from Kholmogory.
- In the modern era it became an important Soviet naval and submarine base. The White Sea–Baltic Canal connects the White Sea with the Baltic Sea.
- **In news**: Russia recently said that the failed missile test that ended in an explosion killing five atomic scientists few weeks earlier on Russia's White Sea involved a small nuclear power source.

23. Correct Option: (b)

Explanation:

- **Option (b) is correct:** Port of Douala is located in Cameroon.

Supplementary notes:

Douala Port

- Douala is the largest city in Cameroon. It is economic capital of Cameroon and the entire CEMAC region comprising Gabon, Congo, Chad, Equatorial Guinea, Central African Republic and Cameroon.
- It is also the capital of Cameroon's Littoral Region.
- Consequently, it handles most of the country's major exports, such as oil, cocoa and coffee, timber, metals and fruits.
- The city sits on the estuary of Wouri River and its climate is tropical.

In news:

- Recently, nine Chinese and eight Ukrainian seamen have been abducted after two merchant vessels came under attack in Cameroonian waters.

- The attacks took place off the Port of Douala.

24. Correct option: (d)

Explanation:

- **Option (d) is correct:** Palani Hills are located in Palani Town in Dindigul District of Tamil Nadu.

Supplementary notes:

- Palani Panchamirtham is added as one of the 4 new GI tags by the Department for Promotion of Industry and Internal Trade (DPIIT).
- It is an abishega Prasadam, from Palani Town in Dindigul District of Tamil Nadu.
- It is one of the main offerings in the Abisegam of Lord Dhandayuthapani Swamy, the presiding deity of Arulmigu Dhandayuthapaniswamy Temple, situated in Palani Hills.
- It is a combination of five natural substances, namely, banana, jaggery sugar, cow ghee, honey and cardamom in a definite proportion.
- It is prepared in a natural method without addition of any preservatives or artificial ingredients and is well known for its religious fervour and gaiety.
- This is the first time a temple 'prasadam' from Tamil Nadu has been bestowed with the GI tag.
- **In news**: The Geographical Indication (GI) under the Department for Promotion of Industry and Internal Trade has recently registered 4 new GIs:
  - Palani Panchamirtham from Tamil Nadu,
  - Tawlhlohpuan and Mizo Puanchei from Mizoram and
  - Tirur Betel leaf from Kerala

25. Correct option: (b)

Explanation:

- **Option (b) is correct**: Strait of Gibraltar connects Atlantic Ocean and Mediterranean Sea.

Supplementary notes:

- Gibraltar is a British Overseas Territory located at the bottom of Spain on the narrow gap between Europe and Africa.
- Known as the Gib or the Rock, it is a small 2.5-mile-squared area with a population of just 30,000 - but it has huge strategic importance.
- This is because from this spot a navy can potentially control shipping in and out of the Mediterranean - much of it coming from Asia having travelled through the Suez Canal.
- The UK, a key member of NATO, has a naval and military base there for this reason.

- **In news**: Gibraltar recently allowed a detained Iranian supertanker Grace 1 to leave the British overseas territory after a last-minute U.S. attempt to seize the vessel.

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TEST
DAY - 21

Time Allowed: 30 mins **Maximum Marks: 50**

1. Which of the following pairs regarding the horizontal distribution of the atmospheric pressure is/are correctly matched?

1. 5^0S: Doldrums
2. 30°N: Horse latitude
3. 90^0N: Low-Pressure belt

Select the correct option using the codes given below:

(a) 1 only
(b) 1 and 2 only
(c) 3 only
(d) 1, 2 and 3

2. Consider the following list:

1. Easterly Waves
2. West African Disturbance Line
3. Tropical Upper Tropospheric Trough
4. Old Frontal Boundary

Which of the above list are required for the formation of a tropical cyclone.

(a) 2 and 4 only
(b) 1 and 3 only
(c) 1, 2, and 3 only
(d) 1, 2, 3, and 4

3. Tropical cyclones differ temperate cyclone in a number of ways. Regarding this, which of the following statements is/are correct?

1. The Temperate Cyclones affect a much larger area as compared to the Tropical cyclone.
2. The Tropical Cyclones move from west to east but, Temperate Cyclones move from east to west.
3. The Temperate Cyclones can originate over the land and sea but Tropical Cyclones can originate only over the seas.

Select the correct option using the codes given below:

(a) 2 only
(b) 1 and 3 only
(c) 1 and 2 only
(d) 1, 2, and 3

4. Consider the following statements regarding the circulation of planetary winds:

1. The planetary winds deflect according to the Ferrel's Law.
2. Westerlies blow from Subpolar pressure belts to sub-tropical belts.
3. Polar easterlies blow towards the poles.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

5. Which of the following statements regarding Jet Stream is/are correct?

1. They are the broad bands of weak wind in the upper levels of the troposphere.
2. The jet stream is the strongest near the Poles.
3. Rossby Waves are the meandering Jet Streams.

Select the correct option using the codes given below:

(a) 3 only

(b) 1 and 2 only

(c) 1 only

(d) 1, 2 and 3

6. Which of the following statements regarding local winds of the world is/ are correct?

1. Foehn is a warm wind whereas, Chinook is a cold wind.
2. Sirocco is a Mediterranean wind causing cool wet weather in Europe.
3. Zonda is a hot wind of the Andes.

Select the correct option using the codes given below:

(a) 3 only

(b) 2 and 3 only

(c) 1 only

(d) 1 and 3 only

7. Consider the following statements regarding katabatic wind:

1. Any wind blowing up a steep incline or mountain is a katabatic wind.
2. Katabatic winds flow during nights.
3. Bora is katabatic wind.

Which of the following statements is/are correct?

(a) 3 only

(b) 1 only

(c) 2 and 3 only

(d) 1, 2 and 3

8. Consider the following statements:

1. Atmospheric circulation is dominated by two major features viz. Hadley cell and the jet stream.
2. Clouds of the tropical region do not shift into the sub-tropical region.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

9. Consider the following statements:

1. A dry, warm summer with offshore trade winds.
2. Rainfall in winter with on-shore westerlies.
3. The climate is best suitable for wine production and orchard farming.

Which of the following climate type best suits the above characteristics?

(a) Laurentian

(b) British

(c) China

(d) Mediterranean

10. Consider the following statements:

1. The cool temperate western margins are under the influence of the Westerlies all-round the year.
2. They are the regions of frontal cyclonic activity.
3. It is also called a North-West European Maritime Climate due to greater oceanic influence.

Which of the following climate type best describes the above characteristics?

(a) Laurentian Type

(b) Siberian Type

(c) Mediterranean Type

(d) British Type

11. Which of the following statements is/ are correct about 'humidity'?

1. The actual amount of water vapor present in the atmosphere is known as relative humidity and expressed as grams per cubic meter.
2. The ability to hold moisture by air depends on the temperature.
3. Relative humidity is greater over continents compared to oceans.

Select the correct answer using the given below:

(a) 1 only

(b) 2 only

(c) 2 and 3 only

(d) 1, 2 and 3

12. Deserts can be formed due to___

1. Continentality
2. Off-shore Trade Winds
3. Warm Ocean currents

Select the correct option using the codes given below:

(a) 1, 2 and 3

(b) 2 and 3 only

(c) 1 and 2 only

(d) 2 only

13. Which of the following is the characteristic feature of the Sudan Type of Climate?

(a) This climate witnesses very high rainfall with high temperature throughout the year.

(b) The trade winds in the region bring rain to the coastal districts.

(c) Cold laden winds 'Harmattan' flows in the region which increases the rate of evaporation.

(d) None

14. Which of the following statements regarding the tropical cyclone is/are *incorrect*?

1. Eye is the center of the cyclone where torrential rainfall occurs.
2. Eyewall is a region of strong ascending air up to the tropopause.
3. The eye can grow or shrink in size.

Select the correct option using the codes given below:

(a) 1 only

(b) 2 only

(c) 3 only

(d) None of the above

15. Consider the following statements regarding Tsunamis:

1. Tsunamis are not tidal waves.
2. They strike generally in the winters.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

16. Consider the following statements:

1. Generally there is an inverse relationship between air temperature and air pressure.
2. The oceans are associated with low pressure in winter and high pressure in summer.

Which of the following statement is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

17. Consider the following statements regarding Wind:

1. The equator ward part of the trade wind is humid.
2. Westerlies wind are more stronger in the northern hemisphere as compared to the southern hemisphere.

Which of the following statement is/are ***incorrect***?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

18. Consider the following statements regarding the Laurentian type of climate:

1. It is an intermediate type of climate between the British and the Siberian type of climate.

2. Laurentian type of climate is found only in two regions in the world.
3. This type of climate is absent in Northern Hemisphere.
4. Oak, beech, maple and birch are the principal trees north of the 50°N latitude.

Which of the following is/are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 4 only

(d) 3 and 4 only

19. The atmospheric circulation is driven by the rotation of the earth and the incoming energy from the sun. Which of the following statements related to it is/are *incorrect*?

1. The doldrums lies at the Tropic of Cancer as well as Tropic of Capricorn.
2. Subtropical Jet Streams are always easterlies and Tropical Jet Streams are always westerlies.
3. The energy at the Ferrel cell is provided by the polar and Hadley cells circulating on either side.

Select the correct answer using the code given below:

(a) 3 only

(b) 2 and 3 only

(c) 1 and 2 only

(d) 1, 2 and 3

20. Which of the following statements is correct regarding Thunderstorms and Tornadoes?

(a) Both are violent storms occurring over a small area but for a short duration.

(b) If there is insufficient moisture, a Tornado can generate dust storms.

(c) Thunderstorms over the sea are called water sprouts.

(d) Thunderstorms are caused by intense convection on dry hot days.

21. Inner Line Permit (ILP) is in force today in which of the north-eastern states?

1. Arunachal Pradesh
2. Nagaland
3. Mizoram
4. Assam
5. Sikkim

Choose the correct option from the given options

(a) 1, 2, 3

(b) 1, 3, 4, 5

(c) 2, 3, 4

(d) All of the above

22. Consider the following statements about bodos tribe that was in news recently:

1. Bodos are the single largest tribal community in Assam, making up over 5-6 per cent of the state's population.
2. Bodos demand to create a separate state of Bodoland

Which of the above statement(s) is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

23. Union Home ministry has introduced a bill for the merger of Union Territories of Dadra and Nagar Havelli and Daman and Diu recently in the Parliament. What are the main reasons behind this move?

1. Both UTs have two separate constitutional and administrative bodies which lead to a lot of duplicacy, inefficiency and wasteful expenditure.
2. The merger will help in achieving the government's goal to have Minimum Government, Maximum Governance.
3. Both of them have small population and limited geographical area so the

merger will not be challenging and the services of officers will be used efficiently.

4. Both have same language and ethinicity.

Choose the correct answer?

(a) 1 and 2 only

(b) 1, 2 and 3 only

(c) 2 and 4 only

(d) 1, 2, 3 and 4

24. What was the theme of the World Soil's Day 2019?

(a) Stop Soil Erosion, Save Our Future'

(b) Stop Soil Degradation

(c) Organic Framing

(d) Control use of excessive fertilizers

25. What are the implications of ongoing US-China trade war?

1. Sharp decline in bilateral trade
2. Higher prices for consumers
3. Trade diversion effects
4. India is a gainer in this war

Choose the correct option

(a) 1 and 2 only

(b) 1, 2 and 3 only

(c) 1, 2, 3 and 4

(d) 3 and 4 only

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ANSWER HINTS

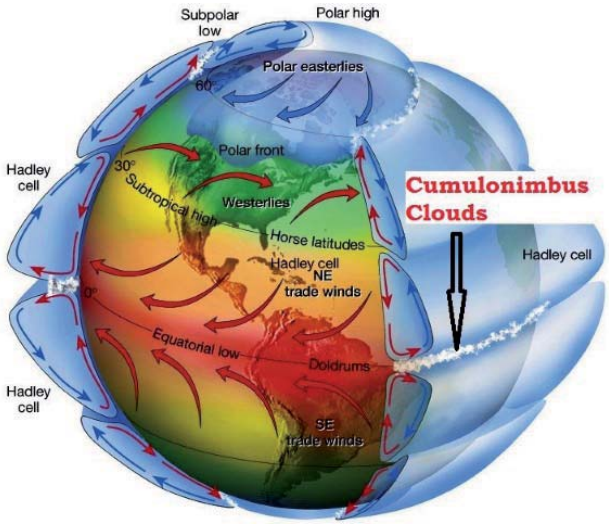
DAY - 21

1. Correct Option: (b)

Explanation:

World pressure belts

- There are distinctly identifiable zones of homogeneous horizontal pressure regimes or 'pressure belts'. On the earth's surface, there are in all seven pressure belts.
- These are Equatorial low, sub-tropical highs(2), the sub-polar lows(2), and the polar highs(2).



- Equatorial low: its width may vary between 5°N and 5°S and 20°N and 20°S depending on the apparent movement of the Sun. This belt happens to be the zone of convergence of trade winds from two hemispheres from sub-tropical high-pressure belts. **This belt is also called the Doldrums, because of the extremely calm air movements.**
- Sub-tropical highs: About 30°N. and S. occur the Sub-Tropical High-Pressure Belts where the air is comparatively dry and the winds are calm and light. **It is a region of descending air currents or wind divergence and anticyclones. It is frequently referred to as the Horse Latitudes.**
- Sub-polar lows: Around the latitudes 60°N. and S. are two Tem¬perate Low-Pressure Belts which are also zones of convergence with cyclonic activity. The sub-polar low-pressure areas are best developed over the oceans, where temperature differences between summer and winter are negligible.
- Polar highs: At the North and South Poles 90°N. and S. where temperatures are permanently low, are the Polar **High-Pressure Belts**.

2. Correct Option: (d)

Explanation:

Conditions favorable for the formation of the Tropical cyclones

- Large surface area with Sea Surface Temperature higher than 27^0C.
- Presence of Coriolis force, that's why the Cyclones originate at some distance from the ITCZ (Inter Tropical Convergence Zone).
- Low-pressure areas at the sea surface i.e. a cyclonic convergence area and Upper divergence area above the sea.
- Small variations in the vertical wind speed.
- Just having warm water alone is not enough for the formation of a tropical cyclone. There also needs to be a disturbance in the atmosphere such as:
  - **Easterly Waves**: Also called tropical waves, this is an inverted trough of low pressure moving generally westward in the tropical easterlies. A trough is defined as a region of relative low pressure. The majority of tropical cyclones form from easterly waves.
  - **West African Disturbance Line** (WADL): This is a line of convection that forms over West Africa and moves

into the Atlantic Ocean. WADL's usually move faster than tropical waves.

- **TUTT: A TUTT (Tropical Upper Tropospheric Trough**) is a trough, or cold core low in the upper atmosphere, which produces convection. On occasion, one of these develops into a warm-core tropical cyclone.
- **Old Frontal Boundary**: Remnants of a polar front can become lines of convection and occasionally generate a tropical cyclone. In the Atlantic Ocean storms, this will occur early or late in the hurricane season in the Gulf of Mexico or Caribbean Sea.

3. Correct Option: (b)

Explanation:

Tropical Cyclones

- Tropical Cyclones are violent storms that originate over the seas in the Low-Pressure belt of the tropical areas and move eastward over to the coastal areas.
- They bring about large scale destruction caused by violent winds, very heavy rainfall and storm surges which make them one of the most devastating natural calamities.
- They are known as Cyclones in the Indian Ocean, Hurricanes in the Atlantic, Typhoons in the Western Pacific and South China Sea, and Willy-willies in Western Australia.
- **They originate only over the seas** because of the need for continuous moisture to energize the Cyclones regularly. This is why they dissipate once reaching the land.
- They are violent because of the energy coming from the condensation process in cumulonimbus clouds surrounding the Cyclones.
- **They move from east to west because they are facilitated by the Trade wind.**

Temperate Cyclone

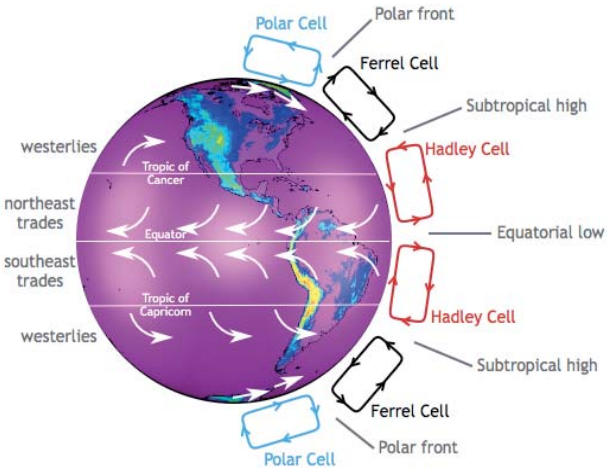
- This system develops in the mid and high latitude (around 60^0 latitude) along the polar front (boundary between the warm air and cold air).
- **As the polar front develops over the entire polar frontal system, this cyclone affects a much larger area of around 2000 km. Also, it develops over land and sea both as far as there is a frontal system.**
- It moves from west to east due to the influence of Westerlies.

4. Correct Option: (a)

Explanation:

The planetary winds

- Within the pattern of permanent pressure belts on the globe, winds tend to blow from the high-pressure belts to the low-pressure belts as the planetary winds.
- Instead of blowing directly from one pressure belt to another, however, the effect of the rotation of the earth (Coriolis Force) tends to deflect the direction of the winds. In the northern hemisphere, winds are deflected to their right, and in the southern hemisphere to their left, this is known as **Ferrel's Law of Deflection.**
- For this reason, winds blowing out from the Sub Tropical High-Pressure Belt in the northern hemisphere towards the Equatorial Low become North-East Trade Winds and those in the southern hemisphere become the South East Trade winds.



PC: NASA Earth Observatory

- **The westerlies are the winds blowing from the sub-tropical high-pressure belts towards the sub-polar low-pressure belts.** They blow from southwest to north-east in the northern hemisphere and north-west to south-east in the southern hemisphere. The westerlies are best developed between 40° and 65°S latitudes. These latitudes are often called Roaring Forties, Furious Fifties, and Shrieking Sixties.
- The Polar easterlies are dry, cold prevailing winds blowing from north-east to south-west direction in Northern Hemisphere and south-east to north-west in Southern Hemisphere.

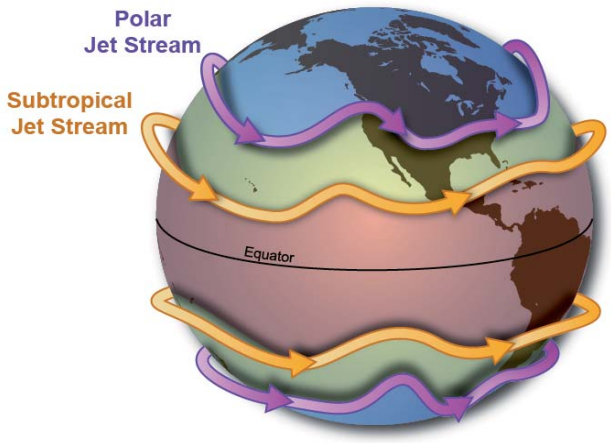
- **They blow out from the Polar High-Pressure Belts towards the Temperate Low-Pressure Belts.** These are extremely cold winds as they come from the tundra and ice-cap regions.

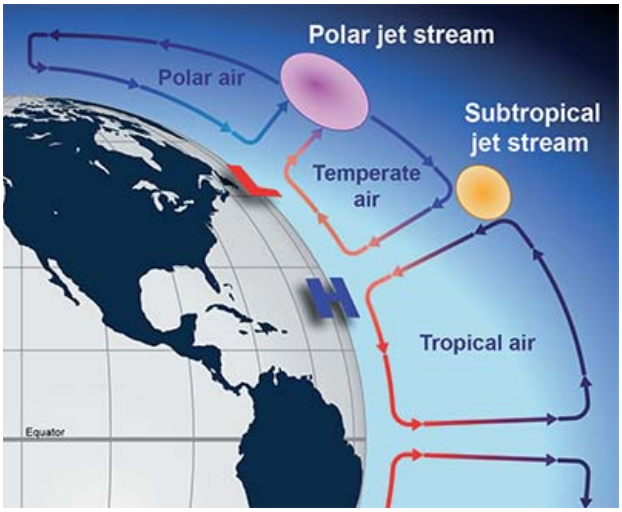
5. Correct Option: (a)

Explanation:

Jet Stream

- **Jet streams are relatively narrow (50 -150 km) bands of strong wind in the upper levels of the atmosphere below the Tropopause.**
- The winds blow from west to east in jet streams, due to the Earth's rotation, but the flow often shifts to the north and south. Jet streams follow the boundaries between hot and cold air.
- When the temperature contrast is maximum, jet stream flows in near straight path. But when temperature contrast reduces, the jet stream starts to follow a meandering path.
- **As the difference in temperature increases between the two locations the strength of the wind increases. Therefore, the regions around 30° N/S and 50°-60° N/S are also regions where the wind, in the upper atmosphere, is the strongest. These are called Subtropical Jet Streams and Polar Jet correspondingly. Near poles or equator, these streams are weak in nature.**
- **The meandering jet streams are called Rossby Waves.** Rossby waves are formed when polar air moves toward the Equator while tropical air is moving poleward.





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6. Correct Option: (b)

Explanation:

Tertiary Winds or Local Winds

- Local differences in temperature and pressure produce local winds. Such winds are local in extent and are confined to the lowest levels of the troposphere. Some examples of local winds are discussed below.

Warm winds

- **Sirocco is a hot, dry, and dusty wind that originates in the Sahara Desert.**
- **After passing over the Mediterranean sea, it absorbs moisture and causes cool wet weather in Europe.**
- Sirocco is so prominent that it is called by many other local names, such as Chili in Tunisia, Ghibli in Libya, Leveche in Spain, Khamsin in Egypt ad Malta. In the Adriatic and Aegean Sea, this hot wind, is better known as Gharbi.
- **Foehn is a strong, hot, gusty, dry and warm wind** of local importance in the Alps. It helps animal grazing by melting snow and aids the ripening of grapes.
- **Chinook is a hot wind of the Rockies** that keeps the grasslands clear of snow during much of the winter.
- **The Zonda (or Sondo) is a hot and dry wind of foehn type on the eastern slopes of the Andes in central Argentina.**

Cold winds

- Mistral is very cold and dry with a high speed of the Alps that brings blizzards into southern France.

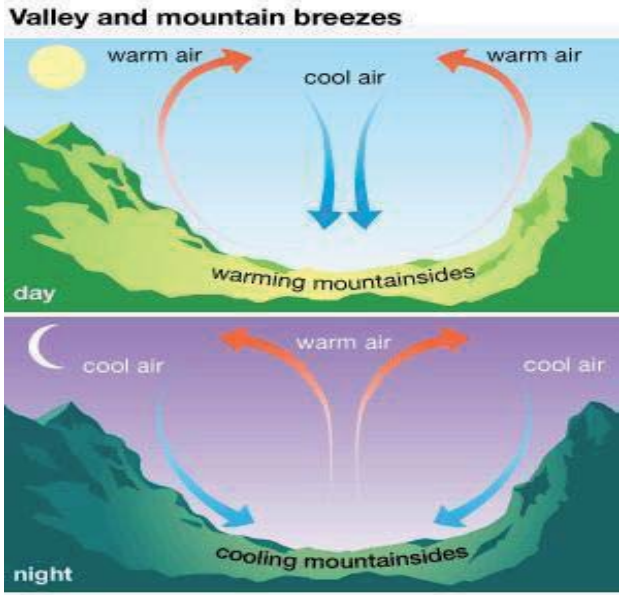
- The pampero is a burst of cold polar air from the west, southwest or south on the pampas in the south of Brazil, Argentina, Uruguay, Paraguay, and Bolivia.

7. Correct Option: (c)

Explanation:

Valley Breeze and Mountain Breeze

- **Any wind blowing down an incline is katabatic wind.** If the wind is warm, it is called a Foehn or Chinook, if cold, it may be a fall wind such as Bora, or a gravity wind.
- **Any wind blowing up a steep incline or mountain is known as Anabatic wind.**
- In mountainous regions, during the day the slopes get heated up and air moves upslope and to fill the resulting gap the air from the valley blows up the valley. Thus, it is an anabatic wind.
- **During the night the slopes get cooled and the dense air descends into the valley as the mountain wind or the katabatic wind.**



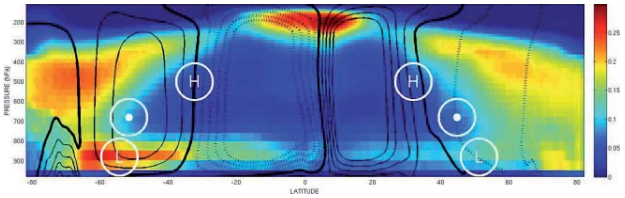
- The bora is a cold and typically very dry and often gusty katabatic wind (fall-wind) from the eastern Adriatic Sea.

8. Correct Option: (a)

Explanation:

Atmospheric circulation

- Atmospheric circulation, when examined using a simplified, two-dimensional view is dominated by two major features. The first is a large feature called the Hadley cell, which lifts air in the ITCZ, moves it at high altitudes towards the poles, and sinks it again to the surface in the subtropical regions. The second feature is a very strong river of air, known as the jet stream, that flows from west to east in the middle latitudes of each hemisphere. The meanders of the jet stream produce the storm tracks that are the major weather makers in the midlatitude regions.



- The interaction between atmospheric circulation in the tropics and sub-tropics and cloud structure is highly correlated. Interestingly, changes in the circulation and the **consequent shifts of cloud cover lead to differing warming/ cooling effects in the northern and southern hemispheres.**

9. Correct option: (d)

Explanation:

Mediterranean Type

- The Warm Temperate Western Margin Climate is found in relatively, few areas in the world. They are entirely confined to the western portion of continental masses, between 30° and 45° north and south of the equator.
- The basic cause of this type of climate is the shifting of the wind belts. Though the area around the Mediterranean Sea has the greatest extent of this type of 'winter rain climate', and gives rise to the more popular name Mediterranean Climate. Other Mediterranean regions include California (around San Francisco), the south-western tip of Africa (around Cape Town), southern Australia (in southern Victoria and around Adelaide, bordering the St. Vincent and Spencer Gulfs), and south-west Australia (Swanland).
- The Mediterranean type of climate is characterized by very distinctive climatic features - a warm summer with off-shore trades, a concentration of rainfall in winter with onshore westerlies, bright, sunny weather with hot dry summers and wet, mild winters and the prominence of local winds around the Mediterranean Sea (Sirocco, Mistral). Since all regions with a Mediterranean climate are near large bodies of water, temperatures are generally moderate with a comparatively small range

of temperature between the winter low and summer high. Areas with this climate receive almost all of their yearly rainfall during the winter season, and may go the summer without having any significant precipitation.

- Trees with small broad leaves are widely spaced and never very tall. Though there are many branches they are short and carry few leaves. The absence of shade is a distinct feature of Mediterranean lands. Growth is slow in the cooler and wetter season, even though more rain comes in winter. The warm, bright summers and cool, moist winters enable a wide range of crops to be cultivated. The Mediterranean lands are also known as the world's orchard lands. A wide range of citrus fruits such as oranges, lemons, limes, citrons, and grapefruit are grown. Wine production is another specialty of the Mediterranean countries, because the best wine is essentially made from grapes. Some 85 percent of grapes produced, go into wine. The long, sunny summer allows the grapes to ripen and then they are handpicked.
- The area is important for fruit cultivation, cereal growing, wine-making and agricultural industries as well as engineering and mining.

10. Correct option: (d)

Explanation:

The Cool Temperate Western Margin (British Type) Climate

- The cool temperate western margins are under the permanent influence of the Westerlies all round the year. They are also regions of much cyclonic activity, typical of Britain, and are thus said to experience the British type of climate. From Britain, the climatic belt stretches far inland into the lowlands North-West Europe, including such regions as northern and western France, Belgium, the Netherlands, Denmark, western Norway and also north-western Iberia. In the southern hemisphere, the climate is experienced in southern Chile, Tasmania and most parts of New Zealand, particularly in South Island.
- The mean annual temperatures are usually between 5°C and 15°C. The annual range of temperature is small. Summers are, in fact, never very warm. Monthly temperatures of over 18°C even in mid-summer are rare.
- The British type of climate has adequate rainfall throughout the year with a tendency towards a slight winter or autumn maximum from cyclonic sources. Since the rain-bearing winds come from the west, the western margins have the heaviest rainfall. The amount decreases eastwards with increasing distance from the sea.
- The natural vegetation of this climatic type is deciduous forest. The trees shed their leaves in the cold season. This is an adaptation for protecting themselves against the winter snow and frost. Shedding begins in autumn, the 'fall' season, during which the leaves fall and are scattered by the winds. Some of the more common species include oak, elm, ash, birch, beech, poplar, and hornbeam. Unlike the equatorial forests, the deciduous trees occur in pure stands and have greater lumbering value from the commercial point of view. The deciduous hardwoods are excellent for both fuel and industrial purposes.
- The region differs from many others in its unprecedented industrial advancement. The countries are concerned in the production of machinery, chemicals, textiles and other manufactured articles rather than agriculture, fishing or lumbering, though these activities are well represented in some of the countries. Fishing is particularly important in Britain, Norway and British Columbia. A very large part of the deciduous woodlands have been cleared for fuel, timber or agriculture.

11. Correct Option: (b)

Explanation:

Humidity

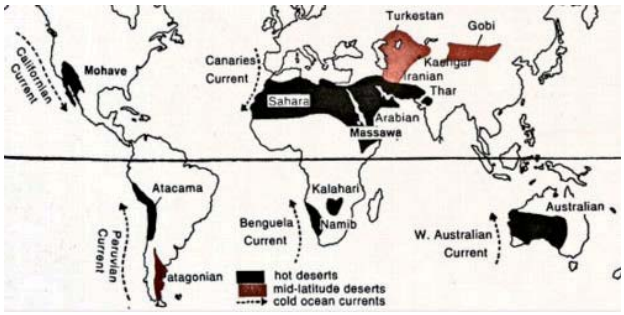
- Water vapor present in the air is known as humidity. It is expressed quantitatively in different ways.
- **The actual amount of water vapor present in the atmosphere is known as the absolute humidity.** It is the weight of water vapor per unit volume of air and is expressed in terms of grams per cubic meter.
- **The ability of the air to hold water vapor depends entirely on its temperature.** As warm air can hold more water vapor than cool air, the relative humidity decreases with increasing temperatures.
- The percentage of moisture present in the atmosphere as compared to its full capacity at a given temperature is known as the relative humidity. With the change of air temperature, the capacity to retain moisture increases or decreases and the relative humidity is also affected. **It is greater over the oceans and least over the continents.**

12. Correct Option: (c)

Explanation:

Desert formation

- Deserts are regions of scanty rainfall which may be like the hot deserts of the Saharan type; or temperate as are the mid-latitude deserts like the Gobi.
- **The aridity of the hot deserts is mainly due to the effects of off-shore Trade Winds, hence they are also called Trade Wind Deserts**. Hot, moist air rises into the atmosphere near the Equator. As the air rises, it cools and drops its moisture as heavy tropical rains. The resulting cooler, drier air mass moves away from the Equator. As it approaches the tropics, the air descends and warms up again. The descending air hinders the formation of clouds, so very little rain falls on the land below. The major hot deserts of the world are located on the western coasts of continents between latitudes 15° and 30°N. and S. Example: Sahara Desert, Great Australian Desert, Arabian Desert, Iranian Desert, Thar Desert, Kalahari and Namib Deserts, etc.
- Amongst the **mid-latitude deserts**, many are found on plateaux and are at a considerable distance from the sea. These are the Gobi, Turkestan and Patagonian Deserts. The Patagonian Desert is more due to its rain-shadow position on the leeward side of the lofty Andes than to continentality.



- **Cold ocean currents contribute to the formation of coastal deserts.** Air blowing toward shore, chilled by contact with cold water, produces a layer of fog. This heavy fog drifts onto land. Although humidity is high, the atmospheric changes that normally cause rainfall are not present.
- Rainshadow deserts exist near the leeward slopes of some mountain ranges. Leeward slopes face away from prevailing winds.
- Parts of the Arctic and the Antarctic are classified as deserts. These polar deserts contain great quantities of water, but most of it is locked in glaciers and ice sheets year-round. So, despite the presence of millions of liters of water, there is actually little available for plants and animals.

13. Correct option: (b)

Explanation:

Sudan type of Climate

- The Sudan Climate is a transitional type of climate found between the equatorial forests and the trade wind hot deserts. It is confined within the tropics and is best developed in the Sudan where the dry and wet seasons are most distinct, hence its name the Sudan Climate.
- **The prevailing winds of the region are the Trade Winds, which bring rain to the coastal districts.** They are strongest in the summer but are relatively dry by the time they reach the continental interiors or the western coasts of the continents, so that grass and scattered short trees predominate.
- Rainfall is low to moderate. Grass is not nutritious as such, hence dairy farming is not well developed. Masais are found here.
- Sudan lies in the North of the Equatorial forests hence there is moderate rainfall since there is little moisture-bearing winds and the process of convectional rainfall is not a major feature here.
- In west Africa, N-E trade winds blow from the Sahara Desert & reach Guinea coast as dry dust-laden winds called locally 'Harmattan', means the doctor, which increases the rate of evaporation & provides cooling effect at Guinea coast; but it is such a dry dusty wind that, besides ruining the crops, sometimes it may cause fire; it also stirs up a thick dusty haze & impedes inland.

14. Correct Option: (a)

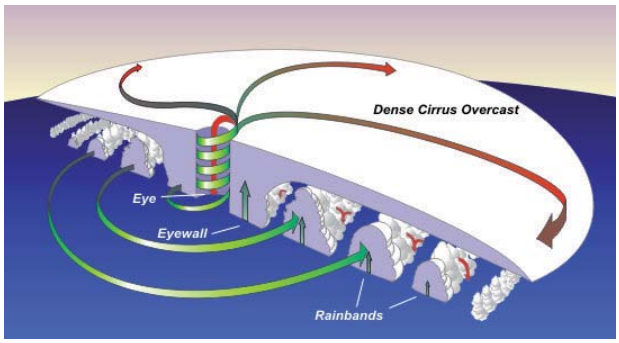
Explanation:

The structure of a Tropical cyclone

- The diameter of a cyclone is 600 - 1200 km.
- **The center of Cyclone is called Eye, which is a small (5km) and calm region of subsiding air.** This sinking air suppresses cloud formation, creating a pocket of generally clear air in the center. People experiencing an eye passage at night often see stars.
- The cause of eye formation is still not fully understood. It probably has to do with

the combination of "the conservation of angular momentum" and centrifugal force. The conservation of angular momentum means is objects will spin faster as they move toward the center of circulation. So, air increases its speed as it heads toward the center of the tropical cyclone.

- Surrounding the Eye is **Eyeball, a region of strong spiraling ascent of air up to the Tropopause. Here, wind blow at 250 km per hr. Torrential rain occurs here.**



PC: NOAAA, USA

- From the eyewall, rain bands and cumulonimbus clouds radiate and drift into the outer region with a slow speed of about 300 - 500 km per day.
- Then, the system moves towards land where the storm dissipates before devastating coastal region.

15. Correct Option: (a)

Explanation:

Tsunamis

- A tsunami is a series of long waves generated by a large and sudden displacement of the ocean. Large earthquakes below or near the ocean floor are the most common cause, but landslides, volcanic activity, certain types of weather, and near-earth objects (e.g., asteroids, comets) can also cause a tsunami.
- **Tsunamis are not related to tides, so tsunamis are not tidal waves.**
- When they reach the coast, they can cause dangerous coastal flooding and powerful currents that can last for several hours or days.
- **A tsunami can strike any ocean coast at any time. There is no season for tsunamis**. This is quite evident when we look at some records of past tsunamis. For instance, on March 11, 2011, a magnitude 9.1 earthquake off the east coast of Japan generated a tsunami that caused tremendous devastation locally and was observed throughout the Pacific. The earthquake was the largest ever recorded in Japan. The tsunami reached as high as 127 feet (39 meters) and traveled up to five miles (eight kilometers) inland.

16. Correct Option: (c)

Explanation:

The factors responsible for variation in the horizontal distribution of pressure are as follows:

- **Air Temperature:** The earth is not heated uniformly because of unequal distribution of insolation, differential heating and cooling of land and water surfaces. Generally there is an inverse relationship between air temperature and air pressure. The higher the air temperature, the lower is the air pressure. In polar region, cold air is very dense hence it descends and pressure increases. From this we might expect, a gradual increase in average temperature towards equator.
- **The Earth's Rotation:** The earth's rotation generates centrifugal force. This results in the deflection of air from its original place, causing decrease of pressure. It is believed that the low pressure belts of the sub Polar Regions and the high pressure belts of the sub-tropical regions are created as a result of the earth's rotation. The earth's rotation also causes convergence and divergence of moving air.
- **Pressure of Water Vapour**: In winter the continents are relatively cool and tend to develop high pressure centres; in summer they stay warmer than the oceans and tend to be dominated by low pressure, conversely, the oceans are associated with low pressure in winter and high pressure in summer.

17. Correct Option: (b)

Explanation:

Planetary Winds

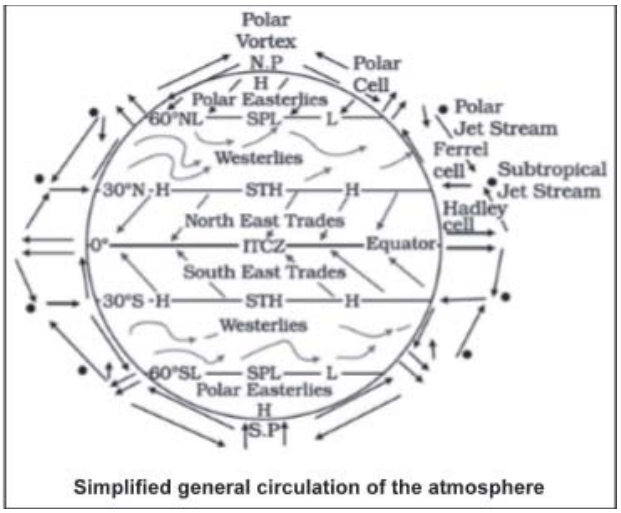
- Planetary winds are major component of the general global circulation of air. These are known as planetary winds because of their prevalence in the global scale throughout the year. Planetary winds occur due to temperature and pressure variance throughout the world.

Trade Wind

- Winds blowing from the subtropical high pressure belt or horse latitudes towards the equatorial low pressure belt of the ITCZ are the trade winds. In the Northern

Hemisphere, the trade winds blow from the northeast and are known as the Northeast Trade Winds; in the Southern Hemisphere, the winds blow from the southeast and are called the Southeast Trade Winds.

- The weather conditions throughout the tropical zone remain more or less uniform. This belt is subjected to seasonal variation due to northward and southward movement of sun.
- The equator ward part of the trade wind is humid because they are characterized by atmospheric instability thus causing heavy precipitation.



Simplified general circulation of the atmosphere

Westerly Wind

- The Westerlies are the prevailing winds in the middle latitudes between 35° and 65° blowing from the high pressure area in the sub tropical high pressure belt, i.e., horse latitudes towards the sub polar low pressure belt.
- The winds are predominantly from the south-west to north-east in the Northern Hemisphere and from the north- west to southeast in the Southern Hemisphere.
- The Westerlies are strongest in the winter season at times when the pressure is lower over the poles, while they are weakest in the summer season when pressures are higher over the poles.
- The Westerlies are particularly strong, especially in the southern hemisphere, as there is less land in the middle latitudes to obstruct the flow.

18. Correct Option: (a)

Explanation:

Laurentian Type of Climate

- The Laurentian type of climate is found only in two regions. One is north-eastern North America, including eastern Canada, north-east U.S.A., (i.e. Maritime Provinces and the New England states), and Newfoundland. The Cool Temperate Eastern Margin (Laurentian) Climate is an intermediate type of climate between the British and the Siberian type of climate. It has features of both the maritime and the continental climates.
- In the southern hemisphere, this climatic type is absent because only a small section of the southern continents extends south of the latitude of 40°S. The only possible location is in eastern Patagonia, south of Bahia Blanca (lat. 39°S.) to Tierra del Fuego (lat. 54°S.).
- The predominant vegetation of the Laurentian type of climate is cool temperate forest. The heavy rainfall, the warm summers and the damp air from fogs, all favour the growth of trees. Generally speaking, the forest tend to be coniferous north of the 50°N. parallel of latitude. South of latitude 50°N., the coniferous forests give way to deciduous forests. Oak. beech, maple and birch are the principal trees.

19. Correct option: (c)

Explanation:

Atmospheric Circulations

- **Doldrums**, also called **equatorial calms**, equatorial regions of light ocean currents and winds within the inter-tropical convergence zone (ITCZ), a belt of converging winds and rising air encircling Earth near the Equator. The northeast and southeast trade winds meet there; this meeting causes air uplift and often produces clusters of convective thunderstorms. **Doldrums lies at equator i.e. from 5 degrees north to 5 degrees south.**
- Tropical easterly jet streams (TEJ) are major high-velocity winds in the lower troposphere called low-level jets (LLJs). In the tropics, the most prominent of these are the Somali Jet and the African Easterly Jet. The TEJ is a unique and dominant feature of the northern hemispheric summer over southern Asia and northern Africa. **The TEJ is found near between 5° and 20°N. These are usually considered as temporary jet streams.**
- However, the Subtropical jet streams (STJ) are permanent in nature. As its name suggests they are formed in the sub-tropical areas. STJ is deflected to the right in the northern hemisphere and to the left in the southern hemisphere, and at about

30° latitude, it becomes concentrated as the subtropical jet streams. During winter, the STJ is nearly continuous in both hemispheres. The STJ exists all year in the southern hemisphere. However, it is intermittent in the northern hemisphere during summer when it migrates north.

- **Subtropical Jet Streams are always westerlies and Tropical Jet Streams are always easterlies. It is due to the effect of the Coriolis force.**
- In the middle latitudes, the circulation is that of sinking cold air that comes from the poles and the rising warm air that blows from the subtropical high. At the surface, these winds are called westerlies and the cell is known as the **Ferrel cell. However, Ferrel cell does not derive its strength from the walker cell**. **Walker cell** is associated with the El-Nino event that takes place in the central Pacific Ocean where warm waters slowly move towards South America.
- **A large part of the energy that drives the Ferrel cell is provided by the polar and Hadley cells circulating on either side or that drag the Ferrel cell with it.**

20. Correct Option: (a)

Explanation:

Thunderstorms and Tornadoes

- Thunderstorms and tornadoes are severe local storms.
- **They are of short duration, occurring over a small area but are violent.**
- **Thunderstorms are caused by intense convection on moist hot days.**
- A thunderstorm is a well-grown cumulonimbus cloud producing thunder and lightning.
- When the clouds extend to heights where sub-zero temperature prevails, hails are formed and they come down as hailstorm.
- **If there is insufficient moisture, a thunderstorm can generate dust storms.**
- A thunderstorm is characterized by the intense updraft of rising warm air, which causes the clouds to grow bigger and rise to a greater height. This causes precipitation.
- Later, downdraft brings down to earth the cool air and the rain.
- From severe thunderstorms sometimes spiraling wind descends like a trunk of an elephant with great force, with very low pressure at the center, causing massive destruction on its way. Such a phenomenon is called a tornado.
- Tornadoes generally occur in middle latitudes.
- **The tornado over the sea is called water sprouts**.
- These violent storms are the manifestation of the atmosphere's adjustments to varying energy distribution.
- The potential and heat energies are converted into kinetic energy in these storms and the restless atmosphere again returns to its stable state.

21. Correct option: (a)

Explanation

The system is in force today in three North-eastern states:

- Arunachal Pradesh
- Nagaland
- Mizoram

Supplementary notes

Inner Line Permit (ILP)

- The Inner Line Permit concept comes from the colonial area. Under the Bengal Eastern Frontier Regulation Act, 1873, the British framed regulations restricting the entry and regulating the stay of outsiders in designated areas.
- Inner Line Permit (ILP) is an official travel document issued by the Government of India to allow inward travel of an Indian citizen into a protected area for a limited period.
- It is obligatory for Indian citizens from outside those states to obtain a permit for entering into the protected state.
- The document is an effort by the government to regulate movement to certain areas located near the international border of India.
- There are different kinds of ILP's, one for tourists and others for people who intend to stay for long-term periods, often for employment purposes.

Where is it applicable?

- The system is in force today in three North-eastern states:
  - Arunachal Pradesh
  - Nagaland

- Mizoram

- No Indian citizen can visit any of these states unless he or she does not belong to that state, nor can he or she overstay beyond the period specified in the ILP.

Relation between ILP and Citizenship Amendment Bill

- The Citizenship Amendment Bill seeks to amend the existing Citizenship Act, 1955 to enable non-Muslim refugees - specifically Hindus, Jains, Sikhs, Buddhists, Parsis and Christians — from Pakistan, Bangladesh and Afghanistan to obtain Indian citizenship.
- If the bill is passed and implemented, with the ILP system also in place, it would mean the refugees who are granted citizenship under the new act will not be permitted to settle in Arunachal Pradesh, Nagaland and Mizoram.
- Arunachal Pradesh and Nagaland are not among those drastically affected by migration from Bangladesh.
- Mizoram shares a border with Bangladesh.
- The three states that have seen the highest migration, however, are Assam, Tripura and Meghalaya, none of which has an ILP system.

22. Correct Answer (c)

Explanation:

- **Both the statements are correct**

Supplementary Notes

- Bodos are the single largest tribal community in Assam, making up over 5-6 per cent of the state's population. They have controlled large parts of Assam in the past.

- The four districts in Assam — Kokrajhar, Baksa, Udalguri and Chirang — that constitute the Bodo Territorial Area District (BTAD), are home to several ethnic groups.
- The Bodos have had a long history of separatist demands, marked by armed struggle.
- In 1966-67, the demand for a separate state called Bodoland was raised under the banner of the Plains Tribals Council of Assam (PTCA), a political outfit.
- In 1987, the All Bodo Students Union (ABSU) renewed the demand. "Divide Assam fifty-fifty", was a call given by the ABSU's then leader, Upendra Nath Brahma.
- The unrest was a fallout of the Assam Movement (1979-85), whose culmination — the Assam Accord — addressed the demands of protection and safeguards for the "Assamese people", leading the Bodos to launch a movement to protect their own identity.
- In December 2014, separatists killed more than 30 people in Kokrajhar and Sonitpur. In the 2012 Bodo-Muslim riots, hundreds were killed and almost 5 lakh were displaced.
- The Home Ministry has declared the NDFB along with all its groups, factions, and front organisations as an "unlawful association" under the Unlawful Activities (Prevention) Act, 1967.

Who are the NDFB?

- Alongside political movements, armed groups have also sought to create a separate Bodo state.
- In October 1986, the prominent group Bodo Security Force (BdSF) was formed by Ranjan Daimary. The BdSF subsequently renamed itself as the National Democratic Front of Bodoland (NDFB), an organisation that is known to be involved in attacks, killings, and extortions.
- In the 1990s, Indian security forces launched extensive operations against the group, causing the latter to flee to bordering Bhutan. In Bhutan, the group faced stiff counter-insurgency operations by the Indian Army and the Royal Bhutan Army in the early 2000s.

NDFB factions and their activities

- In October 2008, bomb attacks in Assam carried out by the NDFB killed 90 people. In January this year, 10 operatives, including

founder Ranjan Daimary, were convicted for their role in the attacks.

- After the blasts, the NDFB was divided into two factions — the NDFB (P), led by Gobinda Basumatary, and the NDFB (R), led by Ranjan Daimary.
- The NDFB (P) started talks with the central government in 2009. In 2010, Daimary was arrested and handed over to India by Bangladesh, and was granted bail in 2013. His faction too then began peace talks with the government.
- In 2012, Ingti Kathar Songbijit broke away from the NDFB (R) and formed his own faction, the NDFB (S). His faction is believed to be behind the killing of 66 Adivasis in Assam in December 2014. The NDFB (S) is against holding talks.
- In 2015, Songbijit was removed as the chief of the group and B Saoraigwra took over. This faction of the NDFB is still active, while Songbijit, himself a Karbi and not a Bodo, is said to have started his own militant group.

Why the demand for separate Bodoland?

