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PAPER - I (GS)

NCERT+

(BASED PRACTICE QUESTIONS)

2000+ MCQs

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GS SCORE
An Institute for Civil Services

TESTIMONIALS

Being in job of IRS, time management was extremely challenging. I express my immense gratefulness towards GS Score and Manoj Jha Sir for providing me best possible support in my success journey

Pratibha Verma
Rank 3

I am highly obliged towards GS SCORE for its best evaluation and assessment mechanism which helped me to crack UPSC in first attempt.

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Rank 97

PRELIMS PRACTICE WORKBBOK

PRELIMS GS (PAPER I)

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Subject-Wise Analysis of previous years Civil Services Preliminary Examinations

YEAR	GEO.	ENVIR.	HISTORY	POLITY	ECO.	General Science	Current Affairs
2011	11	15	11	12	19	19	13
2012	12	12	17	11	13	9	26
2013	9	13	11	13	15	11	28
2014	12	17	17	11	10	13	20
2015	14	10	14	13	13	7	29
2016	7	18	15	7	18	8	27
2017	7	11	14	22	8	4	34
2018	8	13	15	13	16	7	28
2019	14	11	17	15	14	7	22
2020	10	10	20	17	15	10	18
2021	15	12	20	18	14	17	4

The GS SCORE Prelims Workbook (Volumes) consists of questions from the following topics:

Subjects	Questions	Subjects	Questions
1. Geography	**320+**	**4. Polity**	**350+**
2. Environment	**220+**	**5. Economy**	**340+**
3. History	**500+**	**6. Gen. Science**	**170+**

PRELIMS PRACTICE WORKBOOK

VOL-1

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GEOGRAPHY
PRACTICE QUESTIONS

GEOMORPHOLOGY

1. Consider the following statements regarding the Nebular Hypothesis:

1. The hypothesis considered that the planets were formed out of a cloud of material associated with a youthful sun, which was slowly rotating.
2. Otto Schmidt was the major proponent of Nebular Hypothesis.

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

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

2. Consider the following statements regarding the Big Bang Theory:

1. Sir James Jeans and Sir Harold Jeffrey provided the evidence of the Big bang theory.
2. The theory is also called as expanding universe hypothesis.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

3. Consider the following statements regarding Terrestrial Planets:

1. They have a thick atmosphere, mostly of helium and hydrogen.
2. They are made up of rock and metals and have relatively high densities.

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

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

4. Which of the following conditions correctly differentiates between the Terrestrial and the Jovian planets?

1. The Jovian Planets were formed in the close vicinity of the parent star whereas Terrestrial Planets were formed at quite a distant location.
2. The terrestrial planets are bigger than jovian planets.

Select the correct answer using the code given below:

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

5. 'The Big Splat' theory describes the formation of the:

(a) Sun (c) Moon

(b) Earth (d) Mars

6. 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

7. Consider the following statements with respect to the evolution of lithosphere:

1. It is through the process of differentiation that the earth forming material got separated into different layers.
2. From the crust to the core, the density of the material decreases.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

8. Which of the following best explains the concept of 'DEGASSING'?

(a) The early atmosphere filled with water vapour, nitrogen, carbon dioxide and oxygen

(b) The release of energy occurs along a fault.

(c) The process of continuous volcanic eruptions

(d) The process through which the gases were outpoured from the interior of the earth.

9. Consider the following statements regarding the evolution of atmosphere:

1. The early atmosphere largely contained water vapour, nitrogen, carbon dioxide, methane, ammonia and very little of free oxygen.
2. Water vapour in the atmosphere were a result of volcanic eruptions.

Which of the above statements is/are correct?

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

10. Arrange the following stages of the evolution of the earth's atmosphere in chronological order:

1. Process of photosynthesis
2. Loss of primordial atmosphere
3. Hot gases outpoured from the interior

Select the correct answer using the code given below:

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

11. Earth's rotation generates which of the following force?

(a) Centrifugal force (c) Kinetic Force
(b) Centripetal force (d) Static force

12. Two places situated on the same isogonic line in a world map, will have the same:

(a) Ground pollution (c) Seismic activity
(b) Cloud cover (d) Magnetic declination

13. Consider the following statements:

1. Direct rays of the sun fall on the equator on 21st June
2. Winter solstice is seen in the Southern hemisphere on 21st December.

Which of the above statements is/are correct?

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

14. Greenwich Mean Time (GMT) is the time measured on the earth's zero degree line of longitude or meridian. Through which of the following countries does this 'GMT' line passes?

1. France
2. Spain
3. Algeria
4. Niger

Select the correct answer using the code given below:

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

15. Consider the following statements regarding the interior structure of the earth:

1. The outer core is in solid state while the inner core is in liquid state.
2. The upper portion of the mantle is called asthenosphere.

Which of the above statements is/are correct?

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

16. Consider the following statements regarding Interior of the Earth:

1. The density of mantle is higher than the outer core.
2. Core of the earth is considered the main source of magma.

Which of the above statements is/are correct?

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

17. What is asthenosphere?

(a) It is a layer of atmosphere.
(b) It is a tectonic plate
(c) It is a zone of earth's mantle.
(d) It is a newly discovered outer-space beyond Pluto.

18. Consider the following pairs of discontinuities and its location between the layers of earth:

1. **Moho Discontinuity:** Mantle - Core
2. **Lehmann Discontinuity:** Crust – Mantle
3. **Repetti Discontinuity:** Outer core – Inner core
4. **Guttensberg Discontinuity:** Upper Mantle – Lower Mantle

Which of the above pairs are correctly matched?

(a) 1 and 2 only (c) 2, 3 and 4 only
(b) 3 and 4 only (d) None of the above

19. Consider the following about the interior of the earth:

1. Volcanic eruptions are indirect source of information about the interior of the earth.
2. Earthquakes are indirect source of information about the interior of the earth.

Which of the above statements is/are correct?

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

20. The most explosive of the earth's volcanic eruptions are known as:

(a) Shield Volcano (c) Calderas
(b) Cinder Cone (d) Composite Volcanoes

21. Match the following:

Types of minerals	Name of the minerals
A. Non-metallic	1. Kyanite
B. Metallic	2. Gypsum
C. Refractory	3. Asbestos
D. Fertilizer	4. Wolfram

Select the correct answer using the code given below:

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

22. Arrange the following elements in the ascending order on the basis of their proportion in the composition of earth's crust:

1. Iron
2. Silicon
3. Oxygen
4. Nitrogen

Select the correct answer using the code given below:

(a) 3-2-1-4 (c) 4-3-2-1

(b) 1-2-3-4 (d) 3-2-1-4

23. How is Feldspar different from Pyroxene?

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

Select the correct answer using the code given below:

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

24. Which one of the following is not a single element mineral?

(a) Gold (c) Silver

(b) Mica (d) Graphite

25. Match the following:

Minerals	Rock Source
A. Quartz	1. Sand and granite
B. Mica	2. Basaltic Rocks
C. Olivine	3. Igneous and Metamorphic

Select the correct answer using the code given below:

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

26. Consider the following statements about metallic and non-metallic minerals:

1. Metallic minerals contain metal content while non-metallic minerals contain less metals content.
2. Cement is a metallic mineral as it contains iron particles.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1and 2

(b) 2 only (d) Neither 1 nor 2

27. Match the following:

Rock Type	Example
A. Clastic	1. Granite
B. Extrusive	2. Conglomerate
C. Metamorphic	3. Gneiss
D. Plutonic	4. Tuff

Select the correct answer using the code given below:

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

28. Which of the following statements is/are correct about the igneous rocks?

1. It is formed through the cooling and solidification of magma or lava
2. Limestone is an example of igneous rock.

Select the correct answer using the code given below:

(a) 1 only (c) Both 1and 2

(b) 2 only (d) Neither 1 nor 2

29. Which of the following statements is/are correct regarding Igneous Rocks?

1. The process of cooling and solidification of magma happens either in the earth's crust or on the surface of the earth.
2. Gabbro, breccia, and tuff are some of the examples of the igneous rocks.