- For centuries, they survived sanskritisation without giving up their original ethnic identity. However in the 20th century, they had to tackle a series of issues such as illegal immigration, encroachment of their lands, forced assimilation, loss of language and culture. The 20th century also witnessed the emergence of Bodos as a leading tribe in Assam which pioneered the movements for safeguarding the rights of the tribal communities in the area.
- From then on, they have been consistently deprived of the political and socio-economic rights by successive state and central governments. The Bodos have not only become an ethnic minority in their own ancestral land but have also been struggling for their existence and status as an ethnic community.

23. Correct Answer (b)

Explanation:

- 4th statement is incorrect: the union territories of Dadra and Nagar Havelli and Daman and Diu speak different language and diverse ethnicity.

Supplementary Notes

Daman and Diu and Dadra and Nagar Haveli

- These two UTs are located in the western region of India.
- Daman and Diu are two widely separated districts situated on the southern side of Gujarat. Daman is an enclave on Gujarat's southern coast and Diu encompasses an island off the southern coast of Gujarat's Kathiawar Peninsula. It is in close proximity of the UT of DNH.
- Dadra and Nagar Haveli consists of two separate parts. Dadra is surrounded by the state of Gujarat and Nagar Haveli lies on the borders of Maharashtra and Gujarat.
- Both were colonised by the Portuguese and were liberated in December 1961.
- In 1987, when Goa got statehood, Daman and Diu were made a separate Union Territory from the previous Union Territory of Goa, Daman and Diu.
- Recently, a bill for the merger of Union Territories of Dadra and Nagar Haveli and Daman and Diu was introduced in the Parliament by Home Minister.
- The Bill provides for the merger of the Union Territories (UTs) of Dadra and Nagar Haveli, and Daman and Diu into a single UT.
- **Key features of the Bill include:**
  - **Amendment of the Constitution:** The First Schedule to the Constitution specifies the territories that come under various states and UTs. The Bill amends the First Schedule to merge the territories of the two UTs: (a) Dadra and Nagar Haveli, and (b) Daman and Diu. The merged territory will form the UT of Dadra and Nagar Haveli and Daman and Diu. This will come into effect from the day notified by the central government.
- Article 240(1) of the Constitution allows the President to make regulations for certain UTs, including the UTs of Dadra and Nagar Haveli, and Daman and Diu. The Bill amends the Article to replace these two UTs with the merged UT.
- **Representation in Lok Sabha:** The First Schedule to the Representation of the People Act, 1950 provides one seat in Lok Sabha to each of the two UTs. The Bill seeks to amend the Schedule to allocate two Lok Sabha seats to the merged UT.
- **Services under the UTs:** Every person employed in connection with the affairs of the existing UTs will provisionally serve the merged UT. The central government will determine whether every such person will finally be allotted for service in the merged UT.

- The merged UT will take steps to integrate employees into services under its control. The central government may give orders and instructions to the merged UT in this regard.
- The central government may establish Advisory Committees to assist in ensuring fair treatment of all persons affected by these provisions and consideration of any representations made by them. Representations against any service orders must be made within three months from the date of publication, or notice of the order, whichever is earlier.

- These provisions will not apply to members of All India Services (such as Indian Administrative Services, Indian Police Services, and Indian Forest Services), and persons on delegation from any state.
- **Jurisdiction of High Court:** The Bill provides that the jurisdiction of the High Court of Bombay will continue to extend to the merged UT.

Reasons for Merging Two UTs

- Both UTs have two separate constitutional and administrative bodies which lead to a lot of duplicacy, inefficiency and wasteful expenditure.
- The merger will help in achieving the government's goal to have Minimum Government, Maximum Governance.
- Both of them have small population and limited geographical area so the merger will not be challenging and the services of officers will be used efficiently.

24. Correct Answer: (a)

Explanation:

- **Option (a) is correct.**

Supplementary Notes

- The day is observed annually to highlight the importance of healthy soil and advocate for the sustainable management of soil resources. The theme for WSD 2019 was **'Stop Soil Erosion, Save Our Future'**.

Historical background:

- In 2002 **the International Union of Soil Science** (IUSS) voted for a resolution to dedicate 5th December every year as World Soil Day to promote the importance of Nature and human wellbeing.
- **Food and Agriculture organization** (FAO) **supported this initiative together with the Kingdom of Thailand leadership** as a part of "Global soil partnership".
- FAO took the initiative to establish Soil Day. Consequently, unanimously approved it in its FAO conference 2013.
- **Later in 2013, December with FAO's request, UN adopted World Soil Day in its 68th UN General Assembly.** Further, announced that the day would be observed on 5th December every year.
- Especially, this is a tribute to late **King Bhumibol Adulyadej of Thailand** for his contribution in improving quality and sustainable management of soil.
- Thereby, FAO has been celebrating world soil day since 2012.

Highlights about the World Soil Day:

- Annually, to celebrate the day, World Soil Day award is distributed to honour the contributions made by people. That is, **FAO gives two awards in line with this day-**
  - **The King Bhumibol World Soil Day Award-** an annual award that honours individuals, communities, organizations and countries that organized remarkable and engaging World Soil Day activities or campaigns in the previous year.
  - **The Glinka World Soil Prize**- An annual award for dynamic change-

makers dedicated to solving one of our world's most pressing environmental issue: soil degradation. It honours individuals and organizations whose leadership and activities have contributed, or are still contributing to the promotion of sustainable soil management and the protection of soil resources.

25. Correct Answer (c)

Explanation:

- **Option (c) is correct**.

Supplementary Notes:

Implications of US-China Trade War

- Sharp decline in bilateral trade:
  - Higher prices for Chinese consumers, losses for US exporters and trade gains for other countries. Of the $35 billion Chinese export losses in the US market, about $ 21 billion (or 62%) was diverted to other countries, while the remainder of $14 billion was either lost or captured by the US producers.
- **Higher prices for consumers:**
  - Tariffs imposed by the United States on China are economically hurting both countries and consumers in the US and China. The analysis shows that US tariffs caused a 25% export loss, inflicting a $35 billion blow to Chinese exports in the US market for tariffed goods in the first half of 2019
- **Trade diversion effects:**
  - Increased imports from countries not directly involved in the trade war.
  - The trade diversion effects of the US-China tariff war for the first half of 2019 at about $21 billion, implying that the amount of net trade losses corresponds to about $14 billion.
  - These trade diversion effects have brought substantial benefits for Taiwan (province of China), Mexico, and the European Union.
  - Trade diversion benefits to Korea, Canada and India were smaller but still substantial, ranging from $0.9 billion to $1.5 billion
  - The US tariffs on China resulted in India gaining $755 million in additional exports to the US in the first half of 2019 by selling more chemicals ($243 million), metals and ore ($181 million), electrical machinery ($83 million) and various machinery ($68 million) as well as increased exports in areas such as agri-food, furniture, office machinery, precision instruments, textiles and apparel and transport equipment

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TEST
DAY - 22

Time Allowed: 30 mins **Maximum Marks: 50**

1. Which of the following statements regarding the abyssal plain is /are correct?

1. These are underwater plains on the deep ocean floor with rich biodiversity.
2. These are the result of seafloor spreading.
3. These are featureless and flat region of the Ocean.

Which of the above statements is/are ***incorrect***?

(a) 3 only
(b) 2 only
(c) 1 only
(d) None of the above

2. Consider the following statements regarding oceanic reliefs:

1. Continental Margin is a part of an ocean.
2. Deep-sea trenches are formed at the continent margin.
3. Mid-Oceanic Ridges are the longest mountain ranges on the earth.

Which of the above statements is/are ***incorrect***?

(a) 2 only
(b) 3 only
(c) 1 only
(d) None of the above

3. Which of the following statements is/ are correct?

1. A shoal is a detached elevation with shallow depths.
2. A submarine canyon can extend up to the mouth of the rivers.

Select the correct option using the codes given below:

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

4. Consider the following statements regarding the storm surge:

1. Storm Surge is the abnormal rise in the astronomical tide.
2. It occurs during the Solar eclipse.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

5. Wich of the following reliefs is not situated in the Indian Ocean?

(a) Carlsberg Ridge
(b) Lombok Strait
(c) Tonga Trench
(d) Diamantina Trench

6. Which of the following is the correct sequence of the terrigenous deposits from the coast to the deeper part of the sea?

1. Clay
2. Mud
3. Sand
4. Silt

Select the correct answer using the code given below:

(a) 4, 2, 1, 3

(b) 3, 2, 4, 1

(c) 1, 4, 3, 2

(d) 3, 4, 1, 2

7. Which of the following statements regarding Pelagic Deposits are correct?

1. Pelagic deposits cover about three-fourths of the total seafloor.
2. Ooze is the organic material of the Pelagic Deposits.
3. It is made up of calcium carbonate only.
4. The inorganic material i.e. Red clay is the most widely spread pelagic deposit.

Select the correct option using the codes given below:

(a) 1 and 3 only

(b) 3 and 4 only

(c) 1, 2, and 4 only

(d) 1, 2, 3, and 4

8. Consider the following statements regarding the marginal seas:

1. Sargasso Sea is the only marginal sea which does not touch any land.
2. Persian Gulf is not a marginal sea.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

9. Which of the following pairs regarding the primary causes of the oceanic circulation is/are correctly matched?

1. Waves: Friction
2. Tides: Gravity
3. Currents: Wind

Select the correct option using the codes given below:

(a) 1 only

(b) 3 only

(c) 1 and 2 only

(d) 1, 2, and 3

10. Which of the following statements regarding ocean gyres is correct?

1. A gyre is a rotating ocean currents.
2. Turtle Gyre is formed in the Atlantic ocean.
3. Beaufort gyre found in the Arctic Ocean.

Select the correct option using the codes given below.

(a) 1 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1 and 2 only

11. Consider the following statements regarding ocean currents:

1. The effect of winds is more pronounced in the Indian Ocean than that in the Pacific or Atlantic Oceans.
2. Agulhas current is a warm current whereas, the Mozambique current is cold.
3. Antilles Current is a cold current in the South Indian Ocean.
4. Grand Banks which is the richest fishing grounds on Earth is due to the confluence of the Kuroshio and Oyashio Currents.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 and 4 only

(c) 1 and 4 only

(d) 1, 2, 3 and 4 only

12. Arrange the following water bodies into increasing order of salinity:

1. Bay Of Bengal
2. Arabian Sea
3. Mediterranean Sea
4. Dead Sea

Select the correct option using the codes given below:

(a) 1-2-3-4

(b) 3-1-2-4

(c) 2-3-4-1

(d) 4-3-2-1

13. Which of the following statements regarding tides are correct?

1. The time between the high tide and low tide, when the water level is falling, is called the ebb.
2. The time between the low tide and high tide, when the tide is rising, is called the flood.
3. When a tide enters the narrow and shallow estuary of a river or the gulfs, it forms tidal bore.

Select the correct option using the codes given below:

(a) 1 and 3 only

(b) 2 and 2 only

(c) 1, 2 and 3

(d) 1 and 3 only

14. Which of the following statements is/ are correct about the temperature distribution over the oceans?

1. Isotherms are more regular and follow latitudes in the northern hemisphere as compared to the southern hemisphere.
2. Offshore winds drive warm surface water away from the coast resulting in the upwelling of the cold water.
3. The enclosed seas in lower latitudes have higher temperatures as compared to the open seas because of the landmass.

Select the correct answer using the code given below:

(a) 1 only

(b) 2 and 3 only

(c) 3 only

(d) 1, 2 and 3

15. Consider the following statements about the groundwater resource:

1. Areas containing permeable rocks and with a good amount of rainfall have sufficient groundwater storage.
2. Deccan lava region of India has one of the highest underground water reserves.
3. The permeable rock in which water is stored is called an aquifer.

Which of the above statements is/are correct?

(a) 1 and 2 only

(b) 2 only

(c) 1 and 3 only

(d) 1, 2 and 3

16. Consider the following statements regarding the division of ocean:

1. The average width of the continental shelf is about 70 km and mean slope is less than one degree.
2. Continental slope is steeper than the shelf, and it marks the boundary between continental crust and oceanic crust.
3. The abyssal plains are present in all major oceans and several seas of the world.

Which of the following is/are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 only

(d) 1, 2 and 3

17. Which of the following affect the salinity of the ocean?

1. North East Trade Winds
2. West Australian Current
3. Flow of Danube into Black Sea

Select the correct answer from the codes given below:

(a) 1 and 2 only

(b) 1, 2 and 3

(c) 2 and 3 only

(d) 1 only

18. Which of the following statements is correct regarding Tides?

(a) When the sun, the moon and the earth are in a straight line they are called, it is called Neap tide

(b) When the sun and moon are at right angles to each other, it is called Spring tide

(c) During the Diurnal tide, there is only one high tide and two low tide during each day.

(d) During the Semi-diurnal tide, there are two high tides and two low tides each day.

19. Consider the following pairs:

Ocean Current	Feature
1. Benguela Current	Counterpart of the Canaries Current
2. South Equatorial Current	One branch turns south as the warm Brazilian Current
3. East Greenland Current	Flows between Iceland and Greenland

Which of the following is/are correctly matched?

(a) 3 only

(b) 2 and 3 only

(c) 1, 2 and 3

(d) 1 and 3 only

20. Materials eroded from the earth which are not deposited by rivers or at the coast are eventually dropped on the ocean floor. Which of the following statement is *incorrect* regarding the Oceanic Deposits of the Ocean Floor?

(a) Muds are terrigenous deposits because they are derived from land and are mainly deposited on the continental shelves.

(b) Oozes are pelagic deposits because they are derived from the oceans

(c) The muds colouring depends upon their biological content.

(d) Clay is an accumulation of volcanic dust blown out from volcanoes during volcanic eruptions.

21. "Chicago Convention" seen recently in news is related to?

(a) Regulating international air travel

(b) Convention on Climate change

(c) Regulating Terrorism and related activities

(d) WTO outcomes

22. India's first hybrid annuity model (HAM) based Sewage Treatment Plant is been recently established in which state?

(a) Uttarakhand.

(b) Himachal Pradesh

(c) Sikkim

(d) Uttar Pradesh

23. Recently, there was volcanic eruption in White Island, in which country is this island located?

(a) Australia

(b) Philippines

(c) Japan

(d) New Zealand

24. 'Frogphone' was in news recently, is

(a) A device that will allow scientists to monitor frogs in the wild.

(b) A new mobile phone mimicking frog features.

(c) A new species of frog

(d) A mobile application to trace frogs reproduction

25. Which of the following activities can be said to be a cause of climate change?

1. Land degradation
2. Industrial heat
3. Meat consumption

Choose the correct answer:

(a) Only 1

(b) 1 and 2 only

(c) 2 and 3 only

(d) 1, 2 and 3

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ANSWER HINTS

DAY - 22

1. Correct Option: (a)

Explanation:

Abyssal Plain

- **Abyssal Plain** is an underwater plain on the deep ocean floor.
- It lies **between the foot of a continental rise and a mid-ocean ridge**.
- Abyssal plains cover more than 50% of the Earth's surface and two-thirds of the ocean floor.
- It was once thought to be featureless, but modern sounding devices reveal that the abyssal plain is far from being level. **It has an extensive submarine plateau, ridges, trenches, basins and oceanic islands that rise above sea level in the midst of oceans**, e.g. the Azores, Ascension Islands.

Creation of the abyssal plain

- The creation of the abyssal plain is the result of the **spreading of the seafloor**, on both sides of a divergent boundary, and the melting of the lower oceanic crust.
- Magma, after rising from the asthenosphere and upon reaching the surface at mid-ocean ridges, it forms a new oceanic crust and thereby, the Abyssal Plain.
- Owing in part to their vast size, abyssal plains are believed to be major reservoirs of biodiversity.
- They also exert significant influence upon ocean carbon cycling, dissolution of calcium carbonate, and atmospheric CO_2 concentrations over time scales of a hundred to a thousand years.

2. Correct Option: (a)

Explanation:

The Relief of the Ocean

- The ocean basins are in many ways similar to the land surface.
- These are formed when the new ocean crust forms during plate tectonics and seafloor spreading.
- These include continental margins, Abyssal plains and Mid-Oceanic Ridges (MOR).

3. Continental Margin

- It is the intermittent region between Deep ocean plains and the shoreline.
- It is a part of continental crust submerged in the sea/ocean.
- Continental margins constitute about 28% of the oceanic area.
- It is the most productive region of the ocean due to very rich biodiversity.
- **Further, it is sub-divided into Continental shelf, Continental slope, Continental Rise and Deep-sea trenches**

Deep-sea trenches

- **When the oceanic crust is subducted under continental crust along with the continental-oceanic crusts convergent boundary (the continent margin-abyssal plain boundary), deep-sea trenches are formed.**
- Some of the example deep-sea trenches are the Aleutian trench, Peruvian trench and Mariana trench (the deepest one).

Abyssal plains

- **Abyssal Plain** is an underwater plain on the deep ocean floor.
- **It lies between the foot of a continental rise and a mid-ocean ridge.**
- Abyssal plains cover more than 50% of the Earth's surface and two-thirds of the ocean floor.

Mid-Oceanic Ridges (MOR)

- This forms an interconnected chain of mountain system within the ocean.

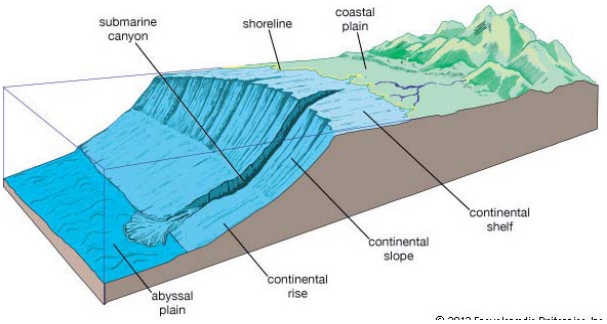
- **They are the longest mountain-chain on the surface of the earth though it is submerged under the oceanic waters.** Ex- **Mid- Atlantic ridge.**
- It is characterized by a central rift system at the crest, a fractionated plateau and flank zone all along its length.
- It forms along the Divergent boundary between two Oceanic crusts.
- From here, seafloor spreads on both sides of the ridges and thus, abyssal plains start from here.
- It is a zone of intense volcanoes.
- Ex- Mid Atlantic Ridges.

4. Correct Option: (c)

Explanation:

Minor oceanic reliefs

- Some of the minor oceanic reliefs are:
  - Ridges, Hills, Seamounts, Guyots, Trenches, Canyons, Sleeps, Fracture zones, Island arcs, Atolls, Coral reefs, Submerged volcanoes, and Sea-scarps, etc.
  - **A shoal is a detached elevation with shallow depths.** Shoal is a natural submerged ridge, bank or bar that consists of, or is covered by sand or other unconsolidated material and rises from the bed of a body to near the surface. Since they project out of water with moderate heights, they are dangerous for navigation.
  - A submarine canyon is a steep-sided valley of the oceans.
  - **They cut into the seabed of the continental slope, sometimes extending well onto the continental shelf, up to the mouth of the rivers.**



5. Correct Option: (d)

Explanation:

Storm surge

- **Storm surge is the abnormal rise in sea level generated by a hurricane or other intense storm, over and above the predicted or normal astronomical tide.** It is caused mainly by atmospheric weather systems such as tropical cyclones, hurricane winds shoving the ocean water up over the coast, although low pressure in the eye also contributes a much smaller amount.
- In general, one may expect that if there is a storm surge of x meters and tidal wave of y meters then during high tide total surges would be x+y and during low tide x-y. But, it is found that there is an interaction of storm surge with astronomical tide, and during high tide time the total surge is little less than x+y and during low tide time it is little more than x-y.
- Disaster potential due to cyclones is due to high storm surges occurring at the time of landfall. The storm surges are by far the greatest killers in a cyclone as seawater inundates low lying areas of the coastal regions causing heavy floods, erosion of beaches and embankments, damage to vegetation and reducing soil fertility. Flooding due to storm surges pollute drinking water sources resulting in a shortage of drinking water and causing out-break of epidemics, mostly water-borne diseases Very strong winds (Gales) may cause uprooting of trees, damage to dwellings, overhead installations, communication lines, etc., resulting in loss of life and property.

6. Correct Option: (c)

Explanation:

Reliefs of the Indian Ocean

- Trenches are generally not found. the exception being the Diamantina trench and Sunda trench**. Diamantina trench** is situated in the southeastern Australian basin, is deeper than the Sunda trench.
- The major choke points include Bab el Mandeb, Strait of Hormuz, the **Lombok Strait**, the Strait of Malacca and the Palk Strait.
- There are many wide ridges found in the abyssal plain of the Indian Ocean. Like the Atlantic ocean, there is a continuous ridge found in the middle portion of the ocean which divides the Indian Ocean into two equal basins.
- Submarine ridges in this ocean include the Lakshadweep-Chagos Ridge (Reunion Hotspot), the Socotra-Chagos Ridge, the

Seychelles Ridge, the South Madagascar Ridge, **Carlsberg Ridge,** etc. Carlsberg ridge, has been discovered, which divides the Arabian Sea into two equal halves.

- **Tonga trench is in the Pacific ocean.**

7. Correct Option. (d)

Explanation:

Terrigenous Deposits

- Terrigenous deposits are derived from the wear and tear of land and volcanic and organic products. The greater part of the deposits on the continental shelf and slopes is derived from rock material let loose by disintegration and decomposition by the agents of weathering and carried to sea by the agents of erosion, such as running water, wind, etc.
- The correct sequence of terrigenous deposits from the coast to the deeper part of the sea is **Sand-Silt-Clay-Mud**.
- In volcanic regions, the deposits of continental shelf and slope consist chiefly of products of volcanism, which are subject to chemical and mechanical weathering and are carried to the ocean by actions of running water and wind.

8. Correct Option: (c)

Explanation:

Pelagic Deposits

- Pelagic deposits are the most conspicuous of all deposits covering about 75% of the total seafloor. The pelagic deposits consist of both organic and inorganic material.

Organic Material

- This is in the form of a kind of liquid mud, called ooze, which contains shells and skeletons of various marine organisms. **The ooze is said to be calcareous** when the shell is made of calcium carbonate. Most parts of the Indian and Atlantic Oceans have calcareous ooze as deposits. When the shell is made of silica, the ooze is said to be **siliceous ooze**, which can be either the diatom type or the radiolarian type of ooze. The southern fringes of the Indian and the Atlantic Oceans have the siliceous type of ooze.

Inorganic Material

- This is in the form of **red clay**, which is apparently of a volcanic origin. The chief constituents of red clay are silicon and aluminum dioxide, while other constituents include iron, manganese, phosphorus, and radium. **The red clay is the most widely spread pelagic deposit and covers 38% of the seafloor**. The red clay covers more than half of the Pacific floor.

9. Correct Option: (a)

Explanation:

Marginal Seas

- A marginal sea is a sea partially enclosed by islands, archipelagos, peninsulas, or ocean currents.
- **Sargasso Sea is the only marginal sea which does not touch any land**. It is a region of the North Atlantic Ocean bounded by four currents forming an ocean gyre.
- Arabian Sea, Baltic Sea, Bay of Bengal, Bering Sea, Black Sea, Gulf of California, Gulf of Mexico, Mediterranean Sea, Red Sea, and all four of the Siberian Seas (Barents, Kara, Laptev, and East Siberian).
- The marginal seas of the Indian Ocean are Andaman Sea, Arabian Sea, Bay of Bengal, Java Sea, **Persian Gulf**, Red Sea, and Sea of Zanj.

10. Correct Option: (d)

Explanation:

Oceanic circulation

- Oceanic circulations are categorized as waves, tides, and currents.
- Waves are formed due to **friction** between wind and surface water layer. The stronger the wind, the bigger the wave. They die out quickly on reaching the shore or shallow waters.
- Tides are formed due to **Gravity** of the Moon and the Sun, and the Earth's rotation.
- The primary forces that cause the ocean currents are **wind, Insolation, Gravity, and rotation of the Earth.**
- The secondary forces that influence the currents are friction (by the oceanic reliefs and Continents), Temperature difference, and Salinity difference.

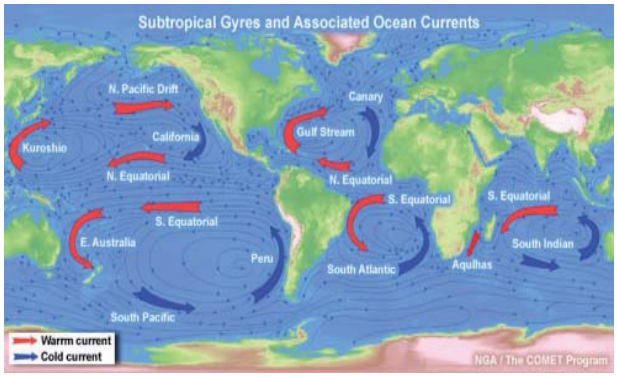
11. Correct Option: (c)

Explanation

Gyres

- **A gyre is a large system of rotating ocean currents**, formed by the Earth's wind patterns, Earth's landmass, and the forces created by the rotation of the planet.

- There are three major types of ocean gyres: tropical, subtropical, and subpolar.
- The Northern Hemisphere has several subpolar gyres, bounded by islands such as Iceland, Greenland, and the Aleutians; and the northern reaches of Scandinavia, Asia, and North America.
- Tropical gyres form near the Equator. The Coriolis effect is not present at the Equator, and winds are the primary creators of currents. For this reason, tropical gyres tend to flow in a more east-west (instead of circular) pattern. The Indian Ocean Gyre is actually two distinct tropical gyres—the northern and southern Indian Ocean Gyres.
- Most of the world's major gyres are subtropical gyres. These form between the polar and equatorial regions of Earth. Subtropical gyres circle areas beneath regions of high atmospheric pressure.
- There are five major gyres formed by the systems of ocean currents.
- **These are (i) North Pacific Subtropical Gyre (Turtle Gyre), (ii) South Pacific Subtropical Gyre (Heyerdahl Gyre), (iii) North Atlantic Subtropical Gyre (Columbus Gyre), (iv) South Atlantic Subtropical Gyre (Prince Henry Gyre), and (v) Indian Ocean Subtropical Gyre (Majid Gyre).**



PC: National Geography

- **Beaufort gyre is a minor gyre, found in the Arctic Ocean.**
- The movement of the world's major ocean gyres helps drive the "ocean conveyor belt." The ocean conveyor belt circulates ocean water around the entire planet. Also known as thermohaline circulation, the ocean conveyor belt is essential for regulating temperature, salinity and nutrient flow throughout the ocean.
- In some instances, the term "gyre" is used to refer to the collections of plastic waste and other debris found in higher concentrations in certain parts of the ocean. While this use of "gyre" is increasingly common, the term traditionally refers simply to large, rotating ocean currents.

12. Correct Option: (a)

Explanation:

Ocean Currents

- The currents in the northern portion of the Indian Ocean change their direction from season to season in response to the seasonal rhythm of the monsoons. The effect of winds is comparatively more pronounced in the Indian Ocean.
- The south equatorial current in the Indian Ocean splits into two branches viz. one flowing to the east of Madagascar known as Agulhas current and the other between Mozambique and Western Madagascar coast known as Mozambique current. **Both are warm currents.**
- The **Antilles Current** is a highly variable surface ocean current of warm water that flows northeasterly past the island chain that separates the Caribbean Sea and the **Atlantic Ocean.** The current results from the flow of the Atlantic North Equatorial Current.
- The **Labrador Current** flows along part of the east coast of Canada and meets the warm **Gulf Stream**. The confluence of these two currents, one hot and the other cold, produce the famous fogs around the at the **Grand Banks of Newfoundland in Canada**. As a result of the mixing of cold and warm waters here, the world's most important fishing grounds is created.

13. Correct Option: (a)

Explanation:

Salinity distribution

- The horizontal salinity distribution of the water bodies depends on evaporation, freezing, melting, freshwater influx, precipitation, geographical location, etc.
- **Dead sea is one of the most saline water bodies of the world due to high evaporation, and land locking. Mediterranean sea is also very salty due to land locking.** But, it is less salty than the Dead Sea.
- **Arabian Sea is saltier than the Bay of Bengal due to less river water influx. And, both these water bodies are less salty than the Mediterranean sea due to high precipitation and openness.**

- **The Don Juan Pond, in Antarctica, is the most saline water body on the earth.**

14. Correct Option (c)

Explanation:

Tides

- The periodical rise and fall of the sea level, once or twice a day, mainly due to the attraction of the sun and the moon, is called a tide.
- The Moon's gravitational pull to a great extent and to a lesser extent the Sun's gravitational pull, are the major causes for the occurrence of tides. Another factor is centrifugal force which acts opposite to the gravitational pull of Earth.
- Based on the Sun, Moon and the Earth Positions, they are of two types viz. Spring tides, and Neap tides.
- When the sun, the moon and the earth are in a straight line, the height of the tide is higher and called spring tides and they occur twice a month, one on full moon period and another during the new moon period.
- **When the sun and moon are at right angles to each other then the forces of the sun and moon tend to counteract one another. It is called the neap tide.**
- **The time between the high tide and low tide, when the water level is falling, is called the ebb whereas, the time between the low tide and high tide, when the tide is rising, is called the flood.**
- **When a tide enters the narrow and shallow gulf or an estuary of a river, the front of the tidal wave appears to be vertical owing to the piling up of water of the river against the tidal wave and the friction of the river bed. The steep-nosed tide crest looks like a vertical wall of-water rushing upstream and is known as a tidal bore.**

15. Correct option: (b)

Explanation:

Isotherms

- Isotherm is an imaginary line joining places having equal temperatures. Isotherms have a close correspondence with the latitude parallels mainly because the same amount of insolation is received by all the points located on the same latitude.
- **The isotherms are irregular over the northern hemisphere due to an enhanced land-sea contrast.** Because of the predominance of land over water in the north, the Northern hemisphere is warmer. The thermal equator (ITCZ) lies generally to the north of the geographical equator. Isotherms are more regular and follow latitudes in the southern hemisphere.
- **Wind direction largely affects the distribution of temperature of ocean water.** The winds blowing from the land towards the oceans and seas (e.g., offshore winds) drive warm surface water away from the coast resulting in the upwelling of cold bottom water from below. Thus, the replacement of warm water by cold water introduces a longitudinal variation in temperature. Contrary to this, the onshore winds pile up warm water near the coast and thus raise the temperature.
- **The enclosed seas (Marginal Seas – Gulf, Bay, etc.) in the low latitudes record relatively higher temperatures than the open seas; whereas the enclosed seas in the high latitudes have a lower temperature than the open seas.**

16. Correct option: (c)

Explanation:

Ground Water Resource

- Groundwater is the water that seeps through rocks and soil and is stored below the ground. **The rocks in which groundwater is stored are called aquifers. Aquifers are typically made up of gravel, sand, sandstone or limestone.** Water moves through these rocks because they have large connected spaces that make them permeable.
- The overall contribution of rainfall to the country's annual groundwater resource is 68% and the share of other resources, such as canal seepage, return flow from irrigation, recharge from tanks, ponds and water conservation structures taken together is 32%. **Thus, good rainfall translates into good groundwater storage.**
- **An underground layer of water-bearing permeable rock or gravel/ sand or silt from which groundwater can be extracted using a water well is called an aquifer**. Trapped between the impermeable layers, water towards the bottom of the aquifer is under tremendous pressure because of weight on top. When a well pierces the impermeable layer above

the aquifer, the pressure is released and water gushes up. If the pressure is great enough, water may spurt into the air in a spectacular fountain.

- Deccan lava has porous and semi-permeable rocks, where land is typically underlain by hard-rock formations. These rocks give rise to a complex and extensive low-storage aquifer system, wherein the water level tends to drop very rapidly once the water table falls by more than 2-6 meters. Additionally, these aquifers have poor permeability which limits their recharge through rainfall. **This implies that water in these aquifers is non-replenishable and will eventually dry out due to continuous usage making Deccan trap groundwater poor region.**

17. Correct Option: (d)

Explanation:

Major Division of Ocean Hour

- Four major divisions can easily be identified on the ocean floor-
  - The Continental Shelf
  - The Continental Slope
  - The Continental Rise
  - The Abyssal Plain.
- Besides these, there are many associated features-ridges, hills, seamounts, guyots, trenches, canyons, sleeps, fracture zones, island arcs, atolls, coral reefs, submerged volcanoes and sea-scarps.
- This great variety of relief is largely due to interaction of tectonic, volcanic, erosional and depositional processes.
- At greater depths, the tectonic and volcanic phenomena are more significant processes.

Continental Shelf

- This is a gentle seaward sloping surface extending from the coasts towards the open sea. In all, about 7.5% of the total area of the oceans is covered by the continental shelves. The shelf is formed by the drowning of a part of a continent with a relative rise in sea level or marine deposition beneath the water.
- The average width of the continental shelf is about 70 km and mean slope is less than one degree, but the width shows great variety from location to location. For instance, it is almost absent in the eastern Pacific, especially of South America and is upto 120 km wide along the eastern coast of USA. The seaward edge of the shelf is usually 150-200 metres deep.
- The continental shelves are mostly covered by sediments of terrestrial origin. There are various types of shelves-glaciated shelf, coral reef shelf, and shelf of a large river, shelf with dendritic valleys and the shelf along young mountain ranges.

Continental Slope

- Marking the seaward edge of the continental shelf is the Continental Slope. This slope is steeper than the shelf, and it marks the boundary between continental crust and oceanic crust. Although the steepness of the continental slope varies greatly from place to place, it averages about 5 degrees. In some places the slope may exceed 25 degrees. The continental slope is a relatively narrow feature, averaging only about 20 kilometers in width.
- Deep, steep-sided valleys known as submarine canyons are cut into the continental slope. These canyons may extend to the ocean basin floor. Submarine canyons have been eroded, at least in part, by turbidity currents.
- Turbidity currents are occasional movements of dense, sediment-rich water down the continental slope.
- They are created when sand and mud on the continental shelf and slope are disturbed-perhaps by an earthquake-and become suspended in the water. Because such muddy water is denser than normal seawater, it flows down the slope. As it flows down, it erodes and accumulates more sediment. Erosion from these muddy torrents is believed to be the major force in the formation of most submarine canyons. Narrow continental margins, such as the one located along the California coast, are marked with numerous submarine canyons.
- Turbidity currents are known to be an important mechanism of sediment transport in the ocean. Turbidity currents erode submarine canyons and deposit sediments on the deep-ocean floor.

Continental Rise

- Continental rise, a major depositional regime in oceans made up of thick sequences of continental material that accumulate between the continental slope and the abyssal plain. Continental Rises form as a result of three sedimentary processes: mass wasting, the deposition from contour currents, and the vertical settling of clastic and biogenic particles.

- The continental slope gradually loses its steepness with depth. When the slope reaches a level of between 0.5° and 1°, it is referred to as the continental rise. With increasing depth the rise becomes virtually flat and merges with the abyssal plain.

Abyssal Plains

- Beyond the continental rise, at depths from 3,000 m to 6,000 m, lie the deep sea plains, called abyssal plains or abyssal floors. Covering nearly 40% of the ocean floor, the abyssal plains are present in all major oceans and several seas of the world. They are uniquely fl at with a gradient of less than 10,000. The large supply of terrigenous and shallow water sediments buries the irregular topography to form a generally flat relief.

18. Correct Option: (b)

Explanation:

Reasons for the Varying Salinity of the Sea Water

Evaporation and Precipitation

- Evaporation causes concentration of salt. Highest salinity is found near the tropics, because of active evaporation owing to clear sky, high temperature and steady trade winds. Salinity decreases towards the equator because of heavier rainfall. In the Atlantic Ocean the salinity near the tropics is 37% and near the equator it is only 35%.

Stream run off

- The areas which receive fresh water by rivers have low salinity, e.g., huge amount of fresh water brought by the Danube, the Dnieper and the Don into the Black Sea reduces its salinity to 17%.

Freezing and Melting of Ice

- In the polar areas, there is very little evaporation and this coupled with the melting of ice, yielding fresh water, leads to a decrease in salinity, usually between 20% and 32%.

Atmospheric Pressure and Wind Direction

- Salinity changes slightly due to winds resulting from differences in atmospheric pressure. Of the Californian coast, North East Trade winds carry the warm saline water far offthe coast and consequently colder and less saline water start upwelling from below.

Ocean Currents

- The currents, stirred by wind, sweep away saline water from the eastern coast of the high latitudes to the western coasts, whereas cold water penetrates into the low latitudes. Thus there is a tendency for salinity to increase from east to west. Salinity is higher in enclosed seas as compared to open seas. The salinity of the Red Sea is 40% and that of the Dead Sea is 2.28%. This is because of high rate of evaporation, lack of supply of fresh water in enclosed seas.
- The Baltic Sea receives many fresh water rivers from the neighboring shield areas, and, with a low rate of evaporation the salinity is only 2% at the head of the Gulf of Bothnia. The Mediterranean waters do not mix freely with the open ocean. In the hot, dry summers there is very rapid evaporation. The Nile is the only large river entering the eastern parts and brings down much salt, so that the salinity of the eastern Mediterranean in summer is about 40%. Further east, in the inland Dead Sea, the salinity is almost 240%, and there is salt accumulation along the shores.
- The movement of ocean waters takes place in three different forms, viz., waves, currents and tides. Ocean water moves horizontally as well as vertically.
- These movements are due to variation in density from one part to another which results from the differences in salinity and temperatures. Winds also provide a motive force for the horizontal movement of surface water. The movement of surface water in which the rise and fall of water surface is more predominant than the actual forward motion of the water particles is called waves. When the movement of a mass of water in a fairly definite direction over great distances takes place is called current. Currents are caused by the differences in salinity, drag of winds, shape and position of coasts and variation in temperature.
- Currents are of two types: Warm currents and Cold currents. Currents exert an influence on the climate of the bordering coastal regions. They provide plankton, a food for the fish. Important ocean routes follow the favorable currents. There are important currents in Pacific Ocean, the Atlantic Ocean and the Indian Ocean.

19. Correct Option: (d)

Explanation:

Types of Tides

- Tides vary in their frequency, direction and movement from place to place and also

from time to time. Tides may be grouped into various types based on their frequency of occurrence in one day or 24 hours or based on their height.

Tides based on Frequency

- **Semi-diurnal tide:** The most common tidal pattern, featuring two high tides and two low tides each day. The successive high or low tides are approximately of the same height.
- **Diurnal tide:** There is only one high tide and one low tide during each day. The successive high and low tides are approximately of the same height.
- **Mixed tide:** Tides having variations in height are known as mixed tides. These tides generally occur along the west coast of North America and on many islands of the Pacific Ocean.
- **Tides based on the Sun, Moon and the Earth Positions:**
- The height of rising water (high tide) varies appreciably depending upon the position of sun and moon with respect to the earth. Spring tides and neap tides come under this category.
- **Spring tides:** The position of both the sun and the moon in relation to the earth has direct bearing on tide height. When the sun, the moon and the earth are in a straight line, the height of the tide will be higher. These are called spring tides and they occur twice a month, one on full moon period and another during new moon period.
- **Neap tides:** Normally, there is a seven day interval between the spring tides and neap tides. At this time the sun and moon are at right angles to each other and the forces of the sun and moon tend to counteract one another. The Moon's attraction, though more than twice as strong as the sun's, is diminished by the counteracting force of the sun's gravitational pull. Once in a month, when the moon's orbit is closest to the earth (perigee), unusually high and low tides occur. During this time the tidal range is greater than normal. Two weeks later, when the moon is farthest from earth (apogee), the moon's gravitational force is limited and the tidal ranges are less than their average heights. When the earth is closest to the sun (perihelion), around 3rd January each year, tidal ranges are also much greater, with unusually high and unusually low tides. When the earth is farthest from the sun (aphelion), around 4th July each year, tidal ranges are much less than average. The time between the high tide and low tide, when the water level is falling, is called the ebb. The time between the low tide and high tide, when the tide is rising, is called the flow or flood.

20. Correct Option: (c)

Explanation:

The Circulation of the Atlantic Ocean

- The steady Trade Winds constantly drift two streams of water from east to west. At the 'shoulder' of north-east Brazil, the protruding land mass splits the South Equatorial Current into the Cayenne Current which flows along the Guiana coast, and the Brazilian Current which flows southwards along the east coast of Brazil.
- In the North Atlantic Ocean, the Cayenne Current is joined and reinforced by the North Equatorial Current and heads north-westwards as a large mass of equatorial water into the Caribbean Sea. Part of the current enters the Gulf of Mexico and emerges from the Florida Strait between Florida and Cuba as the Florida Current. The rest of the equatorial water flows northwards east of the Antilles to join the Gulf Stream off the south-eastern U.S.A. The Gulf Stream Drift is one of the strongest ocean currents, 35 to 100 miles wide, 2,000 feet deep and with a velocity of three miles an hour. The current hugs the coast of America as far as Cape Hatteras (latitude 35°N.), where it is *deflected eastwards* under the combined influence of the *Westerlies* and the *rotation* of the earth. It reaches Europe as the North Atlantic Drift. This current, flowing at 10 miles per day, carries the warm equatorial water for over a thousand miles to the coasts of Europe. From the North Atlantic, it fans out in three directions, eastwards to Britain, northwards to the Arctic and southwards along the Iberian coast, as the cool Canaries Current. Oceanographic researches show that almost two- thirds of the water brought by the Gulf Stream to the Arctic regions is returned annually to the tropical latitudes by dense, cold polar water that creeps southwards in the ocean depths. The Canaries Current flowing southwards eventually merges with the North Equatorial Current, completing the clockwise circuit in the North Atlantic Ocean. Within this ring of currents, an area in the middle of the Atlantic has no perceptible current. A large amount of floating sea-weed gathers and the area is called the Sargasso Sea.

- Apart from the clockwise circulation of the currents, there are also currents that enter the North Atlantic from the Arctic regions. These cold waters are blown south by the out-flowing polar winds. The **Irminger Current or East Greenland Current flows between Iceland and Greenland and cools the North Atlantic Drift at the point of convergence**. The cold Labrador Current drifts south-eastwards between West Greenland and Baffin Island to meet the warm Gulf Stream off Newfoundland, as far south as 50°N. where the icebergs carried south by the Labrador Current melt.
- The South Atlantic Ocean follows the same pattern of circulation as the North Atlantic Ocean. The major differences are that the circuit is anti-clockwise and the collection of sea-weed in the still waters of the mid-South Atlantic is not so distinctive.
- Where the **South Equatorial Current is split at Cape Sao Roque, one branch turns south as the warm Brazilian Current.** Its deep blue waters are easily distinguishable from the yellow, muddy waters carried hundreds of miles out to sea by the Amazon further north. At about 40°S.
- The influence of the prevailing Westerlies and the rotation of the earth propel the current eastwards to merge with the cold West Wind Drift as the South Atlantic Current. On reaching the west coast of Africa the current is diverted northwards as the **cold Benguela Current (the counterpart of the Canaries Current)**.
- It brings the cold polar waters of the West Wind Drift into tropical latitudes. Driven by the regular South-East Trade Winds, the Benguela Current surges equatorwards in a north-westerly direction to join the South Equatorial Current.
- This completes the circulation of the currents in the South Atlantic. Between the North and South Equatorial Currents is the east- flowing Equatorial Counter Current.

21. Correct Option: (c)

Explanation:

The Oceanic Deposits of the Ocean Floor

- Materials eroded from the earth which are not deposited by rivers or at the coast are eventually dropped on the ocean floor. The dominant process is slow sedimentation where the eroded particles very slowly filter through the ocean water and settle upon one another in layers. The thickness of the layer of sediments is still unknown. Its rate of accumulation is equally uncertain. Generally speaking, we may classify all the oceanic deposits as either muds, oozes or clays.
  - **The muds-**These are terrigenous deposits because they are derived from land and are mainly deposited on the continental shelves. The muds are referred to as blue, green or red muds; their colouring depends upon their chemical content.
  - **The oozes-**These are pelagic deposits because they are derived from the oceans. They are made of the shelly and skeletal remains of marine micro¬organisms with calcareous or siliceous parts. Oozes have a very fine; flour-like texture and either occur as accumulated deposits or float about in suspension.
  - **The clays**-These occur mainly as red clays in the deeper parts of the ocean basins, and arc particularly abundant in the Pacific Ocean. Red clay is believed to be an accumulation of volcanic dust blown out from volcanoes during volcanic eruptions.

22. Correct option: (a)

Explanation

- The Chicago Convention (also known as the Convention on International Civil Aviation), established the International Civil Aviation Organization (ICAO), a specialized agency of the United Nations charged with coordinating and regulating international air travel.

Supplementary notes

Chicago Convention

- The Chicago Convention (also known as the Convention on International Civil Aviation), established the International Civil Aviation Organization (ICAO), a specialized agency of the United Nations charged with coordinating and regulating international air travel.
- The Convention establishes rules of airspace, aircraft registration and safety, and details the rights of the signatories in relation to air travel; it also exempts air fuels from tax.
- The Convention was signed by 52 states on 7 December 1944 in Chicago, Illinois, U.S., and came into effect on 4 April 1947.

- The Convention provided for the sovereignty of airspace above the territory of each state, together with five freedoms (later expanded to nine by the addition of four unofficial freedoms) which govern the freedom of states to operate air transport flights (including the carriage of passengers, cargo and mail) across, into and within the airspace of other states.

23. Correct answer: (a)

Explanation

- India's first hybrid annuity model (HAM) based 14 MLD sewage treatment plant (STP) has been inaugurated in Sarai, Haridwar, Uttarakhand.

Supplementary notes

Sarai Sewage Treatment Plant

- India's first hybrid annuity model (HAM) based 14 MLD sewage treatment plant (STP) has been inaugurated in Sarai, Haridwar, Uttarakhand.
- The project has been developed under the Namami Gange project of National Mission for Clean Ganga (NMCG).
- In order to improve the quality of water in the river Ganga in Uttarakhand, 34 projects of sewerage infrastructure works have been taken up at a cost of approximately Rs 1,144.77 crore for creating treatment capacity of 165.50 MLD and laying sewerage network of 152 km.
- Once all these projects are commissioned, the entire sewage capacity of Uttarakhand will be met and there will be a substantial improvement in the quality of water of the river Ganga.
- Namami Gange – National Mission for Clean Ganga is an Integrated Conservation Mission (ICM) , approved as 'Flagship Programme' with budget outlay of Rs.20,000 Crore.

24. Correct answer: (d)

Explanation

- Volcanic eruption in White Island of New Zealand

Supplementary notes

White Island

- Volcanic eruption in White Island of New Zealand.
- Whakaari/White Island (also known as just White Island) is an active andesite stratovolcano, situated 48 km (30 mi) from the east coast of the North Island of New Zealand, in the Bay of Plenty.
- Whakaari/White Island is New Zealand's most active cone volcano which has been built up by continuous volcanic activity over the past 150,000 years. About 70 percent of the volcano is under the sea, making this massive volcanic structure the largest in New Zealand.
- Previous Eruptions: On 27 April, 2016 a short-lived eruption occurred in the evening. It deposited material all over the crater floor onto some of the crater walls.

25. Correct Answer: (a)

Explanation:

- **Option (a) is correct answer**

Supplementary Notes

- Researchers have developed a device that will allow scientists to monitor frogs in the wild.
- Described as the world's first solar-powered remote survey device that can be installed at any frog pond and which receives a 3G or 4G cellular network, it has been named "FrogPhone".
- It has been developed by a team from various Australian institutions, including the University of New South Wales and the University of Canberra.
- A field trial conducted between August 2017 and March 2018 in Canberra proved successful, the British Ecology Society said in a statement.

26. Correct Option (d)

Explanation:

- All statements are correct

Supplementary Notes

- **Co2 emission on rise:** According to the Global Carbon Project, CO2 emissions are on rise by 0.6% in 2019 (2.1% in 2018). The reductions are not enough to stop global warming. Despite a significant decline in coal consumption in US and Europe, the higher global emissions are attributed to growth in natural gas and oil usage.
- **Industrial heat:** Industrial products are essential to construction, infrastructure and manufacturing, but making them requires a lot of heat—heat that emits more carbon dioxide than all the world's cars and planes. Many industrial processes start with melting rocks by burning fossil

fuels, and development of alternative technologies is far behind and expensive.