Select the correct answer using the code given below:

(a) 1 only (c) Both 1and 2

(b) 2 only (d) Neither 1 nor 2

30. In the process of converting unconsolidated sediments into sedimentary rocks, which of the following processes it goes through?

1. Compaction
2. Re-crystallization
3. Cementation
4. Weathering

Select the correct answer using the code below:

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

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

31. Match the following:

Rock	Sedimentary Type
A. Potash	1. Chemically Formed
B. Shale	2. Mechanically Formed
C. Chalk	3. Organically Formed

Select the correct answer using the code given below:

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

32. Minerals are deposited and accumulated in which of the following?

(a) Sedimentary rocks (c) Igneous rocks

(b) Metamorphic rocks (d) None of the above

33. Which of the following pairs is/are correctly matched?

Rock	Formation
1. Igneous	A. Solidification from magma and lava
2. Sedimentary	B. Deposition of fragments of rocks by exogenous processes.
3. Metamorphic	C. Recrystallization of existing rocks

Select the correct answer using the code given below:

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

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

34. Consider the following statements about metamorphic rocks:

1. Recrystallisation and reorganisation of materials within original rocks form metamorphic rocks.
2. Shale is an example of metamorphic rocks.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

35. Which of the following statements is/are correct about the rock cycle?

1. Igneous rocks are primary rocks and other rocks form from these primary rocks.
2. The crustal rocks once formed may be carried down into the mantle through subduction process.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

36. Consider the following statements regarding exogenic geomorphic processes:

1. They obtain their energy from the gradients generated by tectonic factors.
2. Weathering, transportation, and erosion are examples of exogenic processes.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

37. Consider the following statements regarding endogenic processes:

1. The energy emanating from within the earth is the main force behind endogenic geomorphic processes
2. This energy is generated by radioactivity, rotational and tidal friction and primordial heat from the origin of the earth.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

38. Match the following:

Term	Definition
A. Lithification	1. Arrangement of minerals into thin to thick layers appearing in light and dark shades
B. Foliation	2. Turning of fragments into rocks through compaction
C. Banding	3. Arrangement of minerals in layers in metamorphic rocks

Select the correct answer using the code given below:

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

39. Consider the following statements regarding the endogenic processes:

1. Epeirogenic processes involve mountain building through severe folding and affecting long and narrow belts of the earth's crust
2. Orogenic processes involve uplift or warping of large parts of earth's crust.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

40. Physical and Mechanical weathering processes depend on:

1. Gravitational forces such as overburden pressure, load and shearing stress
2. Expansion forces due to temperature changes, crystal growth or animal activity
3. Water pressures controlled by wetting and drying cycles.

Which of the above statements are correct?

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

41. Consider the following statements regarding weathering:

1. It is the mechanical disintegration and chemical decomposition of rocks.
2. It is an ex-situ process.

Which of the above statements is/are correct?

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

42. Which of the following forces are responsible for physical weathering?

1. Gravitational force
2. Expansion force due to temperature variation
3. Water pressure
4. Radioactivity

Select the correct answer using the code given below:

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

43. Consider the following pairs regarding the effects of weathering and their results or regions they are associated with:

Effects of Weathering	Result
1. Unloading and Expansion	Exfoliation domes
2. Salt weathering	Granular foliation
3. Frost wedging	Glacial regions

Which of the above statements are correct?

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

44. Consider the following statements regarding biological weathering:

1. It refers to weathering caused by microorganisms only.
2. Biological weathering agents form weak acids, which can convert some of the minerals to clay.

Which of the above statements is/are correct?

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

45. Consider the following statements regarding mass movements:

1. It essentially happens because of gravitational pull.
2. Weathering is essential for mass movement.

Which of the above statements is/are correct?

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

46. Consider the following events with reference to the causes that may lead to mass movements:

1. Removal of support from below to materials above through natural or artificial means.
2. Overfilling through addition of materials by artificial filling or naturally.
3. Event of explosions.

Which of the above statements are correct?

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

47. Consider the following statements regarding the examples of the types of Mass Movement:

1. Solifluction is an example of rapid mass movement
2. Mud-flow is an example of slow mass movement

Which of the above statements is/are correct?

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

48. Solifluction refers to:

(a) Moderately steep, soil covered slopes.
(b) Slow downslope flowing soil mass or fine grained rock debris saturated with water
(c) Movement of water-saturated clayey earth materials down low-angle terraces
(d) Thick layers of weathered materials flowing either slowly or rapidly along definite channels.

49. Often we see fence posts or telephone poles leaning downslope from their vertical position and in their linear alignment. It is due to which type of mass movement?

(a) Creep (c) Landslide
(b) Avalanche (d) Earthflow

50. Consider the following description:

"It occurs in humid regions with or without vegetation cover and occurs in narrow tracks on steep slopes. It can be much faster than the mudflow."

Above description accurately refers to which type of rapid mass movement?

(a) Creep (c) Solifluction
(b) Debris Avalanche (d) Rock creep

51. Consider the following statements regarding landslides:

1. Slump is slipping of one or several units of rock debris with a backward rotation with respect to slope over which movement takes place.
2. Rapid rolling or sliding of earth debris without backward rotation of mass is known as debris slide.

Which of the above statements is/are correct?

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

52. In our country, debris avalanche and landslides occur very frequently in the Himalayas. Which one of the following doesn't account as a reason for it?

(a) Himalayas are tectonically less active.
(b) large portion of Himalayas is made up of sedimentary rocks and unconsolidated and semi-consolidated deposits.
(c) Himalayas have slopes which are very steep.
(d) None of the above

53. Consider the following statements regarding erosional and depositional agents:

1. The erosion, transportation and deposition of earth materials is brought about by wind, running water, glaciers, waves and ground water.
2. Glaciers are more effective erosional agent than wind.

Which of the above statements is/are correct?

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

54. Which of the following seismic waves are body waves?

1. Primary waves
2. Secondary waves
3. Love waves

Select the correct answer using the code given below:

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

55. With reference to Primary waves (P-waves), consider the following statements:

1. P-waves move the fastest and are the first to arrive at the surface.
2. These waves can travel only through solid materials.

Which of the above statements is/are correct?

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

56. With reference to Epicenter, consider the following statements:

1. The point on the surface, nearest to the focus, is called epicenter.
2. It is the first one to experience the earthquake waves.

Which of the above statements is/are correct?

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

57. Consider the following statements about seismic waves:

1. P – wave shadow zone lies between 104 to 142 degrees.
2. S – wave shadow zone lies between 103 to 142 degrees.

Which of the above statements is/are correct?

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

58. With reference to Shadow Zone, consider the following statements:

1. It is a specific area on the earth's surface where the seismic waves are reported.
2. For each earthquake there exists an altogether different shadow zone.

Which of the above statements is/are correct?

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

59. Earthquake waves get recorded in seismographs located at far off locations. However, there exist some specific areas where the waves are not reported. Such a zone is called as:

(a) Seismograph zone (c) Epicentre zone
(b) Littoral zone (d) Shadow zone

60. Consider the following statements with respect to the types of earthquakes:

1. Explosion earthquakes occur in the areas of intense mining activity.
2. Ground shaking may also occur due to the explosion of chemical or nuclear devices. Such tremors are called collapse earthquakes.

Which of the above statements is/are correct?

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

61. Earthquake is a natural hazard. Which of the following are the immediate effects of earthquake?

1. Differential ground settlement
2. Soil liquefaction
3. Ground lurching

4. Avalanches

Select the correct answer using the code given below:

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

62. The earthquake events are scaled either according to the magnitude or intensity of the shock. Consider the following statements in this regard:

1. The magnitude scale is known as the Richter scale wherein the magnitude relates to the energy released during the quake.
2. The intensity scale is known as the Mercalli scale which takes into account the visible damage caused by the event.

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

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

63. 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.

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

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

64. Consider the following statements regarding Body Waves:

1. The velocity and density changes as the Body waves travel through materials of different densities that helps in understanding the structure of Earth's interior.
2. Surface wave is a type of Body wave.

Which of the above statements is/are correct?

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

65. Consider the following statements with respect to volcanic eruption:

1. The material in the upper mantle portion is called lava.
2. Once it starts moving towards the crust or it reaches the surface, it is referred to as magma.

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

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

66. Consider the following statements:

1. Composite Volcanoes are characterised by eruptions of cooler and more viscous lavas than basalt.
2. The Hawaiian volcanoes are the most famous examples of Composite Volcanoes.

Which of the above statements is/are correct?

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

67. Consider the following statements:

1. Flood basalt provinces volcanoes outpour highly fluid lava that flows for long distances.
2. The Deccan Traps covering most of the Maharashtra plateau, are example of flood basalt province.

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

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

68. The volcanoes that occur in the oceanic areas are known as:

(a) Lacoliths Volcanoes
(b) Cinder Cone
(c) Mid-Ocean Ridge Volcanoes
(d) Caldera

69. Consider the following statements with respect to the volcanic landforms:

1. Batholiths are large body of magmatic material that cools in the deeper depth of the crust develop in the form of large domes.
2. The Karnataka plateau is spotted with domal hills of granite rock are examples of lacoliths.

Which of the above statements is/are correct?

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

70. Match the following:

List I	List II
A. Lapoliths	1. It is an example of Flood Basalt Province.
B. Sills	2. A type of intrusive volcanic landforms having saucer shape.
C. Dykes	3. A vertical wall-like structure that forms after cooling of lava.
D. Deccan Trap	4. A thin horizontal intrusive igneous landform.

Select the correct answer using the code given below:

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

71. Which of the following is not an Intrusive Volcanic landform?

(a) Laccoliths (c) Cinder cone
(b) Sills (d) Dyke

72. With reference to Zealandia, which of the following statements is incorrect?

(a) Zealandia has land mass of around 5 million sq km.
(b) 94 percent of Zealandia is underwater, it has distinctive geology, and crust is much thicker than that found on ocean floor.
(c) New Zealand, New Caledonia and Lord Howe Island lies above the surface.
(d) Zealandia was part of Angaraland which was part of Pangea.

73. Which of the following evidences support the Continental Drift Theory?

1. Matching of Africa and South America continents.
2. Rocks of the same age across the oceans
3. Absences of source rock in the region of rich placer deposits
4. Distribution of fossils

Select the correct answer using the code given below:

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

74. Consider the following statements regarding 'Continental Drift Theory' suggested by Alfred Wegener:

1. He named super-continent as Pangaea, which meant all earth.
2. Pangaea broke into three large continental masses as Laurasia, Gondwanaland, and Panthalassa.

Which of the above statements is/are correct?

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

75. With reference to the theory of Isostasy, consider the following statements:

1. It is based on the opposing influence of two main forces i.e. Buoyancy and Gravity
2. It is the state of gravitational equilibrium between earth's crust and core.

Which of the above statements is/are correct?

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

76. Consider the following statements about the sea-floor spreading theory:

1. The theory was proposed by Harry Hess.
2. One of the assumption made is that spreading of one ocean causes the shrinking of the other.

Which of the above statements is/are correct?

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

77. Which of the following forces, according to Alfred Wegener, were responsible for the drifting of the continents?

(a) Pole-fleeing force and tidal force
(b) Gravitational and centripetal force
(c) Tidal force and kinetic forces
(d) Only Gravitational forces

78. Consider the following statements about the Convectional Current Theory:

1. Convection currents are generated due to radioactive elements causing thermal differences in the inner core portion of the earth.
2. These convection currents spread from core to the mantle portion resulting in the force for the drift of the continents.

Which of the above statements is/are correct?

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

79. Which of the following plates can be categorized as the major plates?

1. Antarctica and Pacific plate
2. North American Plate
3. Arabian Plate
4. Caroline Plate

Select the correct answer using the code given below:

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

80. Match the following:

Minor Tectonic Plates	**Extension**
A. Cocos plate	1. Between South America and Pacific plate
B. Nazca plate	2. Between Central America and Pacific plate
C. Arabian plate	3. Mostly the Saudi Arabian landmass

Select the correct answer using the code given below:

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

81. Which of the following statements is/are correct about the divergent plate boundaries?

1. Mid-Atlantic Ridge is an example of divergent plate.
2. New Crust is created when plates pull apart from each other.

Select the correct answer using the code given below:

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

82. Consider the following statements about the convergent boundaries as per plate tectonics theory:

1. Crust is destroyed when two plates converge .
2. Only convergence of oceanic and continental plates is possible.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

83. Which of the following statements is/are correct about the plate movement?

1. The strips of normal and reverse magnetic field that parallel the mid-oceanic ridges help scientists determine the rates of plate movement
2. Convection current is responsible for the movement of the plates.

Select the correct answer using the code given below:

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

84. Which of the following physiographic features are formed due to collision of Continental plates on the Earth's surface?

1. The Alps
2. The Himalayas
3. The Rockies
4. The Caucasus Mountains

Select the correct answer using the code given below:

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

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

85. Which of the following statements is incorrect regarding variation of biodiversity over Earth's surface?

(a) Terrestrial biodiversity is higher near the equator than poles.

(b) Exogenic processes play no role in influencing biodiversity.

(c) The polar region has a large population of fewer species than the tropical region.

(d) None of the above.

86. Which of the following best explains the landforms 'Mesas and Buttes'?

(a) Flat, table like land masses with a very resistant horizontal top layer & very steep sides.

(b) Formation of irregular edges on alternate bands of softer & harder rocks.

(c) Tabular masses which have a layer of soft rocks lying beneath a surface layer of more resistant rocks.

(d) Isolated residual hills rising abruptly from the ground level

87. Consider the following statements regarding Pediments and Pediplains :

1. Pediments are formed by lateral erosion by combined action of wind and streams.
2. Pediplains are fluvial landforms which are found in the foot of hills in desert while pediments are low-lying reliefs found in deserts.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

88. Consider the following statements regarding erosional desert landforms:

1. Playas are shallow lakes formed at the centre of basin surrounded from all sides by uplands.
2. Deflation hollows are shallow depressions formed due to persistent movement of wind currents in a particular direction.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

89. Consider the following statements regarding different erosional fluvial landforms :

1. Mushroom rocks are formed due to equivalent erosional action of winds at different level from earth's surface.
2. When the top of a mushroom rocks carved out as square then it is called pedestal rock.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

90. Consider the following statements regarding depositional landforms in deserts:

1. Barchans are parabolic shaped sand dunes found in desert.
2. Longitudinal dunes are formed when supply of sand blowing in the region is good and wind direction is not constant.

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

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

91. Which of the following statements is correct regarding Loess?

(a) They are formed when the surface covered by deposits of wind transported silt that has settled out from dust storms over many thousands of years.

(b) It is long, narrow ridges of sand that lie parallel to the direction of the prevailing winds.

(c) It is an isolated heap of free sand.

(d) It dunes are common in the western part of the Thar Desert of India.

92. Meanders are formed in which of the following course of the river?

1. Mountain course
2. Middle course
3. Lower course

Select the correct answer using the code given below:

(a) 1 only 1 and 2 only

(b) 2 only 2 and 3 only

93. Consider the following statements regarding erosional landforms created by rivers:

1. Canyon is an extreme type of V-shaped valley with the very steep sides and no valley floor.
2. Grand Canyon is associated with the Colorado River.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

94. Which of the following landforms are formed by river streams during their youth stage?

1. V-Shaped valleys
2. Rapids
3. Waterfalls
4. Oxbow lakes

Select the correct answer using the code given below:

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

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

95. Which of the following are the erosional landforms formed by running water?

1. Potholes and Plunge Pools
2. River Terraces
3. Floodplains
4. Sinkholes
5. Incised meanders

Select the correct answer using the code given below:

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

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

96. Which of the following statements is incorrect*?*

(a) Gorges and canyons are formed out of soft sedimentary rocks.

(b) Potholes are the circular depressions formed over the rocky beds of hill-streams

(c) Large and deep holes at the base of waterfalls are called plunge pools.