- **Land degradation:** Land degradation, mainly due to human activities like deforestation, mining/quarrying, construction, roads, other infrastructure for economic development, human settlements for increasing population, etc., is a contributing factor to climate change. Even agriculture and related activities are degrading land, including groundwater resources.
- **Meat consumption:** IPCC report 'Climate Change and Land' emphasises the ever-increasing global meat consumption and the resulting distorted land-use pattern to meet this requirement, as a cause contributing to climate change. The EAT-Lancet Commission report also supports this; it adds biodiversity loss, natural water depletion and carbon emission to the associated risks.
  - Creating pastures to feed cattle causes huge deforestation. Processing, preservation and packaging of cattle slaughtered is also highly GHG-generation intensive process.
  - Cattle itself is responsible for producing high quantities of methane, which has a far greater carbon footprint compared to carbon dioxide.
- Disregard for ocean health: Overfishing, plastic pollution, micro-plastics, flow of fertilisers and chemicals etc. is suffocating fish and damaging ocean health. More than 1 billion people depend on the oceans. Ocean health is vital to biodiversity, healthy fisheries and to regulate the climate.

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TEST
DAY - 23

1. Consider the following pairs with reference to the formation of the Himalayas:

1. Greater Himalayas: Pliocene
2. Lesser Himalayas: Miocene
3. Outer Himalayas: Eocene

Which of the above pairs is/are correctly matched?

(a) 2 only
(b) 3 only
(c) 1 and 2 only
(d) 1, 2, and 3

2. Consider the following faults of the Himalayas:

1. Main Central Thrust
2. Himalayan Frontal Thrust
3. Main Boundary Thrust

Arrange the above faults in north-south direction:

(a) 1-2-3
(b) 3-2-1
(c) 1-3-2
(d) 2-1-3

3. Which of the following pairs is/are *incorrectly* matched?

1. Dhupgarh: Vindhyan range
2. Amarkantak: Satpura range
3. Gali Konda: Palkodna range

Select the correct option using the codes given below:

(a) 1 only
(b) 2 only
(c) 1 and 3 only
(d) None of the above

4. Which of the following are the importance of the Himalayas for India?

1. It shapes the climate of India.
2. It contains rich mineral resources including Anthracite coal.
3. It has great tourism potential.
4. Temperate grasslands are found here.

Select the correct option using the codes given below:

(a) 1 and 3 only
(b) 1, 2, and 3 only
(c) 2 and 4 only
(d) 1, 2, 3 and 4

5. Consider the following statements:

1. The Himalayas have been formed due to compression of a geo-syncline, Tethys Sea.
2. Chos are the longitudinal valleys in the Shivalik range.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

6. Which of the following statements regarding Shiwalik Range is/are *incorrect*?

1. Shiwalik Range is not found in the Eastern Himalayas.
2. It is called Nag Tibba in Uttarakhand.
3. Zaskar and Ladakh are in the Greater Himalayas.

Select the correct option using the codes given below:

(a) 3 only

(b) 2 only

(c) 1 only

(d) 1, 2 and 3

7. Consider the following statements:

1. The basin of the Kashmir Valley was formed by the tectonic upliftment of Great Himalayas Range.
2. The 'Karewas' of Kashmir are both lacustrine and fluvial deposits.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

8. Arrange the following countries into the decreasing order of the length of border with India:

1. Pakistan
2. Nepal
3. Myanmar
4. Bhutan

Select the correct option using the codes given below:

(a) 1-2-3-4

(b) 2-1-3-4

(c) 1-3-4-2

(d) 3-2-4-2

9. Which of the following pairs regarding the rock system in India is correctly matched?

1. Dravidian Rock System: Himalayas
2. Gondwana System: Earliest rock system of India
3. Dharwar Rocks: Found in Aravali and Chota Nagpur regions.

Which of the above statements is/are correct?

(a) 2 only

(b) 1 and 2 only

(c) 1 and 3 only

(d) 2 and 3 only

10. Consider the following statements related to the Northern plains of India:

1. The alluvial fertile plains formed by the deposition process of the Himalayan Rivers only.
2. The Delta plains are considered as the extension of Khadar land.
3. The Bhabar Plains is in the north of Shiwalik whereas, Terai region is in the south.

Which of the above statements is/are ***incorrect***?

(a) 1 only

(b) 2 only

(c) 1 and 2 only

(d) 2 and 3 only

11. Arrange the following passes of the peninsular India in the North-South direction:

1. Goram Ghat
2. Haldi Ghati
3. Chorla Ghat
4. Bhor Ghat

Select the correct answer from the options given below:

(a) 1-2-4-3

(b) 1-2-3-4

(c) 2-1-4-3

(d) 2-1-3-4

12. Arrange the following passes of the Himalayas in the East-West direction:

1. Tunga Pass
2. Bom Di La
3. Bum La
4. Dipher Pass

Select the correct answer from the options given below:

(a) 2-3-4-1

(b) 3-4-2-1

(c) 4-1-2-3

(d) 2-3-1-4

13. Unlike the Western Coast, Eastern Coast does not have natural ports due to which of the following reasons?

1. Eastern Coast receives less rainfall than the West Coast.
2. The entire coastlines of the West Coast are the Coastline of Submergence.
3. The west-flowing rivers do not form delta.

Select the correct option using the codes given below:

(a) 1 only
(b) 3 only
(c) 2 and 3 only
(d) 1, 2 and 3

14. Match the following lists of the riverine islands to their locations:

River islands	Location
(A) Bhavani Island	1. Assam
(B) Sagar Island	2. Andhra Pradesh
(C) Umananda Island	3. Kerala
(D) Munroe Island	4. West Bengal

Select the correct answer from the code given below the lists:

	A	B	C	D
(a)	1	4	2	3
(b)	4	1	3	2
(c)	2	3	1	4
(d)	2	4	1	3

15. Consider the following statements regarding islands of India:

1. Like Lakshadweep, Andaman and Nicobar island groups have been formed due to coral deposits.
2. Nicobar island group has a larger number of islands than the Andaman group.
3. New Moore island emerged in the Bay of Bengal in the aftermath of the Bhola cyclone in 1970.

Which of the above statements is/are correct?

(a) 1 only
(b) 3 only
(c) 2 and 3 only
(d) 1, 2 and 3

16. Consider the following pairs:

1. Nathu-La pass: Sikkim
2. Burji la pass: Jammu and Kashmir
3. Shipki-La: Himanchal Pradesh
4. Zoji-La: Arunanchal Pradesh

Which of the following pairs are correctly matched?

(a) 1, 2 and 3 only
(b) 1, 3 and 4 only
(c) 2, 3 and 4 only
(d) 1, 2 and 4 only

17. Which of the following statements is/ are *incorrect* regarding the Himalayan Mountains?

(a) They are the highest mountain range of the world.
(b) Dehra Dun is situated in the Himadari Range.
(c) The famous hill station of Chakrata exists in the Lesser Himalayas.
(d) Bara Lacha-La, Shipki-La, Nathu-La, Zoji-La, Bomidi-La are present in the Himadari range.

18. Which of the following statements is/ are correct regarding the Western and Eastern Ghats?

1. The highest peak in Western Ghats region is Mahendragiri.
2. Shiva Samudram falls is in the Eastern Ghat region.
3. The Eastern Ghat is drained by the Mahanadi, Godawari, Krishna and Kaveri river systems.

Select the correct option form the codes given below:

(a) 1 only
(b) 2 only
(c) 3 only
(d) 2 and 3 only

19. Consider the following statements regarding the Coastal Plains:

1. The formation of deltas is prominent in the Eastern Ghats.

2. Vembanad is famous lagoon which is located at Malabar Coast

Which of the following is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

20. Consider the following statements regarding the Islands:

1. Andaman and Nicobar is the only island in India having an active volcano.
2. Lakshdweep is the only Island in India having coral presence.

Which of the following statements is/are ***incorrect***?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

21. Consider the following statements regarding Gangetic river dolphin

1. The Gangetic river dolphins can only live in freshwater
2. They are one of the oldest creatures in the world along with some species of turtles
3. It is placed under the "critically endangered" category by the International Union for Conservation of Nature (IUCN).

Which of the following statements is/are correct?

(a) 1 only

(b) 2 and 3 only

(c) 1 and 2 only

(d) 1, 2 and 3

22. Which Indian state recently got its first SEZ?

(a) Manipur

(b) Gujarat

(c) Assam

(d) Tripura

23. D Prabhakaran committee was seen recently in news, what was the purpose of this committee?

(a) It suggested reforms in electrification of Indian Railways

(b) It suggested resolving ambiguities on the correct serving size of packed and fast foods and the exact nutritional information.

(c) It suggested the new key reforms in 5G sector

(d) It suggested for conducting the nationwide NRC

24. The term 'Yazidis' was often in news in reference to the conflict and civil war in West Asia. Which of the following statements are correct about Yazidis?

1. Yazidis are an endogamous, mostly Kurmanji-speaking group.
2. Yazidi practices have roots tracing back to the ancient Egyptian civilization.
3. Yazidi practices have mixed elements of Christianity, Islam and Zoroastrianism.

Choose the correct answer:

(a) 1 only

(b) 1 and 2 only

(c) 1 and 3 only

(d) 1, 2 and 3

25. 'Jaga Mission' received the 2019 World Habitat Award. Which of the following statements are correct about Jaga Mission?

1. Jaga Mission is a Housing & Urban Development Department of Government of Odisha project.
2. Jaga Mission aims to transform Urban Local Bodies (ULBS) into livable habitats.
3. Jaga Mission also provides access to livelihood opportunities.

Choose the correct answer:

(a) 1 only

(b) 1 and 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

ANSWER HINTS

DAY - 23

1. Correct Option: (a)

Explanation:

Evolution of the Himalayas

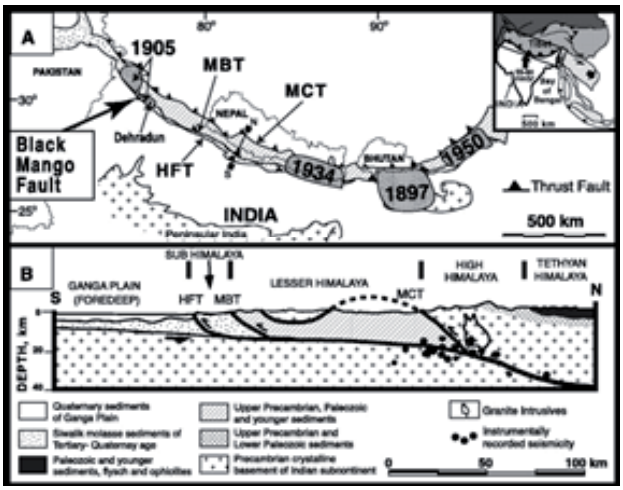
- Approx 10 million years ago, all the ranges of Himalayas got fully developed.
- The Greater Himalayas were formed in the Eocene and Oligocene periods of the Cenozoic era.
- The lesser Himalayas were formed due to the folding of the Potwar sediments in the Miocene period.
- The Shiwaliks were formed in the Pliocene period due to the sediments brought from the Greater and the Lesser Himalayas.

2. Correct Option: (c)

Explanation:

Active faults of the Himalayas

- The frontal zone of the Himalaya is most active at present.
- The geology of the Himalayas on its southern side is characterized by three major tectonic units: The Main Central Thrust (MCT), the Main Boundary Thrust (MBT) and the Himalayan Frontal Thrust (HFT) or the Main Frontal Thrust (MFT).
- These structures essentially separate the different rocky formations that characterize the different stages of the Himalayan outcrop—the higher Himalayas, the lesser Himalayas, and the sub-Himalayan Shivalik range.



- **The highest and the oldest of these is the MCT, which is a north-dipping fault and marks the tectonic contact between the higher and the lesser Himalayas.**
- **The lesser and the sub-Himalayas are separated by the MBT.**
- **The HFT or the MFT constitutes the southern-most and the youngest thrust.**

3. Correct Option: (c)

Explanation:

Hills of the Peninsular India

- Most of the hills in the peninsular region are of the relict type (residual hills).
- Guru Sikhar (1,722 m), the highest peak of Aravali range.
- Satpura range is a series of seven mountains. **Dhupgarh (1,350 m) near Pachmarhi on Mahadev Hills is the highest peak. Amarkantak (1,127 m) is another important peak.**
- Anai Mudi (2,695 m) is the highest peak in the whole of Peninsular India.

- It is only in the northern part, between the Mahanadi and the Godavari that the Eastern Ghats exhibit true mountain character. This part comprises the Maliya and the Madugula Konda ranges. The Madugula Konda range has higher elevations ranging from 1,100 m and 1,400 m with several peaks exceeding 1,600 m. Jindhagada Peak (1690 m) in Araku Valley Arma Konda (1,680 m), **Gali Konda** (1,643 m) and Sinkram Gutta (1,620 m) are important peaks.

4. Correct Option: (d)

Explanation:

Importance of the Himalayas

- Himalayas forms the natural and political boundaries of India. Due to the location of Himalayas, the Indian subcontinent has been able to have its own identity apart from the Asian mainland
- **It plays an important role in the determination of the climate of India.**
- It stand like a mighty wall and protect India from foreign invasion.
- It obstructs the way of the cold polar winds, as a result, the Indian sub-continent is saved from the Polar waves.
- Similarly, Himalayas act as a barrier for the moisture-laden south-western monsoon winds.
- Himalayas make the rivers perennial by continuous supply of the water by the melting of snow. These perennial rivers make the development of irrigation and hydroelectricity facilities possible.
- **Himalayas region contains a rich amount of mineral resources.** Cobalt, Nickel, Zinc, Copper, Antimony, Bismuth, etc. are the metallic minerals. Non-metallic minerals like Coal and Petroleum are also found here. Coal in the Himalayas is found in the Tertiary structures. Out of the various types of coals found here, **the best quality Anthracite coal is found in the Kargil area**.
- The Himalayas are rich in forest resources.
- The Himalayas have magnificent, majestic beauty to admire. The popularity of winter sports and snowfall bring the tourist along with it.
- The animals of this region (Sheep & Goat) depend on the **temperate grasslands** found bere.

5. Correct Option: (a)

Explanation:

Himalayas

- **Regarding the evolution of Himalayas, the Geosynclinal Theory of Kober and the Plate-Tectonics Theory of Harry Hess are considered most acceptable.**
- According to Kober, about 70 million years ago there was a geo-syncline, called Tethys Sea, in the place of the Himalayas and it separated the Angaraland in the north and Gondwanaland in the south. The sediments from these two headlands were deposited into the Tethys Sea. These sediments gradually got raised due to the compression forces of the two landmasses. This compression of the sediments formed the fold mountain ranges of Kunlun, Himalaya, and Karakoram. The median mass(middle portion of geo syncline), less affected by the folding is known as the Tibetan Plateau.
- According to the Plate-Tectonic theory, about 70 million years ago the Indian plate in the south moved in the northeastern direction towards the Eurasian plate. About 20-30 million years ago, these two land-masses got very close, due to which the sediments in the Tethys Sea got folded and Himalayas were evolved. Approx 10 million years ago, all the ranges of Himalayas got fully developed.
- **Chos are the small streams in Punjab, formed by the intensive erosion of the Shivalik.**

6. Correct Option: (d)

Explanation:

Himalayas

- Trans Himalayas is north of the Great Himalayan range. The **Zaskar, the Ladakh**, the Kailas, and the Karakoram are the main ranges. Nanga Parbat (8126 m) is an important range which is in The Zaskar Range.
- The Great Himalaya is also known as Inner Himalaya, Central Himalaya or Himadri. This mountain range boasts of the tallest peaks of the world, most of which remain under perpetual snow. The total west to east extension of the great Himalayas is 2400 km and terminates abruptly at the syntaxial bends.
- Middle or the Lesser Himalaya is between the Shiwaliks in the south and the Greater Himalayas in the north. It is also

called the Himachal or Lower Himalaya. **Middle Himalayas are known by the Mussoorie and the Nag Tibba ranges in Uttarakhand and Dhauladhar in Himachal Pradesh.** East of the Kosi River, the Sapt Kosi, Sikkim, Bhutan, Miri, Abor, and Mishmi hills represent the lower Himalayas.

- Shiwalik/ Outer Himalayas is located between the Great Plains and Lesser Himalayas. Its altitude varies from 600 to 1500 meters. **It runs for a distance of 2,400 km from the Potwar Plateau (Pakistan) to the Brahmaputra valley. The width of the Shiwaliks varies from 50 km in Himachal Pradesh to less than 15 km in Arunachal Pradesh.** The Shiwaliks are consolidated sands, gravels and conglomerate deposits (Bhabhar/ Alluvial fans) which were brought by the rivers flowing from the higher ranges.

7. Correct Option: (b)

Explanation:

Kashmir valley

- Kashmir Valley is surrounded by Great Himalayan Range in the northeast and the Pir Panjal Range in the southwest. **The basin is formed by tectonic upliftment of Pir Panjal Range**, which impound the drainage of Himalayan side and gave rise to a vast lake, known as "Karewa Lake".
- Tectonically Kashmir Valley constitutes the Nappe Zone representing a tectonic depression formed by the upliftment of Pir Panjal Range along the Panjal thrust. The Valley in the form of a graben is flanked by two horsts, Pir Panjal Range in the southwestern side and Zanskar Range in the northeastern side.
- The word "Karewa" is derived from Kashmiri dialect meaning "Wudars". The lake was drained through the Baramullah "Tatamulla Gorge" due to continued upliftment of Pir Panjal Range.
- The sediments deposited in the lake are about 1300m in thickness, known as Quaternary sediments of Karewa Group. These deposits, known as 'Karewas' or 'Karewa Group' are largely **fluvial-lacustrine** and **glacial-fluvial-lacustrine** and aeolian in origin.

8. Correct Option: (a)

Explanation:

Country: length of border (in Kms)

- Bangladesh: 4,096.7
- China: 3,488
- **Pakistan: 3,323**
- **Nepal: 1,751**
- **Myanmar: 1,643**
- **Bhutan: 699**
- Afghanistan: 106

9. Correct Option: (c)

Explanation:

Rock system of India

- Based on the geological history of India, it is of four types viz. Archaean Rock System (oldest), Purana Rock System, Dravidian Rock System, and Aryan Rock System.
- The Archaean rock system includes:
  - **Archaean Rocks:** These are very old primary rocks, which have been metamorphosed into gneiss and schist. Bundelkhand Gneiss (Bellary Gneiss) is the oldest among them. Bengal gneiss and Nilgiri gneiss are other examples of these rocks.
  - **Dharwar Rocks**: These are the layered rocks formed after the erosion and deposition of the Archean rocks. These are highly metamorphosed and fossils are not found inside. **These rocks are found in Dharwar and Bellary districts of Karnataka, Aravalli range, Balaghat, Rewa, Chota Nagpur**, etc.
- **The Purana rock system includes:**
  - Cuddapah Rocks: These rocks have been fonned by the erosion and deposition of Dharwar rocks. These are less metamorphosed but devoid of fossils. These rocks are found in Krishna valley, Nallamalai hills area, Papaghani, and Cheyar valleys.
  - Vlndhyan Rocks: These rocks have been formed after the formation of Cuddappah rocks. These rocks are spread from Chittorgarh of Rajasthan to Sasaram of Bihar.
- Dravidian Rock System (Palaeozoic) was formed about 600 – 300 million years ago and **found in the Extra Peninsular region (Himalayas and Ganga plain) and are very rare in Peninsular India.** The rocks of Cambrian, Ordovician, Silurian, Devonian, and Carboniferous periods fall under the Dravidian system.
  - Carboniferous rocks comprise mainly of limestone, shale and quartzite.

Mount Everest is composed of Upper Carboniferous limestones. Coal formation started in the Carboniferous age.

- Aryan Rock System includes Gondwana System, Jurassic System, Deccan Trap, and the Tertiary System.
  - **Gondwana Rocks: These are the rocks formed in upper Carboniferous to Jurassic era,** hence these are especially important for coal deposits. About 98% of the coal deposits of India are found in these rocks. these rocks are found in the river valleys of Damodar, Mahanadi and Godavari and its tributaries.
  - Jurassic system: The marine transgression in the latter part of the Jurassic gave rise to thick series of shallow-water deposits in Rajasthan and in Kuchchh. Coral limestone, sandstone, conglomerates, and shales occur in Kuchchh.
  - **Deccan Trap:** This was formed in the Cretaceous period of the Mesozoic era due to volcanic eruption (Reunion Hotspot) through fissure.
  - **Tertiary System: It is the most significant period in India's geological history because the Himalayas were born and India's present form came into being in this period.**

10. Correct Option: (b)

Explanation:

North Indian Plains

- The Great North Indian plains are homogeneous surfaces with an invisible slope.
- These are alluvial fertile plains formed by the deposition process of the Himalayan Rivers. **Along with the Himalayan Rivers, the Vindhyan Rivers like are also having a prominent role in making the land fertile**. It deposits a large number of sediments along the foothills.
- The Great North Indian plain is divided into following subdivisions on the basis of relief features:
  - **The Bhabar Plains lie to the south of Shiwalik from Jammu to Assam**. The Bhabar tract consists of gravel and un-assorted sediment deposits and is not suitable for cultivation.
  - **The Terai Plains lies south to the Bhabar tract**. It is a marshy tract with a malarial climate. The width of the Terai tract is more in the eastern region.
  - The Bhangar are older alluvial plain which represents upland alluvial tract. These areas are well-drained and suitable for cultivation.
  - The Khadar is new alluvial deposits along the course of the river. It is enriched by fresh deposits of silt every year.
  - **Delta Plains are considered as the extension of Khadar land**. This area is a depositional area in the lower reaches of the Ganga River.

11. Correct Option: (a)

Explanation:

Passes of Peninsular India

- Bhor Ghat is in Maharashtra.
- Goran Ghat is in Rajasthan.
- Palghat is on the Kerala-Tamil Nadu border. It is also called Palakkad Gap
- **Haldighati Pass is in the Aravalli Range of Rajasthan.**
- **Chorla Ghat Pass is at the intersection of Goa, Karnataka, and Maharashtra.**
- **Goram Ghat is south of Mount Abu (Aravalli Range) in Rajasthan.**

12. Correct Option: (a)

Explanation:

Passes of the Arunachal Pradesh Himalaya

- **Dipher Pass is the trijunction of India, China, and Myanmar**. It is an important land trade route between India and Myanmar and remains open throughout the year.
- **Tunga Pass is located in the West Siang district, Arunachal Pradesh. It is west to the Dipher Pass.**
- **Bom Di La connects Arunachal Pradesh with Bhutan. It is west to the Tunga Pass.**
- **Bum La is in Arunachal Pradesh, located at the Indo-China border. It is west to the Bom Di La.**

13. Correct Option: (b)

Explanation:

Coasts of India

- Eastern coastal plains are broader and less steep due to delta formed by the east-flowing rivers and absent of any geological events. The western coastal plains are narrow **due to absence of riverine deltas and steeper due to down warping of the west coast in the past**. Therefore, Unlike the Western Coast, Eastern Coast does not have natural ports. However, many artificial ports have been developed here. **Less or more rainfall does not have any role in this.**
- Coastline of emergence is formed either by an uplift of the land or by the lowering of the sea level. Coastline of submergence is an exact opposite case.
- Bars, spits, lagoons, salt marshes, beaches, sea cliffs and arches are the typical features of emergence which has been experienced in the East Coast thus, the coastline of the East Coast is emergent. On the contrary, **the west coast of India is both emergent and submergent.** The northern portion of the coast is submerged as a result of faulting and the southern portion, that is the Kerala coast, is an example of an emergent coast.

14. Correct Option: (d)

Explanation:

River islands of India

- All the above islands are formed by rivers hence called as riverine islands.
- **Bhavani Island situated in the midst of the Krishna River, at Vijayawada, Andhra Pradesh.**
- **Munroe Island is an inland island group located at the confluence of Ashtamudi Lake and the Kallada River, in Kollam district, Kerala.**
- **Umananda Island is the smallest river island in the world. It is in the midst of river Brahmaputra near Guwahati, Assam.**
- **Sagar Island is an island in the Ganges delta, lying on the Continental Shelf of Bay of Bengal in West Bengal.**
- Some other islands are Majuli (World's largest river island) in Assam, Abdul Kalam Island (or, Wheeler Island) in Odisha, Dibru-Saikhowa in Assam, Quibble Island in the Adyar river in Tamil Nadu, Mandhata island, also known as Shivapuri or Omkareshwar in the Narmada river in Madhya Pradesh.

15. Correct Option: (b)

Explanation:

Indian islands

- The major islands groups of India are Andaman and Nicobar Archipelago in Bay of Bengal and Lakshadweep islands in the Arabian Sea.
- **Similar to the formation of the Himalayas, Andaman and Nicobar Islands were formed due to collision between Indian Plate and Burma Minor Plate (part of Eurasian Plate).**
- **This archipelago is composed of 265 big and small islands (203 Andaman islands + 62 Nicobar Islands).**
- Lakshadweep Islands are coral islands. These islands are a part of Reunion Hotspot volcanism.
- New Moore island is a small uninhabited offshore sandbar landform in the Bay of Bengal, off the coast of the Ganges-Brahmaputra Delta region.
- **It emerged in the Bay of Bengal in the aftermath of the Bhola cyclone in 1970. It keeps on emerging and disappearing.**

16. Correct Option: (a)

Explanation:

Mountain Passes

- India is the seventh largest country in the world. It has land boundaries of 15,200 km and 6100 km long coast line. India's landmass covers 3.28 million square kilometer of area. This accounts for nearly 2.42 percent of the total geographical area of the world. India is the largest country in terms of area and population in South-Asia. It is surrounded by ocean.
- India is strategically located in Indian Ocean. It commands sea routes between Europe and Africa, South East Asia, far East Asia and Oceania. It is because of this that India shares good trade relation between many countries since ancient times. India has a good location in terms of sea and also well connected by land. Various passes like **Nathu-La (Sikkim), Shipki-La (Himachal Pradesh)**, **Zoji-La and Burji la pass (Jammu & Kashmir)** have their own importance.

- The main India-Tibet trade route that connects Kalimpong near Darjeeling with Lhasa in Tibet passes through Jelepa La. Several passes have provided a passage to many ancient travelers. These routes are not only important for trade but also to exchange ideas and culture.

17. Correct Option: (b)

Explanation:

Himalayan Mountains

- Himalayas are the young fold mountains. This is the highest mountain range of the world. Himalayas act as natural barrier. The extreme cold, snow and rugged topography discourage the neighbors to enter India through Himalayas. They run from west-east direction from Indus to Brahmaputra along the northern boundary of India covering a distance of 2500 km. Their width varies from 400 km in the west and 150 km in the East.
- The Himalayas may be divided into three parallel ranges:
  - Greater Himalayas or Himadari
  - Lesser Himalayas or Himachal
  - Outer Himalayas or Siwaliks.
  - **The Greater Himalayas or Himadari:** The Greater Himalayas comprises of the northern most ranges and peaks. It has an average height of 6000 metres and width lies between 120 to 190 Kms. It is the most continuous range. It is snow bound and many glaciers descend from this range. It has high peaks like Mt. Everest, Kanchenjunga, Makalu, Dhaulagiri, Nanga Parbat etc. having a height of more than 8000 metres. Mt. Everest (8848 m) is the highest peak of the world and Kanchenjunga is the highest peak of Himalaya in India. High Mountain passes also exist in this range, namely, **Bara Lacha-La, Shipki-La, Nathu-La, Zoji-La, Bomidi-La** etc. The Ganga and Yamuna rivers originate from this Himalayas.
  - **The Lesser Himalayas or Himachal:** The altitude of this range lies between 1000 and 4500 metres and the average width is 50 km. The Prominent ranges in this are Pir Panjal, Dhaula Dhar and Mahabharata ranges. It compresses of many famous hill stations like **Shimla, Dalhousie Darjeeling, Chakrata, Mussoorie, Nanital** etc. It also comprises of famous valleys like Kashmir, Kullu, Kangra etc.
  - **The Outer Himalayas or the Siwaliks:** It is the outer most range of the Himalayas. The altitude varies between 900-1100 meters and the width lies between 10 km-50 km. They have low hills like Jammu Hills, etc. The valleys lying between Siwalik and Lesser Himalayas (Himachal) are called 'Duns' like **Dehra Dun, Kotli Dun and Patli Dun**.

18. Correct Option: (c)

Explanation:

The Deccan Plateau

- **The Western Ghats:** Western Ghats or Sahyadris lie on the Western edge of the Deccan plateau. It runs parallel to the western coast for about 1600 km. The average elevation of the Western Ghats is 1000 metres. The famous peaks in this area are Doda Betta, Anaimudi amd Makurti. **The highest peak in this region is Anaimudi (2695m.)**. Western ghats are continuous and can be crossed through passes like Pal Ghat, Thal Ghot and Bhor Ghat. The rivers like Godavari, Bhima and Krishna flow eastward while the river Tapti flows westward. The streams form rapids & water falls before entering the Arabian Sea. The famous water falls are Jog falls on Sharavati, Shiva Samudram falls on Kaveri etc.
- **The Eastern Ghats:** The Eastern Ghats are discontinuous low belt. Their average elevation is 600m. They run parallel to the east coast from south of Mahanadi valley to the Nilgiri hills. **The highest peak in this region is Mahendragiri (1501 m)**. The famous hills are Mahendragiri hills, Nimaigiri hills in Orissa, Nallamallai hills in Southern Andhra Pradesh, Kollimalai and Pachaimalai in Tamilnadu. **The area is drained by the Mahanadi, Godawari, Krishna and Kaveri river systems.** The Nilgiri hills join Western & Eastern Ghats in the south.

19. Correct Option: (c)

Explanation:

The Coastal Plains

- The coastal plains in India run parallel to the Arabian Sea & Bay of Bengal along the Peninsular Plateau. The western coastal plain is a narrow belt along the Arabian sea of about 10-20 km wide. It stretches from Rann of Kachchh to Kanya Kumari.

- Western coastal plains comprises of three sectors (i) Konkan Coast (Mumbai to Goa), (ii) Karnataka coast from Goa to Mangalore (iii) Malabar Coast (Mangalore to Kanya Kumari).
- The eastern coast runs along Bay of Bengal. It is wider than the western coastal plain. Its average width is about 120 kms. The northern part of the coast is called Northern Circar and the southern part is called Coromandal Coast.
- **Eastern coastal plain is marked by Deltas** made by the rivers Mahanadi, Godavari, Krishna and Kaveri. The Chilka largest salt water lake in India in Odisha is located to the south of Mahanadi Delta. The coastal plains are belts for growing spices, rice, coconut, pepper etc. They are centres of trade & commerce.
- The coastal areas are known for fishing activities, therefore large number of fishing villages have developed along the coasts. **Vembanad is famous lagoon which is located at Malabar Coast**.

20. Correct Option: (b)

Explanation:

The Islands

- India has two main groups of Islands. There are 204 islands in Bay of Bengal called as Andaman and Nicobar Islands and 43 islands in Arabian Sea called as Lakshadweep islands
- The Andaman & Nicobar Island extend from north to south in Bay of Bengal.
- They are bigger in size. An **active volcano is located on the Barren Island in Andaman & Nicobar** group of islands. Lakshadweep islands are located near Malabar Coast of Kerala in the Arabian Sea.
- They cover an area of 32 sq km. Kavarati is the capital of Lakshdweep.
- **These islands are formed by corals** and endowed with variety of flora and fauna. These islands are important tourist attraction under water activities like snokling, such diving, deep sea diving and other sports make these island more popular.

21. Correct option: (c)

Explanation

- **Statement 3 is incorrect:** It is placed under the "endangered" category by the International Union for Conservation of Nature (IUCN).

Supplementary notes

Why India needs a Project Dolphin

- The government is planning to launch a programme called "Project Dolphin", along the lines of "Project Tiger" to enhance the population of these dolphins.

About the Gangetic river dolphin

- The Gangetic river dolphins can only live in freshwater, are blind and catch their prey in a unique manner, using ultrasonic sound waves.
- The Gangetic river dolphins were officially discovered in 1801 and are one of the oldest creatures in the world along with some species of turtles, crocodiles and sharks, according to the World Wildlife Fund (WWF).
- They once lived in the Ganges-Brahmaputra-Meghna and Karnaphuli-Sangu river systems of Nepal, India, and Bangladesh, but are now mostly extinct from many of its early distribution ranges, as per WWF.
- In 2009, the Gangetic dolphin was declared India's National Aquatic animal. Gangetic dolphin has been notified by the Assam as the state aquatic animal too.
- It is placed under the "endangered" category by the International Union for Conservation of Nature (IUCN).
- They are distributed across seven states in India: Assam, Uttar Pradesh, Madhya Pradesh, Rajasthan, Bihar, Jharkhand and West Bengal.
- Their numbers have dwindled in the last few decades mainly because of direct killing, habitat fragmentation by dams and barrages and indiscriminate fishing.

Efforts made in India to protect the dolphins?

- Setting up of the Conservation Action Plan for the Gangetic Dolphin (2010-2020), which has identified threats to Gangetic dolphins and impact of river traffic, irrigation canals and depletion of prey-base on dolphin populations.
- Gangetic dolphins have been included in Schedule -I of the Wildlife Protection Act, 1972, which means they have the highest degree of protection against hunting.
- They are also one among the 21 species identified under the centrally sponsored scheme, "Development of Wildlife Habitat".

Threats to Gangetic river dolphin

- **Pollution**: It faces a number of threats such as dumping of single-use plastics in water bodies, industrial pollution, and fishing.
- **Restrictive Flow of Water**: The increase in the number of barrages and dams is also affecting their growth as such structures impede the flow of water.
- **Poaching**: Dolphins are also poached for their flesh, fat, and oil, which is used as a prey to catch fish, as an ointment and as a supposed aphrodisiac.
- **Shipping & Dredging**: It is also called a blind dolphin because it doesn't have an eye lens and uses echolocation to navigate and hunt.

22. Correct option: (d)

Explanation

- The Ministry of Commerce and Industry has notified the setting up of the first ever Special Economic Zone (SEZ) in Tripura.

Supplementary notes

- Tripura gets its first SEZ
- The Ministry of Commerce and Industry has notified the setting up of the first ever Special Economic Zone (SEZ) in Tripura.
- It will be developed by Tripura Industrial Development Corporation (TIDC) Ltd.

About-

- The SEZ is being set-up at Paschim Jalefa, Sabroom, South Tripura District, which is 130 km away from Agartala.
- It will be a Sector Specific Economic Zone for Agro-Based Food Processing.
- The estimated investment in the project will be around 1550 Crore.
- The SEZ is estimated to generate 12,000 skilled jobs.
- Rubber based industries, textile and Apparel Industries, bamboo and Agri-food Processing Industries will be set-up in the SEZ.
- Setting up of the SEZ in Sabroom will open up new avenues to attract private investment considering the proximity of the Chittagong Port and construction of the bridge across Feni River in South Tripura which is underway.
- After it is set up, 100 percent Income Tax exemption will be provided on export income for SEZ units under Section 10AA of the Income Tax Act for the first 5 years.
- Also 50 percent exemption will be provided for the next 5 years and 50 percent of the ploughed back export profit for another 5 years.

SEZs-

- A special economic zone (SEZ) is an area in which the business and trade laws are different from the rest of the country.
- SEZs are located within a country's national borders, and their aims include increased trade balance, employment, increased investment, job creation and effective administration.
- To encourage businesses to set up in the zone, financial policies are introduced. These policies typically encompass investing, taxation, trading, quotas, customs and labour regulations.
- Additionally, companies may be offered tax holidays, where upon establishing themselves in a zone, they are granted a period of lower taxation.
- The benefits a company gains by being in a special economic zone may mean that it can produce and trade goods at a lower price, aimed at being globally competitive.

Special Economic Zones in India-

- India was one of the first in Asia to recognize the effectiveness of the Export Processing Zone (EPZ) model in promoting exports, with Asia's first EPZ set up in Kandla in 1965.
- The second EPZ, SEEPZ (Santa Cruz Electronics Export processing Zone) was set up in Maharashtra in 1974.
- In April 2000, the Government of India adopted a new policy framework titled 'Export and Import Policy 2000' for the establishment of public, private or joint public-private SEZs.
- India witnessed remarkable growth in number of formal, notified and operational approvals post enactment of SEZ Act in 2005. The spread of SEZs within the States is to achieve balanced growth across all regions of the country.
- The sector wise distribution of SEZ's clearly shows that majority of the formal approvals granted have been in IT/ITES sector which comprises nearly 64% of the total formal approvals granted till date.
- The SEZ scheme in India has shown a tremendous growth in infrastructure investment, employment and exports.

23. Correct option: (b)

Explanation

- D Prabhakaran committee suggested resolving ambiguities on the correct serving size of packed and fast foods and the exact nutritional information people need.

Supplementary notes

The link between food, nutrition, diet and non-communicable diseases

- India urgently needs a robust law on labelling and disclosure of nutritional information on food packs.
- The existing Food Safety Standards (Packaging and Labelling) Regulations, 2011, is too weak and ineffective.
- Even some-thing as basic as salt is not mandatorily disclosed.
- But the statutory framework is just not coming along, clearly due to pressure from the powerful junk food industry and the resultant red tape.
- In 2013, Food Safety and Standards Authority of India (FSSAI), the country's food regulator, set up an expert committee to regulate junk food available in schools following an order of the Delhi High Court.
- In 2014, the expert committee, comprising doctors, nutritionists, public health experts, civil society and industry, suggested labelling of calories, sugar, fat, saturated fat and salt on the front of food packs as this would help people make an informed choice about the food they eat.
- **D Prabhakaran committee** suggested resolving ambiguities on the correct serving size of packed and fast foods and the exact nutritional information people need.

Junk food monster: Communicating diseases

- A lab study by the Centre for Science and Environment has found extremely high levels of salt, fat and trans fat in junk foods responsible for obesity and non-communicable diseases like hypertension, diabetes and heart ailments.
- Trans fats are deadly. Their intake must be avoided to prevent heart diseases.
- The new trend of unhealthy food habits among the youth in India has put them at a risk of developing obesity, diabetes, heart attack -basically non-communicable diseases (NCDs) accentuated by unhealthy lifestyles.
- NCDs are those diseases that are not caused by an infection and not spread through contact with another person. They are the silent killers of our generation. Nearly two out of three deaths in India are due to NCDs, with heart diseases and chronic obstructive pulmonary disease (COPD) becoming the leading causes of death in the country.

24. Correct Option (c)

Explanation:

- **Statements 1 and 3 are correct Statement 2 is incorrect**: Yazidi practices have roots tracing back to the ancient Mesopotamian civilization.

Supplementary Notes

'Yazidis'

- **Rise of ISIS:** In 2014, the Iraqi insurgency escalated dramatically following the conquest of Mosul and major areas in northern Iraq by the **Islamic State in Iraq and Syria (ISIS),** a Salafi jihadist militant group and an unrecognised proto-state that follows a fundamentalist, Wahhabi doctrine of Sunni Islam.
- **Yazidi genocide by ISIS:** ISIS is also the perpetrator of genocide of Yazidis in Iraq. This genocide led to expulsion, flight and effective exile of Yazidis from their ancestral lands in Northern Iraq whose women and girls were forced into sexual slavery by ISIS and whose men were killed by thousands. They were also subjected to forced conversions.
- **Yazidis:**
  - Yazidis are an endogamous, mostly **Kurmanji-speaking** group of **predominantly Kurdish** ethnicity, indigenous to Iraq, Syria, and Turkey.
  - Yazidi practices have roots tracing back to the **ancient Mesopotamian religions**, but it has **mixed elements of Christianity (baptism), Islam (circumcision) and Zoroastrianism (reverence of fire as a manifestation from God).**
  - Yazidis have been **denounced as infidels** by fundamentalists like Al-Qaida and ISIS.
  - Despite many years of oppression and attempts to exterminate them, **Yazidis have kept alive their syncretic religion** for centuries.

25. Correct Option (b)

Explanation:

- **Statements 1 and 3 are correct Statement 2 is incorrect:** Jaga Mission aims to transform slums into livable habitats.

Supplementary Notes

'Jaga Mission'

- Government of Odisha won the **'World Habitat Award'** for its ambitious initiative - **Jaga Mission.** Tag line of the mission is **"Transforming Slums to Liveable Habitats".**
  - ➤ It is the **first of its kind** project in the country, to give **land titles to slum dwellers.**
  - ➤ **Odisha Liveable Habitat Mission "JAGA"** is a society under **Housing & Urban Development Department**.
- **Objective:** Jaga Mission promises to provide slum dwellers "self-respect and freedom from the perpetual fear of eviction".
- **Partners:** The Housing and Urban Development Department of Odisha, **Tata Trusts, and Norman Foster Foundation.**
- **Other recognitions:** Recently, this project was also awarded the **'India Geospatial Excellence Award'** for technological innovation in transforming the lives of urban poor.
- **World Habitat:** This award is given by World Habitat, a UK-based organization, in partnership with United Nation (UN)-Habitat, every year, in recognition of innovative, outstanding, and revolutionary ideas, projects, and programs from across the world.
- **Jaga Mission** is the World's largest slum land titling project, benefiting a million urban-poor living in the slums of Odisha, by granted **land rights certificate.**
- **Slum land titling project**: Jaga Mission aims to provide slums with all necessary civic infrastructure and services at par with the better off areas within the same urban local body (ULB). It aims to **improve access to livelihood opportu**nities by **leveraging/converging various schem**es, programs, and funding.
  - ➤ The project uses **drones and GIS technology** with extensive **community participation**.

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TEST
DAY - 24

Time Allowed: 30 mins **Maximum Marks: 50**

1. Which of the following events have shaped the evolution of the drainage pattern of the Peninsular rivers?

1. Upliftment of the Himalayas in the tertiary period.
2. Downwarping of western flank of the Western Ghats.
3. Slight tilting of the Peninsular block.

Which of the above statements is/are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

2. Which of the following are the reasons for the shifting of the Himalayan region?

1. River Capture
2. Floods
3. Gentle slope of the Northern plains.

Select the correct option using the codes given below:

(a) 1 and 3 only
(b) 1 and 2 only
(c) 2 and 3 only
(d) 1, 2 and 3

3. What is/are the objective(s) of the proposed interlinking of Manas, Sankosh, Teesta and Ganga Rivers?

1. Diversion of the surplus waters of Ganga to Manas and Sankosh rivers.
2. Transfer of the surplus water to the water-deficient peninsular rivers.
3. Providing irrigation facilities to the enroute command areas.

Select the correct option using the codes given below:

(a) 1 and 2 only
(b) 2 and 3 only
(c) 3 only
(d) 1, 2 and 3

4. Consider the following pairs:

1. 'Mekedatu' (Goats leap): Krishna river
2. Mettur Dam: Kaveri river
3. Jog falls: Narmada river

Which of the above pairs is/are correctly matched?

(a) 1 only
(b) 1 and 3 only
(c) 2 only
(d) 1 and 2 only

5. Consider the following statements regarding a river:

1. It is a perennial trans-boundary river originating on the Tibetan Plateau near Manasarovar lake.
2. It is the longest river in Nepal.
3. Its tributary is a river which forms the Indo-Nepal border.

Which of the following rivers these statements are about?

(a) Kosi
(b) Karnali
(c) Gandak
(d) Kali

6. Which of the following rivers is/are tributary(s) of Cauvery river?

1. Amaravati
2. Periyar
3. Noyyal
4. Harangi

Select the correct option using the codes given below:

(a) 1 and 4 only

(b) 2 and 3 only

(c) 1, 3 and 4 only

(d) 1 only

7. Arrange the following list of tributaries of the Brahmaputra river in the East-West direction:

1. Manas
2. Sankosh
3. Subansiri
4. Lohit

Select the correct order using the codes given below:

(a) 4-3-1-2

(b) 3-4-2-1

(c) 2-3-4-1

(d) 3-2-4-1

8. Which of the following statements regarding peninsular rivers:

1. All the peninsular rivers are non-perennial in nature.
2. All the peninsular rivers are fed by rain only.

Select the correct option using the codes given below:

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

9. Tehri dam, India's highest dam, has been built on which of the following rivers?

(a) Alaknanda

(b) Tons

(c) Bhagirathi

(d) Yamuna

10. Which of the following pairs regarding rivers and the cities on the rivers is/are correctly matched?

1. Narmada: Jabalpur
2. Mahanadi: Bhuvneshwar
3. Kaveri: Chennai
4. Ghaghra: Ayodhya

Select the correct option using the codes given below:

(a) 1 only

(b) 1 and 4 only

(c) 2 and 3 only

(d) 1, 2 and 4 only

11. Consider the following pairs of the rivers and their tributaries:

1. Yamuna: Tons
2. Jamuna: Tista
3. Ken: Betwa

Which of the above pairs is/are correctly matched?

(a) 3 only

(b) 1 and 3 only

(c) 1 and 2 only

(d) 1, 2 and 3

12. West flowing rivers do *not* form delta due to which of the following reasons?

1. Collision between Indian and Eurasian plates.
2. Shorter course of the rivers.
3. Steeper slope of their course.
4. Smaller tributaries of these rivers.

Select the correct option using the codes given below:

(a) 1 only

(b) 2 and 4 only

(c) 1, 2, and 3 only

(d) 1, 2, 3 and 4

13. Consider the following statements regarding the Narmada river:

1. It rises from the Maikala range.
2. Sahasradhara Falls is situated on the river.
3. It flows through the marble rocks.
4. Aliabet is the largest island made by the river.

Which of the above statements is/are correct?

(a) 1 and 3 only

(b) 2, 3 and 4 only

(c) 1, 3 and 4 only

(d) 1, 2, 3 and 4

14. Consider the following rivers:

1. Gomti
2. Beas
3. Jhelum
4. Barak
5. Mahananda

Which of the above rivers flow(s) in India only?

(a) 1 and 5 only

(b) 2, 3 and 4 only

(c) 1 and 2 only

(d) 1, 2, 4 and 5 only

15. Consider the following Himalayan rivers:

1. Jhelum
2. Chenab
3. Ravi
4. Beas
5. Satluj

Which of the above rivers do(es) originate in India?

(a) 2 and 4 only

(b) 1, 2 and 3 only

(c) 1, 2, 3 and 4 only

(d) 1, 2, 3, 4 and 5

16. Consider the following statements regarding the rivers system in India:

1. The Himalayan rivers intensive erosional activity in their upper courses and carry huge loads of silt and sand.
2. All the peninsular rivers are seasonal.
3. The Peninsular Rivers have shorter and deeper courses as compared to their Himalayan counterparts.

Which of the following statements is/are ***incorrect***?

(a) 1 and 2 only

(b) 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

17. Consider the following statements regarding the Indus River:

(a) In the main stream of the Indus, the water level is at its lowest from mid December to mid-February.

(b) The discharge of the principal rivers of the Indus River system is at a minimum during the summer months.

(c) The principal rivers of the Indus River system are snow-fed

(d) It follows a north-westerly course through Tibet.

18. Consider the following rivers:

1. Subansiri
2. Dhansiri
3. Manas
4. Barak

Which of the following is ***not*** a right bank tributary of Brahmaputra?

(a) 1 and 3 only

(b) 2 and 4 only

(c) 2 and 3 only

(d) 1 and 4 only

19. From which of the following states does the Narmada river *does not* pass?

(a) Madhya Pradesh

(b) Gujarat

(c) Maharashtra

(d) Chhattisgarh

20. Which of the following rivers *does not* meet the sea at the Gulf of Khambhat?

(a) Sabarmati

(b) Luni

(c) Tapi

(d) Mahi

21. Consider the following statements regarding Annular Solar Eclipse

1. An eclipse happens when the moon while orbiting the Earth, comes in between the sun and the Earth.
2. Solar eclipses can be used to study the top layer of the sun called the corona.

Which of the following statement is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

22. Consider the following statements regarding Bushfire that has caused a devastating fire in Australia

1. It is an uncontrolled fire that burns through scrubland.
2. Wind plays a key part in the spread of bushfires.
3. Eucalyptus trees were the major factor for the fire.

Which of the following statement is/are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

23. What are the major causes for winter getting extra cold in India?

1. The cold wave usually arrives from the west, through the Western Disturbance wind system.
2. Extended cold spell has been triggered due to low stratus clouds that are blanketed over a large geographical area.

Which of the following statement is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

24. With reference to Swachh Survekshan 2020 consider the following statements

1. It is a biennial survey of cleanliness, hygiene and sanitation in cities and towns across India.
2. The surveys are carried out by Quality Council of India.