(d) None of the above

97. Which of the following statements is/are correct with reference to meandering of rivers?

1. It is a channeled pattern formed over floodplains and delta plains.
2. Its formations depends upon the propensity of water flowing, unconsolidated nature of alluvial deposits and coriolis force

Select the correct answer using the code given below:

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

98. Consider the following landforms:

1. Natural levees and point bars are the erosional landforms associated with floodplains.
2. Point bars are the sediments deposited on the convex side of meanders of large rivers.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

99. Which of the following are erosional features in a fluvial landscape?

1. River terrace
2. Incised Meander
3. Fans
4. Deltas

Select the correct answer using the code given below:

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

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

100. Which of the following is not a feature of karsts landforms?

(a) Sinkholes (c) Point bars

(b) Uvalas (d) Stalactite

101. Which of the following statements is/are correct with reference to Karst topography?

1. It is a result of the action of groundwater through the processes of solution and deposition.
2. It is a dominant feature of the limestone regions.

Select the correct answer using the code given below:

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

102. Which one of the following sentences best defines the term 'Uvalas'?

(a) A landform whose opening is more or less circular at the top and funnel shaped towards bottom

(b) An irregular surface with sharp pinnacles, grooves and ridges

(c) An elongated trench formed when sink holes and dolines join together

(d) A small to medium sized shallow depression on the surface of limestones

103. Consider the following landforms:

1. A stalagmite is a mineral formation that has its base on the ceiling of a cave whereas stalactites rise up from the floor of the caves.
2. Stalagmites and stalactites are the depositional landforms of groundwater.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

104. Consider the following statements regarding the continental glaciers:

1. A thick ice sheet covering a vast area of land is called a continental glacier.
2. Continental glaciers build up at the centre and move outward in all directions.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

105. Consider the following statements regarding the Valley Glaciers:

1. When a mass of ice from the high mountainous regions starts moving down into the pre-existing valleys, it is called a valley glacier.
2. Siachen Glacier lies in the Pir Panjal Range of Himalayas.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

106. Which of the following landforms is/are created by glacial erosion?

1. Cirque
2. 'U' shaped valley
3. Hanging Valley

Select the correct answer using the code given below:

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

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

107. Consider the following statements regarding the Hanging Valley:

1. The Hanging Valley of the tributary glacier looks like hanging downwards at the point of its confluence with the main valley.
2. When the ice melts in the hanging valley, a waterfall is formed at the point of confluence of this stream with the main river.

Which of the above statements is/are correct?

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

108. Consider the following statements regarding the Erosional Landforms formed by glaciers:

1. Horns are formed by lateral erosion of the cirque walls by glaciers.
2. Serrated Ridges or Arêtes are formed by the erosion of headwall of criques.

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

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

109. Consider the following statements regarding the Glacial Valleys and Troughs:

1. Glacial Valleys contain moraines, hanging valleys and are swampy in appearance.
2. Fiords are shallow depressions found alongside glacial valleys.

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

(a) 1 only (c) Both 1 and 2

(b) 2 only (d) Neither 1 nor 2

110. When the glacier melts or retreats, it deposits its load of different parts and the deposited debris called moraines. Consider the following statements regarding different types of moraines:

1. Moraines thus formed on the confluence of two glaciers are called terminal moraines.
2. When the glacier melts, the debris is deposited at the end of the valley glacier in the form of a ridge called lateral moraine.
3. The moraine which is deposited on either side of a glacier is called medial moraine.

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

(a) 1 only (c) 1 and 3 only

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

111. 'Eskers are unique depositional land forms formed by running water in glaciated regions.' Consider the following statements about them:

1. They are sinuous ridge formed by accumulation of debris of boulders and rocks beneath a glacier.
2. Gravel and boulders are accumulated by sub-glacial streams flowing beneath the glaciers.

Which of the above statements is/are correct?

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

112. Consider the following statements regarding Drumlins:

1. They are ridge like features in glaciated regions having pointed peaks.
2. They indicate the direction of flow of glaciers.

Which of the above statements is/are correct?

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

113. Consider the following statements regarding the erosive action of sea waves:

1. When the sea water loaded with rock fragments and sand attack the coastal rocks it is called abrasion.
2. The rock particles present in the water hit against each other and break into progressively smaller particles, the process is called attrition.

Which of the above statements is/are correct?

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

114. Which of the following landforms are created by the sea waves?

1. Sea Cliff
2. Sea Caves
3. Sea Arches
4. Bars and Spits

Select the correct answer using the code given below:

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

115. Which of the following statements regarding a Fjord is/are correct?

1. It is an emergent coast which originally was a submerged glaciated valley.
2. It is long, narrow inlet of the sea bounded by steep mountain slopes extending to considerable depths.

Select the correct answer using the code given below:

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

116. Consider the following statements regarding physical features alongside high rocky coasts:

1. It possess different depositional features formed by sea waves such as wave-built terrace.
2. Bars and spits are absent at high rocky coasts due to washing away of eroded materials by sea waves.

Which of the above statements is/are correct?

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

117. Consider the following statements regarding Low Sedimentary Coasts:

1. Coastal plains and deltas are prominent physical features formed alongside low sedimentary coasts.
2. Western coast of Indian Peninsula is low sedimentary coast while eastern coast is high rocky coast.

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

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

118. Consider the following statements regarding the Erosional Coastal Landforms:

1. Sea-cliffs are horizontal while terraces are vertical erosional features in coastal regions.
2. On foot of wave cut terraces, sea cliffs are formed by the erosional work of breaking waves.

Which of the above statements is/are correct?

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

119. Consider the following statements regarding the Caves and Stacks:

1. Sea stacks are wide hollows which are formed by at the base of cliffs due to impact of sea waves.
2. Caves are isolated masses of rocks standing offshore formed due to separation from cliffs by wave action.

Which of the above statements is/are correct?

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

120. Consider the following statements regarding the depositional coastal landforms:

1. Shingle beaches are those beaches which are formed by small pebbles and cobbles.
2. Beaches and dunes are common features found alongside high rocky coasts.

Which of the above statements is/are correct?

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

121. Consider the following statements regarding depositional coastal landforms:

1. Barriers are attached to the seashore while spits are offshore depositional landforms formed by sea waves.
2. Barriers are submerged landforms while bars are found on the surface of sea or ocean.

Which of the above statements is/are correct?

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

122. Consider the following statements regarding Outwash Plains:

1. They are transition zone between glacial mountains and continental ice-sheets.
2. They are made up of fluvial deposits similar to alluvial plains formed by rivers.

Which of the above statements is/are correct?

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

123. Consider the following statements regarding Erosional process:

1. It is controlled by the Kinetic Energy.
2. Weathering is a pre-condition for erosion to take place.

Which of the above statements is/are correct?

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

124. Match the following:

List-I	List-II
A. Solution	1. Takes place below the water table
B. Carbonation	2. Removal of solids in solution
C. Hydration	3. Breaking down of feldspar
D. Reduction	4. Minerals take up water and expand

Select the correct answer using the code given below:

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

125. Consider the following statements regarding Exfoliated Domes and Exfoliated Torse:

1. Both are developed from expansion due to unloading and pressure release.
2. Exfoliated domes are large, smooth rounded domes, while exfoliated tors are smooth, surfaced and rounded small to big boulders.

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

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

126. A weathering process, in which layers of rocks peel off as expansion alternates with contraction, is known as:

(a) Shattering
(b) Block separation
(c) Granular disintegration
(d) Exfoliation

127. Match the following:

Peak	Location
A. Saddle Peak	1. North Andaman
B. Mount Diavolo	2. South Andaman
C. Mount Thuiller	3. Middle Andaman
D. Mount Koyob	4. Great Nicobar

Select the correct answer using the code given below:

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

OCEANOGRAPHY

1. Which of the following processes are considered a part of water cycle?

1. Evapo-transpiration
2. Sublimation
3. Snowmelt runoff to streams
4. Groundwater discharge springs

Select the correct answer using the code given below:

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

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

GEOGRAPHY
ANSWERS

GEOMORPHOLOGY

1. Exp. (b)

- **Mathematician Laplace propounded a hypothesis regarding the origin of the earth in 1796, popularly known as 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.

2. Exp. (b)

- **Edwin Hubble, in 1920, provided evidence that the universe is expanding by propounding the Big Bang Theory.**
- The most popular argument regarding the origin of the universe is the Big Bang Theory. It is also called expanding universe hypothesis. As time passes, galaxies move further and further apart. Similarly, the distance between the galaxies is also found to be increasing and thereby, the universe is considered to be expanding.

3. Exp. (a)

- **Jovian (and not terrestrial) planets have a thick atmosphere, mostly of helium and hydrogen.**
- Terrestrial planets are made up of rock and metals, and have relatively high densities.

4. Exp. (d)

- The terrestrial planets were formed in the close vicinity of the parent star whereas jovian planets were formed at quite a distant location.
- The terrestrial planets are smaller than jovian planets.

5. Exp. (c)

- The Big Splat theory describes the formation of the Moon.
- 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".

6. Exp. (c)

- 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.

7. Exp. (a)

- **From the crust to the core, the density of the material increases.**
- During the formation of the moon, due to the giant impact, the earth was further heated up. **It is through the process of differentiation that the earth forming material got separated into different layers.**

8. Exp. (d)

- The process through which the gases were outpoured from the interior is called **degassing.**

9. Exp. (c)

- **The early atmosphere largely contained water vapour, nitrogen, carbon dioxide, methane, ammonia and very little of free oxygen.** The process through which the gases were outpoured from the interior is called degassing.
- **Continuous volcanic eruptions contributed water and gases to the atmosphere.** As the earth cooled, the water vapour released started getteing condensed.

10. Exp. (c)

- The correct chronology in the Stages in the Evolution of atmosphere is:
  - Loss of the primordial atmosphere
  - Hot gases outpoured from the interior
  - Process of photosynthesis

11. Exp. (a)

- **The earth's rotation generates centrifugal force.** This results in the deflection of air from its original place, causing a decrease in pressure.

12. Exp. (d)

- **Isogonic lines** are **lines** on the Earth's surface, used for magnetic declination, along which the declination has the same constant value, and **lines** along which the declination is zero are called agonic **lines**.

13. Exp. (b)

- **The direct sun rays on equator falls during Equinox which is on March 21st and September 21st.**
- **Summer solstice** refers to direct rays of sun on Tropic of cancer on June 21st and similarly,
- **Winter Solstice** falls on December 21st when sun rays are direct of Tropic of Capricorn.

14. Exp. (a)

- In the Northern Hemisphere, the Prime Meridian passes through the UK, France and Spain in Europe and Algeria, Mali, Burkina, Faso, Tongo and Ghana in Africa.
- The only landmass crossed by the Meridian in the Southern Hemisphere is Antarctica

15. Exp. (b)

- Crust is the outermost solid part of the earth. It is brittle in nature. Oceanic crust is thinner as compared to the continental crust.
- The portion of the interior beyond the crust is called the mantle. The upper portion of the mantle is called asthenosphere.
- The outer core is in liquid state while the inner core is in solid state. The core is made up of very heavy material mostly constituted by nickel and iron. It is sometimes referred to as the nife layer.

16. Exp. (d)

- The portion of the interior earth beyond the crust is called the mantle. It has a density higher than the crust (3.4 g/cm). But its density is less than that of outer core. Density, in general, increases as we move towards interior of the earth.
- The outer core is in liquid state while the inner core is in solid state. The density of material at the mantle core boundary is around 5 g/cm^3.
- Mantle of the earth is considered the main source of magma that has been released out in the recent past.

17. Exp. (c)

- Asthenosphere, is the zone of Earth's mantle lying beneath the lithosphere and believed to be much hotter and more fluid than the lithosphere.

18. Exp. (d)

- **Conrad Discontinuity:** Transition zone between SIAL and SIMA.
- **Mohorovicic Discontinuity:** Transition zone between the Crust and Mantle.
- **Repiti Discontinuity:** Transition zone between Outer mantle and Inner mantle.
- **Gutenberg Discontinuity:** Transition zone between Mantle and Core.
- **Lehman Discontinuity:** Transition zone between Outer core and Inner core.

19. Exp. (b)

- **Volcanic eruption forms source of obtaining direct information.** As and when the molten material (magma) is thrown onto the surface of the earth, during volcanic eruption it becomes available for laboratory analysis.
- The study of seismic waves generated during earthquake provides a complete picture of the layered interior.

20. Exp. (c)

- Calderas are the most explosive of the earth's volcanoes.
- They are usually so explosive that when they erupt they tend to collapse on themselves rather than building any tall structure.
- The collapsed depressions are called calderas.
- Their explosiveness indicates that the magma chamber supplying the lava is not only huge but is also in close vicinity.

21. Exp. (b)

Types of minerals	Name of the minerals
A. Non-metallic	2. Gypsum
B. Metallic	4. Wolfram
C. Refractory	1. Kyanite
D. Fertilizer	3. Asbestos

22. Exp. (a)

Major Elements of the Earth's Crust	
Elements By 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

23. Exp. (b)

Feldspar

- It has light cream to salmon pink colour. Feldspar is used in ceramics and glassmaking. **Feldspar is present in half of the earth's crust, while Pyroxene forms 10% of the earth's crust.**

Pyroxene

- It consists of calcium, aluminium, 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 colour.

24. Exp. (b)

- **Mica is not a single element mineral.** It is made up of elements like potassium, aluminium, magnesium, iron, silicon, etc.

25. Exp. (d)

- **Quartz is one of the most important components of sand and granite**. It consists of silica. It is a hard mineral virtually insoluble in water. It is white or colourless and used in radio and radar.
- Mica comprises of potassium, aluminium, magnesium, iron, silica etc. It forms 4 per cent of the earth's crust. **It is commonly found in igneous and metamorphic rocks.** It is used in electrical instruments.
- Magnesium, iron and silica are major elements of **olivine.** It is used in jewellery. It is usually a greenish crystal, **often found in basaltic rocks.**

26. Exp. (d)

- **Metallic Minerals** contain metal content.
- **Non-metallic minerals contain non-metallic minerals. Cement does not contain iron and is a mixture of non-metallic mineral.**

27. Exp. (a)

Rock	Type
A. Clastic	2. Conglomerate
B. Extrusive	1. Tuff
C. Metamorphic	3. Gneiss
D. Plutonic	4. Granite

28. Exp. (a)

- **Igneous rocks are formed through the cooling and solidification of magma or lava such as granite and diorite.**
- **Sedimentary rocks are derived from the process of deposition and solidification** of sediments after the process of denudation. For instance; Sandstone, limestone and chalk rock salts, gypsum or calcium sulphate, etc.
- **Metamorphic Rocks:** Metamorphic rocks arise from the transformation of existing rock types, in a process called metamorphism, which means "change in form". Gneiss, phyllite, slate, schist, marble, quartzite, etc belongs to the category of metamorphic rocks.

29. Exp. (c)

- As igneous rocks form out of magma and lava from the interior of the earth, they are known as primary rocks. The igneous rocks (Ignis – in Latin means 'Fire') are formed when magma cools in its upward movement and turns into a solid form.
- Granite, gabbro, pegmatite, basalt, volcanic breccia, and tuff are some of the examples of igneous rocks.

30. Exp. (c)

- The process of converting unconsolidated sediment into consolidated sedimentary rock is known **as diagenesis or alternatively lithification.** This process involves compaction and squeezing as the sediments become buried.
- Diagenesis also involves cementing of the individual grains together as water is either evaporated or squeezed out of the primary pore spaces.

31. Exp. (a)

- Depending upon the mode of formation, sedimentary rocks are classified into three major groups:
  - **Mechanically formed** — Sandstone, conglomerate, limestone, shale, loess etc. are examples;
  - **Organically formed** — Geyserite, chalk, limestone, coal etc. are some examples;
  - **Chemically formed** — Chert, limestone, halite, potash etc. are some examples.