Which of the following statement is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

25. Exercise INDRA 2019 was held between which countries recently

(a) India and Russia

(b) India and Israel

(c) India and Sri-Lanka

(d) India and France

****

ANSWER HINTS

DAY - 24

1. Correct Option: (d)

Explanation:

Evolution of the Himalayan rivers

- During the Miocene period, Shiwalik or Indo-Brahma river traversed the entire longitudinal extent of the Himalaya from Assam to Punjab and finally discharged into the Gulf of Sind The remarkable continuity of the Shiwalik and its lacustrine origin and alluvial deposits consisting of sands, silt, clay, boulders, and conglomerates support this viewpoint.
- It is opined that in due course of time Indo–Brahma river was dismembered into three main drainage systems: (i) the Indus and its five tributaries in the western part; (ii) the Ganga and its Himalayan tributaries in the central part; and (iii) the stretch of the Brahmaputra in Assam and its Himalayan tributaries in the eastern part.
- The dismemberment was probably due to the Pleistocene upheaval in the western Himalayas, including the (i) uplift of the Potwar Plateau (Delhi Ridge), which acted as the water divide between the Indus and Ganga drainage systems. Likewise, (ii) the down thrusting of the Malda gap area between the Rajmahal hills and the Meghalaya plateau during the mid-Pleistocene period, diverted the Ganga and the Brahmaputra systems to flow towards the Bay of Bengal.

Evolution of the Peninsular rivers

- The water divide in the peninsular India due to (i) the Subsidence of the western flank of the Peninsula leading to its submergence below the sea during the early tertiary period; (ii) Upheaval of the Himalayas when the northern flank of the Peninsular block was subjected to subsidence and the consequent trough faulting; (iii) Slight tilting of the Peninsular block from northwest to the southeastern direction gave orientation to the entire drainage system towards the Bay of Bengal during the same period.

2. Correct Option: (d)

Explanation:

Shifting of rivers

- In the Himalayan region, the rivers have been shifting their courses. A number of examples are there. For instance, the upper course of the Saraswati river was captured by a tributary of Ganga thus giving birth to the Yamuna River and the lower course of it was captured by Satluj.
- The reasons for these shifting are as follows:
  - **The Himalayas are still young, and the rivers are perennial in nature. These rivers like Kosi bring huge amount of eroded materials that block the course of the rivers and hence, the rivers shift.**
  - **The course of these rivers is gently sloped in the middle and lower parts. This cause the meandering and later, shifting of the course.**
  - **Floods cause the straightening of the course of the rivers and later shifting.**

3. Correct Option: (b)

Explanation:

Manas-Sankosh-Teesta-Ganga (MSTG) link

- Manas-Sankosh-Teesta-Ganga (MSTG) link is proposed under the Himalayan Component of National Perspective Plan (NPP).
- The MSTG link canal **envisages diversion of the surplus waters of Manas and Sankosh rivers with supplementation**

from the intermediate major streams for the benefit of augmenting the flows of Ganga at Farakka and further transfer to water-short areas of Krishna, Pennar and Cauvery basins and providing irrigation facilities to the enroute command areas.

- The Feasibility Report could not be prepared as the link canal is passing through the Manas-Tiger Reserve in Manas-Sankosh reach and Buxa Tiger Reserve and other forests in Sankosh-Teesta reaches. NWDA has carried out alternate studies avoiding reserved forest and preparation of feasibility report is under progress.

4. Correct Option: (c)

Explanation:

Features of the Peninsular rivers

- At Shivanasamudram, the **Kaveri river** branches off into two parts. The two branches of the river join after the fall and flow through a **wide gorge which is known as 'Mekedatu' (Goats leap).** It is in Karnataka.
- There are several dams built on the Kaveri River. The most popular ones being the Krishna Raja Sagar Dam (KRS) in Karnataka; Upper Anaicut Dam, Amaravthi Dam, **Mettur Dam,** and Kallanai Dam in Tamil Nadu.
- **The Jog waterfall is on the Sharavati river.**

5. Correct Option: (b)

Explanation:

Ghaghra/ Karnali river

- The above statements are about **Ghaghra/ Karnali** river.
- It is an antecedent river originating from the southern slope of the Himalayas.
- **It is the longest river in Nepal (507 km).**
- **Kali/Sarda, which forms the Indo-Nepal border, is its tributary which meets Ghaghra at Brahmaghat in India.** Thereafter it is known as Ghaghra, before this, it is known as Saryu.
- It is the largest tributary of the Ganges by volume and the second-longest tributary of the Ganges in length after the Yamuna.

6. Correct Option: (c)

Explanation:

Kaveri river

- Cauvery/Kaveri river flows from Talacauvery in the Western Ghat through Karnataka and Tamil Nadu into the Bay of Bengal.
- The total length of the river from origin to outfall is 800 km.
- The river descends from the South Karnataka Plateau to the Tamil Nadu Plains through the Sivasamudram waterfalls (101 m high).
- Its left bank tributaries are **Harangi**, Hemavati, Shimsha, and Arkavathy.
- Its right bank tributaries are Lakshmana Tirtha, Kabini, Bhavani, **Noyyal**, **Amaravati,** and Moyar.
- **Periyar (the lifeline of Kerala) flows from Western Ghat to the Arabian Sea. It is not a tributary of any river.**

7. Correct Option: (a)

Explanation:

Brahmaputra river system

- The Brahmaputra originates in Lake Manasarover in Tibet. It flows eastward in Tibet and south, south-west in India and traverses a distance of about 2900 km out of which 1,700km is in Tibet, 900 km is in India and 300 km is in Bangladesh.
- In Tibet, it is known as the Tsangpo, which means the purifier. The Rango Tsangpo is the major tributary of this river in there.
- It enters India near Namcha Barwa, near Sadia town in Arunachal Pradesh. From here, it is known as Siang or Dihang.
- Flowing southwest, it receives its main left-bank tributaries, viz., Dibang or Sikang and Lohit; thereafter, it is known as the Brahmaputra.
- In Assam, its major left bank tributaries are the Burhi Dihing, Dhansari (South) and Kalang whereas the important right bank tributaries are the Subansiri, Kameng, Manas, and Sankosh(last to join the Brahmaputra in India).
- The Brahmaputra enters into Bangladesh near Dhubri (in Assam) and flows southward.
- In Bangladesh, the Tista joins it on its right bank from where the river is known as the Jamuna.

- It finally merges with the river Padma(Ganga in Bangladesh), which falls in the Bay of Bengal.

8. Correct Option: (b)

Explanation:

Peninsular rivers

- **A few Peninsular rivers are also perennial.** The main reason for this is the continuous rainfall, first by South-West monsoon, and second by North-East monsoon in some regions of South India esp. in Tamil Nadu.
- Examples of some perennial peninsular rivers are **Cauvery** (due to winter rainfall in the lower course), **Periyar**, etc.
- Further, some rivers such as **Godavari, Narmada,** etc have a large number of tributaries making them perennial.
- **However, all the Peninsular rivers are fed by rain only.**

9. Correct Option: (c)

Explanation:

Tehri Dam

- **Tehri Dam has been built on Bhagirathi and Bhilangana Rivers.**
- It is the biggest, highest and tallest dam in India and the fourth highest dam in the world.
- Providing more than 1,000 MW of hydroelectricity, it is also a popular tourist attraction in Uttarakhand.
- Its length is 592 meters, and height is 260.5 meters.

10. Correct Option: (c)

Explanation:

Cities on the bank of rivers

- Surat: Tapti/Tapi
- Vijaywada: Krishna
- Hyderabad: Musi
- Jabalpur: Narmada
- Gwalior: Chambal
- Kota: Chambal
- Jamshedpur: Subarnarekha
- Nasik: Godavari
- Ahmedabad: Sabarmati
- Agra: Yamuna
- Kanpur: Ganga
- Srirangapatnam: Kaveri
- Tiruchirapalli: Kaveri
- Lucknow: Gomti
- Dibrugarh: Brahmaputra
- Guwahati: Brahmaputra
- Cuttack: Mahanadi
- Madurai: Vaigai
- Panji: Mandovi
- Ayodhya: Saryu (Ghaghra)
- Chennai: Cooum, Adyar

11. Correct Option: (c)

Explanation:

Tributaries of rivers

- **In Uttrakhand, Yamuna is joined by Tons river, its largest tributary (by volume).**
- **In Bangladesh, the Tista joins Brahmaputra on its right bank from where the river is known as the Jamuna.**
- **Ken and Betwa are independent tributaries of Yamuna.**

12. Correct Option: (d)

Explanation:

West flowing rivers and delta formation

- **The west-flowing rivers of the Peninsular India are fewer and smaller as compared to their east-flowing counterparts.**
- **Due to the earlier collision between Indian and Eurasian Plates, many rifts/faults were created. Narmada and Tapi flow through these rifts. This causes the lack of denudation and hence they do not form deltas.**
- **The west-flowing rivers have smaller tributaries and that too, of without silt. This also causes the absence of deltas.**
- **The west-flowing rivers from the Western Ghats are shorter, faster due to steeper slope, and of small length which causes the absence of deltas.**
- **These rivers are without distributaries and thus they do not form deltas.**

13. Correct Option: (d)

Explanation:

Narmada river

- Narmada is the largest west flowing river of the peninsular India.
- It flows westwards through a rift valley between the Vindhyan Range on the north and the Satpura Range on the south.
- It **rises from the Maikala range** near Amarkantak in Madhya Pradesh.
- It falls in the Gulf of Khambhat.
- The river forms many waterfalls during its course in Madhya Pradesh such as Dhuan Dhar (Cloud of Mist) Falls, **Sahasradhara** Falls, Kapildhara, Dugdhadhara, etc.
- It flows through the gorge, composed of marble, which is popularly known as the **Marble Rocks.**
- There are several islands in the estuary of the Narmada of which **Aliabet is the largest**.

14. Correct Option: (c)

Explanation:

Himalayan rivers flowing in India only

- **Gomti, a tributary of Ganga, originates from Gomat Taal (Fulhaar jheel) near Madho Tanda, Pilibhit. It meets Ganga at Saidpur, Ghazipur.**
- **Beas, originating from the Beas Kund near the Rohtang flows through the Kullu valley. It enters the Punjab plains where it meets the Satluj near Harike.**
- Jhelum rises from a spring at Verinag situated at the foot of the Pir Panjal range. It flows through Srinagar and the Wular lake before **entering Pakistan** where it joins the Chenab near Jhang.
- Barak, from its source at Liyai Kullen Village in Manipur to the Bay of Bengal, flows through the states of Manipur, Nagaland, Mizoram, and Assam. Of the total length of 900 km, 524 km is in India, 31 km on Indo-Bangladesh border and the rest is in **Bangladesh**.
- The Mahananda rises in the Darjiling hills and joins the Ganga as its last left bank tributary in West Bengal. It is a trans-boundary river that flows through West Bengal and Bihar, and **Bangladesh**.

15. Correct Option: (c)

Explanation:

Indus river system

- Indus originates from a glacier near Bokhar Chu in the Tibetan region at an altitude of 4,164 m in the Kailash Mountain range.
- **The Jhelum, an important tributary of the Indus, rises from a spring at Verinag situated at the foot of the Pir Panjal in the south-eastern part of the valley of Kashmir.**
- **Chenab is the largest tributary of the Indus. It is formed by two streams, the Chandra and the Bhaga, which join at Tandi near Keylong in Himachal Pradesh.**
- **Ravi rises west of the Rohtang pass in the Kullu hills of Himachal Pradesh.**
- **The Beas is another important tributary of the Indus, originating from the Beas Kund near the Rohtang Pass, Himachal Pradesh.**
- **The Satluj originates in the 'Raksas tal' near Mansarovar at an altitude of 4,555 m in Tibet.**

16. Correct Option: (c)

Explanation:

Rivers System in India

- Apart from originating from the two major physiographic regions of India, the Himalayan and the Peninsular Rivers are different from each other in many ways.
- Most of the Himalayan Rivers are perennial. It means that they have water throughout the year. These rivers receive water from rain as well as from melted snow from the lofty mountains.
- The two major Himalayan Rivers, the Indus and the Brahmaputra originate from the north of the mountain ranges. They have cut through the mountains making gorges. The Himalayan Rivers have long courses from their source to the sea.
- **They perform intensive erosional activity in their upper courses and carry huge loads of silt and sand.** In the middle and the lower courses, these rivers form meanders, oxbow lakes, and many other depositional features in their floodplains.
- They also have well-developed deltas.
- **A large number of the Peninsular Rivers are seasonal**, as their flow is

dependent on rainfall. During the dry season, even the large rivers have reduced flow of water in their channels.

- The **Peninsular Rivers have shorter and shallower courses** as compared to their Himalayan counterparts. However, some of them originate in the central highlands and flow towards the west.
- Most of the rivers of peninsular India originate in the Western Ghats and flow towards the Bay of Bengal.

17. Correct Option: (b)

Explanation:

Indus River System

- Indus River is great trans-Himalayan river of South Asia. It is one of the longest rivers in the world, with a length of some 1,800 miles (2,900 km). Its total drainage area is about 450,000 square miles (1,165,000 square km), of which 175,000 square miles (453,000 square km) lie in the Himalayan ranges and foothills and the rest in the semiarid plains of Pakistan.
- The Indus originates in the Kailash range in Tibet near Lake Manasarovar. It follows a north-westerly course through Tibet. It enters Indian Territory in Jammu and Kashmir. It forms a picturesque gorge in this part. Several tributaries - the Zaskar, the Shyok, the Nubra and the Hunza join it in the Kashmir region. It flows through the regions of Ladakh, Baltistan and Gilgit and runs between the Ladakh Range and the Zaskar Range. It crosses the Himalayas through a 5181 m deep gorge near Attock, lying north of the Nanga Parbat and later takes a bend to the south west direction before entering Pakistan. It has a large number of tributaries in both India and Pakistan and has a total length of about 2880 km from the source to the point near Karachi where it falls into the Arabian Sea. The main tributaries of the Indus in India are Jhelum, Chenab, Ravi, Beas and Sutlej.
- The principal rivers of the Indus River system are snow-fed. Their flow varies greatly at different times of the year: the discharge is at a minimum during the winter months (December to February); there is a rise of water in spring and early summer (March to June); and floods occur in the rainy season (July to September). Occasionally there are devastating flash floods. The Indus and its tributaries receive all their waters in the hilly upper parts of their catchments. Therefore, their flow is at a maximum where they emerge out of the foothills, and little surface flow is added in the plains, where evaporation and seepage considerably reduce the flow volume. On the other hand, some water is added by seepage in the period after the monsoon months. In the main stream of the Indus, the water level is at its lowest from mid December to mid-February. After this the river starts rising, slowly at first and then more rapidly at the end of March. The high-water level usually occurs between mid-July and mid-August. The river then falls rapidly until the beginning of October, when the water level subsides more gradually.

18. Correct Option: (b)

Explanation:

The important tributaries of River Brahmaputra are:

- **Left bank tributaries**: Dhansiri, Kapili, Barak.
- **Right bank tributaries**: Subansiri, Jia Bhoraeli, Manas, Sankosh, Tista & Raidak
- **Dhansiri:** Rises from Naga Hills.
- **Sankosh:** It's the main river of Bhutan, meets Brahmaputra at Dhubri, Assam.
- **Manas:** Rises from Tibet and joins Brahmaputra on its right bank.
- **Subansiri:** It is flows in between the Mikir hills & Abor hills and later joins Brahmaputra on its right bank.
- **Tista:** Rises from Kanchan-junga, fed by the tributaries like Rangit & Rangpo, it joins the Brahmaputra river in Bangladesh.
- **Barak:** Rises in Nagaland. It enters Bangladesh as River Surma which falls into River Padma at Chandpur.

19. Correct Option: (d)

Explanation:

Narmada

- **Origin** – Amarkantak plateau (1,057m) (Shahdol district, Madhya Pradesh)
- **Total Length**– 1,310 km (largest west fl owing river) Only 112 km navigable from mouth.
  - ➤ Flows 1,078 km in Madhya Pradesh Forms 32 km long boundary between M.P and Maharashtra.
  - ➤ Forms 40 km long boundary between Maharashtra & Gujarat Flows 160 km in Gujarat

- Makes an estuary before entering into Gulf of Khambhat.
- There are several islands in estuary formed by Narmada. Aliabet is an important estuary island.

- **States** – Madhya Pradesh, Maharashtra, Gujarat.
- **Landmarks** – Dhuan Dhar falls also called cloud of mist (30m) located in Jabalpur district, Madhya Pradesh. This fall is located in a Gorge of marble.
- **Other falls**- Mandhar falls (12m)Dardi fall (12m) Sahasradhara falls (8m)

20. Correct Option: (b)

Explanation:

The Tapi (or Tapti)

- **Origin** – Betul plateau (M.P) in Satpura Range
- **Total length** – 730 km (32 km from sea)
- **State** – M.P, Maharastra & Gujrat
- **Meets**- Arabian Sea at Gulf of Khambhat

The Sabarmati

- Sabarmati River is formed by confluence of Sabar and Hathmati streams
- **Origin** – Mewar hills (Aravali range) (Rajasthan)
- **Length** – 320 km
- **Mouth** – Gulf of Khambhat
- **States** – Rajasthan & Gujarat
- **Tributaries** – The Sedhi, The Harnav, the Vartak, the Wakul, The Meshwa

The Mahi

- **Origin** – Vindhyas (500 m)
- **Meeting point** – Gulf of Khambat
- **States** – Madhya Pradesh, Maharastra & Gujrat
- **Length** – 533 km
- **Tributaries** – Som, Anas and Panam

Luni

- Also known as **'Sagarmati'**
- It flows through **'Thar Desert'**
- It has an **Inland Drainage** as it disappears into Marshy land of **Rann of Kutch**
- **Origin** – Aravalli (west of Ajmer, Rajasthan)
- **Length** – 482 km
- **Meeting point** – Lost into Marshy land of Rann of Kutch (Inland drainage)

21. Correct option: (c)

Explanation

- **Both the statements are correct**

Supplementary notes

What is Annular Solar Eclipse?

- An eclipse happens when the moon while orbiting the Earth, comes in between the sun and the Earth, due to which the moon blocks the sun's light from reaching the Earth, causing an eclipse of the sun or a solar eclipse.
- It was visible from India, Saudi Arabia, Qatar, Malaysia, Oman, Singapore, Sri Lanka, Mariana Islands and Borneo among a few other places.
- There are three types of eclipses: one is a total solar eclipse, which is visible only from a small area on Earth.
- People who are able to view the total solar eclipse are in the centre of the moon's shadow as and when it hits the Earth.
- A total solar eclipse happens when the sun, moon and Earth are in a direct line.
- The second type of a solar eclipse is a partial solar, in which the shadow of the moon appears on a small part of the sun.
- The third kind is an annular solar eclipse, which happens when the moon is farthest from the Earth, which is why it seems smaller.
- In this type of an eclipse, the moon does not block the sun completely, but looks like a "dark disk on top of a larger sun-colored disk" forming a "ring of fire".
- Furthermore, during a solar eclipse the moon casts two shadows on the Earth, the first one is called the umbra, which gets smaller as it reaches the Earth.
- The second one is called the penumbra, which gets larger as it reaches the Earth.
- According to NASA, people standing in the umbra see a total eclipse and those standing in the penumbra see a partial eclipse.
- One of the reasons that NASA studies solar eclipses is to study the top layer of the sun called the corona.
- During an annular eclipse, NASA uses ground and space instruments to view this top layer when the sun's glare is blocked by the moon.

- Some of the areas in India from where the annular solar eclipse can be viewed include Kannur, Ooty, Palakkad, Kozhikode, Erode Trichy, Madurai and Karaikudi among a few others.

22. Correct option: (d)

Explanation

- All the above statements are correct

Supplementary notes

Australia Fire

- Wild bushfires have been ravaging Australia for several weeks now. These fires have been especially severe in the New South Wales and Victoria.
- The State declared a week-long state of emergency in response to the escalating disaster.
- 916 homes have been destroyed this season, 363 more have been damaged.
- Both New South Wales and Victoria have given fire fighting authorities the power to forcibly relocate people.
- Bushfires in Australia impact extensive areas and cause property damage and loss of human life.
- Some of Australia's native flora has evolved to rely on bushfires as a means of reproduction, and fire events are an interwoven and an essential part of the ecology of the continent.
- For thousands of years, Indigenous Australians have used fire to foster grasslands for hunting and to clear tracks through dense vegetation.
- Major firestorms that result in severe loss of life are often named based on the day on which they occur, such as Ash Wednesday and Black Saturday.
- Some of the most intense, extensive and deadly bushfires commonly occur during droughts and heat waves.
- One type of wildfire is known as a bushfire, an uncontrolled fire that burns through scrubland, which is common to Australia.
- Like all wildfires, a bushfire places nature and man under threat.
- There are many factors that lead to a bushfire or influence its spread. This includes the type of fuel. Some grasses as well as twigs can burn very quickly. On the other hand, large tree trunks don't burn as easily.
- The moisture of the fuel is another critical factor. Fuel that's wet is unlikely to burn. Similarly, increased humidity decreases the chances that a bushfire will start.
- On the flipside, lower humidity, higher temperature, and drier conditions all help ignite and spread a fire.
- Wind plays a key part in the spread of bushfires too. Wind provides much needed oxygen for a fire.
- A bushfire will spread up a hill much faster than it will down a hill due to the processes of convection and radiation.
- It's an explosive storm called pyro cumulonimbus and it can inject particles as high as 10 miles into the air.
- During a fire, heat and moisture from the plants are released, even when the fuel is relatively dry.
- Warm air is less dense than cold air so it rises, releasing the moisture and forming a cloud that lifts and ends up a thunderstorm started by fire.
- It happens from time to time in Australia and other parts of the world, including Canada.

23. Correct option: (c)

Explanation

- **Both the statements are correct**

Supplementary notes

Why this winter is extra cold in India

- The unusually cold December this year could just be another instance of extreme climates becoming more and more frequent, a result of climate change. Across the world, the frequency and intensity of both heat waves and cold waves have increased in the last few years.
- Extreme cold temperatures, rainfall and intense fog in the months of December and January are witnessed by north and northwest India.
- Every year, in the second half of December and the first half of January, temperatures routinely drop to 2-4°C at some point of the day in many places in north and northwest India.
- In December, the maximum daily temperature does not rise beyond 16-18°C in most of Punjab, Haryana, Himachal Pradesh and western Uttar Pradesh.
- In Delhi and northern Rajasthan, daily maximum temperatures are usually not over 20-22°C for most of December.

- This has happened only four times in the last 118 years, and the IMD has said this month would most likely become the second coldest December for Delhi since 1901.
- This is already the longest such spell for December since 1997.
- A cold-day condition is said to prevail when the maximum temperature during the day is at least 4.5°C below normal.
- If the maximum temperature is at least 6.5°C below normal, it is classified as a severe cold day.
- Scientists say there is nothing unusual in the climatic conditions that influence temperatures in this region at this time of the year.
- The cold wave usually arrives from the west, through the Western Disturbance wind system.
- This system is also responsible for causing rains in northern and northwestern parts, after having picked up moisture on its way from the Mediterranean Sea.
- The intensity of the cold also depends on the amount of snowfall that happens in Jammu and Kashmir, Ladakh, Himachal Pradesh and nearby areas.
- They combine in different ways to produce different kinds of winter conditions.
- The frequency and intensity of both heat waves and cold waves have increased in the last few years, and are predicted to increase further. The same is the case with extreme rainfall and drought.
- Flow of north-westerly winds over northwest India that too over much lower levels, further fuelled the chill factor, making the days much colder than normal during December.
- This extended cold spell has been triggered due to low stratus clouds that are blanketed over a large geographical area — between Pakistan, cutting across India and running up to Bangladesh.

24. Correct option: (b)

Explanation

- **Statement 1 is incorrect:** It is an annual survey of cleanliness, hygiene and sanitation in cities and towns across India.

Supplementary notes

Swachh Survekshan 2020

- **Swachh Survekshan League 2020** (SS League 2020) was launched for Housing and Urban Affairs, Government of India.
- **Objective:** SS League 2020 was introduced with the objective of sustaining the on-ground performance of cities along with continuous monitoring of service level performance when it comes to cleanliness.
- **SS 2020 parameters:** The focus of the survey was on waste water treatment, faecal sludge management. The survey also focused on implementation of ODF+, water plus and ODF+ and ODF++ protocols of the ministry of housing and urban affairs.
- **Results**: In the category of 10 lakh plus population, Indore secured first place. Indore has remained in first place for the last three years. Following Indore, Bhopal and Surat are in second and third places respectively. In the category of population between one lakh and 10 lakhs, Jamshedpur was in 1st spot following New Delhi and Khargone.
- **Swachh Survekshan (Cleanliness survey)** is an annual survey of cleanliness, hygiene and sanitation in cities and towns across India.
  - ➤ It was launched as part of the Swachh Bharat Abhiyan, which aims to make India clean and free of open defecation by 2 October 2019.
  - ➤ SS League 2020 is the fifth edition of the annual urban cleanliness survey conducted by MoHUA.
  - ➤ It is a cleanliness survey that helps in competitive federalism.
  - ➤ The first survey was undertaken in 2016 and covered 73 cities; by 2019 the survey had grown to cover 4237 cities and was said to be the largest cleanliness survey in the world.
  - ➤ The surveys are carried out by **Quality Council of India.**
  - ➤ The annual cleanliness survey aims to encourage large scale participation of citizens in cleanliness drives.
  - ➤ It aims to ensure sustainability of initiatives taken towards garbage free and open defecation free cities.
  - ➤ It aims to create awareness among all sections of the society regarding the importance of working together towards making towns and cities a better place to live in.

- The survey also aims to foster healthy competition among towns and cities to improve their service delivery to citizens, towards creating cleaner cities.

25. Correct Answer: (a)

Explaination:

- **Option (A) is correct**

Supplementary Notes

- Exercise INDRA 2019 a joint, tri services exercise between India and Russia will be conducted in India from 10 — 19 December 2019 simultaneously at Babina (near Jhansi), Pune, and Goa.
- The INDRA series of exercise began in 2003 and the First joint Tri Services Exercise was conducted in 2017, It will be a historic occasion for two of the world's greatest Armed Forces to join hands and successfully conduct an exercise of this magnitude with professionalism, to imbibe the best practices from each other, jointly evolve and drills to defeat the scourge of terror under the United Nation mandate.
- Company sized mechanised contingents, fighter and transport aircraft as well as ships of respective Army, Air Force and Navy wiil participate in this exercise of ten days duration. The exercise will consist of a five day training phase consisting of a comprehensive training curriculum. Tactical operations end drills such as cordon house intervention, handling and neutralisation of Improvised Explosive Devices, prevention of arms smuggling through the sea route and anti-piracy measures will be practiced.
- This training phase will be followed by a 72 hour validation exercise. INDRA 2019 will culminate on 19 December with an Integrated Fire Power demonstration and the Closing Ceremony.
- The contingents of both the countries will share expertise and their professional experience. The espirit-de-corps and goodwill shall be the key areas during the exercise which will facilitate further strengthening of bonds between the defence forces of India and Russia.

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TEST
DAY - 25

Time Allowed: 30 mins **Maximum Marks: 50**

1. Consider the following factors:

1. Latitude
2. Distance from the Sea
3. Distribution of Land and Water

Which of the above factors influence the Indian Climate?

(a) 1, 2 and 3

(b) 1, 3 only

(c) 2 and 3 only

(d) 1 and 2 only

2. Which of the following climatic regions are found in India?

1. Steppe climate
2. Tropical Savannah
3. Monsoon with dry summer
4. Monsoon with dry winter

Select the correct option using the codes given below:

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1, 2 and 3 only

(d) 1, 2, 3 and 4

3. October and November are the rainiest months of the year in Tamil Nadu. Which of the following is/are the reason(s) for this?

1. North-East Monsoon
2. Retreating South-West Monsoon
3. Western Disturbances

Select the correct option using the codes given below:

(a) 2 only

(b) 1 and 2 only

(c) 1 only

(d) 1, 2 and 3

4. Which of the following pairs is/are correctly matched?

1. Norwesters: Pre-Monsoon raining
2. October Heat: Retreating Monsoon
3. Blossom shower: Post-Monsoon raining

Select the correct option using the codes given below:

(a) 1 only

(b) 1 and 3 only

(c) 1 and 2 only

(d) 2 and 3 only

5. Consider the following statements:

1. A negative Southern Oscillation Index is good for the Indian Monsoon.
2. During La Nina, the walker cell over the Pacific Ocean shifts to the central regions of the Pacific Ocean from the western Pacific region.

Select the correct option using the codes given below:

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

6. Despite there is good sun's insolation from March to May, the South-West monsoon does not occur. Which of the following is/are the reason(s)?

1. ITCZ is still south of the Equator in these months.
2. Sub Tropical Jet stream blows north of the Himalayas in these months.
3. There is a strong divergence in the upper atmosphere over India.

Select the correct option using the codes given below:

(a) 1 only

(b) 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

7. Which of the following pairs regarding the types of traditional Indian seasons is/are correctly matched?

1. Sharada: September-October
2. Hemanta: January-February
3. Vasanta: February-March

Select the correct option using the codes given below:

(a) 1 only

(b) 1 and 3 only

(c) 2 and 3 only

(d) 1, 2, and 3

8. Which of the following factor(s) lead to heatwaves in India?

1. The northward movement of the Sun in summers.
2. Anti-cyclonic conditions in the Bay of Bengal.
3. A sudden increase in atmospheric pressure in the interiors of the country.
4. Frequent El-Nino.

Select the correct answer using the code given below:

(a) 1 only

(b) 2 and 4 only

(c) 1, 2 and 3 only

(d) 1, 2, 3 and 4

9. Which of the following experiments for the study of Monsoon was carried out exclusively by India?

(a) MONEX

(b) ISMEX

(c) Monsoon-77

(d) MONTBLEX

10. The term El Niño refers to the large-scale ocean-atmosphere climate interaction linked to periodic warming in sea surface temperatures across the central and east-central Equatorial Pacific. Consider the following statements regarding El Nino:

1. During the El Nino, the Peruvian coast witness cold currents in place of usual warm currents of normal years.
2. During the El Nino, the South American coast witnesses a good amount of rainfall.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

11. Which of the following are the postulates of the modern theory of the origin of the Monsoon in India?

1. Migration of the Sub-Tropical Jet stream southward.
2. Origin of the Tropical Easterly Jetstream.
3. Influence of the Polar Jetstream.

Select the correct option using the codes given below:

(a) 2 only

(b) 1 and 3 only

(c) 1 and 2 only

(d) 1, 2 and 3

12. Which of the following is/are not the features of the Monsoon Rainfall in India?

1. Spatial distribution of rainfall is largely governed by relief or topography.

2. Breaks in the Monsoon rainfall are related to the cyclonic depressions

Select the correct option using the codes given below:

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

13. Consider the following statements regarding Somali Jet and the Indian Ocean Dipole:

1. Indian Ocean Dipole is good for the Indian Monsoon.
2. The onset of the southwest monsoon is coincided with the onset of the Warm Somali Current.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

14. Which of the following are the factors responsible for the formation/ strengthening of North-East Monsoon?

1. Formation of high-pressure cells over Tibetan plateau in winter.
2. Weakening of the Walker Cell in the Southern Indian Ocean.
3. Migration of ITCZ to the south of the Equator.

Select the correct option using the codes given below:

(a) 2 only

(b) 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

15. Why Tamil Nadu coast remains dry during the South-West Monsoon season.

1. It is parallel to the Bay of Bengal branch of the South-West monsoon.
2. No moisture-laden South-West Monsoon wind reach in Tamil Nadu.

Select the correct option using the codes given below:

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

16. Consider the following regions:

1. Malabar Coast
2. Western Ghats
3. Eastern Ghats
4. Northern Assam
5. Lakshadweep

The tropical wet monsoon climate occurs in which of the following regions of India?

(a) 1, 3 and 5 only

(b) 2, 3 and 4 only

(c) 1, 2 and 5 only

(d) 1, 2, 4 and 5 only

17. The southwest monsoon arrives in two branches: the Bay of Bengal branch and the Arabian Sea branch. Regarding the above statement, consider the following:

1. The Arabian Sea branch is much more stronger than the Bay of Bengal branch.
2. The Bay of Bengal branch is responsible for much of the rainfall in the northwest.
3. South India receives more rainfall than North India.

Which of the following statements is/are correct?

(a) 1 only

(b) 2 and 3 only

(c) 1, 2 and 3

(d) 1 and 2 only

18. Consider the following statements:

1. During the winter season, the westerly jet streams sets in on the south of the

Himalayas due to the shift of the ITCZ (Inter Tropical Convergence Zone) southward.

2. The eastern Himalayan region does not get rainfall from the north east monsoon.

Which of the following is/are ***incorrect***?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

19. Which of the following factors affect the monsoon of India?

1. Phinlander jet
2. Subtropical westerly jet stream
3. Tibet Plateau
4. Subtropical easterly jet

Select the correct option from the codes given below:

(a) 1, 2 and 3 only

(b) 2, 3 and 4 only

(c) 1, 3 and 4 only

(d) 1, 2 and 4 only

20. Consider the following statements regarding causes of monsoon:

1. There is a negative correlation between Tibetan snow cover and Indian summer monsoon rainfall (IMR).
2. The stronger the effect of El-Nino, the stronger the monsoon will be in Australia.

Which of the following statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

21. Which of the following product (s) is/ are the latest addition to Geographical Indicator (GI) list?

1. Palani Panchamirtham from Tamil Nadu
2. Tawlhlohpuan and MizoPuanchei from the state of Mizoram
3. Tirur Betel leaf from Kerala
4. Saffron from Kashmir

Choose the correct answer

(a) 1 and 2

(b) 1, 2 and 3

(c) 1, 2, 3 and 4

(d) Only 4

22. Consider the following statements about the Global Refugee Forum (GRF)

1. The first Global Refugee Forum (GRF) was held in Geneva, Switzerland, jointly hosted by the United Nations High Commissioner for Refugees (UNHCR), the United Nations Refugee Agency, and the Government of Switzerland.
2. The Global Refugee Forum is an opportunity to translate the principle of international responsibility-sharing into concrete action.

Which of the above statement(s) is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

23. Which of the following offered to Arabs across the Middle East right to self-rule in exchange for their aid in defeating the Ottoman Empire?

Choose the correct answer:

(a) Sykes-Picot Agreement

(b) Balfour Declaration

(c) Camp David Accord

(d) McMahon-Hussein Correspondence

24. Operation Twist was in news recently. What is Operation Twist?

Choose the correct answer:

(a) UN backed coalition combat in Yemen

(b) Monetary measure by the central bank

(c) United States led coalition combat in Syria

(d) New approach to address climatic concerns

25. Indians have lately been facing issues related to H-1B visas. Which of the following statements are correct about H-1B visas?

1. H-1B is a United States visa of which India is currently the majority holder.
2. H-1B is an immigrant visa.
3. H-1B allows US companies to employ Indian workers in "specialty occupations".

Choose the correct answer:

(a) 1 only

(b) 1 and 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

****

ANSWER HINTS

DAY - 25

1. Correct Option: (a)

Explanation:

Factors influencing the climate of India

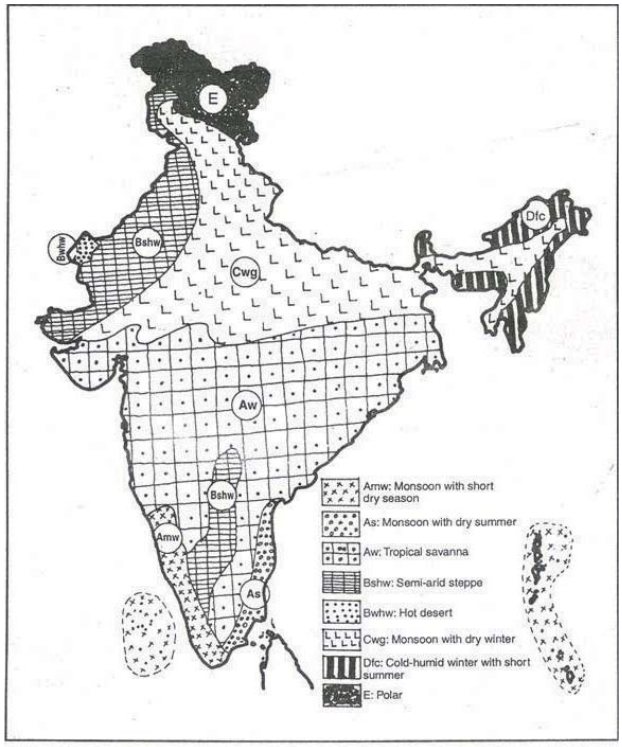
- Latitude: The Tropic of Cancer passes through the central part of India in the east-west direction. Thus, the northern part of India lies in the sub-tropical and temperate zone and the part lying south of the Tropic of Cancer falls in the tropical zone. The area north of the Tropic of Cancer being away from the equator experiences an extreme climate with a high daily and annual range of temperature.
- The Himalayas: The towering mountain provides an invincible shield to protect the subcontinent from the cold northern winds. These cold and chilly winds originate near the Arctic circle and blow across central and eastern Asia. The Himalayas also trap the monsoon winds, forcing them to shed their moisture within the subcontinent.
- Distribution of Land and Water: India is surrounded by the Indian Ocean on three sides in the south and girdled by a high and continuous mountain-wall in the north. As compared to the landmass, water heats up or cools down slowly. This differential heating of land and sea creates different air pressure zones in different seasons in and around the Indian subcontinent. The difference in air pressure causes a reversal in the direction of monsoon winds.
- Distance from the Sea: With a long coastline, large coastal areas have an equable climate. Areas in the interior of India are far away from the moderating influence of the sea. Such areas have extremes of climate. People of Mumbai and the Konkan coast have hardly any idea of extremes of temperature and the seasonal rhythm of weather. On the other hand, the seasonal contrasts in weather at places in the interior of the country such as Delhi, Kanpur, and Amritsar affect the entire sphere of life.
- Altitude: Temperature decreases with height. Due to thin air, places in the mountains are cooler than places on the plains. For example, Agra and Darjiling are located on the same latitude, but the temperature of January in Agra is 16°C whereas it is only 4°C in Darjiling.
- Relief: The physiography or relief of India also affects the temperature, air pressure, direction and speed of the wind and the amount and distribution of rainfall. The windward sides of the Western Ghats and Assam receive high rainfall during June-September whereas the southern plateau remains dry due to its leeward situation along the Western Ghats.

2. Correct Option: (d)

Explanation:

Climatic Regions of India according to Koeppen's Scheme

- The whole of India has a monsoon type of climate. But the combination of elements of the weather, however, reveals many regional variations. These variations represent the subtypes of the monsoon climate. It is on this basis that the climatic regions can be identified.
- Koeppen based his scheme of Climatic classification on monthly values of temperature and precipitation. He used letter symbols to denote climatic types.
- According to this scheme, the climatic regions in India are as follows:



- Monsoon with short dry season (Amw): It is found on the west coast of India south of Goa.
- **Monsoon with dry summer** (As): It is found on the Coromandel coast of Tamil Nadu.
- **Tropical savannah** (Aw): It is found in most of the peninsular plateaus, south of the Tropic of Cancer.
- **Steppe climate** (BShw): In North-western Gujarat, some parts of western Rajasthan and Punjab.
- Hot desert Extreme (BWhw): In western Rajasthan
- **Monsoon with dry winter** (Cwg): In Ganga plain, eastern Rajasthan, northern Madhya Pradesh, and most of North-east India.
- Cold humid winter with short summer (Dfc): Arunachal Pradesh
- Polar type (E): Jammu and Kashmir, Himachal Pradesh and Uttarakhand.

3. Correct Option: (b)

Explanation:

Rainfall in Winter Monsoon

- Winter monsoons do not cause rainfall as they move from land to the sea. So, most parts of India do not have rainfall in the winter season. However, there are some exceptions to it:
- **The months of September and October are known for retreating monsoons since the southwest monsoon has become weak due to the southward shift in ITCZ. It is associated with rainfall on the Coromandel Coast due to cyclonic depressions that develop over the Andaman Sea.**
- **During October and November, northeast monsoon, which is in-sync with the North-East Monsoon, while crossing over the Bay of Bengal picks up moisture and causes torrential rainfall over the Tamil Nadu coast, southern Andhra Pradesh, southeast Karnataka, and southeast Kerala.**
- **These two factors make October and November as the wettest months in Tamil Nadu.**
- In northwestern India, some weak temperate cyclones from the Mediterranean Sea cause rainfall in Punjab, Haryana, Delhi, and western Uttar Pradesh. It is called the western disturbance.

4. Correct Option: (c)

Explanation:

Summer Season in India

- It is also referred to as the **pre-monsoon period**. High temperature and low humidity are the chief characteristics.
- A strong convectional movements related to the westerly jet stream lead to thunderstorms in the eastern and north-eastern part of the country. They are called **norwesters.**
- They are, sometimes, useful for tea, jute and rice cultivation. In Assam, these storms are known as 'Barodoli Chheerha'. The period of maximum occurrence of these storms is the month of Vaisakh (mid-March to mid-April) and hence, they are locally known as Kalabaisakhis, the black storms or a mass of dark clouds of Vaisakha.
- **In the south, the thunderstorms occur in Kerala (Mango Showers) and adjoining parts of Karnataka (Blossom Showers) and Tamil Nadu, particularly during evenings and nights.**

October Heat

- The retreating southwest monsoon season is marked by clear skies and a rise in temperature. Owing to the conditions of high temperature and humidity, the weather becomes rather oppressive.
- This is commonly known as the 'October heat'.

5. Correct Option: (d)

Explanation:

Walker cell and Indian Monsoon

- It is observed that there is an east-west atmospheric circulation over the tropical oceanic regions. Such circulation in the Pacific Ocean is generally called walker cell. However, many scientists use the term 'walker cell' for all east-west circulations in different oceans.
- Walker cell is associated with southern oscillation and its strength fluctuates with that of the Southern Oscillation Index (SOI).
- **With a high positive SOI, there would be a zone of low atmospheric pressure over Australia and the Indonesian archipelago. The rising air from this region deflects in the upper atmosphere in both directions towards Africa and South America.**
- **In the Indian Ocean, the air descends down at high-pressure zone from where surface winds blow as Southwest monsoon towards the Indian sub-continent in summers.**
- **During La-Nina Indian ocean branch of walker cell get strengthen and surface winds are more intense. La Nina condition is generally associated with good monsoon.**
- **During the appearance of El-Nino or negative SOI,** the ascending branch of the Walker cell shifts to the central regions of the Pacific Ocean from the west pacific region.
- In a result, the Indian Ocean cell shifts towards the east. The surface winds or Southwest monsoon winds are weaker than normal conditions.

6. Correct Option: (b)

Explanation:

- The months of April and May are generally dry and rainless in spite of high temperatures (low pressure on land) and high evaporation.
- The reasons for the absence of the S-W monsoon in March-May are as follows:
- During the summer season in the Northern Hemisphere, low-pressure areas develop at the ground surface near north-west India due to intense heating of ground surface during April, May, and June.
- **As the position of the upper air jet stream i.e. Sub Tropical Jet stream (STJ) is maintained above the surface low pressure to the south of Himalayas, the dynamic anti-cyclonic conditions (strong divergence) persist over north-west India.**
- The winds descending from the upper air high pressure [because of the ridge of STJ] obstructs the ascent of winds from the surface low-pressure areas, with the result that the weather remains warm and dry.

7. Correct Option: (a)

Explanation:

Traditional Indian seasons

- In the Indian tradition, a year is divided into six bi-monthly seasons. These are:
  - **Vasanta in Chaitra-Vaisakha (March-April).**
  - **Grishma in Jyaistha-Asadha (May-June).**
  - **Varsha in Sravana-Bhadra (July-August).**
  - **Sharada in Asvina-Kartika (September-October).**
  - **Hemanta in Margashirsa-Pausa (November-December).**
  - **Shishira in Magha-Phalguna (January-February).**

8. Correct Option: (d)

Explanation:

Heat Waves

- As the sun moves northwards after March equinox, central India heats up during April and northwest India during May. This heat is transferred to eastern regions through advection and resulting in heatwave conditions in these areas also.
- Anti-cyclone conditions in the Bay of Bengal prevent the extension of maritime influence in the coastal regions and leading to a rise in temperature there also. **The reason behind heatwaves is believed to be a sudden increase in the atmospheric pressure, due to the descent of the heavier air from the upper levels of the atmosphere, happening especially over interior parts of the country.**
- Regions of northwest India like Western UP, Haryana, and Rajasthan where it is given name 'loo' face regular heatwaves. Interior regions of other states like Odisha,

Andhra Pradesh, and West Bengal also face heatwave conditions.

- In recent years because of the global warming effect, frequent El-Nino the events of heatwaves have increased and in the year 2015 more than 2000 people died because of heatstroke, mostly in the regions of Telangana and Andhra Pradesh.

9. Correct Option: (d)

Explanation:

Projects to understand monsoon

- First attempt was made during the International India Ocean Expedition (HOE) from 1962 to 1965. It was organized jointly by the International Council of Scientific Unions (ICSU), Scientific Committee on Ocean Research (SCOR) and UNESCO with World Meteorological Organization (WMO) joining the meteorology program.

ISMEX

- Two more experiments were conducted, jointly, by India and the erstwhile USSR with limited participation from other countries.
- These experiments are known as **the Indo-Soviet Monsoon Experiment (ISMEX) in 1973** and **Monsoon-77** in 1977 respectively.

MONEX(Monsoon Experiment)

- Data collection effort was made under the aegis of **MONEX** in1979.
- It was organized jointly by many researching organizations and the World Meteorological Organisation (WMO) under their World Weather Watch (WWW) program.
- It is so far the largest scientific effort made to understand monsoons.

MONTBLEX

- **It was the first national effort to understand the meteorological phenomenon in 1990.**
- This was known as Monsoon Trough Boundary Layer Experiment (MONTBLEX).

10. Correct option: (b)

Explanation:

El-Nino and La-Nina

- Niño and La Niña are opposite phases of what is known as the El Niño-Southern Oscillation (ENSO) cycle. The ENSO cycle is a scientific term that describes the fluctuations in temperature between the ocean and atmosphere in the east-central Equatorial Pacific (approximately between the International Date Line and 120 degrees West). In a normal year, a surface low pressure develops in the region of northern Australia and Indonesia and a high-pressure system over the coast of Peru. As a result, the trade winds over the Pacific Ocean move strongly from east to west. The easterly flow of the trade winds carries warm surface waters westward, bringing convective storms (thunderstorms) to Indonesia and coastal Australia. Along the coast of Peru, cold bottom cold nutrient-rich water wells up to the surface to replace the warm water that is pulled to the west.
- During the El Niño, the normal low-pressure system is replaced by a weak high in the western Pacific (the southern oscillation). This change in pressure pattern causes the trade winds to be reduced. This reduction allows the equatorial counter-current (current along with doldrums) to accumulate warm ocean water along the coastlines of Peru and Ecuador leading to weakening of the southwest monsoon over the Indian subcontinent.
- Climatically, the development of an El Niño brings drought to the western Pacific, rains to the equatorial coast of South America, and convective storms and hurricanes to the central Pacific. The warmer waters had a devastating effect on marine life existing off the coast of Peru and Ecuador. Fish catches off the coast of South America were lower than in the normal year (Because there is no upwelling). Severe droughts occur in Australia, Indonesia, India, and southern Africa. Heavy rains in California, Ecuador, and the Gulf of Mexico.

11. Correct Option: (a)

Explanation:

Modern Theory of the origin of the Monsoon

- According to this theory, the monsoon is simply a modification of the planetary winds of the tropics.
- The theory is based on the migration of ITCZ based on seasons
- The front where the south-west monsoons meet the north-east trade winds is known as the Monsoon Front (ITCZ). Rainfall occurs along this front. In the month of

July, the ITCZ shifts to 20°- 25° N latitude and is located in the Indo-Gangetic Plain and the south-west monsoons blow from the Arabian Sea and the Bay of Bengal. The ITCZ in this position is often called the Monsoon Trough [maximum rainfall].

- Jet stream Theory is the latest theory regarding the origin of the monsoons and has earned worldwide acceptance from the meteorologists.
- Sub-Tropical Jet stream plays a significant role in both hindering the monsoon winds as well as in the quick onset of monsoons.
- It is a narrow band of fast-moving air flowing from west to east
- STJ in northern hemisphere flows between 25° to 35° N in the upper troposphere at a height of about 12-14 km
- Polar Jet has no influence on Indian monsoons
- In winter STJ flows along the southern slopes of the Himalayas but in summer it shifts northwards, rather dramatically, and flows along the northern edge of Himalayas in early June and in late summer (July-August) along the northern edge of the Tibetan Plateau.
- The periodic movement of the Jet stream is often the indicator of the onset (STJ shits to the north of Himalayas in a matter of days) and subsequent withdrawal (STJ returns back to its position – south of Himalayas) of the monsoon.
- The northward movement of the subtropical jet is the first indication of the onset of the monsoon over India.
- **Tropical easterly jet stream (TEJ), that branch off from anticyclone developed over Tibet, sometimes reaches to the tip of Peninsular India. Apart from this, Jet speed winds are also reported over other parts of Peninsular. This jet descends over the Indian Ocean and intensifies its high-pressure cell known as Mascarene High.**
- **It is from this high-pressure cell that the onshore winds start blowing towards the thermally induced low-pressure area, developed in the northern part of the Indian subcontinent. After crossing the equator such winds become south-westerly and are known as the south-westerly summer monsoon.**
- **This Easterly Jetstream dies in the winter.**

12. Correct Option: (c)

Explanation:

The features of the Monsoon rainfall in India are as follows:

- **Spatial distribution of rainfall is largely governed by relief or topography.** For instance, the windward side of the Western Ghats registers a rainfall of over 250 cm while the leeward side receives much less rainfall. Again, the heavy rainfall in the northeastern states can be attributed to their hill ranges and the Eastern Himalayas. Rainfall ranges from 20 cm in western Rajasthan to more than 400 cm in certain parts of Western Ghats and North-East India. Less rainfall in the Rajasthan is because the South-West monsoon winds coming from the Arabian Sea are parallel to the Aravali range there.
- The monsoon rainfall has a declining trend with increasing distance from the sea.
- Rainfall decreases from east to west in plains as one branch of monsoon enters from the eastern side. Kolkata receives 119 cm, Allahabad 76 cm and Delhi 56 cm only.
- **Breaks in rainfall are related to the cyclonic depressions** mainly formed at the head of the Bay of Bengal, and their crossing into the mainland. Besides the frequency and intensity of these depressions, the passage followed by them determines the spatial distribution of rainfall.
- The rains sometimes end considerably earlier than usual, causing great damage to standing crops and making the sowing of winter crops difficult.

13. Correct Option: (a)

Explanation:

Role of Indian Ocean Dipole in South-West Monsoon

- Indian Ocean Dipole is a recently discovered phenomenon that has a significant influence on Indian monsoons.
- Indian Ocean Dipole is an SST (Sea Surface Temperature) anomaly that occurs occasionally in Northern or Equatorial Indian Ocean Region (IOR).
- The Indian Ocean Dipole (IOD) is defined by the difference in sea surface temperature between two areas (or poles, hence a dipole) – a western pole in the Arabian Sea (western Indian Ocean) and an eastern pole in the eastern Indian Ocean south of Indonesia.

- With a positive IOD winds over the Indian Ocean blow from east to west (from Bay of Bengal towards Arabian Sea). This results in the Arabian Sea as much warmer and eastern Indian Ocean around Indonesia becoming colder and dry.
- In the negative dipole year, reverse happens which makes Indonesia much warmer and rainier.
- Positive IOD is good for Indian Monsoons as more evaporation occurs in warm water.
- Similar to ENSO, the atmospheric component of the IOD is named as Equatorial Indian Ocean Oscillation (EQUINOO)(Oscillation of pressure cells between Bay of Bengal and Arabian Sea).
- During the positive phase of the 'Equatorial Indian Ocean Oscillation (EQUINOO),' there is enhanced cloud formation and rainfall in the western part of the equatorial ocean near the African coast while such activity is suppressed near Sumatra.

Role of Somali Jet

- The progress of the southwest monsoon towards India is greatly aided by the onset of the Somali jet that transits Kenya, Somalia, and the Sahel.
- It strengthens permanent high near Madagascar and also helps to drive S-W monsoons towards India at a greater pace and intensity
- **As the strong winds drive away the surface coastal waters towards the east, extremely cold water (Cold Somali Current) from the depths of the sea rise upwards to preserve the continuity of mass.**

14. Correct Option: (d)

Explanation:

Formation of the North-East Monsoon

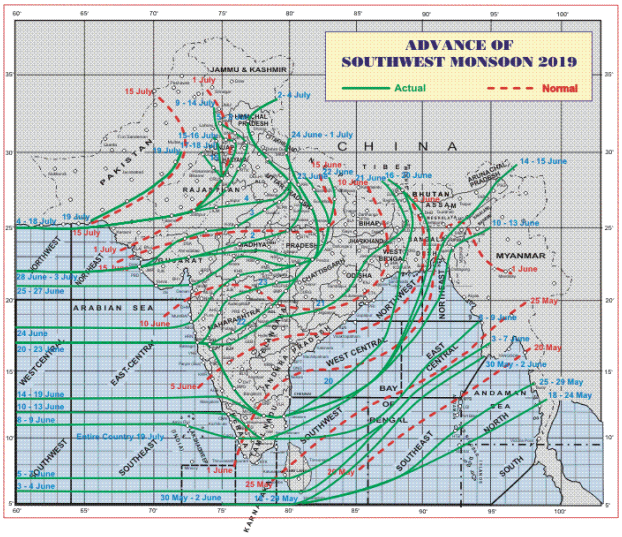
- The north-east monsoon, commonly known as winter monsoon blows from land to sea.
- As the Sun moves southwards due to which, the following phenomena occur.
  - ITCZ moves southward.
  - Formation of the High-Pressure belt over Tibet due to cooling of the Plateau. This leads to the end of the Somali Jet and Tropical Easterly Jet stream.
  - Subtropical Jetstream returns back in its original position i.e. over Indian Peninsula, south of the Himalayas.
  - The Walker Cell, which was formed and strong in Summer, gets weakened.
- All these factors aid the movement of the Nort-East Trade wind and cold air mass from the Siberia and Tibet into India and the Bay of Bengal. This is called North-East Monsoon(due to reversal of wind).
- This cold and moisture-free wind when blows over the Bay of Bengal, its humidity increases and thus the rainfall over Tamil Nadu.

15. Correct Option: (a)

Explanation:

South-West Monsoon in Tamil Nadu

- The factors responsible for it are as follows:
- The Tamil Nadu coast is situated parallel to the Bay of Bengal branch of southwest monsoon.
- It lies in the rainshadow area of the Arabian Sea branch of the south-west monsoon.
- In spite of this, the moisture-laden S-W monsoon winds cross through the Passes of the Western Ghats and bring rainfall in the Eastern part of the Peninsular India



16. Correct Option: (c)

Explanation:

Tropical wet

- A tropical rainy climate covers regions experiencing persistent warm or high temperatures, which normally stay above 18°C (64°F). India hosts two climatic subtypes that fall under that group.
- The most humid, the tropical wet monsoon climate, covers a strip of southwestern lowlands abutting the Malabar Coast,

the Western Ghats, and southern Assam. That climate prevails in India's two island territories, Lakshadweep and the Andaman and Nicobar Islands.

- Most rainfall occurs between May and November, adequate for the maintenance of lush forests and other vegetation throughout the remainder of the year.
- December to March represent the driest months, when days with precipitation are rare. The heavy monsoon rains create the extremely biodiverse tropical wet forests of those regions.
- India commonly experiences a tropical wet and dry climate. Significantly drier than tropical wet zones, it prevails over most of inland peninsular India except for a semi-arid rain shadow east of the Western Ghats.
- Long Winter and early summers typically bring dry periods with temperatures averaging above 18°C (64°F). Indians experience exceptionally hot Summers; temperatures in low-lying areas may exceed 50°C (122°F) during May, leading to heat waves that occasionally kill hundreds of Indians.
- The rainy season lasts from June to September; annual rainfall averages between 750–1500 millimetres (30–59 in) across the region. Once the dry northeast monsoon begins in September, most precipitation in India falls on Tamil Nadu, leaving other states comparatively dry.

17. Correct Option: (c)

Explanation:

Southwest Monsoon

- The southwest summer monsoon, a four-month period when massive convective thunderstorms dominate India's weather, constitutes the Earth's most valuable wet season. Resulting from the southeast trade winds originating from a high-pressure mass centered over the southern Indian Ocean, a low-pressure region centered over South Asia attracts monsoons.
- They give rise to surface winds that ferry humid air into India from the southwest. Those inflows ultimately result from a northward shift of the local jet stream, which itself results from rising summer temperatures over Tibet and the Indian subcontinent.
- The void left by the jet stream, which switches from a route just south of the Himalayas to one tracking north of Tibet, then attracts warm, humid air.
- The high summer temperature difference between Central Asia and the Indian Ocean embodies the main factor behind that shift.
- Accompanied by a seasonal excursion of the normally equatorial intertropical convergence zone (ITCZ), a low-pressure belt of highly unstable weather moves northward towards India.
- That system intensified to its present strength as a result of the Tibetan Plateau's uplift, accompanying the Eocene–Oligocene transition event, a major episode of global cooling and aridification occurring 34–49 mya.
- The southwest monsoon arrives in two branches: the Bay of Bengal branch and the Arabian Sea branch. The latter extends toward a low-pressure area over the Thar Desert, **measuring roughly three times stronger than the Bay of Bengal branch**.
- The monsoon usually breaks over Indian Territory by around May 25, when it lashes the Andaman and Nicobar Islands in the Bay of Bengal. It strikes the Indian mainland around June 1, supplies over 80 percent of India's annual rainfall.
- First appearing near the Malabar Coast of Kerala. By June 9, it reaches Mumbai; it appears over Delhi by June 29. **The Bay of Bengal branch, which hugs the Coromandal Coast between Cape Comorin and Orissa, swerves to the northwest**. The Arabian Sea branch moves northeast towards the Himalayas.
- By the first week of July, the entire country experiences monsoon rain; **on average, South India receives more rainfall than North India**. Yet Northeast India receives the most precipitation. Monsoon clouds begin retreating from North India by the end of August; it withdraws from Mumbai by October 5. As India further cools during September, the southwest monsoon weakens. By the end of November, it has left the country.

18. Correct Option: (b)

Explanation:

Seasonal Rhythm

- **During the winter season, the westerly jet streams sets in on the south of the Himalayas due to the shift of the ITCZ (Inter Tropical Convergence Zone) southward.** These jet streams often bring the low pressure depression created over the Mediterranean Sea to Himalayan region

while its journey from Mediterranean Sea to Himalayas, the moisture content gets augmented by Caspian Sea and Persian Gulf. They even reach up to Arunachal Pradesh. Due to orographic upliftment, they cause precipitation in the form of snowfall. After the passage of the disturbance, widespread fog and cold waves set in the region thus lowering the minimum temperature by 5°C to 10°C below the normal average. The range of diurnal temperature increases and winters become more severe. Haze is common in morning and evening. These situations cause great problems to day to day activities. The roads get blocked, commercial setups cannot work due to snow cover creating difficulty, flights are affected and the people struggle to get everyday requirements and groceries.

- The frequencies of western disturbances vary from year to year but on an average 3 to 5 disturbance per month are experienced. The average precipitation during the three months of winter season i.e. from December to February is about 60cm in the Himalayan region. **The eastern Himalayan region also gets rainfall from the north east monsoon.** Although it is not so significant as the north east monsoon winds are coming from land and do not have sufficient moisture content due to lack of source, but the combined effect of western disturbances and north east monsoon causes an average precipitation of about 50 cm in Sikkim**,** Arunachal Pradesh and Assam.

19. Correct Option: (a)

Explanation:

Factors Affecting Indian Monsoon

- **Tibet Plateau (TP)**
  - ➤ It is the most mountainous in the world, with a mean height that exceeds 4000 m above sea level. The mechanical effect of the plateau has determinative roles upon the formation of a regional climate system in Asia.
  - ➤ The thermal effect of the plateau may profoundly affect the atmospheric circulation as well because the sensible and latent heat fluxes from TP reach a higher altitude than its surroundings. The atmosphere above TP is heated more strongly than the surrounding atmosphere at the same level.
  - ➤ The roles of the Tibetan Plateau (TP) upon the transition of precipitation in the South Asian summer monsoon are investigated using a simplified regional climate model. Before the onset of the south Asian monsoon, descending flow in the mid-troposphere, which can be considered as a suppressor against precipitation, prevails over northern India.
- **Jet Stream Theory**
  - ➤ This theory tries to explain the establishment of both the NE and SW Monsoons as well their unique features like bursting and variability. The jet streams are a system of upper-air westerlies. It gives rise to slowly moving upper-air waves, with 250 knots winds in some air streams.
  - ➤ Over India, a subtropical westerly jet develops in the winter season which is replaced by the tropical easterly jet in the summer season. The high temperature over the Tibetan Plateau, as well as over Central Asia in general, during the summer is believed to be the critical factor leading to the formation of the tropical easterly jet over India in summer. The mechanism affecting monsoon is that the westerly jet causes high pressure over northern parts of the subcontinent during the winter. This results in the north to south flow of the winds in the form of the NE Monsoon. With the northwards shift of the vertical sun, this jet shifts northwards too. The intense heat over the Tibetan Plateau, coupled with associated terrain features of high altitude of the plateau, etc. generate the tropical easterly jet over Central India. This jet creates a low pressure zone over the northern Indian plains influencing the wind flow towards these plains, assisting the establishment of the SW Monsoon.
- **Tropical easterly jet**
  - ➤ Due to low pressure over Tibetan plateau, high pressure exists in upper troposphere. Due to high pressure, tropical easterly jet stream blow from Tibetan plateau to Mascrene high (low pressure at troposphere) near Madagascar. This helps in sudden onset of monsoon.
- Subtropical westerly jet stream
  - ➤ Subtropical westerly jet stream flows entirely south of Himalayas over north India. (during winter). They form depressions and high pressure over northern India.
- **Somali current and Somali jet stream (Phinlander jet)**

- During June-July-August due to creation of high pressure at Mascrene high basin, air diverges due to which it goes towards horn of Africa. Here it is divided into two parts - one goes towards Africa and another goes towards Indian subcontinent.]
  - ➤ It is a low level jet stream (appear only in summer)
  - ➤ Its occurrence predicts good monsoon in India.
  - ➤ Somali jet Stream is a low level jet stream which flows from Somalia to Indian mainland

20. Correct Option: (b)

Explanation:

Monsoon

- Recently it has been found that there is a positive correlation between Tibetan snow cover and Indian summer monsoon rainfall (IMR). The seasonal monsoon wind shift and weather associated with the heating and cooling of the Tibetan plateau is the strongest such monsoon on earth.
- There is a positive correlation between El-nino and monsoon in Australia.

21. Correct Option: (b)

- **Explaination: 4th statement is incorrect.** Saffron from Kashmir has been added to the list earlier.

Supplementary Notes

- **Department for Promotion of Industry and Internal Trade** has added four new products to the list of registered GIs.
- Four new products added to GI list are:
  - ➤ **Palani Panchamirtham from Palani Town in Dindigul District of Tamil Nadu** State,
  - ➤ **Tawlhlohpuan** and **MizoPuancheifrom** the state of **Mizoram**
  - ➤ **Tirur Betel leaf** from **Kerala**
- **Palani Panchamirtham** is a combination of banana, jaggery sugar, cow ghee, honey and cardamom in a definite proportion. It is prepared in a natural method without addition of any preservatives or artificial ingredients and is well known for its religious fervour and gaiety. **This is the first time a temple 'prasadam' from Tamil Nadu has been bestowed with the GI tag.**
- **Tawlhlohpuania a good quality fabric** from **Mizoram** known for warp yarns, warping, weaving & intricate designs that are made by hand. Tawlhloh, in Mizo language, means 'to stand firm or not to move backward'.
- **MizoPuanchei is a colourful Mizo shawl/textile, from Mizoram**. It is considered as the **most colourful among the Mizo textiles**. It is an essential possession for every Mizo lady and an important marriage outfit in the state. It is also the most commonly used costume in Mizo festive dances and official ceremonies.
- Tirur betel vine from Kerala is valued both for its mild stimulant action and medicinal properties. It is generally used for **making pan-masala.**

22. Correct Answer: (c)

Explanation:

- **Both the statements are true**

Supplementary Notes

- The Global Refugee Forum is an opportunity to translate the principle of international responsibility-sharing into concrete action.
- The first Global Refugee Forum (GRF) was held in Geneva, Switzerland, jointly hosted by the United Nations High Commissioner for Refugees (UNHCR), the United Nations Refugee Agency, and the Government of Switzerland.
- Globally, more than two-thirds of all refugees come from five countries: Syria (6.7 million), Afghanistan (2.7 million), South Sudan (2.3 million), Myanmar (1.1 million), and Somalia (0.9 million).
- According to the UN, by the end of 2018, there were around 70.8 million people around the world who had left their home countries because of conflict and persecution. Of these 70.8 million, roughly 30 million are refugees.
- Countries in the developed regions host 16 per cent of refugees; one-third of the refugee population (6.7 million people) are in the Least Developed Countries.
- The largest host countries are Turkey (3.7 million), Pakistan (1.4 million), Uganda (1.2 million), Sudan (1.1 million), and Germany (1.1 million).
- According to the UN's Global Trends report, there are 37,000 new displacements every day.

- In 2018, 13.6 million people were newly displaced due to conflict and or persecution.
- It was affirmed by the United Nations General Assembly in December 2018. It represents the determination of the international community to strengthen solidarity with refugees and the countries that host them. The Compact sets out arrangements to ensure that host countries receive predictable and sustainable support; that refugees can contribute to their host communities and secure their own futures; and that solutions are sought from the outset.

23. Correct Option (d)

Explanation:

- **Statement (d) is correct**

Supplementary Notes

- **McMahon–Hussein Correspondence 1915 –16:** Under this correspondence the Britain offered Arabs across the Middle East self-rule in exchange for their aid in defeating the **Ottoman Empire** during the First World War.
- **Sykes-Picot Agreement 1916:** Britain and France sign a secret pact outlining their spheres of control in Middle East after the First World War. Palestine is designated for international administration pending consultations with Russia and other powers. The agreement is **seen by Arabs as a betrayal** of the Hussein-McMahon correspondence.
- **Balfour Declaration 1917:** It was a public statement issued by the British government during the First World War announcing support for the establishment of a "**national home for the Jewish people"** in Palestine, then an Ottoman region with a small minority Jewish population.
- Later in the period, many Jews arrived in Palestine.
- Camp David Accord 1979: In 1956, Egypt nationalised the Suez Canal and took control over the Sinai Peninsula. This led to further confrontation between Egypt and Israel.
  - Finally, in 1979, a peace deal was reached between Egypt and Israel through the Camp David Accord. **Egypt became the first Arab country to recognise Israel**.
  - Following Egypt's peace agreement with Israel, Arab League suspended Egypt's membership to the league.

24. Correct Option (b)

Explanation:

- **Statement (b) is correct**

Supplementary Notes

Operation Twist

- The Reserve Bank of India (RBI) announced **simultaneous sale and purchase of government bonds**. RBI will sell short-term bonds of ₹10,000 crore, it will also purchase long-term securities of the same value. With RBI's Operation Twist the net liquidity in the system will remain unchanged.
- **Operation Twist of United States:** RBI's move resembles the 2011 Operation Twist of the US Federal Reserve Bank. The Fed had swapped short-term bonds for longer-term debt. US first attempted this exercise in 1962. At that time, **the "twist" was a new dance craze sparked by singer Chubby Checker**. Since then this exercise has carried this name.
- **The idea is to twist the yield curve:** The yield curve is a graph that plots the yields of government securities (or other financial securities) of different maturities.
  - The yield is the per-year return an investor can earn on a financial security by staying invested in it till maturity.
  - When a central bank buys government securities, the prices go up. At a higher price, the yields or the returns come down as the interest paid on the securities stays the same.
  - Vice versa, when the bank sells government securities, the prices fall and the return or the yield on the security goes up.
  - This creates a visual effect of a twist in the yield curve and the yield curve will flatten.
- **Benefits of RBI's Operation Twist:**
  - Yield anomaly corrected
  - Long-term borrowing will become cheaper
  - Spur bank lending private borrowing

25. Correct Option (a)

Explanation:

- **Statements 1 is correct Statement 2 and 3 are incorrect:** H-1B is a non-immigrant visa. H-1B allows

US companies to employ 'not just Indian' but all 'foreign' workers in "specialty occupations".

Supplementary Notes

H-1B visas

- The US government had recently said that it is **planning to curb the distribution of H-1B visa to Indians.** The **objective is to better protect US workers and wages,** and save them from competition from workers arriving from outside countries like India and China.
- **H-1B visa:**
  - The H-1B is a United States visa under the **Immigration and Nationality Act**. It is one of the most popular visas for foreigners visiting the US for business or trade purpose.
  - It is a **non-immigrant visa** that **allows US companies to employ foreign workers in specialty occupations** that require **theoretical or technical expertise.**
  - Specialty occupations include specialized fields like IT, finance, accounting, architecture, engineering, mathematics, science, medicine, etc. which usually **require a bachelor's degree or higher.**
  - US employers wishing to bring in staff for long-term assignment prefer H1B visa because its application is **quicker than applying for a US Green Card**.
  - H-1B visa has its roots in the **H1 visa** of the Immigration and Nationality Act; which split between H-1A (for nurses) and H-1B in 1990.
- **Who will be worst hit:** Worst hit by the new H1B bill will be **Indian tech companies** such as Infosys, TCS, and Wipro, as well as **US tech giants** like Apple, Facebook and Google, who use the H1B visa to fill positions that cannot be filled by American workers.
- **India has been the only country that takes 70 per cent of the 85,000 H-1B visas** applied annually.
- **Problems that Indians face with current H-1B rules:**
  - Recently, US proposed revision of "specialty occupations" definition for the H1B visa.
  - USCIS can reject H1B applications that do not provide the necessary required information when submitted.
  - New rules require H-1B petitioners to first electronically register with USCIS.
  - US can initiate deportation of expired H1-B holders.
  - US Department of Homeland Security (DHS) is also considering ban on work authorization for spouses of H-1B visa holders.
  - H-1B visa holders in the US face problems in switching jobs even if the new job requires the exact same skill set as before.

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TEST

DAY - 26

Time Allowed: 30 mins **Maximum Marks: 50**

1. On which of the following cities the Mid-day Sun is overhead twice a year?

1. Aizwal
2. Agartala
3. Bhopal
4. Ranchi
5. Nagpur

Select the correct option using the codes given below:

(a) 4 and 5 only

(b) 1, 3, 4 and 5 only

(c) 3, 4 and 5 only

(d) 1,2, 3, 4 and 5

2. Consider the following pairs:

1. Eight-degree channel: Separates Amindivi islands from Cannanore Islands.
2. Nine-degree channel: separates Minicoy from rest of the Lakshadweep
3. Coco channel: Separates Little Andaman from South Andaman
4. Eleven-degree channel: Separates Maldives from Lakshadweep

Which of the above pairs is/are *incorrect*?

(a) 2 only

(b) 1 and 3 only

(c) 1, 2 and 4 only

(d) 1, 3 and 4 only

3. Which of the following pairs is correctly matched?

1. Bass Strait: separates Tasmania from the New Zealand
2. Cook strait: Separates the North and South Islands of New Zealand
3. Torres Strait: Separates Australia from New Guinea

Select the correct option using the codes given below:

(a) 1 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

4. Which of the following pairs is/are correctly matched?

1. Longest strait: Strait of Malacca
2. Widest strait: Bosphorus Strait
3. Narrowest strait: Denmark Strait

Select the correct option using the codes given below:

(a) 1 only

(b) 3 only

(c) 1 and 2 only

(d) 1, 2 and 3

5. Arrange the following Seas in the North-South Direction:

1. Sulu Sea
2. Banda Sea
3. Celebes Sea
4. Cream Sea

Select the correct option using the codes given below:

(a) 4-2-1-3

(b) 1-4-3-2

(c) 1-3-4-2

(d) 2-4-3-1

6. Which of the following lakes is *not* present in Australia?

(a) Lake Disappointment

(b) Lake Eyre

(c) Lake Moore

(d) Lake Taupo

7. Consider the following pairs regarding States of Australia and their Capitals:

1. New South Wales: Melbourne
2. Victoria: Sydney
3. Tasmania: Hobart
4. Queensland: Brisbane

Which of the above pairs are correctly matched?

(a) 1 and 2 only

(b) 3 and 4 only

(c) 1 and 4 only

(d) 1, 2, 3 and 4

8. Consider the following statements regarding the Jordan River:

1. It flows from Lebanon to Jordan.
2. It ends its run on to the Sea of Galilee.
3. West Bank got its name from the River.

Which of the above statements are correct?

(a) 1 and 3 only

(b) 2 and 3 only

(c) 1 and 2 only

(d) 1, 2 and 3

9. Through which of the following countries, the Tropic of Capricorn is not passed?

(a) Namibia

(b) Mozambique

(c) Lesotho

(d) Botswana

10. Which of the following connects the Sea of Azov with the Black Sea?

(a) Kerch Strait

(b) Strait of Tartary

(c) Bosporus Strait

(d) Dardanelles Strait

11. Arrange the following cities in the North-South direction:

1. Manama
2. Muscat
3. Abu Dhabi
4. Doha

Select the correct option using the codes given below:

(a) 4-1-3-2

(b) 1-4-3-2

(c) 1-3-4-2

(d) 3-1-2-4

12. Which of the following two water bodies are separated by the Isthmus of Kra?

(a) Java Sea and Andaman Sea

(b) Gulf of Thailand and the Gulf of Mottama

(c) Gulf of Tongking and the South China Sea

(d) Gulf of Thailand and the Andaman Sea

13. Consider the following statements regarding mountain peaks:

1. Lhotse is the fourth highest peak in the world.
2. Mount Kinabalu is the highest peak in the South-East Asian region.
3. Mount Vinson is the highest peak in Antarctica.
4. Gunnbjorn Fjeld is the highest peak in the Arctic region.

Which of the above statements are correct?

(a) 2 and 4 only

(b) 1, 2, and 3 only

(c) 1, 3, and 4 only

(d) 1, 2, 3 and 4

14. Which of the following groups forms the 'Lithium Triangle'?

(a) Australia, New Zealand, East Timor

(b) Argentina, Bolivia, Chile

(c) China, South Korea, Japan

(d) Argentina, Peru, Chile

15. The southernmost city of the world is Puerto Williams. It has replaced which of the following cities to achieve this status?

(a) Ushuaia

(b) Stanley

(c) Sentosa

(d) Puerto Santa Cruz

16. If a person has to travel from Aizwal to Jamnagar, what is the minimum number of states that s/he has to set foot in, including the states from where s/he is starting and finishing?

(a) 4

(b) 5

(c) 6

(d) 7

17. Ross Island, which has recently been named as Netaji Subhas Chandra Bose Dweep, is situated in which part of the Andaman and Nicobar Islands?

(a) North Andaman

(b) Middle Andaman

(c) South Andaman

(d) Little Andaman

18. Consider the following Island Nations of Pacific Ocean:

1. Tonga
2. Marshall Islands
3. Tuvalu
4. Kiribati

Arrange the following nations in North to South order and select the correct option from the codes given below:

(a) 3-1-2-4

(b) 2-3-4-1

(c) 2-4-3-1

(d) 4-2-3-1

19. Consider the following seas:

1. Caspian sea
2. Aral sea
3. Black sea
4. Mediterranean sea

Arrange the following from west to east and choose the correct option from the codes given below:

(a) 4-3-1-2

(b) 4-3-2-1

(c) 3-4-2-1

(d) 3-4-1-2

20. Consider the following statements regarding the geography of India:

1. Andaman and Nicobar Islands share a maritime border with both Thailand and Indonesia.
2. Indian Standard Meridian, it passes through Mirzapur in Uttar Pradesh and touches six states of India.
3. Drass in western Ladakh is the coldest place in the world.

Which of the following statements is/are correct?

(a) 1 only

(b) 1 and 2 only

(c) 2 only

(d) 1 and 3 only

21. With reference to "The Impossible Row" project, consider the following statements

1. The project is related to the Drake Passage.
2. The Passage is located between Cape Horn at the tip of South America and the Antarctic Peninsula.
3. This is the first completely human-powered crossing of the passage.

Which of the following statement is/are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

22. World's oldest rhino recently died in which country?

(a) Zimbabwe

(b) Tanzania

(c) Kenya

(d) South Africa

23. The Cabinet recently decided to merge all central service cadres of Railways officers into a single Indian Railways Management Service (IRMS). Which of the following statements are true about IRMS?

1. IRMS will merge nine Group A services in Indian Railways (IR).
2. Wadwa committee in 2015 has noted that "departmentalism" is a major problem in the Railway system and recommended merging of all services into one.

Choose the correct answer:

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

24. Consider the following statements about Drake Passage-

1. It is the body of water between South America's Cape Horn and the South Shetland Islands of Antarctica.
2. There is no significant land anywhere around the world at the latitudes of Drake Passage.

Which of the following statements above is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

25. Consider the following statements about the e-Bkry e-auction portal-

1. It has been recently launched by Ministry of Commerce.
2. It is framework for promoting online auction of assets attached by the banks.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

****

ANSWER HINTS

DAY - 26

1. Correct Option: (c)

Explanation:

Tropic of Cancer in Indias

- Mid-day sun is exactly overhead twice a year in cities in India which are located in the south of the Tropic of Cancer i.e. $23^{0}26'16''$ N.
- **Aizwal, and Agartala are located just north of the Line, hence, the Sun is never overhead in these cities.**
- **Bhopal, Ranchi, and Nagpur are in the south of the Tropic of Cancer, hence in these cities, the Sun is overhead twice a year.**
- Those located above the Tropic will never have the sun overhead any time of the year, while those located below the Tropic will have it twice a year, once between March 22 and June 22 and the other time between June 22 and September 22. All the above cities are either located above the Tropic of Cancer or below it.

2. Correct Option: (d)

Explanation:

Islands of India

- In India, there are 2 groups of oceanic islands viz. Andaman and Nicobar group (in the Bay of Bengal) and Lakshadweep group(in the Arabian Sea).

Andaman and Nicobar group

- There are 572 islands in Andaman and Nicobar group.
- **It is separated from the islands of Myanmar by Coco Channel.**
- **Ten degrees Channel separates the Andaman group from the Nicobar group.**
- **Duncan passage separates Little Andaman from South Andaman.**

Lakshadweep group

- It is a group of 36 coral islands located in the Arabian Sea.
- **Eleven-degree channel: Separates Amindivi islands from Cannanore Islands.**
- **Minicoy is separated from the rest of the Lakshadweep by Nine Degree Channel.**
- **Lakshadweep group separated from the Maldives by Eight Degree Channel.**

3. Correct Option: (b)

Explanation:

Straits in Australia

- Bass Strait is a sea strait separating Tasmania from the Australian mainland, specifically the state of Victoria.
- Cook Strait is a strait that separates the North and South Islands of New Zealand. It connects the Tasman Sea on the northwest with the South Pacific Ocean on the southeast, and runs next to the capital city, Wellington.
- The Torres Strait is a strait which lies between Australia and the Melanesian island of New Guinea.

4. Correct Option: (a)

Explanation:

Popular Straits

- Strait of Malacca separates the Malay Peninsula from the Sumatra island. It is the longest strait of the World.
- Denmark Strait is the widest strait which separates Greenland from Iceland.
- Bosphorus Strait is the narrowest strait.

5. Correct Option: (c)

Explanation:

Water bodies in the Western Pacific Ocean

- The Sulu Sea is a body of water in the southwestern area of the Philippines.
- The Celebes Sea is in the Western Pacific Ocean and south of the Sulu Sea.
- Cream Sea is south of the Celebes Sea
- The Banda Sea is south of the Cream Sea and east of Indonesia.

6. Correct Option: (d)

Explanation:

Lake Taupo

- **It is in New Zealand.**
- All the other above-mentioned lakes are in Australia.

7. Correct Option: (b)

Explanation:

States of Australia

- There are six states viz. New South Wales, Victoria, Queensland, Western Australia, South Australia and Tasmania in Australia.
- **The Capital of New South Wales is in Sydney, that of Queensland is in Brisbane, of Victoria is in Melbourne, of Tasmania is in Brisbane, of Western Australia is in Perth and that of South Australia is in Adelaide.**
- There are also ten territories, whose existence and governmental structure (if any) depend on federal legislation.
- These are three Internal territories of Australia viz. Australian Capital Territory, Jervis Bay Territory, and Northern Territory, and 7 External territories of Australia viz. Ashmore and Cartier Islands, Australian Antarctic Territory, Christmas Island, Cocos (Keeling) Islands, Coral Sea Islands, Heard Island and McDonald Islands, and Norfolk Island.

8. Correct Option: (a)

Explanation:

Jordan River

- The Jordan River is a 251-kilometer long river in the Middle East that flows roughly north to south **through the Sea of Galilee** and **on to the Dead Sea.**
- **It originates at the Mount Hermon in Syria and Lebanon.**
- **Both Jordan and the West Bank(As it is situated in the west of the River) take their names from the river.**

9. Correct Option: (c)

Explanation:

Tropic of Capricorn through Africa

- The Tropic of Capricorn is an imaginary line of latitude encircling the Earth at approximately 23.5° south of the equator.
- **In Africa, it passes through the countries of Namibia, Botswana, South Africa and Mozambique.**

10. Correct Option: (a)

Explanation:

Popular Straits

- The Black Sea is connected by a narrow passage, the Kerch Strait, to the shallow Sea of Azov.
- The Strait of Tartary connects the Sea of Japan and Sea of Okhotsk (Russia).
- Bosporus Strait links the Black Sea to the Mediterranean Sea(Turkey).
- Dardanelles Strait connects the Sea of Marmara with the Aegean Sea (Turkey)

11. Correct Option: (b)

Explanation:

Countries around the Persian Gulf

- The Persian Gulf is a mediterranean sea in Western Asia. It is an extension of the Indian Ocean (Gulf of Oman) through the Strait of Hormuz.
- It touches the borders of Iran, Iraq, Kuwait, Saudi Arabia, Qatar, Bahrain, United Arab Emirates, and Oman.
- **Amongst the above options, Manama is the northernmost city. Doha is south of Manama. Abu Dhabi is south of Doha. Muscat is the southernmost city.**

12. Correct Option: (d)

Explanation:

Isthmus of Kra

- An isthmus is a narrow strip of land that connects two larger landmasses and separates two bodies of water.

- Isthmus of Kra is the narrowest part of the Malay Peninsula.
- **It separates the Andaman Sea (West) and the Gulf of Thailand (East).**
- The western part of the isthmus belongs to Thailand's Ranong Province and the eastern part to Chumphon Province, both in Southern Thailand.

13. Correct Option: (c)

Explanation:

Highest peaks of the world

- **Lhotse (8516 m) is the fourth highest peak in the world after Everest, K2, and Kangchenjunga. It is in Nepal and Tibet.**
- **Mount Kinabalu (4095 m) is the second-highest peak and the highest non-Himalayan peak in the South-East region. It is in Malaysian Borneo. Hkakabo Razi(in Myanmar) is the highest peak in the region.**
- **Gunnbjørn Fjeld is Greenland's highest mountain and also the highest mountain north of the Arctic circle.**
- Mount Elbrus (5642 m), an inactive volcano in Russia, is the highest mountain in Europe.
- The highest African mountain is Kilimanjaro (5895 m), which has three peaks, named Kibo, Mawenzi, and Shira, of which Kibo is the tallest.
- Mount McKinley (6168 m) is the highest mountain on the North American continent.
- Aconcagua (6962 m) is the highest peak in South America.
- Mount Kosciuszko (2228 m) is Australia's highest point.
- **Vinson Massif (4897 m) is the highest mountain on the Antarctic continent.**

14. Correct Option: (b)

Explanation:

Lithium Triangle

- The Lithium Triangle is a region of the Andes rich in lithium reserves around the borders of **Argentina, Bolivia, and Chile.**
- The lithium in the triangle is concentrated in various salt pans that exist along the Atacama Desert and neighboring arid areas.
- The area holds around 54% of the world's lithium reserves.

15. Correct Option: (a)

Explanation:

The southernmost city of the world

- Puerto Williams in far southern Chile has become the world's southernmost city after its status upgraded from "hamlet" to "city".
- It took over the title from **Ushuaia in Argentina** which was the world's southernmost city till recently.
- It is the main settlement, port and naval base on Navarino Island in Chile.
- It faces the Beagle Channel, which is a strait in Tierra del Fuego Archipelago.

16. Correct Option: (d)

Explanation:

Maps of India

- The person has to cross 7 states.
- Aizwal (Mizoram)-Assam-West Bengal-Jharkhand-Chhattisgarh-Madhya Pradesh-Jamnagar (Gujarat)

17. Correct Option: (a)

Explanation:

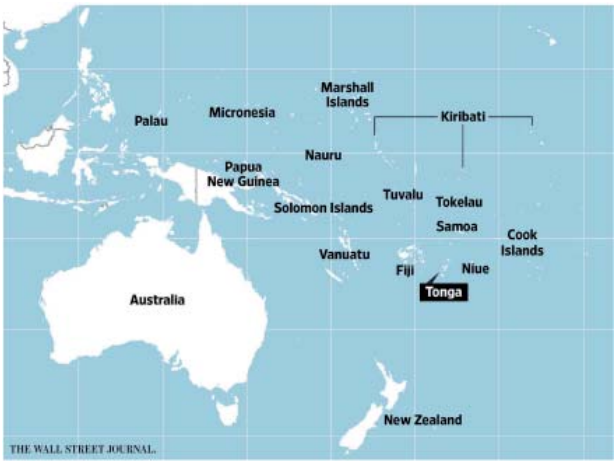
Andaman and Nicobar Islands

18. Correct Option: (c)

Explanation:

Island Nations of the World

- The correct order from north to south is Marshall Island-Kiribati-Tuvalu-Tonga.



19. Correct Option: (a)

Explanation:

Seas of the world

- The correct order from west to east is Mediterranean Sea- Black Sea- Caspian Sea- Aral Sea.

20. Correct Option: (a)

Explanation:

Maps of India

- It is the seventh-largest country by area, the **second-most** populous country, and the **most populous democracy in the world.**
- Bounded by the Indian Ocean on the south, the Arabian Sea on the southwest, and the Bay of Bengal on the southeast, **it shares land borders with Pakistan to the west; China, Nepal, and Bhutan to the north; and Bangladesh and Myanmar to the east.**
- **The longest boundary is shared by Bangladesh**
- In the Indian Ocean, India is in the vicinity of Sri Lanka and the Maldives; **it's Andaman and Nicobar Islands share a maritime border with Thailand and Indonesia.**
- The Tropic of Cancer passes through 8 states**. States being Gujarat, Rajasthan, Chhattisgarh, Madhya Pradesh, Jharkhand, West Bengal, Mizoram and Tripura.**
- 82° 30′ East is the Indian Standard Meridian**, it passes through Mirzapur in Uttar Pradesh and touches five states of India. The states it passes through are Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Orissa and Andhra Pradesh.**
- Siachen Glacier is the largest glacier in

India. At 75.6 km long and 2.8 km wide, it is the longest glacier in the Karakoram and second-longest in the world's non-polar areas.

- **Drass in western Ladakh is the coldest place in India. It is also the second coldest inhabited place in the world after Siberia.**

21. Correct option: (d)

Explanation

- All the above statements are correct

Supplementary notes

Drake Passage and "The Impossible Row" project

- In a first, six rowers from four countries crossed the Drake Passage, in just under two weeks after pushing off from the southern tip of South America.
- The Passage is located between Cape Horn at the tip of South America and the Antarctic Peninsula.
- This is the first completely human-powered crossing of the passage.
- The project was dubbed "The Impossible Row", for which the team departed from Cape Horn in Chile and arrived at Primavera Base on San Martin Land on the Antarctic Peninsula.
- The passage is named after Sir Francis Drake, who was the first Englishman to circumnavigate the globe.
- The passage has an average depth of about 11,000 feet, with deeper regions going up to over 15,600 feet near the northern and southern boundaries.
- The Drake Passage is considered one of the roughest waterways in the world because here, layers of cold seawater from the south and warm seawater from the north collide to form powerful eddies, which when combined with strong winds and storms can be treacherous for those attempting to navigate it.
- It is also the narrowest stretch in the Southern Ocean and spans approximately 800 km between the southern tip of South America and the northern tip of the West Antarctic Peninsula.
- NASA describes the waters of the passage as "notoriously turbulent, unpredictable, and frequented by icebergs and sea ice.

22. Correct option: (b)

Explanation

- A rhino believed to the world's oldest has died at the age of 57 in a Tanzanian conservation area.

Supplementary notes

World's oldest rhino' dies in Tanzania

- A rhino believed to the world's oldest has died at the age of 57 in a Tanzanian conservation area.
- Fausta, a female black rhino, died of natural causes in captivity on Friday in the Ngorongoro Crater.
- Records show that Fausta lived [longer] than any rhino in the world and survived in the Ngorongoro, free-ranging, for more than 54 years before it was kept in a sanctuary for the last three years of its life in 2016.
- Fausta was first located in 1965 when she was between three and four years old. Her health deteriorated after hyenas attacked her in 2016. She was subsequently taken into refuge.
- Rhinos' life expectancy is around 40 years in the wild, but they can live an extra decade in captivity.
- Decimated by poaching, black rhinos now number around 5500, according to charity Save The Rhino.
- The smaller of the two African species, they are found in southern and eastern Africa, including Kenya, Tanzania, Namibia, South Africa and Zimbabwe.

23. Correct Answer: (D)

Explaination:

- 1st and 2nd statements are incorrect:
- IRMS will merge eight and not nine Group A services in Indian Railways (IR) - IRPS (Indian Railway Personnel Service), IRTS (Indian Railway Traffic Service), IRSS (Indian Railway Stores Service), IRSME (Indian Railway Service of Mechanical Engineers), IRSEE (Indian Railway Service of Electrical Engineers), IRSSE (Indian Railway Service of Signal Engineers), IRSE (Indian Railway Service of Engineers) and IRAS (Indian Railway Accounts Service). Five—IRSME, IRSEE, IRSSE, IRSS and IRSE—are so-called technical services, recruited through an engineering service examination conducted by UPSC.

- Bibek Debroy and not Wadwa committee in 2015 has noted that "departmentalism" is a major problem in the Railway system and recommended merging of all services into one.

Supplementary Notes

- Recently, the Cabinet recently approved to trim the Railway Board and merge service cadres.
- The Cabinet recently approved **trimming of the Railway Board**, the powerful body that governs the Indian Railways. From **nine**, the Board will now have only **five Members**.
- The Cabinet also decided to merge all **central service cadres of Railways officers into a single Indian Railways Management Service (IRMS)**. Now, any eligible officer could occupy any post, including Board Member posts, irrespective of training and specialisation, since they will all belong to IRMS.
- The five members of the Board, other than a Chairman-cum-CEO, will now be the Members Infrastructure, Finance, Rolling Stock, Track, and Operations and Business Development. The Board will also have independent members, who will be industry experts with at least 30 years of experience, but in non-executive roles, only attending Board meetings.
- The move has led to protests from serving civil servants, prompting the Railway Board to reach out to them to allay their concerns.

Present System in Railways

- The Indian Railways is governed by a pool of officers, among whom engineers are recruited after the Indian Engineering Service Examination, and civil servants through the Civil Services Examination. The civil servants are in the Indian Railway Traffic Service (IRTS), Indian Railway Accounts Service (IRAS) and Indian Railway Personnel Service (IRPS). The engineers are in five technical service cadres — Indian Railway Service of Engineers (IRSE), Indian Railway Service of Mechanical Engineers (IRSME), Indian Railway Service of Electrical Engineers (IRSEE), Indian Railway Service of Signal Engineers (IRSSE) and the Indian Railway Stores Service (IRSS).
- Until the 1950s, the Railways system was run by officers from just three main streams: Traffic, Civil Engineering, and Mechanical. The other streams emerged as separate services over time.

Need for Reform

- There are 8 Group A services in Indian Railways (IR) — IRPS (Indian Railway Personnel Service), IRTS (Indian Railway Traffic Service), IRSS (Indian Railway Stores Service), IRSME (Indian Railway Service of Mechanical Engineers), IRSEE (Indian Railway Service of Electrical Engineers), IRSSE (Indian Railway Service of Signal Engineers), IRSE (Indian Railway Service of Engineers) and IRAS (Indian Railway Accounts Service). Five—IRSME, IRSEE, IRSSE, IRSS and IRSE—are so-called technical services, recruited through an engineering service examination conducted by UPSC. Three—IRPS, IRTS and IRAS—are non-technical, recruited through the civil service examination conducted by UPSC. It has led to inter-departmental rivalry. The government wants to end inter-departmental rivalries, which it says have been hindering growth for decades. **Railway Minister Piyush Goyal said departments were working "in silos".**
- Unification has been recommended by several committees—**Prakash Tandon** (1994), **Khanna** (1998), **Rakesh Mohan** (2001), **Sam Pitroda** (2012) and **Bibek Debroy** (2015). Prakash Tandon Committee recommended a single service. A Gupta-Narain Committee (1994), set up to examine feasibility of implementing this single service idea, questioned whether this could be done.
- **Bibek Debroy committee in 2015 has noted that "departmentalism" is a major problem in the system.** Most committees have said merger of the services in some form would be a solution. **The Debroy report recommended merging of all services to create two distinct services: Technical and Logistics.** But it did not say how to merge the existing officers.
- A separate exam under the Union Public Service Commission is proposed to be instituted in 2021 to induct IRMS officers.

24. Correct answer- (c)

Explanation-

- Both the statements are correct.

Supplementary notes

About the Drake Passage-

- It is the body of water between South America's Cape Horn, Chile and the South Shetland Islands of Antarctica.
- It connects the southwestern part of the Atlantic Ocean (Scotia Sea) with the southeastern part of the Pacific Ocean and extends into the Southern Ocean.
- It is the shortest crossing from Antarctica to any other landmass. There is no significant land anywhere around the world at the latitudes of Drake Passage, which is important to the unimpeded flow of the Antarctic Circumpolar Current which carries a huge volume of water through the Passage and around Antarctica.
- The passage is named after Sir Francis Drake, who was the first Englishman to circumnavigate the globe.

25. Correct answer- (b)

Explanation:

- **Only statement (2) is correct**- It has been launched by the Ministry of Finance.

Supplementary notes

e-Bkry e-auction portal

- The main objective is to enable online auction by banks of attached assets transparently and cleanly for the improved realization of value.
- It is framework for promoting online auction of assets attached by the banks.
- It is equipped with the property search features and contains navigational links to all PSBs e-auction sites.
- The framework aims to provide single-window access to information on properties.

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TEST
DAY - 27

Time Allowed: 30 mins **Maximum Marks: 50**

1. Consider the following statements regarding the Malthusian Theory of Population.

1. While the food supply increases in geometrical progression, the population increases in arithmetical progression.
2. It violates the law of diminishing returns.
3. The theory takes account of the scientific and technological advancements.

Which of the above statements is/are ***incorrect***?

(a) 1 only
(b) 1 and 2 only
(c) 2 and 3 only
(d) 1, 2 and 3

2. Which of the following pairs regarding spices and their largest producers is/ are correctly matched?

1. Cardamom (Large): Kerala
2. Turmeric: Andhra Pradesh
3. Chilli: Karnataka

Select the correct option using the codes given below:

(a) 1 only
(b) 1, 2, and 3
(c) 2 only
(d) 2 and 3 only

3. Which of the following tribes are found in the Union Territory of Ladakh?

1. Drokpa
2. Bora
3. Beda
4. Bot

Select the correct option using the codes given below:

(a) 1 and 4 only
(b) 2 and 3 only
(c) 1, 3 and 4 only
(d) 1, 2 and 4 only

4. Which of the following are the mandates of the UN Population Fund?

1. Reproductive health
2. Gender equality
3. Population and development

Select the correct option using the codes given below:

(a) 3 only
(b) 1 and 2 only
(c) 2 and 3 only
(d) 1, 2 and 3

5. Consider the following statements regarding approaches to Human Development:

1. Welfare Approach was propounded by Amartya Sen.
2. Basic Needs Approach was proposed by the International Labour Organisation.

Which of the above statements is/are ***incorrect***?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

6. Consider the following statements:

1. In the areas of extensive agriculture, per worker productivity is high whereas in the areas of intensive agriculture per hectare productivity is high.
2. Crop Intensity of a country cannot exceed 100%.