32. Exp. (a)

Sedimentary Rocks

- These rocks are formed by successive deposition of sediments.
- These sediments may be the debris eroded from any previous existing rock which may be igneous, metamorphic or old sedimentary rocks.
- The process of successive deposition and formation of sedimentary rocks is called as Lithification.
- Due to successive depositions, they have a layered or stratified structure and hence are also called as Stratified Rocks.

33. Exp. (d)

- There are many different kinds of rocks which are grouped under three families on the basis of their mode of formation. They are:
  - **Igneous Rocks** — solidified from magma and lava
  - **Sedimentary Rocks** — the result of

deposition of fragments of rocks by exogenous processes

- **Metamorphic Rocks** — formed out of existing rocks undergoing recrystallisation.

34. Exp. (a)

- The word metamorphic means 'change of form'. These rocks form under the action of pressure, volume and temperature (PVT) changes.
- **Metamorphism is a process by which already consolidated rocks undergo recrystallisation and reorganisation of materials within original rocks.**
- Gneissoid, granite, syenite, slate, schist, marble, quartzite etc. are some examples of metamorphic rocks.
- **Shale is an example of Sedimentary rocks.**

35. Exp. (c)

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

36. Exp. (c)

- The exogenic processes obtain their energy from the gradients generated by tectonic factors, processes, their corresponding driving forces and atmosphere determined by the energy from the sun.
- Precipitation and temperature are the two significant climatic components that regulate different processes.
- Whole exogenic geomorphic processes are covered under a common term, denudation which means to uncover.
- Weathering, transportation, and erosion are comprised in denudation.

37. Exp. (c)

- The energy emanating from within the earth is the main force behind endogenic geomorphic processes.
- This energy is mostly generated by radioactivity, rotational and tidal friction and primordial heat from the origin of the earth.

38. Exp. (a)

Term	Definition
A. Lithification	2. Turning of fragments into rocks through compaction
B. Foliation	3. Arrangement of minerals in layers in metamorphic rocks
C. Banding	1. Arrangement of minerals into thin to thick layers appearing in light and dark shades

39. Exp. (d)

- **Orogenic Processes includes mountain building through severe folding and faulting affecting long and narrow belts of the crust of Earth.** It is a mountain building process.
- **Epeirogenic processes involve the uplift or warping of large parts of the crust of the earth.** It is a continental building process.

40. Exp. (d)

Physical Weathering Processes

- Physical or mechanical weathering processes depend on applied forces. The applied forces could be:
  - Gravitational forces such as overburden pressure, load and shearing stress;
  - Expansion forces due to temperature changes, crystal growth or animal activity
  - Water pressures controlled by wetting and drying cycles.

41. Exp. (a)

- **Weathering is the action of components of weather and climate materials over Earth.**
- There are several processes within weathering which act either independently or together to affect the materials of the earth in order to cut them to fragmental state.
- **This process causes mechanical disintegration and chemical decomposition of rocks near** the surface of the Earth.
- **As very little or no motion of materials takes place in weathering, it is an in-situ or on-site process.**

42. Exp. (b)

- Physical or mechanical weathering processes are influenced by some applied forces.
- The applied forces are:
  - Gravitational forces like shearing stress, load, and overburden pressure.

- Expansion forces due to crystal growth, animal activity or temperature variations.
- Water pressures regulated by drying and wetting cycles.

- Radioactivity is not merely a physical process; it involves nuclear forces and disintegration.

43. Exp. (d)

Effects of Weathering	Result
1. Unloading and Expansion	Exfoliation domes
2. Salt weathering	Granular foliation
3. Frost wedging	Glacial regions

44. Exp. (b)

- **Biological weathering only refers to weathering caused by plants, animals, fungi, and microorganisms such as bacteria.**
- It is contributed to or removal of ions and minerals from the weathering environment and physical variations due to movement or development of organisms.
- It is also the wearying and subsequent fragmentation of rock by plants, animals, and microbes.

45. Exp. (a)

- Mass movement is also known as mass wasting.
- **It is the movement of masses of bodies of mud, bedrock, soil, and rock debris, which commonly happen along steep-sided hills and mountains because of the gravitational pull.**
- Gravity exerts its force on all matter, both bedrock and the products of weathering.
- Hence, **weathering is not essential for mass movement though it helps mass movements.**

46. Exp. (d)

- There are many activating causes preceding mass movements. They are :
  - **Removal of support from below to materials above through natural or artificial means.**
  - An upsurge in height of slopes and gradient.
  - **Overfilling through addition of materials by artificial filling or naturally.**
  - Overburdening due to heavy rainfall, saturation, and lubrication of slope materials.
  - Elimination of material or load from over the original slope surfaces.
  - **Event of explosions, earthquakes, etc.**
  - Extreme natural seepage.
  - Heavy drawdown of water from reservoirs, lakes, and rivers leading to a slow outflow of water from under the slopes or river banks.
  - Indiscriminate removal of natural vegetation.

47. Exp. (d)

- Solifluction is an example of slow mass movement.
- Mud-Flow is an example of rapid mass movement.

48. Exp. (b)

- **Solifluction** involves slow down slope flowing soil mass or fine grained rock debris saturated or lubricated with water.
- This process is quite common in moist temperate areas where surface melting of deeply frozen ground and long continued rain respectively, occur frequently. When the upper portions get saturated and when the lower parts are impervious to water percolation, flowing occurs in the upper parts.

49. Exp. (a)

- Creep is a type of slow mass movement that can occur on moderately steep, soil covered slopes.
- Movement of materials is extremely slow and imperceptible except through extended observation. Materials involved can be soil or rock debris.
- **Fence posts, telephone poles leaning downslope from their vertical position and in their linear alignment is due to the creep effect.**

50. Exp. (b)

- Creep, Solifluction and Rock Creep are types of slow mass movement.
- Earthflow, Mudflow and Debris Avalanche are types of rapid mass movement.

51. Exp. (c)

- Landslides are relatively rapid and perceptible movements. The materials involved are relatively dry. The size and shape of the detached mass depends on the nature of discontinuities in the rock, the degree of weathering and the steepness of the slope.
  - **Slump is slipping of one or several units of rock debris with a backward rotation with respect to the slope over which the movement takes place.**
  - **Rapid rolling or sliding of earth debris without backward rotation of mass is known as debris slide.** Debris fall is nearly a free fall of earth debris from a vertical or overhanging face.
  - Sliding of individual rock masses down bedding, joint or fault surfaces is rockslide. Over steep slopes, rock sliding is very fast and destructive

52. Exp. (a)

- Intensive rainfall; Snow thawing; Himalayas are mostly made up of sedimentary rocks and unconsolidated and semi-consolidated deposits, which is more fragile. The steep and sharp slopes of the Himalayan mountains is one of the major reasons for frequent landslides compared to other regions in India.
- Plate tectonics: Himalayan ranges are situated at the convergence zone of two lithospheric plates i.e Indian plate in South and Eurasian plate in North. It makes Himalayas are tectonically more active.

53. Exp. (c)

- Erosion involves acquisition and transportation of rock debris. When massive rocks break into smaller fragments through weathering and any other process, **erosional geomorphic agents like running water, groundwater, glaciers, wind and waves remove and transport and deposit it to other places depending upon the dynamics of each of these agents.**
- **Though the glaciers move at very low velocities due to tremendous mass are more effective as the agents of erosion and wind, being in gaseous state, is less effective.**

54. Exp. (a)

- Earthquakes generate three types of seismic waves: P (primary) waves, S (secondary) waves and surface waves (L waves), which arrive at seismic recording stations one after another.
- Both P and S waves penetrate the interior of the Earth while surface waves do not. Due to this, P and S waves are known as "body waves".
- **The Love (L) waves are surface waves as they travel along the surface of the earth from the point directly above the quake or epicentre.** L waves are shear waves where the shearing (back and forth) motion, is confined to a horizontal plane at the Earth's surface.

55. Exp. (a)

- There are **two types of body waves**. They are called P and S-waves. P-waves move faster and are the first to arrive at the surface. These are also called 'primary waves'.
- The P-waves are similar to sound waves. They travel through gaseous, liquid and solid materials.

56. Exp. (c)

- The point where the energy is released is called the focus of an earthquake or the hypocenter.
- The energy waves travelling 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.
- It is a point directly above the focus.

57. Exp. (d)

- The seismic shadow zone is the reach of the Earth's surface where seismographs cannot detect an earthquake after the waves have passed through the earth
- P-waves are refracted by the liquid outer core and are not detected between 104° and 142°
- S-waves cannot pass through the liquid outer core and are not detected beyond 103°

58. Exp. (b)

- Earthquake waves get recorded in seismographs located at far off locations. However, there exist some specific areas where the waves are not reported. Such a zone is called the **'shadow zone'**.
- The study of different events reveals that for each earthquake, there exists an altogether different shadow zone.

59. Exp. (d)

- There exist some specific areas on Earth where the earthquake waves are not reported. Such a zone is called the 'shadow zone'.

60. Exp. (d)

- In the areas of intense mining activity, sometimes the roofs of underground mines collapse causing minor tremors. These are called **collapse earthquakes.** Ground shaking may also occur due to the explosion of chemical or nuclear devices. Such tremors are called explosion earthquakes.

61. Exp. (d)

- The following are the immediate hazardous effects of earthquake:
  - Ground Shaking
  - Differential ground settlement
  - Land and mud slides
  - Soil liquefaction
  - Ground lurching
  - Avalanches
  - Ground displacement
  - Floods from dam and levee failures
  - Fires
  - Structural collapse
  - Falling objects
  - Tsunami

62. Exp. (d)

- Earthquakes are measured using seismographs, which monitor the seismic waves that travel through the Earth after an earthquake strikes.
- The magnitude scale is known as the Richter scale. The magnitude relates to the energy released during the quake. The magnitude is expressed in numbers, 0-10.
- The intensity scale is named after Mercalli, an Italian seismologist. The intensity scale takes into account the visible damage caused by the event. The range of intensity scale is from 1-12.

63. Exp. (c)

- All natural earthquakes take place in the lithosphere.
- Although body waves are faster and arrive first at the surface they are less damaging than surface waves.

64. Exp. (a)

- Body waves are generated due to the release of energy at the focus and move in all directions traveling through the body of the earth.
- The velocity of waves changes as they travel through materials with different densities. The denser the material, the higher is the velocity. Their direction also changes as they reflect or refract when coming across materials with different densities.
- The body waves interact with the surface rocks and generate a new set of waves called surface waves. **Surface wave is a type of earthquake wave (not of body wave).** These waves are more destructive.

65. Exp. (c)

- A volcano is a place where gases, ashes and/or molten rock material – lava – escape to the ground. A volcano is called an active volcano if the materials mentioned are being released or have been released out in the recent past.
- The material in the upper mantle portion is called **magma.** Once it starts moving towards the crust or it reaches the surface, it is referred to as **Lava.**

66. Exp. (a)

- **Barring the basalt flows, the shield volcanoes are the largest of all the volcanoes on the earth. The Hawaiian volcanoes are the most famous examples**. These volcanoes are mostly made up of basalt, a type of lava that is very fluid when erupted. For this reason, these volcanoes are not steep. They become explosive if somehow water gets into the vent; otherwise, they are characterised by low-explosivity. The upcoming lava moves in the form of a fountain and throws out the cone at the top of the vent and develops into cinder cone.
- **Composite Volcanoes** are characterised by eruptions of cooler and more viscous lavas than basalt. These volcanoes often result in explosive eruptions. Along with lava, large quantities of pyroclastic material and ashes find their way to the ground. This material accumulates in the vicinity of the vent openings leading to formation of layers, and this makes the mounts appear as composite volcanoes.

67. Exp. (d)

- Flood Basalt Provinces volcanoes outpour highly fluid lava that flows for long distances.
- The Deccan Traps from India, presently covering most of the Maharashtra plateau, are a much larger flood basalt province.

68. Exp. (c)

- **Mid-Ocean Ridge Volcanoes:** These volcanoes occur in the oceanic areas. There is a system of mid-ocean ridges more than 70,000 km long that stretches through all the ocean basins. The central portion of this ridge experiences frequent eruptions.

69. Exp. (c)

- **Batholiths:** A large body of magmatic material that cools in the deeper depth of the crust develops in the form of large domes. They appear on the surface only after the denudational processes remove the overlying materials. They cover large areas, and at times, assume depth that may be several km. These are granitic bodies. Batholiths are the cooled portion of magma chambers.
- The Karnataka plateau is spotted with domal hills of granite rocks. Most of these, now exfoliated, are examples of lacoliths or batholiths.

70. Exp. (d)

List I	List II
A. Lapoliths	2. A type of intrusive volcanic landforms having saucer shape.
B. Sills	4. A thin horizontal intrusive igneous landform.
C. Dykes	3. A vertical wall- like structure that forms after cooling of lava.
D. Deccan Trap	1. It is an example of Flood Basalt Province.

71. Exp. (c)

- Intrusive landforms are formed when magma cools within the crust
- The intrusive activity of volcanoes gives rise to various forms.
  - Batholiths
  - Laccoliths

- Phacoliths
- Sills
- Dykes

72. Exp. (d)

- Although **Zealandia** was submerged from the time it separated from Australia and Antarctica – part of the ancient continent of Gondwana – 80 million years ago, this event pushed it deeper beneath the sea.

73. Exp. (d)

- **The Matching of Continents (Jig-Saw-Fit):** The shorelines of Africa and South America facing each other have a remarkable and unmistakable match.
- **Rocks of Same Age Across the Oceans:** The radiometric dating methods developed in the recent period have facilitated correlating the rock formation from different continents across the vast ocean.
- The glacial tillite provides unambiguous evidence of palaeoclimates and also of drifting of continents.
- The occurrence of rich placer deposits of gold in the Ghana coast and the absolute absence of source rock in the region is an amazing fact.
- **Distribution of Fossils.**

74. Exp. (a)

- Alfred Wegener, a German meteorologist, put forth a comprehensive argument in the form of "the continental drift theory" in 1912.
- According to Wegener, all the continents formed a single continental mass, a mega ocean surrounded by the same.
- The supercontinent was named PANGAEA, which meant all earth. The mega-ocean was called PANTHALASSA, meaning all water.
- He argued that, around 200 million years ago, the supercontinent, 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.

75. Exp. (a)

- Theory of Isostasy, is a fundamental concept in geology, **is based on the opposing influence of two main forces – Buoyancy and Gravity**
- **It is the state of gravitational equilibrium between earth's crust and mantle,** Such that – The crust floats at an elevation that depends on its thickness and density.
- It is the idea that **the lighter crust must be floating on the denser underlying mantle.**

76. Exp. (a)

- The analysis of magnetic properties of the rocks on either sides of the mid-oceanic ridge led Harry Hess (1961) to propose his hypothesis, known as the "sea floor spreading".
- Hess argued that constant eruptions at the crust of oceanic ridges cause the rupture of the oceanic crust and the new lava wedges into it, pushing the oceanic crust on either side. The ocean floor thus spreads.
- The younger age of the oceanic crust as well as the fact that the spreading of one ocean does not cause the shrinking of the other, made Hess think about the consumption of the oceanic crust.
- He further maintained that the ocean floor that gets pushed due to volcanic eruptions at the crust, sinks down at the oceanic trenches and gets consumed.

77. Exp. (a)

- It was **Alfred Wegener** (German meteorologist) who put forth a comprehensive argument in the form of **"the continental drift theory" in 1912.**
- According to Wegener, **all the continents formed a single continental mass (Pangaea) and Mega Ocean (Panthalassa)** surrounded the same.
- Wegener suggested that the movement responsible for the drifting of the continents caused by **pole-fleeing force and tidal force.**
- The **polar-fleeing force relates to the rotation of the earth.**

78. Exp. (d)

- Arthur Holmes in 1930s discussed the possibility of convection currents operating in the mantle portion.
- **These currents are generated due to radioactive elements causing thermal differences in the mantle portion**.
- Holmes argued that there exists a system of such currents in the entire mantle portion.
- This was an attempt to provide an explanation to the issue of force, on the basis of which contemporary scientists discarded the continental drift theory.