Which of the above statements is/are ***incorrect***?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

7. Which of the following statements regarding Double-Cropping Agriculture is/are correct?

1. Double-Cropping Agriculture practice involves the cultivation of two crops simultaneously.
2. It is prevalent in those areas where there is inadequate rainfall.

Select the correct option using the codes given below:

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

8. Consider the following pairs regarding Specialized Cultivations:

1. Silviculture: Honey production
2. Moriculture: Silk production
3. Mariculture: Forest management

Which of the above pairs is/are correctly matched?

(a) 1 only

(b) 3 only

(c) 2 only

(d) 1 and 3 only

9. Arrange the following states into the increasing order of on-shore oil production?

1. Gujarat
2. Assam
3. Andhra Pradesh
4. Rajasthan

Select the correct option using the codes given below:

(a) 1-3-2-4

(b) 3-1-2-4

(c) 2-1-4-3

(d) 4-1-2-3

10. Which of the following pairs regarding types of agriculture and their main region/countries are correct?

1. Intensive Subsistence Agriculture: Monsoon Climate
2. Extensive Commercial Grain Cultivation: Steppe Climate
3. Dairy Farming: Tropical Climate
4. Viticulture: Mediterranean region

Select the correct option using the codes given below:

(a) 1 and 4 only

(b) 2 and 3 only

(c) 1, 2, and 4 only

(d) 2, 3 and 4 only

11. Arrange the following list of renewable resources according to the *decreasing order* of their cost per MW production in India:

1. Geothermal
2. Solar Thermal
3. Solar PV
4. Hydro

Select the correct option using codes given below:

(a) 1-2-4-3

(b) 1-3-2-4

(c) 3-2-4-1

(d) 2-3-1-4

12. Consider the following hydropower stations:

1. Nimmo-Bazgo
2. Rangit
3. Dulhasti

4. Chutak

Which of the following hydropower stations is/are situated in the Union Territory of Ladakh?

(a) 2 and 3 only

(b) 1 and 4 only

(c) 1, 3 and 4 only

(d) 1, 2, 3 and 4

13. Which of the following statements is/ are *incorrect* regarding Biogas?

1. Biogas typically refers to a mixture of different gases produced by the breakdown of organic matter in the presence of oxygen.
2. Ethane (CH4) and Carbon dioxide (CO2) are the primary components of Biogas.
3. Biogas can be compressed, the same way natural gas is compressed to CNG.

Select the correct answer using the code given below.

(a) 1 only

(b) 1 and 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

14. Which of the following pairs are correctly matched?

Nuclear Plants: States

1. Kaiga: Karnataka
2. Chutka: Gujarat
3. Kalpakkam: Tamil Nadu
4. Kovvada: Andhra Pradesh

Select the correct answer using the code given below.

(a) 1 and 2 only

(b) 1, 3 and 4 only

(c) 2, 3 and 4 only

(d) 1, 2, 3 and 4

15. Which of the following statements is/ are correct regarding Thoriumvis-a-vis Uranium as a fuel?

1. Thorium is more efficient than Uranium.
2. Uranium is fertile rather than fissile, whereas Thorium is both fertile and fissile.
3. Thorium is more abundant in nature.

Select the correct option using the codes given below:

(a) 1 and 2 only

(b) 1 and 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

16. Consider the following pairs regarding the Nuclear Power plants and their location:

1. Kakrapara: Maharashtra
2. Kudankulam: Karnataka
3. Kalpakam: Tamil Nadu

Which of the following is/are ***incorrectly*** matched?

(a) 3 only

(b) 1, 2 and 3

(c) 1 and 2 only

(d) 2 and 3 only

17. Global uranium production increased by 40% between 2004 and 2013, mainly because of increased production by Kazakhstan, the world's leading producer.

Two-thirds (44) of the units (nuclear reactors) under construction are located in three countries. Which one of the following is not one of them?

1. China
2. Russia
3. Kazakhstan
4. USA
5. India

Select the correct option from the codes given below:

(a) 1, 2 and 3 only

(b) 2, 3 and 4 only

(c) 1, 2 and 4 only

(d) 1, 2 and 5 only

18. Which of the following statements is *incorrect* regarding Shale Gas?

(a) Shale gas refers to natural gas that is trapped within shale formations.

(b) Shales are fine-grained igneous rocks that can be rich sources of petroleum and natural gas.

(c) According to the EIA, USA has the maximum potential for shale gas production.

(d) Shale gas drilling is associated with water supply issue.

19. Consider the following sources of renewable energy:

1. Small hydropower
2. Bioenergy
3. Geothermal power
4. Solar power
5. Wind power

Arrange the following in the decreasing order of their consumption in the world.

(a) 5-4-1-2-3

(b) 4-5-1-2-3

(c) 5-4-3-2-1

(d) 4-5-2-1-3

20. China is the major producer of cotton, and is also the world's largest cotton consumer and importer. Consider the following statements regarding the above:

1. Xinjiang has become the largest cotton producing area in China.
2. All agriculture in Xinjiang depends on irrigation.
3. A mulched drip irrigation technique has been proven a great success in the production of cotton in water deprived areas.

Which of the following statements is/are correct?

(a) 1and 3 only

(b) 2 and 3 only

(c) 1, 2 and 3

(d) 3 only

21. Rotavac 5D, an oral rotavirus vaccine, which was currently been developed. With respect to that, consider the following statements regarding it

1. Hyderabad-based Bharat Biotech International has commercially launched it.
2. The roll-out of oral rotavirus vaccine is also the lowest dose-volume rotavirus vaccine in the world.
3. Rotavirus is the most common cause of severe diarrhea among infants and children throughout the world.

Which of the following statement is/are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

22. The 2019 United Nations Climate Change Conference, also known as COP25, is been held at which place?

(a) Paris

(b) New York

(c) Moscow

(d) Madrid

23. With reference to NATO, consider the following statements

1. India is the founding member of NATO
2. Each member designates an ambassador to NATO.
3. NATO's primary purpose was to defend member nations from threats by communist countries.

Which of the following statement is/are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

24. India's first hybrid annuity model (HAM) based Sarai Sewage Treatment Plant is been inaugurated in which state?

(a) Himachal Pradesh

(b) Rajasthan

(c) Uttar Pradesh

(d) Uttarakhand

25. Which constitutional amendment provided 10% reservation in government jobs and educational institutions for the "economically backward" in the unreserved category?

(a) Constitutional (103rd Amendment) Act

(b) Constitutional (101st Amendment) Act

(c) Constitutional (102nd Amendment) Act

(d) Constitutional (104th Amendment) Act

****

ANSWER HINTS

DAY - 27

1. Correct Option: (d)

Explanation:

Malthusian Theory of Population

- It is one of the three most popular theories of population viz. Malthusian Theory, Optimum Theory, and the Theory of Demographic Transition.
- Published in 1798 by Thomas Robert Malthus, the theory explains the relationship between the growth in food supply and in population.
- According to this theory, the **human population increases in geometrical progression** and if unchecked doubles itself every 25 years. On the other hand, the **food supply increases in a slow arithmetical progression due to the operation of the law of diminishing returns** based on the supposition that the supply of land is constant. And if unchecked, the population tends to outrun food supply, thus creating an imbalance.
- Malthus was severely criticized for his narrow and pessimistic views.
- For instance, his idea that population increases in geometrical progression in 25 years have not been proved empirically.
- **His doctrine advocates that food supply increases in arithmetical progression but he underestimated the technological advancements of the force of production through controlling nature over time.**
- Further, his suggested preventive measures (by human themselves) such as late marriage, celibacy, moral restraint, etc. or, the positive measures (by nature) such as vice, misery, famine, war, disease, pestilence, floods, etc. to check the population growth are very pessimistic.

2. Correct Option: (c)

Explanation:

Spice producing states

- States like Gujarat, Karnataka, Rajasthan, Tamil Nadu, Assam, Kerala, Madhya Pradesh, Maharashtra, Orissa, Uttar Pradesh and West Bengal are popular for production of spices. **Andhra Pradesh is the largest spice producer of India.**
- **Sikkim and West Bengal are the largest producers of Cardamom (large).** Kerala is best in cardamom (small).
- **Andhra Pradesh, Karnataka, and Kerala are the largest producers of Turmeric.**
- **Andhra Pradesh, Gujarat, Karnataka, and Maharashtra are the largest producers of Chilli.**

3. Correct Option: (d)

Explanation:

Tribes in Ladakh

- The total tribal population in Ladakh region is more than 97 percent.
- **The region is inhabited by following Scheduled Tribes viz. Balti, Beda, Bot, Boto, Brokpa, Drokpa, Dard, Shin, Changpa, Garra, Mon, Purigpa, etc.**
- This is why the National Commission for Scheduled Tribes has recommended the inclusion of Ladakh under the Fifth/Sixth Schedule of the Constitution of India.
- **Bora tribe is found in the Western Amazon basin and marginal areas of Peru, Columbia, and Brazil.**

4. Correct Option: (d)

Explanation:

UN Population Fund

- The UN Population Fund (UNFPA) started operations in 1969 to assume a leading role within the UN system in promoting population programs, based on the human right of individuals and couples to freely determine the size of their families.
- At the International Conference on Population and Development (Cairo, 1994), its mandate was fleshed out in greater detail, to give more emphasis to the gender and human rights dimensions of population issues, and UNFPA was given the lead role in helping countries carry out the Conference's Programme of Action.
- **The three key areas of the UNFPA mandate are reproductive health, gender equality, and population and development.**
- World Population Day is observed annually on 11 July. It marks the date, in 1987, when the world's population hit the 5 billion marks.

5. Correct Option: (a)

Explanation:

Approaches to Human Development

- There are four approaches to human development viz. Income Approach, Welfare Approach, Basic Needs Approach, and Capability Approach.
- **Income Approach** is one of the oldest approaches to human development. Human development is seen as being linked to income. The idea is that the level of income reflects the level of freedom an individual enjoys. Higher the level of income, the higher is the level of human development.
- **Welfare Approach** looks at human beings as beneficiaries or targets of all development activities. The approach argues for higher government expenditure on education, health, social secondary and amenities. People are not participants in development but only passive recipients. The government is responsible for increasing levels of human development by maximizing expenditure on welfare.
- **Basic Needs Approach was initially proposed by the International Labour Organisation (ILO).** Six basic needs i.e.: health, education, food, water supply, sanitation, and housing were identified. The question of human choices is ignored and the emphasis is on the provision of basic needs of defined sections.
- **Capability Approach is associated with Prof. Amartya Sen.** Building human capabilities in the areas of health, education and access to resources is the key to increasing human development.

6. Correct Option: (b)

Explanation:

Crop Productivity and Intensity

- Crop Intensity refers to raising a number of crops from the same field during one agriculture year. The arable land can hardly be stretched further in countries like India. Therefore, it is essential to produce more than one crop in a year. The optimum agricultural use of land is termed as crop intensity.
- Crop Intensity = Gross Cropped Area/Net Sown Area x100.
- **The present cropping intensity of India is 136%.**
- Crop productivity means the amount of production of crops per hectare or per worker.
- **In the areas of extensive agriculture, per worker productivity is high whereas in the areas of intensive agriculture, per hectare productivity is high**.
- But, India is lagging behind under both these conditions, as the agricultural practices have not developed sufficiently. Moreover, per worker and per hectare productivity is high only in the Green revolution confined areas.

7. Correct Option: (d)

Explanation:

Double-Cropping Agriculture

- **This practice involves the cultivation of two crops in rotation in a year.**
- **It is prevalent in those areas where there is adequate rainfall or proper facility of irrigation.**
- Its main aim is to maintain the fertility of the soil. Therefore, usually, the second crop grown is a nitrogen-fixing leguminous crop.

8. Correct Option: (c)

Explanation:

Specialized Cultivations

- **Moriculture is the science of mulberry cultivation for silk production.**
- **Mariculture is the commercial production of ocean or sea organisms (shrimps, oysters, etc.).**
- **Silviculture is the practice of controlling the establishment, growth, composition, health, and quality of forest.**
- Vermiculture is the rearing of earthworms for increasing agricultural production.
- Apiculture is the rearing of honeybees for the production of honey.
- Pisciculture/aquaculture is the trade-oriented breeding of fish.

9. Correct Option: (d)

Explanation:

State-wise Crude Oil Production Trends (Figures in Thousand Metric Tonnes) in 2015-16

- **Rajasthan: 8601.59**
- **Gujarat: 4460.92**
- **Assam: 4185.13**
- **Andhra Pradesh: 294.79**
- **Tamil Nadu: 260.99**
- **Arunachal Pradesh: 57.33**

10. Correct Option: (c)

Explanation:

Types of agriculture and their main location

- Based on methods of farming, different types of crops are grown and livestock raised. The following are the main agricultural systems.
- **Subsistence Agriculture:** Subsistence agriculture is one in which the farming areas consume all, or nearly so, of the products locally grown. It can be grouped into two categories — Primitive Subsistence Agriculture and Intensive Subsistence Agriculture. Primitive subsistence agriculture or shifting cultivation is widely practiced by many tribes in the tropics, especially in Africa, south and central America and southeast Asia. **Intensive Subsistence Agriculture is largely found in densely populated regions of monsoon Asia.**
- Plantation Agriculture: Plantation agriculture was introduced by the Europeans in colonies situated in the tropics. Some of the important plantation crops are tea, coffee, cocoa, rubber, cotton, oil palm, sugarcane, bananas, and pineapples, etc.
- **Extensive Commercial Grain Cultivation:** Commercial grain cultivation is practiced in the interior parts of semi-arid lands of the midlatitudes. Wheat is the principal crop, though other crops like corn, barley, oats, and rye are also grown. **This type of agriculture is best developed in Eurasian steppes, the Canadian and American Prairies, the Pampas of Argentina, the Velds of South Africa, the Australian Downs and the Canterbury Plains of New Zealand.**
- Mixed Farming: This form of agriculture is found in the highly developed parts of the world, e.g. North-western Europe, Eastern North America, parts of Eurasia and the temperate latitudes of Southern continents
- **Dairy Farming: There are three main regions of commercial dairy farming. The largest is North Western Europe the second is in Canada and the third belt includes South Eastern Australia, New Zealand, and Tasmania.**
- **Viticulture**: Viticulture or grape cultivation is a specialty of the **Mediterranean region.** Best quality wines in the world with distinctive flavors are produced from high-quality grapes in various countries of this region. The inferior grapes are dried into raisins and currants. This region also produces olives and figs.
- Market Gardening and Horticulture: Market gardening and horticulture specialize in the cultivation of high-value crops such as vegetables, fruits, and flowers, solely for the urban markets. This type of agriculture is well developed in densely populated industrial districts of north-west Europe, northeastern United States of America and the Mediterranean regions. The Netherlands specializes in growing flowers and horticultural crops especially tulips, which are flown to all major cities of Europe.
- Co-operative Farming: In this type, a group of farmers form a co-operative society by pooling in their resources voluntarily for

more efficient and profitable farming. Co-operative movement originated over a century ago and has been successful in many western European countries like Denmark, Netherlands, Belgium, Sweden, Italy, etc. In Denmark, the movement has been so successful that practically every farmer is a member of a co-operative.

- Collective Farming: The basic principle behind these types of farming is based on social ownership of the means of production and collective labor. Collective farming or the model of Kolkhoz was introduced in the erstwhile Soviet Union

11. Correct Option: (a)

Explanation:

Cost per MW production from renewable resources

- According to the Ministry of New and Renewable Energy website, the cost per MW production from the renewable resources are-
  - **Rs 30.0 Cr for Geothermal**
  - **Rs 25.0 Cr for Solar Thermal**
  - Rs 7.35 Cr for Hydro
  - **Rs 6.91 Cr for Solar PV**
  - **Rs 6.03 Cr for Wind**

12. Correct Option: (b)

Explanation:

Hydroelectric power plants in Jammu & Kashmir and Ladakh Union Territories

- Being a Himalayan UTs, Both Jammu & Kashmir and Ladakh have a lot of potential for hydroelectric power.
- Under NHPC, various power plants have been set up.
- **These are Salal, Uri-I & Uri-II, Dulhasti, Sewa-I & Serwa-II, and Kishanganga in J&K.**
- **Nimmo-Bazgo, and Chutak are in Leh, Ladakh.**
- **Rangit is in Sikkim.**

13. Correct Option: (a)

Explanation:

Bio-gas

- Biogas is a renewable energy source. It refers to a mixture of different gases produced by the breakdown of organic matter in the **absence of oxygen.**
- Biogas can be produced from raw materials such as agricultural waste, manure, municipal waste, plant material, sewage, green waste or food waste. Biogas can be produced by anaerobic digestion with anaerobic organisms, which digest material inside a closed system, or fermentation of biodegradable materials.
- **Biogas is primarily methane (CH4) and carbon dioxide (CO2)** and may have small amounts of hydrogen sulfide (H2S), moisture and siloxanes.
- It can be compressed like CNG called Bio-CNG. Bio-CNG is a cheaper, cleaner and then conventional diesel. Vehicles can run solely on gas (dedicated), or on both diesel and gas (dual-fuel).

14. Correct Option: (b)

Explanation:

Nuclear Power Plants in India

- Kaiga is in Karnataka.
- Chutka is a proposed nuclear plant in Madhya Pradesh.
- Kalpakkam is located in Tamil Nadu.
- Kovvada Atomic Power Project is a proposed nuclear power station in Andhra Pradesh.

15. Correct Option: (b)

Explanation:

Thorium and Uranium

- **Thorium is more abundant in nature** than uranium.
- **It is fertile rather than fissile, and can only be used as a fuel in conjunction with a fissile material such as recycled plutonium.**
- Thorium fuels can breed fissile uranium-233 to be used in various kinds of nuclear reactors.
- Uranium can be used directly in reactors whereas Thorium would go through a three-stage process only then it can be put into reactor assembly.
- **Uranium-fuelled reactors can be built right away, but they use fuel inefficiently.** Thorium-fuelled reactors, on the other hand, are fuel-efficient, almost perfectly.
- India has one of the world's largest thorium reserves.

16. Correct Option: (c)

Explanation:

Nuclear Power plants in India

- **Kudankulam Nuclear Power Plant** is located in the Tamil Nadu, Southern India. It is the highest-capacity nuclear plant in India, with a total of 2,000MW currently installed with a further 2,000MW under construction.
- The **Tarapur Nuclear Reactor** in Maharashtra, Western India is the oldest nuclear facility in India, having commenced commercial operations in 1969.
- The reactor is currently the second most powerful in India, with two BHWR of 160MW and two PHWR reactors of 540MW forming a total of 1,400MW.
- **Kalapakkam Nuclear Power Plant** in Tamil Nadu first began operating in 1984 and currently has two 235MW reactors, with two more reactors of 500MW and 600MW to be added at a later date.
- Kalapakkam has a prototype fast breeder reactor (PFBR) which does not produce highly radioactive nuclear waste and can produce 70% more energy.
- The reactor survived the Vardah cyclone when winds of up to 90mph hit Tamil Nadu province in December 2016.
- The **Kakarapar Atomic Power Plant** in Gujarat, Western India has two PHWR reactors with a total installed capacity of 440MW. The two reactors were completed in May 1993 and September 1995 respectively.
- The plant was shut down for 66 days in 1998 due to a leak in its water systems, but it recovered to be awarded the best PHWR in its class by the CANDU owners group in January 2003.
- The plant also received a successful 'heart transplant' in September 2018 when all of its coolant channel and feeder tubes at the core of its reactor were replaced.

17. Correct Option: (d)

Explanation:

Uranium and Nuclear

- Global uranium production increased by 40% between 2004 and 2013, mainly because of increased production by Kazakhstan, the world's leading producer.
- As of December 2015, 65 nuclear reactors were under construction with a total capacity of 64 GW.
- Two-thirds (44) of the units under construction are located in three countries: **China, India and Russia**.
- Currently there are more than 45 Small Modular Reactors designs under development and four reactors under construction.

18. Correct Option: (b)

Explanation:

Shale Gas

- Shale gas refers to **natural gas that is trapped within shale** formations**. Shales are fine-grained sedimentary rocks that can be rich sources of petroleum and natural gas.**
- Over the past decade, the combination of horizontal drilling and hydraulic fracturing has allowed access to large volumes of shale gas that were previously uneconomical to produce. The production of natural gas from shale formations has rejuvenated the natural gas industry in the United States.
- Of the natural gas consumed in the United States in 2009, 87% was produced domestically; thus, the supply of natural gas is not as dependent on foreign producers as

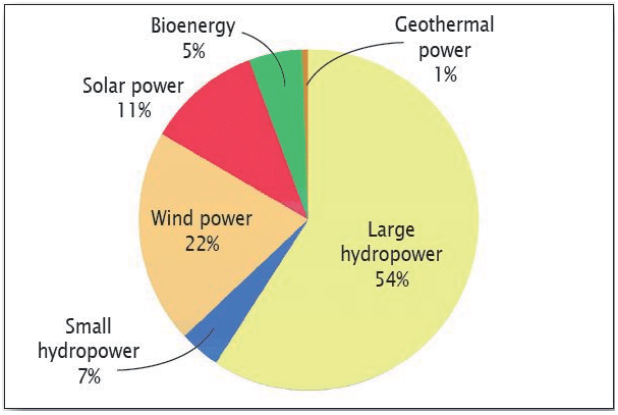
is the supply of crude oil, and the delivery system is less subject to interruption. **The availability of large quantities of shale gas will further allow the United States to consume a predominantly domestic supply of gas.**

- According to the EIA Annual Energy Outlook 2011, the United States possesses 2,552 trillion cubic feet (Tcf) of potential natural gas resources. Natural gas from shale resources, considered uneconomical just a few years ago, accounts for 827 Tcf of this resource estimate, more than double the estimate published last year.
- **At the 2009 rate of U.S. consumption (about 22.8 Tcf per year), 2,552 Tcf of natural gas is enough to supply approximately 110 years of use**. Shale gas resource and production estimates increased significantly between the 2010 and 2011 Outlook reports and are likely to increase further in the future.
- Natural gas is cleaner-burning than coal or oil. The combustion of natural gas emits significantly lower levels of key pollutants, including carbon dioxide (CO2), nitrogen oxides, and sulfur dioxide, than does the combustion of coal or oil.
- However, there are some potential environmental issues that are also associated with the production of shale gas. **Shale gas drilling has significant water supply issues**. The drilling and fracturing of wells requires large amounts of water. In some areas of the country, significant use of water for shale gas production may affect the availability of water for other uses, and can affect aquatic habitats.

19. Correct Option: (a)

Explanation:

Consumption of Renewable Energy in the World



20. Correct Option: (c)

Explanation:

Cotton Production in China

- China is the world's largest cotton producer, consumer and importer, and **Xinjiang is China's largest cotton producing area.**
- The cotton production in Xinjiang is directly related to the income level of local farmers and also plays an important role in the development of the whole cotton industry.
- **Xinjiang is situated in an arid region, and all agriculture in Xinjiang depends on irrigation**. With the development of urbanization in Xinjiang water resources have become polluted.
- Meanwhile, as a result of climate change and the decrease in the availability of the fresh water in Xinjiang, the shortage of water for agriculture becomes increasingly serious. Thus, there is a continuing need for agriculture to reduce its water use rate.
- **A mulched drip irrigation technique has been proven a great success**.
- Since 2000, the cotton planting area in Xinjiang has shown a fluctuating and increasing trend. Encouraged by the increase of cotton price and government subsidies, the cotton planting area increased significantly after 2017, and the cotton planting area almost reached a maximum.
- The total cotton planting area in Xinjiang will be 2×106ha in 2020. In 2020 the estimated maximum amount of water available for agriculture will be 4.95×1010m3and the available water per unit area for cotton will be approximately 3860 m3/ha.

21. Correct option: (d)

Explanation

- All the above statements are correct

Supplementary notes

Bharat Biotech Launches New Rotavirus Vaccine to Tackle Diarrhoea

- Rotovac 5D has been developed with close coordination with the Department of Biotechnology.
- Earlier, Bharat Biotech had originated ROTAVAC and now they have upgraded their already available oral vaccine to ROTAVAC 5D.

- The roll-out of oral rotavirus vaccine is also the lowest dose-volume rotavirus vaccine in the world.
- Along with the reduction in dosage, they have also made the oral vaccine low cold chain proof. This has resulted in making the vaccine stable at 2-degree to 8-degree Celsius for up to 24 months.
- Globally, rotavirus causes approximately 200,000 deaths and about 2 million hospitalizations annually, mostly in low-income countries.
- Currently, ROTAVAC 5D is being supplied in seven countries including India and 50 more countries have registered for it.

What is rotavirus?

- Rotavirus is a virus that infects the bowels, causing a severe inflammation of the stomach and bowels (known as gastroenteritis). It is a very contagious virus that causes diarrhea.
- Rotavirus is the most common cause of severe diarrhea among infants and children throughout the world and causes the death of about 500,000 children worldwide annually.
- The name rotavirus comes from the characteristic wheel-like appearance of the virus when viewed by electron microscopy.

22. Correct option: (d)

Explanation

- COP 25 will take place from 2-13 December, in Madrid, Spain.

Supplementary notes

Climate Emergency CoP 25: Climatic tipping point is closer than we think

- The 2019 United Nations Climate Change Conference, also known as COP25, is the 25th United Nations Climate Change conference.
- It was held in Madrid, Spain, under the presidency of the Chilean government.
- The conference incorporates the 25th Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC), the 15th meeting of the parties for the Kyoto Protocol (CMP15), and the second meeting of the parties for the Paris Agreement.

Why climate emergency?

- In the climate lexicon, tipping points are thresholds beyond which certain impacts can no longer be avoided even if temperatures are brought down later. Examples include the loss of the Amazon rainforest or of the West Antarctic ice sheet.
- Recent IPCC reports, including last year's Global Warming of 1.5°C and this year's Special Report on the Ocean and Cryosphere in a Changing Climate, suggest that tipping points could be exceeded even between 1 and 2 °C of warming.
- This is worrying as we are on track to a 3.2 degree warmer world, suggests the UNEP's Emissions Gap Report.
- The report addresses biosphere tipping points such as Amazonian deforestation, which can trigger abrupt carbon releases into the atmosphere, amplify climate change and reduce remaining emission budgets.

23. Correct option: (b)

Explanation

- India is not a member of NATO

Supplementary notes

- NATO is an alliance of 28 countries bordering the North Atlantic Ocean.
- It includes the United States, most European Union members, Canada, and Turkey.
- NATO is an acronym for the North Atlantic Treaty Organization.
- The United States contributes three-fourths of NATO's budget.
- NATO's mission is to protect the freedom of its members. Its targets include weapons of mass destruction, terrorism, and cyber-attacks.
- If the stability is threatened, NATO would defend non-members.
- NATO's headquarters are located in Haren, Brussels, Belgium.
- Each member designates an ambassador to NATO.
- The founding members of NATO signed the North Atlantic Treaty on April 4, 1949.
- It worked in conjunction with the United Nations, the World Bank, and the International Monetary Fund.
- NATO's primary purpose was to defend member nations from threats by communist countries.

24. Correct option: (d)

Explanation

- India's first hybrid annuity model (HAM) based 14 MLD sewage treatment plant (STP) has been inaugurated in Sarai, Haridwar, Uttarakhand.

Supplementary notes

Sarai Sewage Treatment Plant

- **India's first hybrid annuity model (HAM)** based 14 MLD sewage treatment plant (STP) has been inaugurated in Sarai, Haridwar, Uttarakhand.
- The project has been developed **under the Namami Gange project of National Mission for Clean Ganga** (NMCG).
- In order to **improve the quality of water in the river Ganga** in Uttarakhand, 34 projects of sewerage infrastructure works have been taken up at a cost of approximately Rs 1,144.77 crore for creating treatment capacity of 165.50 MLD and laying sewerage network of 152 km.
- Once all these projects are commissioned, the entire sewage capacity of Uttarakhand will be met and there will be a substantial improvement in the quality of water of the river Ganga.
- Namami Gange – National Mission for Clean Ganga is an **Integrated Conservation Mission (ICM), approved as 'Flagship Programme'** with budget outlay of Rs.20,000 Crore.

25. Correct Answer (a)

Explaination:

- **B, C and D are incorrect:**
- Constitutional (101st Amendment) Act is about GST.
- Constitutional (102nd Amendment) Act provides constitutional status to the National Commission for Backward Classes (NCBC).
- Constitutional (104th Amendment) Act provides reservation to socially and educationally backward sections

Supplementary Notes

- **William Hunter and Jyotirao Phule in 1882** originally conceived the idea of caste-based reservation system.
- The reservation system that exists today, in its true sense, was introduced in **1933 when British Prime-Minister Ramsay Macdonald** presented the **'Communal Award'**.
- The award made provision for separate electorates for Muslims, Sikhs, Indian Christians, Anglo-Indians, Europeans and the Dalits.
- After long negotiations, Gandhi and Ambedkar signed the **'Poona Pact'**, where it was decided that there would be a single Hindu electorate with certain reservations in it.
- After independence, initially reservations were provided only for SCs and STs.
- OBCs were included in the ambit of reservation in 1991 on the recommendations of **the Mandal Commission.**
- In the **Indra Sawhney Case of 1992**, the Supreme Court while upholding the **27 percent quota** for backward classes, struck down the government notification reserving 10% government jobs for economically backward classes among the higher castes.
- Supreme Court in the same case also upheld the principle that the combined reservation beneficiaries should not exceed 50 percent of India's population.
- The concept of 'creamy layer' also gained currency through this judgment and provision that reservation for backward classes should be confined to initial appointments only and not extend to promotions.
- Recently, the Constitutional (103rd Amendment) Act of 2019 has provided 10% reservation in government jobs and educational institutions for the "economically backward" in the unreserved category.
- The Act amends Articles 15 and 16 of the Constitution by adding clauses empowering the government to provide reservation on the basis of economic backwardness.
- This 10% economic reservation is over and above the 50% reservation cap.

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TEST
DAY - 28

Time Allowed: 30 mins **Maximum Marks: 50**

1. Which of the following pairs regarding ore/minerals of elements is/are correctly matched?

1. Pitchblende: Uranium
2. Coffinite: Thorium
3. Wolframite: Tungsten

Select the correct option using the codes given below:

(a) 1 and 3 only
(b) 3 only
(c) 1 and 2 only
(d) 1, 2 and 3

2. Which of the following is the biggest coal mine in the world?

(a) North Antelope Rochelle, USA
(b) Haerwusu Coal Mine, China
(c) Peak Downs coal mine
(d) Raspadskaya, Russia

3. Arrange the following states into *increasing order* of the graphite reserves in India:

1. Arunachal Pradesh
2. Jharkhand
3. Odisha
4. Tamil Nadu

Select the correct option using the codes given below:

(a) 1-2-4-3
(b) 1-4-3-2
(c) 4-2-3-1
(d) 4-1-3-2

4. Consider the following statements:

1. Apatites are the most common source of Phosphate.
2. Phosphorites are the rock phosphate.
3. Apatites can be igneous, metamorphic, or sedimentary rocks.

Which of the above statements is/are correct?

(a) 1 and 3 only
(b) 2 only
(c) 2 and 3 only
(d) 1, 2 and 3

5. What is/are the uses of the foundry industry?

1. Infrastructure development
2. Farm machinery products productions
3. Textile industry

Select the correct option using the codes given below:

(a) 1 and 3 only
(b) 3 only
(c) 1 and 2 only
(d) 1, 2 and 3

6. Consider the following pairs:

Zones:	***Headquarters***
1. North Frontier Railway:	Siliguri
2. North Eastern Railway:	Guwahati
3. South Central Railway:	Secunderabad
4. North Western Railway:	Jaipur

Which of the above pair are ***incorrectly*** matched?

(a) 1, 2 and 3 only

(b) 2 and 3 only

(c) 3 and 4 only

(d) 1, 3 and 4 only

7. Consider the following pairs regarding Steel Companies in Public Sector and their locations:

1. Rashtriya Ispat Nigam Ltd: Visakhapatnam
2. Steel Authority of India Ltd: Burnpur
3. National Mineral Development Corporation: Bastar

Which of the above pairs is/are correctly matched?

(a) 1 only

(b) 2 only

(c) 3 only

(d) 1,2 and 3

8. Consider the following statements regarding cement industry:

1. Cement is produced by the process known as Smelting.
2. India is the second-largest producer of cement in the world.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

9. Consider the following pairs regarding types of glasses and their compositions:

1. Soda glass: Sodium carbonate
2. Pyrex glass: Boron trioxide
3. Flint Glass: Potassium carbonate

Which of the above pairs is/are correctly matched?

(a) 1 only

(b) 1 and 3 only

(c) 3 only

(d) 1, 2 and 3

10. Match the following lists:

List-I ***(Revolution)***	***List-II*** ***(Cultivation)***
(A) Gray revolution	1. Cocoa
(B) Red revolution	2. Honey
(C) Brown revolution	3. Spices
(D) Golden revolution	4. Tomato

Select the correct answer from the codes given below the lists:

	A	B	C	D
(a)	2	3	4	1
(b)	3	4	1	2
(c)	4	2	1	3
(d)	4	1	2	3

11. Which of the following National Highways is *not* included in the Golden Quadrilateral?

(a) NH-1

(b) NH-2

(c) NH-4

(d) NH-8

12. Which of the following statements regarding the Cotton Textile Industry in India is/are correct?

1. India is the largest producer of both yarn and textile.
2. India is the second-largest exporter.
3. It is the largest consumer of cotton textiles.

Select the correct option using the codes given below:

(a) 1 and 3 only

(b) 3 only

(c) 2 only

(d) 1, 2 and 3

13. Pipeline infrastructure is an economical and safe mode of transportation. Consider the following statements in this regard:

1. Jagdishpur-Haldia-Bokaro-Dhamra Pipeline (JHBDPL) is being constructed by GAIL under the Pradhan Mantri Urja Ganga Project.
2. North Eastern Region (NER) Gas Grid is being constructed by Petroleum Conservation Research Association (PCRA) to connect NER with National Gas Grid.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

14. Which among the following statements regarding greenfield airport is correct?

1. Greenfield airports are such airports which are built on the previous used lands to cut carbon emission.
2. Rajeev Gandhi International Airport Hyderabad is the first greenfield airport in Asia.

Select the correct option using the codes given below:

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

15. Consider the following statements regarding solar power generation in India:

1. India is now producing world's cheapest solar power.
2. India is the world's second-largest producer of the solar power after China.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

16. Consider the following statements regarding the Census of India:

1. Census 2011 is the only source of primary data at village, town and ward level.
2. The decadal growth rate of 2001-2011 period was less than that of the 1991-2001 period.
3. While Uttar Pradesh is the most populous among the state, Bihar is the state with highest density.

Which of the following statements is/are correct?

(a) 2 and 3 only
(b) 1 and 3 only
(c) 3 only
(d) 1, 2 and 3

17. Mesabi Range in USA, Quebec in Canada, Normandy in France, etc. are famous for which of the following mineral?

(a) Coal
(b) Iron
(c) Gold
(d) Uranium

18. Consider the following statements regarding Fish production in India:

1. India is the second largest fish producer in the world.
2. India is the largest producer of inland fish in the world.
3. Marine fishing in India is more on the West Coast than the East Coast.

Which of the following statements is/are ***incorrect***?

(a) 1 and 3
(b) 3 only
(c) 2 and 3 only
(d) 2 only

19. Which one of the following routes is the greatest and busiest ocean route in the world?

(a) North Atlantic Route

(b) Cape of Good Hope route

(c) West Coast North America route

(d) Trans-Pacific route

20. Consider the following statements regarding mineral production in India:

1. India's richest haematite deposits, located in Barabil-Koira valley, are situated in Jharkhand.
2. Madhya Pradesh has become the largest producer of copper in India.
3. India is a major producer of silver in the World.

Which of the following statements is/are ***incorrect***?

(a) 1 and 2 only

(b) 2 only

(c) 1 and 3 only

(d) 2 and 3 only

21. With reference to Mahila Kisan Sashaktikaran Pariyojana, consider the following statements

1. Ministry of women and child development will be implementing the scheme.
2. Aim is to empower women in agriculture by making systematic investments to enhance their participation and productivity.
3. More than 80% of rural women are engaged in agriculture activities for their livelihoods.

Which of the following statement is/are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

22. With reference to Small Finance Banks, consider the following statements

1. Minimum capital net worth requirement shall be Rs 200 crore in general.
2. SFBs will be given scheduled bank status immediately upon commencement of operations
3. Payments Banks can apply for conversion into SFB after five years of operations.

Which of the following statement is/are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

23. Industrial Code 2019 that was in news recently introduced in the Parliament seeks to replace which of the following laws

(a) Industrial Disputes Act, 1947, Trade Unions Act, 1926, and Industrial Employment (Standing Orders) Act, 1946

(b) Insolvency code 2016, Trade Unions Act, 1926, and Industrial Employment (Standing Orders) Act, 1946

(c) Minimum Wages Act, 1948, Insolvency code 2016 and Trade Unions Act, 1926

(d) Payment of Bonus Act, 1965, Industrial Disputes Act, 1947 and Trade Unions Act, 1926

24. Which of the following is/are earth observatory satellite(s)?

1. CartoSat 3
2. ResourceSat
3. RISAT
4. OceanSat

Choose the correct option

(a) 1 only

(b) 2 only

(c) 1, 2 and 3 only

(d) 1, 2, 3 and 4

25. With reference to Mega Food Park Scheme, consider the following statements

1. The Mega Food Park Scheme is based on "Cluster" approach
2. The Mega Food Park project is implemented by a Special Purpose Vehicle (SPV) which is a Body Corporate registered under the Companies Act.

Which of the following statement is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

****

ANSWER HINTS

DAY - 28

1. Correct Option: (a)

Explanation:

Ores and Minerals

- Tungsten is a valuable metal whose chief ore is wolframite.
- The primary uranium ore mineral is uraninite or, pitchblende. Other important ores include carnotite, coffinite tyuyamunite, torbernite and autunite, etc.
- Thorium is obtained from thorite, thorianite, and monazite.

2. Correct Option: (a)

Explanation:

Biggest coal mines in the world

- The USA has the largest coal reserve in the world but, it is the second-largest producer and consumer after China.
- Three of the world's ten biggest coal mines by reserve are located in the Powder River Basin in Wyoming, USA of which the **North Antelope Rochelle Mine** is the world largest.
- Haerwusu Coal Mine, China is the second largest. It is is located in the Inner Mongolia Autonomous Region of China in which Hei Dai Gou coal mine is also located.

3. Correct Option: (c)

Explanation:

Graphite resources in India

- Graphite, also known as plumbago or blacklead or mineral carbon, is a stable form of naturally occurring carbon.
- As per the Indian bureau of mines, **Arunachal Pradesh accounts for 37% of the total resources which is followed by the undivided Jammu & Kashmir (32%), Odisha (9.7%), Jharkhand (9%) and Tamil Nadu (4%).**
- However, in terms of reserves, Jharkhand has the leading share of about (52%) followed by Tamil Nadu (42%) and Odisha (6%).
- Jharkhand was the leading producing state contributing 56% to the total output during 2017- 18, followed by Odisha and Kerala.

4. Correct Option: (c)

Explanation:

Apatite and Rock Phosphate

- Apatite is the most abundant crystalline phosphate mineral found as an accessory mineral in practically all kinds of **igneous** rocks. It also occurs in **metamorphic** rocks and as a secondary mineral in phosphatic rocks of **sedimentary** origin**. It is a group of phosphate minerals,** usually referring to Hydroxylapatite, Fluorapatite, and Chlorapatite.
- **Rock phosphates or phosphorites are sedimentary phosphatic deposits** comprising fine-grained mixture of various calcium phosphates, most important being hydroxyl-apatite, carbonate-apatite, fluorapatite and their solid solutions. **About 80% phosphate production in the world is derived from phosphate rocks (phosphorite)** containing one or more phosphatic minerals, usually calcium phosphate of sufficient purity and quantity to permit its use directly or after concentration in manufacturing commercial products.

5. Correct Option: (d)

Explanation:

Foundry industry

- Foundries are facilities that produce **metal castings** and offer casting-related services
- In simplified terms, a foundry is a factory where castings are produced by melting

metal, pouring liquid metal into a mold, then allowing it to solidify.

- **Foundries don't just produce metal products for engine, railroad, or pipe components. They also form components for machines that are required to make many of the essential consumer products we depend on. 90 percent of all manufactured goods rely on metal castings.**
- **The Indian foundry industry manufacturers metal cast components for applications in Auto, Tractor, Railways, Machine tools, Sanitary, Pipe Fittings, Defence, Aerospace, Earth Moving, Textile, Cement, Electrical, Power Machinery, Pumps / Valves, Wind turbine generators, etc.**

6. Correct Option: (c)

Explanation:

Indian Railway Zone and their Headquarters

Railway Zone	*Zonal Headquarters*
Central Railway	Mumbai
Eastern Railway	Kolkata
East Central Railway	Hajipur
East Coast Railway	Bhubaneshwar
Northern Railway	New Delhi
North Central Railway	Allahabad
North Eastern Railway	**Gorakhpur**
North Frontier Railway	**Guwahati**
North Western Railway	**Jaipur**
Southern Railway	Chennai
South Central Railway	**Secunderabad**
South Eastern Railway	Kolkata
South East Central Railway	Bilaspur
South Western Railway	Hubli
Western Railway	Mumbai CST
West Central Railway	Jabalpur

7. Correct Option: (d)

Explanation:

Steel Companies in Public Sector

- Steel Authority of India Ltd (SAIL): SAIL is a Public Sector Company that operates five integrated steel plants at Bhilai in Chhattisgarh, Bokaro in Jharkhand, Durgapur & **Burnpur in West Bengal** and Rourkela in Odisha. It has three special and alloy steel plants viz Alloy Steel Plant at Durgapur (West Bengal), Salem Steel Plant at Salem (Tamil Nadu) & Visvesvaraya Iron & Steel Plant at Bhadravati (Karnataka).
- Rashtriya Ispat Nigam Ltd (RINL): Visakhapatnam Steel Plant (VSP) of RINL is the first shore-based integrated steel plant located at **Visakhapatnam** in Andhra Pradesh.
- National Mineral Development Corporation (**NMDC**): NMDC is setting up a 3.0 MTPA Greenfield Integrated Steel Plant at Nagarnar, Bastar District in **Chhattisgarh**.

8. Correct Option: (b)

Explanation:

Cement Industry

- The cement is made by heating limestone (calcium carbonate) with other materials (such as clay) in a kiln, in a process known as **calcination** that liberates a molecule of carbon dioxide from the calcium carbonate to form calcium oxide, or quicklime, which then chemically combines with the other materials in the mix to form calcium silicates and other cementitious compounds.
- China produces the most cement globally by a large margin, at an estimated 2.4 billion metric tons in 2018, followed by India at 29 million metric tons in 2019.

9. Correct Option: (d)

Explanation:

Ores and Minerals

- Glass is a non-crystalline, transparent amorphous solid. Silicon dioxide (SiO_2) is a common fundamental constituent of glasses.
- Soda glass is the most common glass. It is used in making tube light, bottles, equipment of laboratory, daily useable domestic utensils, etc.
- The composition of few types of glasses are as follows:

Types	Composition
Soda Glass	Sodium Carbonate, Calcium Carbonate and Silica

Flint Glass	Potassium Carbonate, silica, lead oxide
Potash Glass	Potassium Carbonate, Calcium Carbonate and Silica
Pyrex Glass	boron trioxide, Silica, soda, and alumina

10. Correct Option: (b)

Explanation:

Major agricultural revolutions in India are as follows:

- **Gray revolution: For spices production**
- **Red revolution: For meat/tomato production**
- **Blue revolution: For fish production**
- Black revolution: For petroleum production
- **Brown Revolution: For leather/cocoa production**
- White Revolution: For milk and dairy production
- Silver Revolution: For eggs and paltry production, etc.
- Golden Revolution: For honey production.

11. Correct Option: (a)

Explanation:

Golden Quadrilateral

- The Golden Quadrilateral (GQ) is a national highway network connecting most of the major industrial, agricultural and cultural centers of India. It forms a quadrilateral connecting the four major metro cities of India. It is India's longest and World's fifth-longest road network.
- The four sections of the Golden Quadrilateral.
- Section I: This covers **National Highway 2** from Delhi to Kolkata. Total stretch is 1454 km. States covered are Delhi, Haryana, Uttar Pradesh, Bihar, Jharkhand and West Bengal. Major cities include Delhi, Mathura, Faridabad, Agra, Allahabad, Firozabad, Kanpur and Varanasi.
- Section II: This covers NH6 from Kolkata to Chennai, NH60 (Kharagpur to Balasore) and NH5 (Balasore to Chennai). Total stretch is 1684km. States include West Bengal, Andhra Pradesh, Orissa and Tamil Nadu.
- Section III: Total stretch is 1,290km. It covers parts of **NH4** (Mumbai to Bangalore), NH7 (Bangalore to Krishnagiri, Tamil Nadu) and NH46 (Krishnagiri to nearby Chennai). States include Maharashtra, Karnataka, Andhra Pradesh and Tamil Nadu.
- Section IV: Covering parts of **NH8** (Delhi to Kishangarh), NH 79A (Ajmer bypass), NH 79 (Nasirabad to Chittaurgarh) and NH 76 (Chittaurgarh to Udaipur), the stretch is 1,419km. States include Maharashtra, Gujarat, Rajasthan, Haryana and New Delhi. Major cities connected are Delhi, Ajmer, Udaipur, Gurgaon, Jaipur, Gandhinagar, Ahmedabad, Vadodara, Surat and Mumbai.

12. Correct Option: (c)

Explanation:

Cotton Textile Industry in India

- India is the world's largest cotton producer, accounting for 38% of global cotton acreage and 23% of global cotton production. The biggest producers are India, China and the USA, followed by Pakistan, Brazil and Uzbekistan.
- India is also the second largest exporter (after the USA) and the second largest consumer (after China).
- **But, as far as finished cotton textiles are concerned, China is the largest producing and exporting country in the world.**

13. Correct Option: (a)

Explanation:

Pipelines

- Pipeline infrastructure is an economical and safe mode of transporting natural gas, coal, iron ore etc. by connecting sources to consuming markets.
- The gas pipeline grid determines the structure of the gas market and its development. Therefore, an interconnected National Gas Grid has been envisaged to ensure the adequate availability and equitable distribution of natural gas in all parts of the country.
- At present, there are about 16800 km long Natural Gas pipeline network which is operational in the country. In order to make available natural gas across the country, it has been envisaged to develop an additional about 14,300 km pipelines to complete the National Gas Grid.

- **Jagdishpur – Haldia/Bokaro – Dhamra Pipeline Project (JHBDPL) & Barauni-Guwahati Pipeline project (BGPL)**
- **GAIL is executing Jagdishpur-Haldia-Bokaro-Dhamra Pipeline (JHBDPL) of length 2,655 km and Barauni-Guwahati Pipeline of length 729 km under Pradhan Mantri Urja Ganga Project to connect Eastern India.**

North East Region (NER) Gas Grid

- A joint venture of five oil and gas CPSEs i.e. GAIL, IOCL, OIL, ONGC, and NRL named as "Indradhanush Gas Grid Ltd" (IGGL) has been entrusted to develop trunk pipeline connectivity in all North Eastern States i.e. Assam, Sikkim, Mizoram, Manipur, Arunachal Pradesh, Tripura, Nagaland and Meghalaya in a phased manner.
- The prime objective of these pipelines would be to transport the domestic natural gas produced in the northeast states and the same may first cater to the local requirements.
- It shall also connect the NER grid to the National Gas Grid.

14. Correct Option: (b)

Explanation:

Green Field Airports

- Greenfield airports are such airports which have certain environmental qualities (using previously undeveloped or empty greenfield land, for example) and commissioning, planning and construction processes that are generally carried out from scratch.
- **The Greenfield project means that a work which is not following a prior work. In infrastructure the projects on the unused lands where there is no need to remodel or demolish an existing structure are called Green Field Projects.**
- A brownfield, on the other hand, remodels or improves upon existing facilities.
- **Rajeev Gandhi International Airport in Hyderabad is the first greenfield airport in India and in Asia.**

15. Correct Option: (a)

Explanation:

Solar power in India

- The country's solar installed capacity reached 33.730 GW as of 31 December 2019.
- **India has the lowest capital cost per MW globally to install solar power plants.**
- As per the Economic Survey 2018-2019, India stands at **5th position** in terms of solar power globally.

16. Correct Option: (d)

Explanation:

Census of India

- Census 2011 is the 15th National Census of the country. **This is the only source of primary data at village, town and ward level.** It provides valuable information for planning and formulation of polices for Central & State Governments and is widely used by National & International agencies, scholars, business people, industrialists, and many more.
- According to the provisional population count released within four weeks of completing the Census, India's total population in 2011 was 1.21 billion, up from 1.03 billion in 2001, thus adding 181 million people in one decade.
- However, the **2001-2011 decadal growth rates of 17.6 %, compared to 21.5 recorded during 1991-2001**, suggests slowing down of growth. Interestingly, the enumerated population size was larger than most projections, including that of the Registrar General's office that projected the 2011 population to be 1.19 billion.
- India is now expected to become the most populous country of the world by 2030 overtaking China sooner than earlier expected.
- The State of **Uttar Pradesh with 199.6 million people is India's most populous state** accounting for 16.5% of country's population.

Ranking of States and Union Territories by Density: 2011 & 2001

Rank in 2011	1 State/ Union Territory	Density (per 2011)	Density (sq km) 2001	Rank in 2001
	India	382	325	
1.	NCT of Delhi	11,297	9,340	1
2.	NCT of Delhi	11,297	9,340	2
3.	Puducherry	2,598	2,034	3
4.	Daman & Diu	2,169	1,413	5
5.		2,013	1,895	4

6.	Bihar	1,102	881	7
7.	West Bengal	1,029	903	6
8.	Kerala	859	819	8
9.	Uttar Pradesh	828	690	9
10.	Dadra & N. Haveli	698	449	13
Lowest five				
1.	Nagaland	119	120	27
2.	Sikkim	86	76	32
3.	Mizoram	52	42	34
4.	Andaman & Nicobar Islands	46	43	33
5.	Arunachal Pradesh	17	13	35

17. Correct Option: (b)

Explanation:

Distribution of Iron

- Lake Superior Region— (Mainly haematite ores) **Mesabi Range**, Vermilion, Cuyuna, Gogebic, Menominee and Marquette Ranges.
- North-eastern Region—(Mainly Magnetite ores) Adirondacks region of New York and Cornwall area of Pennsylvania.
- South-western Region—(Both haematite and limonite ores) Birmingham and Alabama.
- Western Region—Utah (magnetite), Nevada, Wyoming (haematite) and California.
- Canada—Lake Superior Region, Labrador and **Quebec** (Haematite), the main centres being Schefferville and Wabush city. Newfoundland, British Columbia.
- Common Wealth of Independent State (CIS) — Near Moscow and at Krivoi Rog in the Ukraine (haematite ore); Siberia and the Urals region near Magnitogorsk; Kuzbas at Kustanay. Kursk Magnetic Anomaly—Lipetsk and Donbass.
- Sweden— Kiruna and Gallivare (Magnetite ores); Central Sweden—Dannemora and Grangeborg; Southern Sweden—Kopparberg.
- France— Lorraine (Siderite ores); **Normandy** in Pyrenees; and central Massif.
- Britain— Scunthorpe (Siderite ores) and Frodingham.
- Germany— Siegerland.
- Spain— Bilbao, Santander and Oviedo (haematite).
- Norway— Kirkenes.
- Finland—Jussaro in the Ekenas Archipelago.
- Austria— Erzberg (siderite) and Huttenburg in Karnten.
- Erstwhile Yugoslavia— North of Sarajevo and Zagreb and Banjalanka.
- China— Manchurian deposits at Anshan, Yangtze valley and in Hopei.
- India— Jharkhand and Orissa.
- South Africa— Postmasburg in Griqualand and Thabazimbi in the Transvaal (haematite).
- Liberia— BomiHtlls and Mt. Nimba.
- Mauritania— Zouerate.
- Australia— Western -Australia at Mt. Goldsworthy, Mt. Whaleback, Mt. Bruce, Mt. Tom Price and Yampi Sound; South Australia at Iron Knob.
- Brazil— Itabira and near Belo Horizonte in Minas Gerais.
- Venezuela— Guiana highlands at Cerro Bolivar and El Pau.
- Chile— Algarrobo in Central Chile.
- Peru— Nazca-Marcona area.

18. Correct Option: (d)

Explanation:

Fish Production in India

- India is the **second largest fish producer in the world** with a total production of 13.7 million metric tonnes in 2018-19 of which 65 per cent was from inland sector.
- India is also the **second largest producer of inland fish in the world**. Almost 50 per cent of inland fish production is from culture fisheries, which constitutes 6.5 per cent of global fish production.
- The sector has been showing a steady growth in the total gross value added and accounts for 5.23 per cent share of agricultural GDP.
- A new department called department of fisheries has been created out of the erstwhile department of Animal husbandary, dairying and fisheries.

Marine Fisheries

- It is estimated that **about 75 per cent of the marine fish landings are on the West coast and only 25 per cent is contributed by East coast.**
- It is worth mentioning here that Indian Ocean is the least exploited of all the oceans of the world so far as fishing is concerned.
- The important fish caught along the coast are shark, sardine, herring, anchovies, Mumbai duck, fly fish, ribbon fish, mackerel and Indian salmon.

19. Correct Option: (a)

Explanation:

North Atlantic Route

- It is the **greatest and the busiest ocean route**, with western terminal branches extending from central America to Hudson Bay and western terminals from the Mediterranean Sea to northern Scandinavia and north western Russia.
- The major ports of Western Europe are: London, Liverpool, Hamburg, Bremen, Bergen, Rotterdam, Amsterdam, the Hague, Le Havre, Brest, Nantes, Bilbao, Rome, Naples etc. Ports of North America include Halifax, Quebec, New York, Boston, Philadelphia, Baltimore, Galveston, New Orleans, Houston, etc.
- Countries bordering the North Atlantic have 62% of the registered gross tonnage of ocean going ships. This route connects regions of dense population, energetic people, enormous amount of capital, and the most technologically advanced countries of the world.

20. Correct Option: (c)

Explanation:

Minerals and India

- Odisha produces over 40 per cent iron ore of India. The most important deposits occur in Sundargarh, Mayurbhanj, Cuttack, Sambalpur, Keonjhar and Koraput districts. India's richest haematite deposits are located in Barabil-Koira valley.
- Madhya Pradesh has become the largest producer of copper in India surpassing Karnataka, Rajasthan and Jharkhand in succession. In the year 2011-12 the state produced 59.85 per cent of the total copper production of the country. The state is blessed with a fairly large belt in Taregaon area, in Malanjkhand belt of Balaghat district. This district has recoverable reserve of 84.83 million tonnes of copper ore having 1,006 thousand tonnes of metal. Reserves of moderate size are also found in Kherlibazar-Bargaon area of BetuI district. Some other areas are also reported to have copper ore reserves.
- Silver is another precious metal produced in India. It is valued next only to gold for making ornaments due to its softness and attractive white colour. It had been an important currency metal in several parts of the world. It is also used in the manufacture of chemicals, electroplating, photography and for colouring glass, etc. The chief ore minerals of silver are agentine, stephanite, pyrargyrite and proustite. It is found mixed with several other metals such as copper, lead, gold, zinc, etc. India is not a major producer of silver in the World. The main production comes from Zawar mines in Udaipur district of Rajasthan. Here, silver is obtained as a by-product during the concentration and smelting of galena ore in Hindustan Zinc Smelter.

21. Correct option: (b)

Explanation

- Department of Rural Development, Ministry of Rural Development is implementing Mahila Kisan Sashaktikaran Pariyojana (MKSP) to empower women in agriculture by making systematic investments to enhance their participation and productivity, as also to create and sustain their agriculture-based livelihoods.

Supplementary notes

Mahila Kisan Sashaktikaran Pariyojana

- Rural women form the most productive work force in the economy of majority of the developing nations including India. More than 80% of rural women are engaged in agriculture activities for their livelihoods.
- About 20 per cent of farm livelihoods are female headed due to widowhood, desertion, or male emigration. Agriculture support system in India strengthens the exclusion of women from their entitlements as agriculture workers and cultivators.
- The "Mahila Kisan Sashaktikaran Pariyojana" (MKSP), a sub component of the Deendayal Antodaya Yojana-NRLM (DAY-NRLM) seeks to improve the present status of women in Agriculture, and to enhance the opportunities available to empower her.
- MKSP recognizes the identity of "Mahila" as "Kisan" and strives to build the capacity

of women in the domain of agro-ecologically sustainable practices. It has a clear vision to reach out to the poorest of poor households and expand the portfolio of activities currently handled by the Mahila Kisan.

- The focus of MKSP is on capacitating smallholders to adopt sustainable climate resilient agro-ecology and eventually create a pool of skilled community professionals.

Objective of the mission

- Its objective is to strengthen smallholder agriculture through promotion of sustainable agriculture practices such as Community Managed Sustainable Agriculture (CMSA), Non Pesticide Management (NPM), Zero Budget Natural Farming (ZBNF), Pashu-Sakhi model for doorstep animal care services, Sustainable regeneration and harvesting of Non-Timber Forest Produce.

Objectives of MKSP

- To enhance the productive participation of women in agriculture;
- To create sustainable agricultural livelihood opportunities for women in agriculture;
- To improve the skills and capabilities of women in agriculture to support farm and non-farm-based activities;
- To ensure food and nutrition security at the household and the community level;
- To enable women to have better access to inputs and services of the government and other agencies;
- To enhance the managerial capacities of women in agriculture for better management of bio-diversity;
- To improve the capacities of women in agriculture to access the resources of other institutions and schemes within a convergence framework.

22. Correct option: (d)

Explanation

- All the above statements are correct

Supplementary notes

Small Finance Banks

- **RBI releases guidelines for on-tap licensing of Small Finance Banks** in the private sector.
- The Reserve Bank of India (RBI) had last issued guidelines for licensing of Small Finance Banks in the private sector on 27 November 2014.
- Major changes from the earlier Guidelines on Small Finance Banks dated 27 November 2014, are:
  - ➤ The licensing window will be open on-tap;
  - ➤ **minimum paid-up voting equity capital** / net worth requirement shall be Rs 200 crore;
  - ➤ for Primary (Urban) Co-operative Banks (UCBs), desirous of voluntarily transiting into **Small Finance Banks (SFBs) initial requirement of net worth shall be at Rs 100 crore**, which will have to be increased to Rs 200 crore within five years from the date of commencement of business;
  - ➤ SFBs will be **given scheduled bank status** immediately upon commencement of operations;
  - ➤ SFBs will have general permission to open banking outlets from the date of commencement of operations;
  - ➤ Payments Banks can apply for conversion into SFB after five years of operations, if they are otherwise eligible as per these guidelines.

23. Correct Answer: (a)

Explanation:

- (a) is correct Answer

Supplementary Notes

- The Industrial Relations Code, 2019 seeks to replace three labour laws: (i) the Industrial Disputes Act, 1947, (ii) the Trade Unions Act, 1926, and (iii) the Industrial Employment (Standing Orders) Act, 1946.
- Seeks to allow companies to hire workers on fixed-term contract of any duration.
- Has retained the threshold on the worker count at 100 for prior government approval before retrenchment, but it has a provision for changing 'such number of employees' through notification.
- Provides setting up of a two-member tribunal (in place of one member) wherein important cases will be adjudicated jointly and the rest by a single member, resulting speedier disposal of cases.
- Has vested powers with the government officers for adjudication of disputes involving penalty as fines.
- Introduces a feature of 'recognition of negotiating union' under which a trade union will be recognized as sole

'negotiating union' if it has the support of 75% or more of the workers on the rolls of an establishment.

- As several trade unions are active in companies, it will be tough for any one group to manage 75% support, hence taking away their negotiating rights. In such a case, a negotiating council will be constituted for negotiation.
- Underlines that fixed-term employees will get all statutory benefits on a par with the regular employees who are doing work of the same or similar nature.
- Under the code, termination of service of a worker on completion of tenure in a fixed-term employment will not be considered as retrenchment.
- Proposes setting up of a "re-skilling fund" for training of retrenched employees. The retrenched employee would be paid 15 days' wages from the fund within 45 days of retrenchment.

24. Correct Answer (d)

Explanation:

- Option (d) is correct

Supplementary Notes

- The Earth-observation satellites also include the **ResourceSat** and **RISAT series**, the **OceanSat** series.
  - **The CartoSat series** is a part of the Indian Remote Sensing Programme.
  - The **ResourceSat** and **RISAT** series of satellites, for example, provide images and data that are needed for land and water resources applications.
  - The **OceanSat** series and the **SARAL** satellite, meanwhile, produce data on the oceans.
  - The satellites like **INSAT 3D, INSAT-VRR or Megha Tropiques** study the atmosphere.
- The CartoSat series is a part of the Indian Remote Sensing Programme.
- Till date, eight CartoSats have been launched.
- They were specifically launched for Earth's resource management and monitoring.
- **CartoSat-1** was launched by **PSLV-C6**, on May 5th 2005 from Sriharikota.
- **CartoSat-3** was originally planned to be launched on board PSLV during 2014. However, ISRO appears to launching additional satellites in the CartoSat-2 series through 2017, and ISRO's 2017 plans involve launching CartoSat 2D/2E in 2017. CartoSat-3 will now be launched on 27 November 2019.
- **CartoSat-3 is an advanced version with better spatial and spectral characteristics as compared to the CartoSat-2 series satellites**.

25. Correct option: (c)

Explanation

- Both the above statements are correct

Supplementary notes

Mega Food Park Scheme

- The Scheme of Mega Food Park aims at providing a mechanism to link agricultural production to the market by bringing together farmers, processors and retailers so as to ensure maximizing value addition, minimizing wastage, increasing farmers income and creating employment opportunities particularly in rural sector.
- The Mega Food Park Scheme is based on **"Cluster" approach** and envisages creation of state of art support infrastructure in a well-defined agri / horticultural zone for setting up of modern food processing units in the industrial plots provided in the park with well-established supply chain.
- The Mega Food Park project is **implemented by a Special Purpose Vehicle (SPV)** which is a Body Corporate registered under the Companies Act. **State Government, State Government entities and Cooperatives are not required to form a separate SPV** for implementation of Mega Food Park project.

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TEST
DAY - 29

Time Allowed: 30 mins **Maximum Marks: 50**

1. Consider the following statements:

1. The world's biggest coal mine is in the United States.
2. Australia is the largest producer of coal.
3. China is the second-largest consumer of coal after the United States.

Which of the above statements are correct?

(a) 1, 2 and 3
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1 and 2 only

2. "Asian mainland is composed of varied physiography and vegetation due to its location from the tropical region in the south to Arctic Circle in the north". Consider the following statements regarding the vegetation of Asia:

1. There has been a considerable shift in the vegetation of south-east Asia from tropical evergreen forest to the deciduous forest due to the degeneration of tropical grassland due to wildfire.
2. Spruce, larch, fir, and pine are dominant softwood trees of the Taiga region of Asia.

Which of the following statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 or 2

3. Consider the following statements regarding the Hawaii Islands of the Pacific Ocean:

1. The Island of Hawaii is an archipelago of eight major Islands which are of volcanic origin.
2. Hawaii, which is the largest island of the archipelago, is an Island Arc.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 or 2

4. Which of the following pairs is/are *incorrectly* matched?

1. Zagros Mountains: Iran
2. Elburz Mountains: Turkey
3. Atlas Mountains: Tunisia

Select the correct option using the codes given below:

(a) 2 only
(b) 1 and 3 only
(c) 1, 2 and 3
(d) 1 and 3 only

5. Which of the following are the regions of the Mediterranean climate?

1. California
2. South-West Africa
3. Northern Australia

Select the correct answer using the code given below:

(a) 1, 2 and 3
(b) 1 and 2 only

(c) 3 only

(d) 2 only

6. Which of the following countries are located around the Black Sea?

1. Turkey
2. Bulgaria
3. Romania
4. Moldova
5. Ukraine

Select the correct answer using the code given below:

(a) 1,2 and 4 only

(b) 1 and 2 only

(c) 1,2, 3 and 4 only

(d) 1, 2, 3 and 5 only

7. If one starts at the Keoladeo National Park and reaches Guindy National Park, how many minimum numbers of states she has to pass through?

(a) 3

(b) 4

(c) 5

(d) 6

8. Which of the following districts is not present in the Bodoland Territorial Area Districts?

(a) Kokrajhar

(b) Baska

(c) Chirang

(d) Dima Hasao

9. Consider the following statements regarding a river:

1. In its upper reaches, it is known as the Banda River.
2. It separates Goa from Maharashtra.

Which of the following rivers is described above?

(a) Terekhol

(b) Mandovi

(c) Zuari

(d) Sal

10. Which of the following hill ranges does *not* fall on the Indo-Myanmar border?

1. Lushai Hills
2. Chin Hills
3. Mikir Hills
4. Barail range

Select the correct option using the codes given below:

(a) 1, 2, 3 and 4

(b) 2, 3 and 4 only

(c) 1 and 2 only

(d) 2 only

11. Which of the following statements regarding Mica reserves in India is/are correct?

1. Mica occurs only in sedimentary rock system.
2. Andhra Pradesh leads in country's total resources followed by Jharkhand.

Select the correct option using the codes given below:

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

12. Consider the following pairs regarding types of coal reserves in India:

1. Tertiary coalfield: Assam
2. Girdih coalfield: Coking coal
3. Anthracite Coal: Jammu and Kashmir

Which of the above pairs is correctly matched?

(a) 1 and 2 only

(b) 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

13. Which of the following statements regarding Natural gas reserves in India is/are correct?

1. In India, onshore areas are the largest reserve of natural gas.
2. Gujarat is the second-largest natural gas producer after Assam.

Select the correct option using the codes given below:

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

14. Which of the following pair is/are correctly matched?

Crops in	*Largest producer India*
1. Sugarcane	Uttar Pradesh
2. Wheat	Punjab
3. Cotton	Maharashtra
4. Rice	West Bengal

Select the correct answer using the code given below:

(a) 1 and 4 only

(b) 2 and 3 only

(c) 1, 3 and 4 only

(d) 1, 2, 3 and 4

15. In which of the following regions/ states of India, Shale Gas is found?

1. Gangetic plain
2. Assam-Arakan Basin
3. Rajasthan
4. Andhra Pradesh

Select the correct option using the codes given below:

(a) 2 and 4 only

(b) 2, 3 and 4 only

(c) 1, 2, 3 and 4

(d) 1 and 3 only

16. Consider the following statements regarding the Solar System:

1. All the terrestrial planets does not have rings around it.
2. All the planets have satellites around them.
3. The gas planets are composed primarily of hydrogen and oxygen.

Which of the following statements is/are correct?

(a) 3 only

(b) 1 and 2 only

(c) 2 only

(d) 1 and 3 only

17. Consider the following statements:

1. Days and nights occur due to rotation of the Earth.
2. The Chaibagaan Time or Bagaan time was introduced by British people and was set one hour behind the Indian Standard Time (IST).

Which of the following statements is/are ***incorrect***?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

18. Consider the following regions:

1. Owen Fracture Zone
2. Cascadia subduction zone
3. Gakkel Ridge
4. Sunda Plate

Which of the following are the regions of Convergent boundary?

(a) 2 and 4 only

(b) 1 and 3 only

(c) 2 and 3 only

(d) 1 and 2 only

19. Regarding the various geomorphic forces, consider the following:

1. The Endogenetic forces make the surface uneven while the Exogenetic forces tries to level the surface.
2. The activity of wearing away the rocks of the land surface of the earth by external forces is called Denudation.

Which of the following statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

20. The Banihal-Qazigund tunnel is located in which of the mountain ranges of Jammu and Kashmir?

(a) Pir Panjal

(b) Karakoram

(c) Shivaliks

(d) Zaskar

21. With reference to Battle of Koregaon, consider the following statements

1. It was a battle between Mahar soldiers of the East India Company and massive Peshwa army, led by Chhatrapati Shivaji Maharaj.
2. The pillar was erected by the East India Company in memory of those who fought the battle.

Which of the following statement is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

22. Consider the following statements about Budapest Convention

1. The convention is the sole legally binding international multilateral treaty on cybercrime which coordinates cybercrime investigations between nation-states and criminalizes certain cybercrime conduct.
2. India is a signatory to the convention.

Which of the above statement(s) is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

23. Climate summit at Madrid in 2019 (CoP 25) could not reach a consensus due to which of the following reasons

1. No consensus on rules under Article 6 of the Paris Agreement, which deals with carbon trading or carbon markets
2. Lack of clarity on the creation of a financial mechanism dedicated to loss and damage
3. Exit of United States from Paris agreement has demotivated other countries towards climate change obligations.

Choose the correct option:

(a) 1 only

(b) 1 and 2 only

(c) 1, 2 and 3

(d) 3 only

24. Which state government has launched 'Lado Campaign' to eradicate child marriages?

(a) Uttar Pradesh

(b) Rajasthan

(c) Madhya Pradesh

(d) Bihar

25. Consider the following statements about The Asiatic Lion-

1. It is listed as 'Endangered' under the IUCN Red List.
2. Asiatic Lion Conservation Project has been launched by the Ministry of Environment, Forest and Climate Change.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

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ANSWER HINTS

DAY - 29

1. Correct Option: (c)

Explanation:

Global Coal Reserves

- North Antelope Rochelle coal mine in the Powder River Basin of Wyoming, USA, is the largest coal mine in the world.
- The USA has the largest coal reserves but China is the largest producer in 2018. India was the second-largest producer.
- China is the biggest consumer (50% of total consumption in 2018) of Coal, more than the USA.

2. Correct Option: (b)

Explanation:

Global climate

- In Asia, South-East Islands are the largest producer of palm oil, Indonesia being the largest producer followed by Malaysia. The tropical climate of these countries supports the growth of the palm.
- But at the same time once degenerated the land becomes unfit for agriculture due to high temperature and high microbial growth rate in these regions.
- Apart from it many tribal groups in these Island nations practice Shifting agriculture or Slash and Burn agriculture which has led to shrinking in the cover of tropical evergreen forest.
- Taiga vegetation lies in the vicinity of the Arctic Circle where the Tundra region ends. It is marked by needled leaf softwood trees such as spruce, larch, fir, and pine.
- There has been a considerable shift in the vegetation of south-east Asia from tropical evergreen forest to the deciduous forest due to the degeneration of tropical grassland due to the cultivation of palm and Shifting Agriculture, not a wildfire.

3. Correct Option: (d)

Explanation:

Hawaii Islands

- Hawaiian Island consists of many atolls and islets which are essentially formed by coral reefs. Few of the islands of Hawaii are of volcanic origin and are formed by the consolidation of basaltic lava which comes out of the submarine volcanoes.
- Hawaii Islands are not Island arcs but are formed by a linear chain of volcanoes. These Islands are formed by the outpouring of highly basaltic mobile lava which comes out of the submarine volcanoes, cool down and consolidate over time.
- These submarine volcanoes were the hotspot volcanoes or plum volcanoes over which the pacific plate passed which led to the deposition of basaltic lava on it and Islands were formed.
- Although, Hawaii Islands is an Archipelago consisting of eight major Islands and seven minor Islands all of them are not of volcanic origin. There are various atolls of coral origin is present in the Island group.
- Hawaiian Island is not an island arc but a linear chain of a volcano.

4. Correct Option: (a)

Explanation:

Mountains of the world

- The Atlas Mountains extend some 2,500km across northwestern Africa, spanning Morocco, Algeria, and Tunisia, separating the Atlantic and Mediterranean coastline from the Sahara Desert.
- Both Zagros Mountains and Elburz Mountains are in Iran.

5. Correct Option: (b)

Explanation:

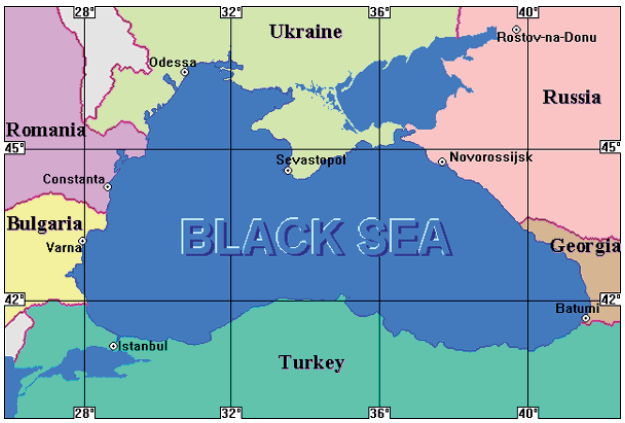
Mediterranean climate

- This type of climate is defined by mild, wet winters and warm to hot, dry summers.
- There are many places throughout the world that have temperature ranges similar to what would be found in Mediterranean climates. It is also called Warm Temperate Western Margin Climate, because this type of climate is found on the western margin of the continent and near the shoreline.
- Though the area around the Mediterranean Sea has the greatest extent of this type of 'winter rain climate', and gives rise to the more popular name Mediterranean Climate, the best-developed form of this peculiar climatic type is, in fact, found in Chile.
- Other Mediterranean regions include California (around San Francisco), the south-western tip of Africa (around Cape Town), southern Australia (in southern Victoria and around Adelaide, bordering the St. Vincent and Spencer Gulfs), and south-west Australia (Swanland).

6. Correct Option: (d)

Explanation:

Moldova is not situated on the banks of the black sea. It is a landlocked country and shares its border with Romania and Ukraine.



7. Correct Option: (c)

Explanation:

Map of India

- Keoladeo National Park is in Bharatpur, Rajasthan and Guindy National Park is in Chennai, Tamil Nadu. Therefore, she has to pass **5 states** in the following fashion:
  - **Rajasthan-Madhya Pradesh-Maharashtra-Karnataka-Tamil Nadu.**
  - **Or, Rajasthan-Gujarat-Maharashtra- Karnataka-Tamil Nadu.**
  - **Or, Rajasthan-Madhya Pradesh-Chhattisgarh-Andhra Pradesh-Tamil Nadu.**

8. Correct Option: (d)

Explanation:

Bodoland Territorial Area Districts

- Bodoland Territorial Council was formed through the second Bodo Accord in 2003. The Council comprised of 3,082 villages in four districts— **Kokrajhar, Chirang, Udalguri and Baska.**
- Dima Hasao is in the North Cachar Hills Autonomous Council.

9. Correct Option: (a)

Explanation:

Terekhol river:

- **The Terekhol River starts from Sindhudurg district of the Maharashtra state. This flows in Goa in North district. It also flows near the Terekhol Fort and meets the Arabian Sea.**
- **Its upper region is known as Banda River and in the lower end, it reaches towards Terekhol. It forms boundaries between Maharashtra's Sindhudurg districts and also the northern Goa district region for a range of distances.**

10. Correct Option: (c)

Explanation:

Purvachal hills

- **Chin Hills is in northwestern Myanmar extending along the India border** and forming the central and widest part of a mountain arc that stretches northward from the Arakan Mountains to the Patkai Range.
- **Lushai hills, also called as Mizo hills, is on the Indo-Myanmar border.** It is a part of the Patkai range.
- Mikir Hills are a group of hills located to the south of the Kaziranga National Park, Assam.

- Barail range is in Assam.

11. Correct Option: (d)

Explanation:

Mica in India

- Mica is widely distributed and occurs in **igneous, metamorphic and sedimentary regimes.** Mica group represents 34 phyllosilicate minerals that exhibit a layered or platy structure. Commercially important mica minerals are muscovite (potash or white mica) and phlogopite (magnesium or amber mica).
- Most important mica-bearing pegmatites occur in Andhra Pradesh, Bihar, Jharkhand, Maharashtra, Odisha, Rajasthan, and Telangana. Occurrences of mica pegmatites are also reported from Gujarat, Haryana, Karnataka, Kerala, Tamil Nadu and West Bengal.
- **Andhra Pradesh leads with 41% share in country's total resources followed by Rajasthan (28%), Odisha (17%), Maharashtra (13%), Bihar (2%) and a small quantity of resources is found in Jharkhand and Telangana.**

12. Correct Option: (d)

Explanation:

Coal reserves in India

- Most of the world's coal was formed in Carboniferous age (350 million years ago). It is the best quality of coal reserves, but India does not have this type of coalfields.
- Gondwana Coalfields were formed nearly 250 million years ago. They make up to 98 percent of the total reserves and 99 percent of the production of coal in India.
- Tertiary coal is 15 to 60 million years old hence, its carbon content is very low. Mainly confined to the extra-Peninsula, the important areas of Tertiary coal include parts of **Assam**, Meghalaya, Arunachal Pradesh, Nagaland, Himalayan foothills of Darjeeling in West Bengal, Jammu and Kashmir, Uttar Pradesh, Rajasthan, Kerala, Tamil Nadu, and Puducherry.
- On the basis of carbon content, Coal is of 4 types viz. Anthracite(80-95% C), Bituminous (60-80% c), Lignite (40-55% c),and Peat (less than 40% C). Anthracite coal is very rare in India. **Only Jammu & Kashmir has this type of coal reserves.**
- On the basis of metallurgical uses, Coal is of two types viz. Coking coal and non-Coking coal. Jharkhand produces more than 90% of India's Coking coal. **Girdih coalfield of Jharkhand produces the coking coal.**

13. Correct Option: (b)

Explanation:

Natural Gas reserves in India

- Natural gas consists primarily of methane. Propane, butane, pentane, and hexane are also present.
- Offshore areas continued to be the largest producer of natural gas (utilized) in 2017-18 with a share of 67.41%.
- Next in the order were Assam with a share of 9.86%, Gujarat 4.92%, Rajasthan 4.42%, Tripura 4.41%, Tamil Nadu 3.70%, Andhra Pradesh 2.94% and West Bengal (CBM), Madhya Pradesh (CBM), Jharkhand (CBM) & Arunachal Pradesh together accounted for the remaining 2.34%.

14. Correct Option : (a)

Explanation:

Largest Producer of crops in India

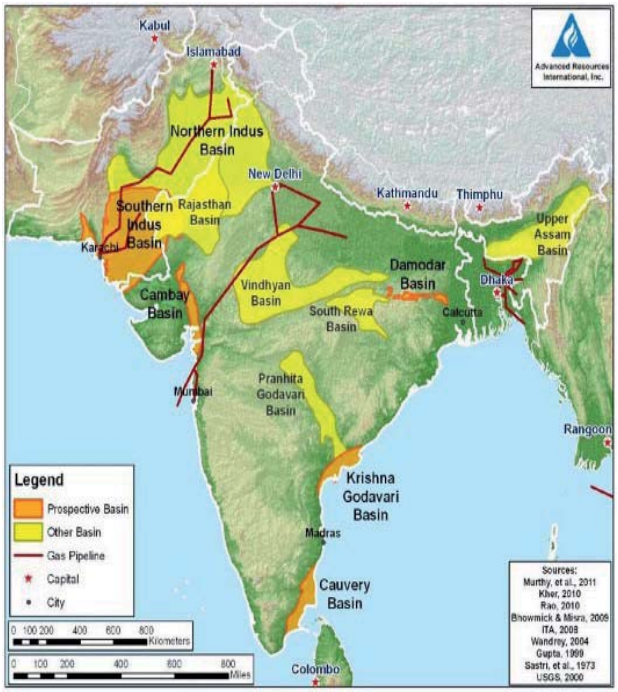
1. Sugarcane: Uttar Pradesh
2. Wheat: Uttar Pradesh
3. Cotton: Gujarat
4. Rice: West Bengal

15. Correct Option: (c)

Explanation:

Shale Gas reserves in India

- Oil Shales are usually fine-grained sedimentary rocks containing relatively large amounts of organic matter from which significant quantities of shale oil and combustible gas can be extracted by destructive distillation.
- India has several Shale Formations which seem to hold shale gas.
- The Shale Gas Formations are spread over several sedimentary basins, such as **Gangetic plain, Gujarat, Rajasthan, Andhra Pradesh and other coastal areas in the country,** including hydrocarbon-bearing ones— Cambay, Assam-Arkan & Damodar Basins, have large shale deposits.



16. Correct Option: (b)

Explanation:

Solar System

- Terrestrial or rocky planets: Mercury, Venus, Earth, and Mars:
  - The terrestrial planets are composed primarily of rock and metal and have relatively high densities, slow rotation, solid surfaces, **no rings** and **few satellites**.
- Jovian or gas planets: Jupiter, Saturn, Uranus, and Neptune:
  - The gas planets are composed primarily of **hydrogen and helium** and generally have low densities, rapid rotation, deep atmospheres and **lots of satellites**.

17. Correct Option: (b)

Explanation:

- Earth rotates along its axis from west to east. It takes approximately 24 hours to complete on rotation**. Days and nights occur due to rotation of the Earth.**
- The second motion of the earth around the sun in its orbit is called revolution. It takes 365¼ days (one year) to revolve around the sun.
- Six hours saved every year are added to make one day (24 hours) over a span of four years. This surplus day is added to the month of February.
- Thus every fourth year, February is of 29 days instead of 28 days. Such a year with 366 days is called a leap year.
- The Chaibagaan Time or Bagaan time – Introduced by British people over 150 years ago, was set **one hour ahead of the Indian Standard Time (IST)** for tea estates, collieries and oil industry of Assam. This Bagaan time is more suitable for tea plantations.

18. Correct Option: (a)

Explanation:

Regions of Convergent Boundaries

- The oceanic Nazca Plate subducts beneath the continental South American Plate at the Peru–Chile Trench.
- Just north of the Nazca Plate, the oceanic Cocos Plate subducts under the Caribbean Plate and forms the Middle America Trench.
- **Cascadia subduction zone** is where the oceanic Juan de Fuca, Gorda and Explorer Plates subduct under the continental North American plate.
- Oceanic Pacific Plate subducts under the North American Plate (composed of both continental and oceanic sections) forming the Aleutian Trench.
- Oceanic Pacific plate subducts beneath the continental Okhotsk Plate at the Japan Trench.
- Oceanic Philippine Sea Plate subducts beneath the Eurasian Plate at the Ryukyu Trench.
- Oceanic Pacific Plate subducts under the oceanic Philippine Sea Plate forming the Mariana Trench.
- Oceanic Philippine Sea Plate is subducting under the Philippine Mobile Belt forming the Philippine Trench and the East Luzon Trench.
- Eurasian Plate is subducting under the Philippine Mobile Belt at the Manila Trench.
- **Sunda Plate** is subducting under the Philippine Mobile Belt at the Negros Trench and the Cotobato Trench.
- Oceanic Indo-Australian Plate is subducted beneath the continental Sunda Plate along the Sunda Trench.
- Oceanic Pacific Plate is subducting under the Indo-Australian Plate north and east of New Zealand, but the direction of subduction reverses south of the Alpine

Fault where the Indo-Australian Plate starts subducting under the Pacific Plate.

- South American Plate is subducting under the South Sandwich Plate, forming the South Sandwich Trench.

19. Correct Option: (c)

Explanation:

Geomorphic Forces

- Our earth is a play field of two opposing forces. **The Endogenetic forces make the surface uneven while Exogenetic forces (flowing water, winds, glaciers, etc.) destroy the raised portions and try to level them down**.
- Due to the activities of these two forces the cycle of life comes into being on the earth or else the earth would have been a leveled and lifeless planet.
- The exogenetic forces through weathering and erosion act to destroy the relief of the earth's surface.
- **The activity of wearing away the rocks of the land surface of the earth by external forces is called Denudation.**
- The word Denudation is derived from a Latin word denudare which means to lay bare. It therefore includes the three processes.

20. Correct Option: (a)

Explanation:

Banihal-Qazigund tunnel

- National Highway Authority of India (NHAI) has announced that Banihal-Qazigund tunnel will be commissioned soon.
- About: Banihal Qazigund Road Tunnel is an 8.5 km road tunnel at an elevation of 1,790 m in the Pir Panjal range in the Indian state of Jammu and Kashmir connecting Banihal and Qazigund.
- It is a double tube tunnel consisting of two parallel tunnels - one for each direction of travel. Each tunnel is 7 m wide and has two lanes of road.
- The two tunnels are interconnected by a passage at every 500 m for maintenance and emergency evacuation.
- The tunnel will have forced ventilation for extracting smoke and stale air and infusing fresh air. It will have state of the art monitoring and control systems for security.
- Signifi cance: It will replace existing dependence on Jawahar Tunnel which is prone to avalanches and is closed time to time.
- The new Banihal-Qazigund tunnel's elevation is 1,790 metres (5,870 feet), 400 metres below the Jawahar tunnel. This makes it less prone to avalanches.

21. Correct option: (b)

Explanation

- Statement 1 is incorrect: On January 1, 1818, a few hundred Mahar soldiers of the East India Company, led by the British, defeated the massive Peshwa army, led by Peshwa Bajirao II, in Koregaon.

Supplementary notes

202nd Anniversary of Battle of Koregaon Bhima

- Bhima-Koregaon, a small village in Pune district of Maharashtra, has a rich Maratha history. Two hundred years ago, on January 1, 1818, a few hundred Mahar soldiers of the East India Company, led by the British, defeated the massive Peshwa army, led by Peshwa Bajirao II, in Koregaon.
- Legend has it that about 500 Mahar soldiers under the East India Company clashed with a 25,000-strong army of Peshwa Bajirao II.
- Mahars, at this point, were considered an untouchable community, and were not recruited in the army by the peshwas.
- This battle has, since, attained legendary stature in Dalit history.
- The Dalits who follow BR Ambedkar view this battle as a victory of Mahars over the injustice and torture meted out to them by the Brahminical Peshwas.

22. Correct Answer: (a)

Explanation:

- 2nd statement is incorrect. India is not a signatory to Budapest convention.

Supplementary Notes

- Recently, United Nations approved a Russian-led resolution that aims to create a new convention on cybercrime when Budapest Convention is already there. India has voted in its favour. Russia has opposed the Budapest Convention, arguing that giving investigators access to computer data across borders violates national sovereignty.

- The **Council of Europe's (CoE) Cybercrime Convention is also known as the Budapest Convention.** It was open for signature in **2001** and **came into force in 2004**.
- The convention is the **sole legally binding international multilateral treaty on cybercrime.** It coordinates cybercrime investigations between nation-states and criminalizes certain cybercrime conduct.
- It serves as a guideline for any country developing comprehensive national legislation against Cybercrime and as a framework for international cooperation between state parties to this treaty.
- The Budapest Convention is supplemented by a Protocol on Xenophobia and Racism committed through computer systems.
- India is not a signatory to Budapest Convention.

23. Correct Answer: (b)

Explanation:

3rd statement is incorrect.

- Exit of United States from Paris agreement has not demotivated other countries towards climate change obligations. US were not a part of Kyoto Protocol and that agreements still remained one of the successful climate treaties. Therefore, US exit has not demotivated the countries but connected the Small Ocean and low lying nations for exerting more pressure for strict climate agreements

Supplementary Notes

- Recently 25th Conference of Parties (CoP 25) to the United Nations Framework Convention on Climate Change concluded in December 2019 at Madrid.

Background

Why CoP 25 is a failure?

- The key deliverables from the 25th Conference of Parties (CoP 25) to the United Nations Framework Convention on Climate Change (UNFCCC) in Madrid (originally scheduled in **Santiago, Chile**) were two-fold:
- **Rules under Article 6** of the Paris Agreement, which deals with carbon trading or carbon markets
- The creation of a financial mechanism dedicated to **loss and damage**
- With some caveats, CoP 25 failed to deliver on these requirements. Reasons for this are:
- No Consensus on Rules on carbon market
  - ➤ There was no consensus on rules under Article 6.
  - ➤ The European Union (EU) and Switzerland held that the lack of consensus on rules would not prevent the operation of carbon markets.
  - ➤ They are both relying on Article 6.2 of the Paris Agreement, which deals with bilateral and mini-multilateral markets.
  - ➤ This is in contrast with Article 6.4, which creates a centralised, global market — the Sustainable Development Mechanism, which effectively succeeds the Clean Development Mechanism under the Kyoto Protocol. It is clear that the Article 6.4 market cannot operate without consensus on rules.
  - ➤ Article 6.2 is a little different. It does not create a market. It regulates bilateral and mini-multilateral markets, and it does so indirectly. It sets up conditions under which credits from these markets can be used to achieve a country's national targets (nationally determined contributions, or NDCs).
  - ➤ (nationally determined contributions, or NDCs).
- Lack of Clarity on Loss and Damage
  - ➤ Loss and damage refers to the unavoidable, irreversible impacts of climate change, where mitigation has failed and adaptation is not possible.
  - ➤ It is important to distinguish it from adaptation, particularly, because while some 'new and additional' finance was committed to adaptation in the Paris Decision, loss and damage has not been similarly addressed yet.
  - ➤ Financial support is one of the work-streams of the **Warsaw International Mechanism** on Loss and Damage (WIM), which was set up in 2013. Work on this front has remained stagnant for six years, and vulnerable countries and activists were clear that COP 25 needed to establish secure new and additional finance for loss and damage.

- The debate coming into this CoP was initially centered on whether this finance would take the form of:
  - A finance arm of the WIM — opposed by developed countries because they consider it an admission of liability for climate change
  - A financing 'window' under the Green Climate Fund (GCF) — opposed by developing countries because it would risk diluting the distinction between loss and damage and adaptation, and effectively reducing the amount of finance available for both

- **India's mixed role in CoP 25**
  - India played a mixed role at the recently concluded 25th Conference of Parties (CoP 25) to the United Nations Framework Convention on Climate Change at Madrid.
  - Union Minister of Environment, Forest and Climate Change Prakash Javadekar emphasized the transition of the Clean Development Mechanism (CDM) credits earned under the Kyoto Protocol to the Paris Agreement. He effectively demanded the carryover of the untraded emission reduction certificates held by Indian companies (estimated at 750 million Certified Emissions Reductions or CERs), which they can sell to raise funds.
  - On the question of 'loss and damage', the minister urged developed countries to give financial teeth to the Warsaw International Mechanism on Loss and Damage (WIM). The Warsaw Mechanism has been resisted by these countries due to their paranoia (officially enshrined) that the provision of finance would imply admission of legal liability.
  - India played a strong role in critiquing the developed world's continuing poor record on climate action.
  - India also took a lead in calling for more finance for developing countries for climate action, with the minister emphasizing that "not even 2 per cent" of the promised "$1 trillion in the last 10 years" had been delivered.

24. Correct Option: (c)

Explanation:

- Lado Campaign is an innovative flagship programme of the Government of Madhya Pradesh aiming at eradicating child marriages.

Supplementary notes

Objectives of Lado

- To inform and educate citizens about PCMA.
- To identify and train proactive citizens from the community to create a pool of human resource for advocacy.
- To dissuade service providers from conducting child marriage.
- To priorize access to inclusive quality education for all boys and girls
- To sensitize young children on child marriage in schools.
- To support victims of child marriage for their economic empowerment.
- To ensure intergenerational equity.

25. Correct answer- (c)

Explanation

- Both the statements are correct.

Supplementary notes

About The Asiatic Lion-

- The Asiatic Lions in Gujarat is restricted to Gir National Park in the state.
- It is listed as 'Endangered' under the IUCN Red List.
- It is listed in Schedule-I of the Wildlife (Protection) Act, 1972.
- In the initial stage, the lions were spread from the east of the Indus River to West Bengal and also to Narmada river in Central India.
- Until the 19th century, it occurred in Saudi Arabia, eastern Turkey, Iran, Mesopotamia.
- Since the turn of the 20th century, it is restricted to the Gir Forest National Park and surrounding areas.
- Asiatic Lion Conservation Project has been launched by the Ministry of Environment, Forest and Climate Change with an aim to protect and conserve the world's last ranging free population of Asiatic Lion and its associated ecosystem.

TEST
DAY - 30

Time Allowed: 30 mins **Maximum Marks: 50**

1. Which of the following statements is/ are correct?

1. Sun rotates as it orbits the center of the Milky Way.
2. Different parts of the Sun rotate at different rates.

Select the correct option using the codes given below

(a) 1 only

(b) 2 only

(c) Both 1and 2

(d) Neither 1 nor 2

2. Which of the following statements is/ are *incorrect*?

1. The temperature in the atmosphere is more than that at the surface of the Sun.
2. Like of the Earth, the magnetic polarity of the Sun also changes.s

Select the correct option using the codes given below

(a) 1 only

(b) 2 only

(c) Both 1and 2

(d) Neither 1 nor 2

3. Consider the following statements:

1. Aurorae occur in the troposphere of the Earth due to incoming Solar Winds
2. Only Earth can have auroras/aurorae.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1and 2

(d) Neither 1 nor 2

4. Consider the following statements regarding Van Allen belt:

1. It is the outer boundary of the Earth's Magnetosphere.
2. The inner Van Allen belt is composed predominantly of protons and the outer belt, mostly electrons.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1and 2

(d) Neither 1 nor 2

5. Which of the following pairs is/are correctly matched?

1. Melanesia: North Pacific Ocean
2. Micronesia: South Pacific Ocean
3. Macaronesia: North Atlantic Ocean

Select the correct option using the codes given below:

(a) 1 only

(b) 2 only

(c) 3 only

(d) 1, 2 and 3

6. Consider the following statements regarding the measurement of Earthquakes:

1. While the Mercalli scale measures the intensity of an earthquake based on its actual impacts.

2. The Mercalli scale is logarithmic whereas the Richter scale is linear in nature.

Which of the above statements is/are ***incorrect?***

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

7. With reference to gradation or leveling of land, consider the following statements:

1. All the agents of gradation are controlled by climatic conditions.
2. Gradation is nature's attempt to achieve a balance between erosion and deposition.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

8. Which of the following statements regarding folding is/are correct?

1. If the limbs of a fold are parallel to the axial plane, it is called symmetrical fold.
2. A recumbent fold has an essentially horizontal axial plane.
3. Nappe is an exclusive feature of faulting.

Select the correct option using the codes given below:

(a) 2 only

(b) 1 only

(c) 2 and 3 only

(d) 1, 2 and 3

9. Which of the following pairs is/are *incorrectly* matched?

1. Kerguelen Plateau: Largest plateau
2. Iberian Plateau: Chile
3. Mascarene Plateau: Indian Ocean
4. Massif Central: France

Select the correct option using the codes given below:

(a) 2 and 3 only

(b) 2 only

(c) 1 and 2 only

(d) 3 and 4 only

10. Iron & steel is the driving force behind industrial development in any country. With this reference, consider the following statements:

1. In India, most of the iron ore present are of pre-Cambrian age.
2. Western Ghat is the main reserve of the Haematite ore.
3. Jharkhand has the largest reserves of magnetite deposit in India.

Which of the above statements is/are correct?

(a) 1 only

(b) 2 and 3 only

(c) 1, 2 and 3

(d) 1 and 3 only

11. Consider the following statements regarding Earthquake Waves:

1. All natural earthquakes take place in the asthenosphere.
2. Body waves are faster than Surface waves and arrive first at the Surface hence they are more damaging than surface waves.
3. S-Waves propagation reveals that the outer core of the Earth is in liquid form.
4. P- Waves propagate longitudinally while S-Waves transversally.

Which of the above statements is/are ***incorrect***?

(a) 3 only

(b) 2 only

(c) 1 and 2 only

(d) 1, 2, 3 and 4

12. Consider the following description:

In 1900, a theory of the origin of the earth was developed. It considered that a wandering star approached the sun. As a result, a cigar-shaped extension of the material was separated from the solar surface. As the passing star moved away, the material separated from the solar surface continued to revolve around the sun and it slowly condensed into planets.

Which of the following theories is discussed in the above-given passage?

(a) Nebular Hypothesis

(b) The Big Splat Theory

(c) Chamberlain and Moulton theory

(d) Big Bang Theory

13. Consider the following statements regarding Mass Movement:

1. Mass movements are aided by gravity.
2. No geomorphic agent like running water, glaciers, wind, waves and currents participate in the process of mass movements.
3. Mass movements are very active over unweathered materials.

Which of the above statements is/are correct?

(a) 1 and 2 only

(b) 1 only

(c) 2 and 3 only

(d) 1, 2 and 3

14. The main reason that the Earth experiences the highest temperature in the subtropics in the northern hemisphere rather than at the Equator is:

(a) Subtropical areas tend to have less cloud cover than equatorial areas.

(b) Subtropical areas have longer day hours in the summer than the equatorial.

(c) Subtropical areas have an enhanced "greenhouse effect" compared to equatorial areas.

(d) Subtropical areas are nearer to the oceanic areas than the equatorial locations.

15. Consider the following oceanic features and their characteristics:

1. **Continental Shelf:** Active volcanoes and strong earthquake.
2. **Continental Slope:** Canyons and trenches.
3. **Deep-Sea Plain:** flattest and smoothest regions.

Which of the above pairs is/are correctly matched?

(a) 1 and 2 only

(b) 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

16. Consider the following statements regarding Volcanism:

1. Usually asthenosphere is the source of magma.
2. Lava domes made up of small fragments of lava from a single vent that has been blown up.
3. Shield volcanoes are volcanoes shaped like a bowl in the middle with long gentle slopes made by basaltic lava flows.

Which of the following statements is/are correct?

(a) 2 only

(b) 1 and 3 only

(c) 1 and 2 only

(d) 1 only

17. Which of the following statements is *incorrect* regarding the settlement hierarchy?

(a) When many individual units are cluster together they form hamlets.

(b) When many hamlets combine they from a village.

(c) A megalopolis is a large city, with a population of at least one million living in its urban agglomeration.

(d) Cities with population of 5 million and above are known as mega cities.

18. The definition of urban areas has been refined in 2011 according to which urban areas are comprised of two types of administrative units—Statutory Towns and Census Towns. What are the necessary conditions that needed to be fulfilled for a town to be declared as a Census Town?

1. A minimum population of 5000
2. At least 75 percent of male working population engaged in non-agricultural sector
3. A density of population of at least 4,000 persons per square kilometer

Select the correct option from the codes given below:

(a) 1 and 3 only

(b) 1 only

(c) 1, 2 and 3

(d) None of the above

19. Which of the following is *not* one the Approaches to Human Development?

(a) Income Approach

(b) Expenditure Approach

(c) Basic Needs Approach

(d) Welfare Approach

20. Consider the following statements regarding the UN-Habitat:

1. It is a UN agency responsible for sustainable urban development and human settlements.
2. Headquartered in UN Office at Nairobi.
3. Currently India holds the presidentship of UN-Habitat Alliance.

Which of the following statements is/are correct?

(a) 2 only

(b) 1 and 2 only

(c) 1 and 3 only

(d) 1, 2 and 3

21. Consider the following statements regarding Pradhan Mantri Matru Vandana Yojana

1. The Programme is launched by the Ministry of Social Justice and Empowerment.
2. A beneficiary is eligible to receive benefits under the scheme only once.
3. It is been implemented only in some selected districts of India on Pilot basis.

Which of the following statements is/are correct?

(a) 1 and 2 only

(b) 2 only

(c) 3 only

(d) 1, 2 and 3

22. Consider the following statements regarding One-horn Rhino

1. The Indian rhinoceros are ranged throughout the entire stretch of the Indo-Gangetic Plain currently.
2. It is listed as Endangered on the IUCN Red List.
3. The Indian rhinoceros is regionally extinct in Pakistan.

Which of the following statements is/are correct?

(a) 1 and 2 only

(b) 2 only

(c) 3 only

(d) 1, 2 and 3

23. Which of the following statements is correct about the Principle of Non-refoulement?

1. Principle of Non-refoulement forbids a country receiving asylum seekers from returning them to a country in which they would be in likely danger of persecution.
2. The persecution has to be on the basis of race, religion, nationality, membership of a particular social group or even political opinion.
3. The principle also applies to states that are not parties to the 1951 Convention Relating to the Status of Refugees or its 1967 Protocol.

Choose the correct answer:

(a) 1 only

(b) 1 and 2 only

(c) 2 and 3 only

(d) 1, 2 and 3

24. Koraga community won the Gold Award of 2019 World Habitat Awards. Which of the following statements are correct about Koraga community?

1. Koragas is a community of mainly basket-weavers found in South of India.
2. The practice of 'Ajalu' is associated with Koraga community.
3. Koragas are classified by the Government of India as a Scheduled Caste.

Choose the correct answer:

(a) 1 and 2 only

(b) 2 only

(c) 2 and 3 only

(d) 1, 2 and 3

25. Which of the following committees were set up for recommending on reforming criminal justice system?

1. Vohra Committee
2. Malimath Committee
3. Wadhwa Committee
4. Shanta Kumar Committee

Choose the correct option:

(a) 1 and 2 only

(b) 1, 2 and 3 only

(c) 1 and 4 only

(d) 1, 2, 3 and 4

****

ANSWER HINTS

DAY - 30

1. Correct Option: (c)

Explanation:

Orbit and Rotation of the Sun

- The Sun, and everything that orbits it, is located in the Milky Way galaxy. More specifically, our Sun is in a spiral arm called the Orion Spur that extends outward from the Sagittarius arm. From there, the Sun orbits the center of the Milky Way Galaxy, bringing the planets, asteroids, comets and other objects along with it.
- **The Sun rotates as it orbits the center of the Milky Way**. Its spin has an axial tilt of 7.25 degrees with respect to the plane of the planets' orbits. **Since the Sun is not a solid body, different parts of the Sun rotate at different rates.** At the equator, the Sun spins around once about every 25 days, but at its poles, the Sun rotates once on its axis every 36 Earth days.

2. Correct Option: (d)

Explanation:

Structure of the Sun

- The Sun, like other stars, is a ball of gas. In terms of the number of atoms, it is made of 91.0% hydrogen and 8.9% helium. By mass, the Sun is about 70.6% hydrogen and 27.4% helium.
- The Sun has six regions: the **core**, the **radiative** zone, and the **convective** zone in the interior; the visible surface, called the **photosphere**; the **chromosphere**; and the outermost region, the **corona**.
- At the core, the temperature is about 27 million degrees Fahrenheit (15 million degrees Celsius), which is sufficient to sustain thermonuclear fusion.
- Energy from the core is carried outward by radiation, which bounces around the radiative zone, taking about 170,000 years to get from the core to the top of the convective zone.
- The surface of the Sun, the photosphere, is a 300-mile-thick (500-kilometer-thick) region, from which most of the Sun's radiation escapes outward. This is not a solid surface like the surfaces of planets. Instead, this is the outer layer of the gassy star. We see radiation from the photosphere as sunlight when it reaches Earth about eight minutes after it leaves the Sun. The temperature of the photosphere is about 10,000 degrees Fahrenheit (5,500 degrees Celsius).
- **Above the photosphere lie the tenuous chromosphere and the corona (crown), which make up the thin solar atmosphere. This is where we see features such as sunspots and solar flares. Strangely, the temperature in the Sun's atmosphere increases with altitude, reaching as high as 3.5 million degrees Fahrenheit (2 million degrees Celsius). The source of coronal heating has been a scientific mystery for more than 50 years.**
- The Sun releases a constant stream of particles and magnetic fields called the solar wind. This solar wind slams worlds across the solar system with particles and radiation — which can stream all the way to planetary surfaces unless thwarted by an atmosphere, magnetic field, or both.
- **The Sun does not have rings.**
- The Sun and other stars don't have moons; instead, they have planets and their moons, along with asteroids, comets, and other objects.

Magnetosphere of the Sun

- The electric currents in the Sun generate a complex magnetic field that extends out into space to form the interplanetary magnetic field. The volume of space controlled by the Sun's magnetic field is called the heliosphere.

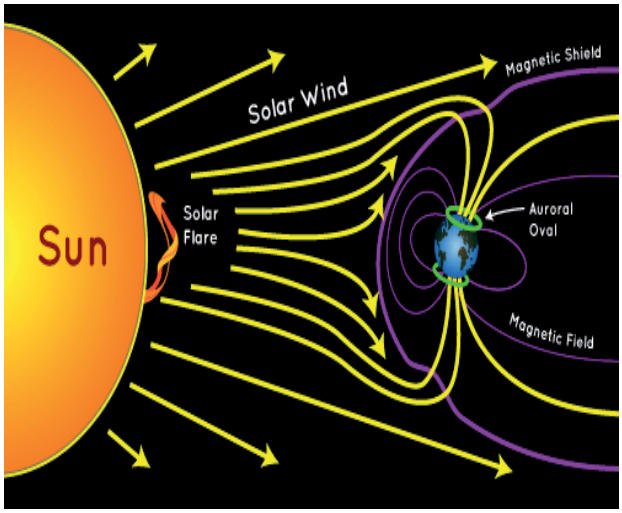
- The Sun's magnetic field is carried out through the solar system by the solar wind—a stream of electrically charged gas blowing outward from the Sun in all directions. Since the Sun rotates, the magnetic field spins out into a large rotating spiral, known as the Parker spiral.
- The Sun doesn't behave the same way all the time. It goes through phases of its own solar cycle. **Approximately every 11 years, the Sun's geographic poles change their magnetic polarity.** When this happens, the Sun's photosphere, chromosphere, and corona undergo changes from quiet and calm to violently active. The height of the Sun's activity, known as solar maximum, is a time of solar storms: sunspots, solar flares, and coronal mass ejections. These are caused by irregularities in the Sun's magnetic field and can release huge amounts of energy and particles, some of which reach us here on Earth. This space weather can damage satellites, corrode pipelines and affect power grids.

3. Correct Option: (d)

Explanation:

Aurora

- When a solar storm(coronal mass ejection) comes toward us, some of the energy and small particles can travel down the magnetic field lines at the north and south poles into Earth's atmosphere. There, the particles interact with gaseous ions in our atmosphere resulting in beautiful displays of light in the sky. Oxygen gives off green and red light. Nitrogen glows blue and purple. This is called Aurora.



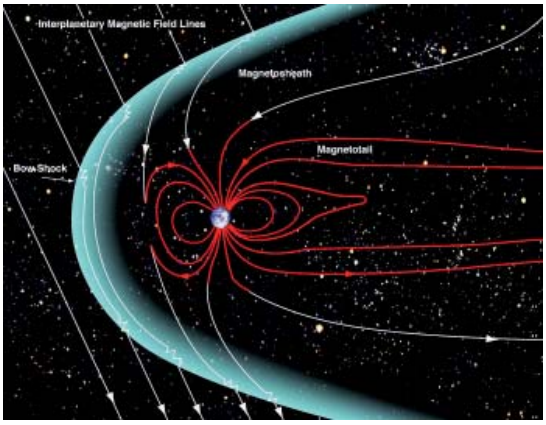
- **Aurora (the Southern and Northern Lights) primarily occur in the thermosphere due to presence of Charge particles over there.**
- It mainly occurs near the poles as the magnetic field intensity of the Earth at the poles are strong. it is called an aurora borealis or northern lights if it occurs at the North Pole. If occurred at the South Pole, it is called an aurora australis or the southern lights.
- If other planets have atmosphere and magnetic field, for instance, Jupiter and Saturn, they too can have aurorae.

4. Correct Option: (b)

Explanation:

Van Allen belt

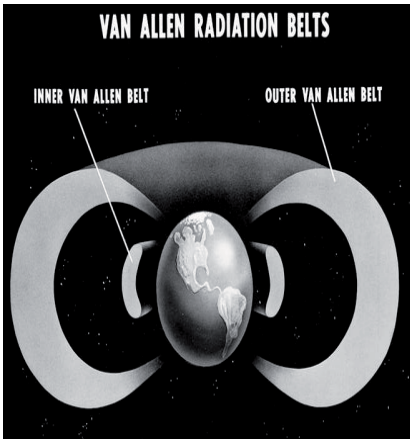
- A magnetosphere is that area of space, around a planet, that is controlled by the planet's magnetic field. The shape of the Earth's magnetosphere is the direct result of being blasted by solar wind. The solar wind compresses its sunward side to a distance of only 6 to 10 times the radius of the Earth. A supersonic shock wave is created sunward of Earth called the Bow Shock. Most of the solar wind particles are heated and slowed at the bow shock and detour around the Earth in the Magnetosheath. The solar wind drags out the night-side magnetosphere to possibly 1000 times Earth's radius; its exact length is not known. This extension of the magnetosphere is known as the Magnetotail. **The outer boundary of Earth's confined geomagnetic field is called the Magnetopause.** The Earth's magnetosphere is a highly dynamic structure that responds dramatically to solar variations. The magnetosheath is the region of space between the magnetopause and the bow shock of a planet's magnetosphere.



- **The Van Allen Belts** are a region of charged particles held in place by the magnetosphere. Named for their discoverer, James Van Allen, the belts swell and shrink over time. The belts swell when already energetic electrons and protons are

pumped up to relativistic energies during geomagnetic storms. They can shrink if electrons manage to escape from radiation belts – either along the field down into the Earth's atmosphere or back out into interplanetary space.

- There are two sub belts of this. The outer belt is made up of billions of high-energy particles that originate from the Sun and become trapped in Earth's magnetic field, an area known as the magnetosphere. The inner belt results from interactions of cosmic rays with Earth's atmosphere. **The inner belt, composed predominantly of protons, and the outer belt, mostly electrons.**



5. Correct Option: (c)

Explanation:

Maps of the world

- Melanesia is a subregion of Oceania extending from New Guinea island in the **southwestern Pacific Ocean** to the Arafura Sea, and eastward to Tonga. The region includes the four independent countries of Vanuatu, Solomon Islands, Fiji, and Papua New Guinea, as well as the French special collectivity of New Caledonia, and the Indonesian region of Western New Guinea. Most of the region is in the Southern Hemisphere, with a few small northwestern islands of Western New Guinea in the Northern Hemisphere.
- Micronesia is a subregion of Oceania, composed of thousands of small islands in **the western Pacific Ocean**.
- Macaronesia is a collection of four archipelagos in the **North Atlantic Ocean** off the coast of the continents of Europe and Africa.

6. Correct Option: (b)

Explanation:

Measurement of Earthquakes

- Although the curve of Earthquake Waves is recorded at Seismograph, **the intensity and magnitude** of the Earthquakes are measured by two different scales namely **Richter Scale** and **Mercalli Scale.**

Richter Scale

- This scale, developed by Charles Richter, measures the magnitude of the energy released during the Earthquake.
- This scale is open-ended i.e. there is not any end of the scale but, it has never measured any Earthquake of magnitude greater than 8.9.
- **The Richter-scale, in nature, is logarithmic based on 10.** That is, the Earthquake at magnitude 5 is 10 times more powerful than the Earthquake at magnitude 4 and 100 times more than the earthquake at magnitude 3.

Mercalli Scale

- The Mercalli Intensity Scale, developed by Giuseppe Mercalli, and expanded to include 12 degrees of intensity by Adolfo Cancani. It was further modified again by Harry O. Wood and Frank Neumann and today known as the Modified Mercalli Intensity Scale.
- **It measures the intensity of an earthquake based on its actual impacts on people, the environment and the Earth's surface.**
- **It is a closed-ended linear Scale,** scaled from 1-12 or I-XII with zero effect in Intensity 1 Earthquake and total destruction in Intensity 12 Earthquake.

7. Correct Option: (b)

Explanation:

Gradation

- The phenomenon of wearing down of relief variations of the surface of the earth through erosion is known as gradation.
- **Exogenetic forces** constantly work to bring about **leveling or the gradation** of land.
- **They attempt to achieve a condition of balance between erosion and deposition which means a graded position.**
- Agents of gradation like rivers, glaciers, winds, sea waves, and groundwater perform their tasks with the help of the triple action of weathering, erosion, and deposition.

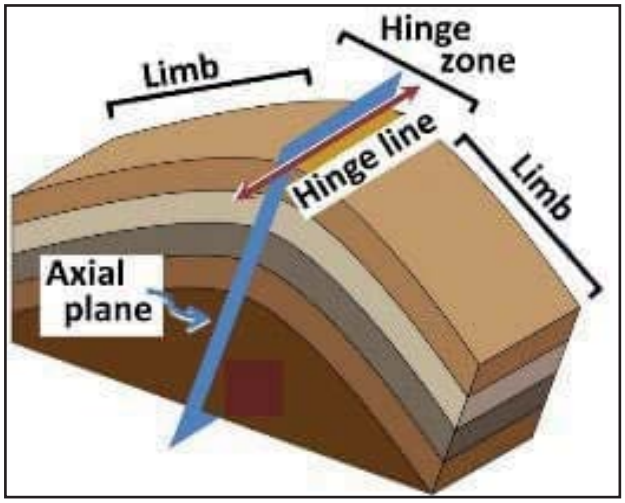
- **Of these, the first three agents are controlled by climatic conditions. The work of the other two agents of erosion-waves and groundwater is not controlled by climate.**
- In the case of waves, it is the location along with the interface of the lithosphere and hydrosphere — coastal region — that will determine the work of waves, whereas the work of groundwater is determined more by the lithological character of the region.
- The leveling down of elevated portions of the earth's surface is done by erosion.
- The filling up of depressions is done by deposition of the eroded material transported by the external agents of gradation.

8. Correct Option: (a)

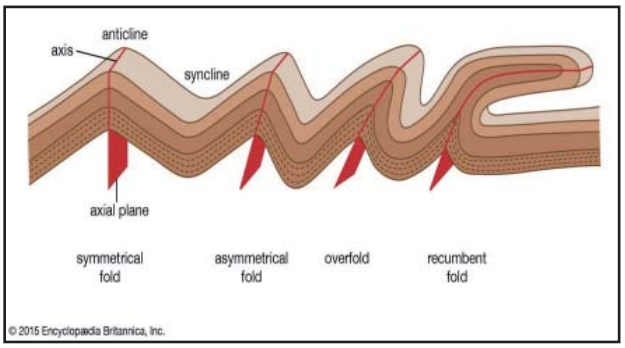
Explanation:

Types of Folds

- A fold is an undulating structure (wave-like) that forms when rocks or a part of the earth's crust is folded (deformed by bending) under compressional stress. The folds that are upwardly convex are called anticlines. In contrast, the folds that are downwardly convex are called synclines.



- **Symmetrical fold is one in which the axial plane is vertical.**
- An asymmetrical fold is one in which the axial plane is inclined.
- **An isoclinal fold has limbs that are essentially parallel to each other and thus approximately parallel to the axial plane.**
- An overturned fold has a highly inclined axial plane such that the strata on one limb are overturned.
- A recumbent fold has an essentially horizontal axial plane.



- On the basis of nature, folds are of two types viz. Simple and Complex fold.
- Simple folds have well-developed systems of synclines and anticlines are found, and folds are of wavy patterns.
- in Complex fold, the rock strata are intensely compressed to produce a complex structure of folds. In these types of folds, over folds and recumbent folds are often found detached from their roots and carried a few hundred kilometers away by the tectonic forces. **These detached folds are called 'nappe.'**

9. Correct Option: (c)

Explanation:

Some famous plateaus of the world

- Tibetan Plateau is the highest and largest plateau in the world and hence called the 'roof of the world'.
- Iberian Plateau is in Portugal and Spain.
- Mascarene Plateau is a submarine plateau in the Indian Ocean north and east of Madagascar.
- Massif Central lies in central France and famous for Grapes cultivation.
- Kerguelen Plateau is the largest undersea plateau in the Indian Ocean.

10. Correct Option: (a)

Explanation:

Iron Ores in India

- Iron ores occur in different geological formations. **But, in India or elsewhere, these ores are found associated with volcanic-sedimentary Banded iron formations (BIF) of the Pre-Cambrian age.**
- With the total resources of over 33.276

billion tonnes of Haematite (Fe_2O_3) and Magnetite (Fe_3O_4), India is one of the leading producers of iron ore in the world.

- India has both the ores. In fact, it is Haematite that has been exploited through mining as the **most of the magnetite reserves are in the eco-fragile regions of the Western Ghat.**
- Haematite and magnetite are the most important iron ores in India.
- About 79% of haematite ore deposits are found in the Eastern Sector (Assam, Bihar, Chhattisgarh, Jharkhand, Odisha & Uttar Pradesh).
- **About 93% of magnetite ore deposits occur in Southern Sector** (Andhra Pradesh, Goa, Karnataka, Kerala & Tamil Nadu).
- **Karnataka alone contributes 72% of magnetite deposit in India.**

11. Correct Option: (c)

Explanation:

- **Statement 1 is incorrect:** All natural earthquakes take place in the **lithosphere.**
- **Statement 2 is incorrect:** Although body waves are faster and arrive first at the surface **they are less damaging than surface waves.**

Supplementary notes:

Earthquake

- An earthquake in simple words is shaking of the Earth.
- It is a natural event, caused due to the release of energy, which generates waves that travel in all directions.
- The release of energy occurs along a fault, a sharp break in the crustal rocks.
- The point where the energy is released is called the focus or hypocentre of an earthquake. The energy waves traveling in different directions reach the surface. The point on the surface, nearest to the focus, is called epicenter. It is the first one to experience the waves.
- This release of energy is propagated as waves or simply saying Earthquake Waves.

Earthquake Waves

- The Earthquakes Waves are recorded on the seismograph.
- There are basically two types of Earthquake Waves – Body waves and surface waves.

Body Waves

- **Body waves are generated at the focus and move in all the directions through the body of the Earth (3-dimensional). They are the fastest in reaching to the surface.**
- They are of two types viz. **Primary waves/ P-waves and Secondary waves/S-waves.**

Primary waves/P-waves

- **P-waves moves longitudinally** i.e. the propagation and vibration are in a same direction similar to the sound waves. They are the fastest of all the earthquake waves. They travel through gaseous, liquid and solid materials.

Secondary waves/S-waves

- **S-waves are second to reach at the surface after P-waves. As they can travel only through solid materials of the Earth, they cannot pass through Earth's outer core, therefore their shadow zone is broader than that of P-waves. This reveals that the outer core of the Earth is not in solid form.**
- **S-waves propagate transversally** i.e. the direction of propagation and the direction of vibration is perpendicular to each other.

Surface waves

- Surface waves are generated when the body waves interact with the surface rocks. As they move along the surface and the direction of the vibration is perpendicular to the propagation, **these waves are considered as the most damaging one.**

12. Correct Option: (c)

Explanation:

Early theories of Origin of the Earth

- One of the earlier and popular arguments was by German philosopher Immanuel Kant. Mathematician Laplace revised it in 1796. It is known as the Nebular Hypothesis.
- The hypothesis considered that the planets were formed out of a cloud of material associated with a youthful sun, which was slowly rotating.
- In 1900, Chamberlain and Moulton considered that a wandering star

approached the sun. As a result, a cigar-shaped extension of the material was separated from the solar surface. As the passing star moved away, the material separated from the solar surface continued to revolve around the sun and it slowly condensed into planets.

The Big Splat Theory

- It is now generally believed that the formation of the moon, as a satellite of the earth, is an outcome of 'giant impact' or what is described as "the big splat".
- A body of the size of one to three times that of mars collided into the earth sometime shortly after the earth was formed. It blasted a large part of the earth into space.
- This portion of blasted material then continued to orbit the earth and eventually formed into the present moon about 4.44 billion years ago.

The Big Bang Theory

- The most popular argument regarding the origin of the universe is the Big Bang Theory.
- It is also called the expanding universe hypothesis.
- According to this theory, the universe is expanding. As time passes, galaxies move further and further apart.
- Edwin Hubble, in 1920, provided evidence for the same.

13. Correct Option: (a)

Explanation:

- Statement 3 is incorrect: Mass movements are very active over weathered slopes rather than over un-weathered materials.

Supplementary notes:

Mass Movements

- These movements transfer the mass of rock debris down the slopes under the direct influence of gravity. That means, air, water or ice do not carry debris with them from place to place but on the other hand, the debris may carry with it air, water or ice.
- The movements of mass may range from slow to rapid, affecting shallow to deep columns of materials and include creep, flow, slide, and fall.
- Gravity exerts its force on all matter, both bedrock and the products of weathering. So, weathering is not a pre-requisite for mass movement though it aids mass movements.
- **Mass movements are very active over weathered slopes rather than over un-weathered materials.**
- **Mass movements are aided by gravity and no geomorphic agent like running water, glaciers, wind, waves and currents participate in the process of mass movements. That means mass movements do not come under erosion though there is a shift (aided by gravity) of materials from one place to another.**
- Materials over the slopes have their own resistance to disturbing forces and will yield only when force is greater than the shearing resistance of the materials.
- Weak unconsolidated materials, thinly bedded rocks, faults, steeply dipping beds, vertical cliffs or steep slopes, abundant precipitation and torrential rains and scarcity of vegetation, etc., favour mass movements

14. Correct Option: (a)

Explanation:

- Option (a) is correct: Earth experiences highest temperature in the subtropics in the northern hemisphere rather than at the Equator because subtropical areas tend to have less cloud cover than equatorial areas.

Supplementary notes:

Spatial Distribution of Insolation at the Earth's Surface

- The insolation received at the surface varies from about 320 Watt/m2 in the tropics to about 70 Watt/m2 in the poles.
- **Maximum insolation is received over the subtropical deserts, where the cloudiness is the least.**
- The Equator receives comparatively less insolation than the tropics.
- Generally, at the same latitude, the insolation is moreover the continent than over the oceans.
- In winter, the middle and higher latitudes receive less radiation than in summer.

15. Correct Option: (c)

Explanation:

- **Pair 1 is incorrectly matched:** Continental shelf is occupied by relatively **shallow seas and gulfs.**

Supplementary notes:

Divisions of the Ocean Floors

- The ocean floors can be divided into four major divisions:
- The Continental Shelf
- The Continental Slope
- The Deep Sea Plain
- The Oceanic Deeps.
- Besides, these divisions there are also major and minor relief features in the ocean floors likeridges, hills, seamounts, guyots, trenches, canyons, etc.

Continental Shelf

- The continental shelf is the extended margin of each continent occupied by relatively shallow seas and gulfs.
- It is the shallowest part of the ocean showing an average gradient of 1° or even less. The shelf typically ends at a very steep slope, called the shelf break.
- The width of the continental shelves varies from one ocean to another. The average width of continental shelves is about 80 km.
- The shelves are almost absent or very narrow along some of the margins like the coasts of Chile, the west coast of Sumatra, etc.
- On the contrary, the Siberian shelf in the Arctic Ocean, the largest in the world, stretches to 1,500 km in width. The depth of the shelves also varies. It may be as shallow as 30 m in some areas while in some areas it is as deep as 600 m.
- The continental shelves are covered with variable thicknesses of sediments brought down by rivers, glaciers, wind, from the land and distributed by waves and currents. Massive sedimentary deposits received over a long time by the continental shelves become the source of fossil fuels.

Continental Slope

- The continental slope connects the continental shelf and the ocean basins.
- It begins where the bottom of the continental shelf sharply drops off into a steep slope. The gradient of the slope region varies between 2-5°. The depth of the slope region varies between 200 and 3,000 m. The slope boundary indicates the end of the continents.
- Canyons **and trenches are observed in this region.**

Deep-Sea Plain

- Deep-sea plains are gently sloping areas of the ocean basins. These are the flattest and smoothest regions of the world. The depths vary between 3,000 and 6,000m. These plains are covered with fine-grained sediments like clay and silt.

Oceanic Deeps or Trenches

- These areas are the deepest parts of the oceans. The trenches are relatively steep-sided, narrow basins. They are some 3-5 km deeper than the surrounding ocean floor**.**
- **They occur at the bases of continental slopes and along island arcs and are associated with active volcanoes and strong earthquakes**. That is why they are very significant in the study of plate movements.
- As many as 57 deeps have been explored so far; of which 32 are in the Pacific Ocean; 19 in the Atlantic Ocean and 6 in the Indian Ocean.

16. Correct Option: (b)

Explanation:

Volcanism

- Magma is the term used to denote the molten rocks and related materials seen inside earth. A weaker zone of the mantle called **asthenosphere usually is the source of magma**. Once this magma came out to the earth surface through the vent of a volcano, it is called as the Lava. Therefore, Lava is nothing but the magma on earth surface.
- **Cinder cones** are circular or oval cones made up of small fragments of lava from a single vent that has been blown up. Cinder cones result from eruptions of mostly small pieces of scoria and pyroclastics that build up around the vent. Most cinder cones erupt only once. Cinder cones may form as flank vents on larger volcanoes, or occur on their own.
- **Composite Volcanoes** are steep-sided volcanoes composed of many layers of volcanic rocks, usually made from high-viscosity lava, ash and rock debris.
- **Shield volcanoes** are volcanoes shaped like a bowl or shield in the middle with long gentle slopes made by basaltic lava flows.

- **Lava domes** are formed when erupting lava is too thick to flow and makes a steep-sided mound as the lava piles up near the volcanic vent. They are built by slow eruptions of highly viscous lava.

17. Correct Option: (c)

Explanation:

Settlement Hierarchy

- **Isolate dwellings**: Such settlement consists of individual units. It can be termed as the initial state of development of a settlement. An isolated dwelling would only have 1 or 2 buildings or families in it.
- **Hamlets**: When many individual units are cluster together they form hamlets. The grouping may be due to similar occupation patterns, religion, cultural factors etc. a hamlet has a tiny population (<100) and very few (if any) service.
- **Villages**: When many hamlets combine they from a village. The reason for such grouping may be due to interdependencies of one hamlet on another, thus to form a self-sufficient unit.
- **Towns**: A town is a larger entity which is more self-sufficient and has a stronger economic base.
- **Cities**: Where large concentration of people exists, multiple economic activities exist.
- **Metropolis**: **A metropolis is a large city, with a population of at least one million living in its urban agglomeration.**
- **Megalopolis**: An extensive, metropolitan area or a long chain of continuous metropolitan areas.
- **Mega Cities**. Cities with population of 5 million and above are known as mega cities, according to Census of India. But United Nations considers mega cities as those that have a population of 10 million and above. In India, Greater Mumbai, Kolkata and Delhi are examples of mega cities.

18. Correct Option: (c)

Explanation:

Census Town

- The definition of urban areas has been refined in 2011 according to which urban areas are comprised of two types of administrative units—Statutory Towns and Census Towns.
- Statutory Towns : All administrative units that have been defined by statute as urban like Municipal Corporation, Municipality, Cantonment Board, Notified Town Area Committee, Town Panchayat, Nagar Palika etc., are known as Statutory Towns.
- Census Towns : Administrative units satisfying the following three criteria simultaneously are treated as Census Towns as mentioned below:
  - A minimum population of 5000;
  - At least 75 percent of male working population engaged in non-agricultural sector; and
  - A density of population of at least 4,000 persons per square kilometer

19. Correct Option: (b)

Explanation:

Approaches to Human Development

- **Income Approach**: This is one of the oldest approaches to human development. Human development is seen as being linked to income. The idea is that the level of income reflects the level of freedom an individual enjoys. Higher the level of income, the higher is the level of human development.
- **Welfare Approach**: This approach looks at human beings as beneficiaries or targets of all development activities. The approach argues for higher government expenditure on education, health, social secondary and amenities. People are not participants in development but only passive recipients. The government is responsible for increasing levels of human development by maximising expenditure on welfare.
- **Basic Needs Approach**: This approach was initially proposed by the International Labour Organisation (ILO). Six basic needs i.e.: health, education, food, water supply, sanitation, and housing were identified. The question of human choices is ignored and the emphasis is on the provision of basic needs of defined sections.
- **Capability Approach**: This approach is associated with Prof. Amartya Sen. Building human capabilities in the areas of health, education and access to resources is the key to increasing human development.

20. Correct Option: (d)

Explanation:

UN Habitat

- It is a UN agency responsible for

sustainable urban development and human settlements. It is an intergovernmental body established in 1978.

- Headquartered in UN Offi ce at Nairobi, Kenya.
- It is also a member of United Nation Development Programme (UNDP).
- It promotes socially and environmentally sustainable towns and cities with the goal of providing adequate shelter for all.
- UN-Habitat works in more than 70 countries in five continents focusing on seven areas:
  - Urban Legislation, Land and Governance;
  - Urban Planning and Design;
  - Urban Economy;
  - Urban Basic Services;
  - Housing and Slum Upgrading;
  - Risk Reduction and Rehabilitation;
  - Urban Research and Capacity Development
- India has been unanimously elected as President of UN-Habitat in 2017.

21. Correct option: (b)

Explanation

- **Statement 1 is incorrect:** It is a conditional Maternity Benefit Programme launched by the Ministry of Women and Child Development.
- **Statement 3 is incorrect:** It is implemented in all the districts of the country in accordance with the provision of the National Food Security Act, 2013.

Supplementary notes

Pradhan Mantri Matru Vandana Yojana

- Pradhan Mantri Matru Vandana Yojana (PMMVY) is a Maternity Benefit Programme that is implemented in all the districts of the country in accordance with the provision of the National Food Security Act, 2013.
- It is a conditional Maternity Benefit Programme launched by the Ministry of Women and Child Development.
- Providing partial compensation for the wage loss in terms of cash incentive s so that the woman can take adequate rest before and after delivery of the first living child.
- All Pregnant Women and Lactating Mothers, excluding PW&LM who are in regular employment with the Central Government or the State Governments or PSUs or those who are in receipt of similar benefits under any law for the time being in force are eligible.
- A beneficiary is eligible to receive benefits under the scheme only once.In case of miscarriage/still birth, the beneficiary would be eligible to claim the remaining instalment(s) in event of any future pregnancy.
- Providing partial compensation for the wage loss in terms of cash incentive s so that the woman can take adequate res t before and after delivery of the first living child.
- The cash incentive provided would lead to improved health seeking behaviour amongst the Pregnant Women and Lactating Mothers (PW& LM).

22. Correct option: (c)

Explanation

- **Statement 1 is incorrect**: The Indian rhinoceros once ranged throughout the entire stretch of the Indo-Gangetic Plain, but excessive hunting and agricultural development reduced its range drastically to 11 sites in northern India and southern Nepal.
- **Statement 2 is incorrect**: It is listed as Vulnerable on the IUCN Red List.

Supplementary notes

Rhinos to be re-introduced in Uttarakhand

- According to officials, around 10 rhinos will be brought in CTR in the first phase and subsequently, 10 more would be added.
- Experts claim that protecting these rhinos from poaching will be the only challenge for the state's forest department staff after the move.
- The geographical terrain and environmental conditions in CTR are suitable for rhinos.
- The ideal sites chosen in Corbett are valley habitats bounded on either side by the lower Himalayas (north), Shivalik Hills (south) and the Ramganga Reservoir (east), which would also act as natural barriers to rhino movement outside these area, thereby minimising conflict with people.

Benefits from this move-

- According to wildlife experts, rhinos reduce the size of elephant grass by eating it.
- This would mean that species that thrive on lower-height grass — Hog Deer, Cheetal, Sambar and Swamp Deer, among others — would also be encouraged.
- According to WII experts, the rhino's range was once continuous across the flood plains of the Indus, Ganges and the Brahmaputra, but today, it is limited to small fragmented pockets in India and Nepal as a result of anthropogenic pressures.
- Re-introduction into habitats in its historic range would not only create safety-net populations for the species but also restore their ecological role in these faunally-degraded habitats.

About One-horn Rhino

- The Indian rhinoceros also called the greater one-horned rhinoceros and great Indian rhinoceros is a rhinoceros species native to the Indian subcontinent.
- It is listed as Vulnerable on the IUCN Red List.
- The Indian rhinoceros once ranged throughout the entire stretch of the Indo-Gangetic Plain, but excessive hunting and agricultural development reduced its range drastically to 11 sites in northern India and southern Nepal.
- It inhabits the alluvial grasslands of the Terai and the Brahmaputra basin.
- The Indian rhinoceros is regionally extinct in Pakistan.
- There are about 2,600 rhinos in India, with more than 90% of the population concentrated in Assam's Kaziranga National Park. Outside Kaziranga, rhinos are found in West Bengal, Uttar Pradesh, and Bihar.
- Kaziranga National Park in Assam, India, holds about 70% of the world population. This is worrisome for two reasons – the park may have reached its carrying capacity and might not be able to support any more rhinos; and the entire species' population could decimated because by a disease outbreak, natural disaster, or another acute threat.

About Jim Corbett National Park-

- It is the oldest national park in India and was established in 1936 as Hailey National Park to protect the endangered Bengal tiger.
- It is located in Nainital district and Pauri Garhwal district of Uttarakhand and was named after Jim Corbett, a well-known hunter and naturalist.
- The park was the first to come under the Project Tiger initiative in 1973.

23. Correct Option (d)

Explanation:

- **All statements are correct**

Supplementary Notes

Principle of Non-refoulement

- **Non-refoulement** is a fundamental principle of international law that **forbids a country receiving asylum seekers** from returning them to a country in which they would be in likely danger of persecution based on **"race, religion, nationality, membership of a particular social group or political opinion**".
- **Unlike political asylum**, which applies to those who can prove a well-grounded fear of persecution based on certain category of persons, non-refoulement refers to the generic repatriation of people, including refugees into war zones and other disaster locales.
- It is a principle of **customary international law,** as it **applies even to states that are not parties to the 1951 Convention Relating to the Status of Refugees or its 1967 Protocol**.
- It is also a principle of the **Trucial law of nations.**
- **History:** The principle of non-refoulement arises out of an international collective memory of the **failure of nations during World War II** to provide a safe haven to refugees fleeing certain genocide at the hands of the **Nazi regime.**

24. Correct Option (a)

Explanation:

- **Statements 1 and 2 are correct**
- **Statement 3 is incorrect:** Koragas are classified by the Government of India as a Scheduled Tribe.

Supplementary Notes

Koraga community

- **Geographical presence:** The Koragas are a **tribal community** found mainly in Dakshina Kannada, Udupi districts of Karnataka and Kasaragod district of

Kerala, **South India**. These areas in Karnataka, are together often referred to as Tulu Nadu.

- **Way of life:** The area in which Koragas live comprise mostly of **agricultural land and forest**. The tribe continues to **make use of the forest produce**—principally, bamboo and creepers—for the **manufacture of baskets.**
  - Traditionally, they lived in structures made of leaves, called **koppus** and also **dressed in leaves.** Around the beginning of 21st century, they started to live in **simple free houses** constructed and sanctioned by Government agencies.
  - Some continue to remain either homeless or live on government-owned lands.
- Culture and language: Koraga people are known for drum beating (dollu or dolu beating). They used to beat dolu during events such as Kambala, village fairs or just for fun in their living places.
  - **Flute music and dance** involving both men and women are also important parts of Koraga culture and are apparent at celebrations such **as Bhoomi Habba** (worshipping earth).
  - **Language:** Koragas have their **own language,** classified as an independent Dravidian language, which is strongly influenced by Tulu, Kannada, Malayalam, languages commonly found in their area.
- **Social Status:** The 1901 census report noted the Koraga as a lowly tribe of **basket-makers and labourers**, some of whom were employed as scavengers.
  - In past they **were claimed to be of Chandala origin**, considered **untouchables** among Hindus and suffered **centuries of oppression.**
  - Presently, Koragas are classified by the Government of India as a **Scheduled Tribe.**
  - The Koraga people are an **educationally disadvantaged** tribe.
- **Practice of Ajalu**: Koraga people have been subjected to a caste-based discriminatory practice known as Ajalu, where Koragas are made to eat leftover food from upper caste households mixed with hair, fingernails and other inedible substances and **made to run like buffaloes** before the beginning of **Kambala race**."
  - Ajalu has been considered inhuman and was prohibited in 2000 by the **Karnataka Koragas (Prohibition of Ajalu Practice) Act, 2000.**

25. Correct Answer: (a)

Explanation:

- 3rd and 4th statements are incorrect. Wadhwa and Shanta Kumar committees were set up for reforming public distribution system.

Supplementary Notes

- The Criminal Justice System in India is an age-old system primarily based upon the Penal legal system that was established by the British Rule in India.
- The system has still not undergone any substantial changes even after 70 years of Independence. The biggest example could be Section 124A of the Indian Penal Code (IPC) that defines sedition and provides for its punishment.
- The entire Code of Criminal Procedure (Cr.P.C.) was amended in 1973.
- The appointment of the **Vohra Committee** was the very first attempt towards reforming the Criminal Justice System in India. Vohra Committee report (1993) made an observation on the criminalisation of politics and of the nexus among criminals, politicians and bureaucrats in India.
- In 2000, the government formed a panel headed by Justice V.S. Malimath, the former Chief Justice of Kerala and Karnataka, to suggest reform in the century-old criminal justice system.
- The **Malimath Committee** submitted its report in 2003 with 158 recommendations but these were never implemented.
- The Committee felt that the existing system "weighed in favour of the accused and did not adequately focus on justice to the victims of crime."
- **Wadhwa and Shanta Kumar committees were set up for reforming public distribution system.**
- Malimath Committee (2000) on reforms in the Criminal Justice System of India (CJS) submitted its report in 2003. It suggested 158 changes in the CJSI but the recommendations weren't implemented.
- The Committee had opined that the existing system "weighed in favour of the accused and did not adequately focus on justice to the victims of crime."

Recommendations

- **Rights of the Accused:** The Committee suggested that a Schedule to the Code be brought out in all regional languages so that the accused knows his/her rights, as well as how to enforce them and whom to approach when there is a denial of those rights.
- **Police Investigation:** The Committee suggested hiving off the investigation wing from Law and Order.
- **Court and Judges:** The report pointed out the judge-population ratio in India is 10.5 per million population as against 50 judges per million population in many parts of the world. The ratio is 19.66 per million people as of 2017.
    - ➤ It suggested the increase in strength of judges and courts.
- **Witness Protection:** It suggested separate witness protection law so that safety and security of witness can be ensured and they can be treated with dignity.
- **Vacations of Court:** It recommended reducing the vacations of court on account of long pendency of cases.

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PRELIMS TEST SERIES

BATCH: 10 - PT MAXIMA

DAILY TEST

Total 63 Tests: 10 NCERT + 29 Sub Sectional + 6 Sectional + 5 Current Affair + 10 Mock Test + 3 CSAT

STARTS 1 MARCH 2020

TEST SCHEDULE

Test No.	Date	Subject	Subject	Topics Covered
Polity (01 March to 08 March, 2020)				
Test 1	1 March, 2020	Polity 1	NCERT	Fundamentals (NCERT 11th & 12th)
Test 2	2 March, 2020	Polity 2	NCERT	Fundamentals (NCERT 11th & 12th)
Test 3	3 March, 2020	Polity 3	Sub-Sectional	Constitutional Development + Preamble + Union Territories + Citizenship
Test 4	4 March, 2020	Polity 4	Sub-Sectional	FR + DPSP + FD + Other Constitutional Provisions such as Emergency Provisions etc.
Test 5	5 March, 2020	Polity 5	Sub-Sectional	Executive + Legislature + Judiciary - 1
Test 6	6 March, 2020	Polity 6	Sub-Sectional	Executive + Legislature + Judiciary - 2
Test 7	7 March, 2020	Polity 7	Sub-Sectional	Governance + Socio Economic Development + Reforms + Bills + Welfare Schemes + Policies
Test 8	8 March, 2020	Polity 8	Sectional	Polity & Governance
Economy (12 March to 18 March, 2020)				
Test 9	12 March, 2020	Economy 1	NCERT	Fundamentals (NCERT 11th & 12th)
Test 10	13 March, 2020	Economy 2	NCERT	Fundamentals (NCERT 11th & 12th)
Test 11	14 March, 2020	Economy 3	Sub-Sectional	Basic Concepts of National Income
Test 12	15 March, 2020	Economy 4	Sub-Sectional	Budgeting + Fiscal and Monetary Policy Agricultural and Industrial Policy
Test 13	16 March, 2020	Economy 5	Sub-Sectional	External Sector + International Institutes
Test 14	17 March, 2020	Economy 6	Sub-Sectional	Money, Banking Financial Market and Other Provisions
Test 15	18 March, 2020	Economy 7	Sectional	Indian Economy
Environment (21 March to 27 March, 2020)				
Test 16	21 March, 2020	Environment 1	NCERT	Fundamentals of Environment (NCERT Biology 12th - Ch. 10 to 16)
Test 17	22 March, 2020	Environment 2	Sub-Sectional	Environment and Ecology
Test 18	23 March, 2020	Environment 3	Sub-Sectional	Biodiversity
Test 19	24 March, 2020	Environment 4	Sub-Sectional	Environmental Pollution and Management
Test 20	25 March, 2020	Environment 5	Sub-Sectional	Climate Change + Global Warming
Test 21	26 March, 2020	Environment 6	Sub-Sectional	Environmental Governance
Test 22	27 March, 2020	Environment 7	Sectional	Environment and Ecolog

Test No	Date	Subject	Subject	Topics Covered
HISTORY & CULTURE (30 March to 07 April, 2020)				
Test 23	30 March, 2020	History 1	NCERT	Fundamentals (Ancient +Medieval) (NCERT Old + New 11th & 12th)
Test 24	31 March, 2020	History 2	NCERT	Fundamentals (Modern) (NCERT Old + New 11th & 12th)
Test 25	1 April, 2020	Culture 3	Sub-Sectional	Visual Arts + Performing Arts
Test 26	2 April, 2020	Culture 4	Sub-Sectional	Religions + Languages + Literature + Institutions
Test 27	3 April, 2020	History 5	Sub-Sectional	Ancient India
Test 28	4 April, 2020	History 6	Sub-Sectional	Medieval India
Test 29	5 April, 2020	History 7	Sub-Sectional	Modern India (1757 – 1885)
Test 30	6 April, 2020	History 8	Sub-Sectional	Modern India (1885 – 1947)
Test 31	7 April, 2020	History 9	Sectional	History and Culture of India
GEOGRAPHY (10 April to 18 April, 2020)				
Test 32	10 April, 2020	Geography 1	NCERT	Fundamentals World Geography (NCERT 11th & 12th)
Test 33	11 April, 2020	Geography 2	NCERT	Fundamentals Indian Geography (NCERT 11th & 12th)
Test 34	12 April, 2020	Geography 3	Sub-Sectional	Geomorphology + Indian Physiography
Test 35	13 April, 2020	Geography 4	Sub-Sectional	Climatology + Indian Climate
Test 36	14 April, 2020	Geography 5	Sub-Sectional	Oceanography + Biogeography
Test 37	15 April, 2020	Geography 6	Sub-Sectional	Demography + Human Geography + Census
Test 38	16 April, 2020	Geography 7	Sub-Sectional	Economic Activities + Agriculture + Minerals + Energy
Test 39	17 April, 2020	Geography 8	Sub-Sectional	Industry + Transport + Trade + Communication
Test 40	18 April, 2020	Geography 9	Sectional	Geography of India and World
SCIENCE & TECHNOLOGY (21 April to 25 April, 2020)				
Test 41	21 April, 2020	Science & Tech 1		NCERTBiology + Everyday Science + + Institutions + Award
Test 42	22 April, 2020	Science & Tech 2		Sub-SectionalBiotechnology + Health + Nuclear tech
Test 43	23 April, 2020	Science & Tech 3		Sub-SectionalSpace + Defence
Test 44	24 April, 2020	Science & Tech 4		Sub-SectionalIT + Telecom + IPR + Nanotech + Robotics
Test 45	25 April, 2020	Science & Tech 5		SectionalScience and Technology
CSAT (28 April to 30 April, 2020)				
Test 46	28 April, 2020	CSAT-1	Sectional	Reasoning
Test 47	29 April, 2020	CSAT-2	Sectional	General Mental Ability
Test 48	30 April, 2020	CSAT-3	Sectional	Reading Comprehension
CURRENT AFFAIRS (03 May to 07 May, 2020)				
Test 49	3 May, 2020	Current Affairs-1		Current AffairsJune + July + August 2019
Test 50	4 May, 2020	Current Affairs-2		Current AffairsSeptember + October, 2019
Test 51	5 May, 2020	Current Affairs-3		Current AffairsNov + Dec 2019 + Jan, 2020
Test 52	6 May, 2020	Current Affairs-4		Current AffairsFeb + March + April, 2020
Test 53	7 May, 2020	Current Affairs-5		Current AffairsEconomy Survey + Budget + Indian Year Book 2020

FULL MOCK TESTS (08 May to 19 May, 2020)

Test No.	Date	Test
Test 54	8 May, 2020	MOCK 1PAPER 1 & 2
Test 55	9 May, 2020	MOCK 2PAPER 1 & 2
Test 56	12 May, 2020	MOCK 3PAPER 1 & 2
Test 57	13 May, 2020	MOCK 4PAPER 1 & 2
Test 58	14 May, 2020	MOCK 5PAPER 1 & 2
Test 59	15 May, 2020	MOCK 6PAPER 1 & 2
Test 60	16 May, 2020	MOCK 7PAPER 1 & 2
Test 61	17 May, 2020	MOCK 8PAPER 1 & 2
Test 62	18 May, 2020	MOCK 9PAPER 1 & 2
Test 63	19 May, 2020	MOCK 10PAPER 1 & 2

Office: 1B, 2nd Floor, Pusa Road, Karol Bagh, Delhi-110005 (Adjacent to Karol Bagh Metro Gate No. 8)

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