79. Exp. (a)

Major Plates

- Antarctica and the surrounding oceanic plate
- North American (with western Atlantic floor separated from the South American plate along the

Caribbean islands) plate

- South American (with western Atlantic floor separated from the North American plate along the Caribbean islands) plate
- Pacific plate
- India-Australia-New Zealand plate
- Africa with the eastern Atlantic floor plate
- Eurasia and the adjacent oceanic plate.

80. Exp. (b)

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 Asiatic and Pacific plate
- **Caroline plate:** Between the Philippine and Indian plate (North of New Guinea)
- **Fuji plate :** North-east of Australia

81. Exp. (c)

Divergent Boundaries

- **New crust is generated as the plates pull away from each other**.
- The sites where the plates move away from each other are called spreading sites.
- **The best-known example of divergent boundaries is the Mid-Atlantic Ridge.**

82. Exp. (a)

- According to Plate Tectonics theory, Crust is destroyed when plates converge and three types of convergence are possible:
- between an oceanic and continental plate
- between two oceanic plates
- between two continental plates

83. Exp. (c)

- The strips of normal and reverse magnetic field that parallel the mid-oceanic ridges help scientists determine the rates of plate movement. These rates vary considerably.
- The mobile rock beneath the rigid plates is believed to be moving in a circular manner.
- The heated material rises to the surface, spreads and begins to cool, and then sinks back into deeper depths.
- This cycle is repeated over and over to generate what scientists call a convection cell or convective flow.

84. Exp. (c)

- **Convergent boundaries:** There are two main ways that two plates can converge. In a collision boundary, the two plates push almost equally against each other, buckling the material up in the middle. This leads to the formation of mountain ranges, such as the **Himalayas** and **the Alps.**
- The **Caucasus Mountains formed** largely as the result of a tectonic plate collision between **the Arabian plate moving northwards with respect to the Eurasian plate.**
- The Rockies are formed due to collision between American Plate (Continental) and Pacific Plate (Oceanic).

85. Exp. (b)

- Biodiversity is not evenly found on the earth.
- The weathering of Earth's crust is the basis for the diversity of vegetation and hence biodiversity.
- The basic cause for such weathering variations and resultant biodiversity is the input of solar energy and water. Hence the areas that are rich in these inputs are the areas of a wide spectrum of biodiversity.
- It is consistently richer in the tropics. As one approaches the polar region, one finds larger and larger populations of fewer and fewer species.
- More the variety of species in an ecosystem, more stable the ecosystem is.

86. Exp. (a)

- Mesa is a flat, table like land mass with a very resistant horizontal top layer & very steep sides, may be formed in canyon region.
- The hard stratum on the surface resist denudation by both wind & water thus protects the underlying layer of rocks from being eroded.
- **Continuous denudation through ages may reduce Mesas in area so that they become isolated flat topped hills called Buttes.** Many of which are separated by deep gorges & canyons.

87. Exp. (a)

- **Pediplains are low-lying featureless plains in deserts covered with debris or not while pediments are gently inclines rocky floors attached to the mountains.**
- Landscape evolution in deserts is primarily concerned with the formation and extension of pediments.
- Gently inclined rocky floors close to the mountains at their foot with or without a thin cover of debris, are called pediments. Such rocky floors

form through the erosion of mountain front through a combination of lateral erosion by streams and sheet flooding. Erosion starts along the steep margins of the landmass or the steep sides of the tectonically controlled steep incision features over the landmass.

88. Exp. (c)

- Plains 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 sufficient 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.**
- Weathered mantle from over the rocks or bare soil, gets blown out by persistent movement of wind currents in one direction. This process may create shallow depressions called deflation hollows.

89. Exp. (d)

- Mushroom rocks are formed due to differential erosional action of winds not equivalent erosional action at different level from earth's surface.
- When the top of a mushroom rocks carved out as square then it is called table rocks not pedestal rock.

90. Exp. (c)

- Both Barchans and siefs are Crescent shaped.
- Barchans have both wings while siefs has only one wing.
- Longitudinal dunes are formed when supply of sand blowing in the region is poor and wind blowing is constant.

91. Exp. (a)

- In several large areas of the world, the surface is covered by deposits of wind transported silt that has settled out from dust storms over many thousands of years. This material is known as loess.
- Loess tends to break away along vertical cliffs whenever it is exposed by the cutting of a stream or grading of a roadway.

92. Exp. (b)

- Meanders, ox bow lakes, basins all are formed in the mid course of the river.

93. Exp. (b)

- V-shaped valleys are divided into two types: Gorges and (b) Canyons. Gorges and Canyons represents very deep and **Narrow** valleys having very steep valley side slopes, say wall like steep valley sides.
- Normally a very deep and narrow valley is called a Gorge and the extended form of a Gorge is called a canyon.
- Grand Canyon is associated with the Colorado River. It is in Arizona (USA) and runs for 483 km and has a depth of 2.88 km.

94. Exp. (a)

Youth Stage of the River

- 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.
- **Oxbow lakes are formed by river streams during their old stage**

95. Exp. (d)

- **Valleys, Potholes and Plunge Pools, Incised or entrenched Meanders, River Terraces are the erosional landforms formed by running water**
- Floodplains are the **depositional landforms** formed by running water.
- Sinkholes are the erosional landforms formed by **ground water**

96. Exp. (a)

- A gorge is a deep valley with very steep to straight sides and a canyon is characterized by steep step-like side slopes. A gorge is almost equal in width at its top as well as its bottom. In contrast, a canyon is wider at its top than at its bottom.
- Canyons commonly form in horizontal bedded sedimentary rocks and gorges form in hard rocks.
- Over the rocky beds of hill-streams more or less circular depressions called potholes form because of stream erosion aided by the abrasion of rock fragments.
- At the foot of waterfalls also, large potholes, quite deep and wide, form because of the sheer impact of water and rotation of boulders. Such large and deep holes at the base of waterfalls are called plunge pools.

97. Exp. (c)

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:
  - **propensity of water flowing** over very gentle gradients to work laterally on the banks;
  - **unconsolidated nature of alluvial deposits** making up the banks with many irregularities which can be used by water exerting pressure laterally;
  - **coriolis force** acting on the fluid water deflecting it like it deflects the wind.

98. Exp. (b)

- **Natural levees and point bars are the depositional landforms associated with floodplains**.
- Natural levees and point bars are some of the important landforms found associated with floodplains. Natural levees are found along the banks of large rivers. They are low, linear and parallel ridges of coarse deposits along the banks of rivers, quite often cut into individual mounds.
- Point bars are also known as meander bars. They are found on the convex side of meanders of large rivers and are sediments deposited in a linear fashion by flowing waters along the bank.

99. Exp. (a)

- **River terraces** are surfaces marking old valley floor or floodplain levels. They **are basically products of erosion** as they result due to vertical erosion by the stream into its own depositional floodplain
- **Incised or Entrenched Meanders** are very deep wide meanders (loop-like channels) found cut in hard rocks. In the course of time, they deepen and widen to form gorges or canyons in hard rock.
- **Fans and deltas are depositional features.**

100. Exp. (c)

- Point bars are also known as meander bars. Point bars are important landforms found associated with floodplains. They are found on the convex side of meanders of large rivers and are sediments deposited in a linear fashion by flowing waters along the bank.
- All others are features of karsts landforms.

101. Exp. (c)

- **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.

102. Exp. (c)

- When sink holes and dolines join together because of slumping of materials along their margins or due to roof collapse of caves, long, narrow to wide trenches called **valley sinks or Uvalas form.**

103. Exp. (b)

- **A Stalactite** is a mineral formation that has its base on the ceiling of a cave whereas stalagmite rises up from the floor of the caves.
- **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**.

104. Exp. (c)

- A thick ice sheet covering a vast area of land is called a continental a glacier.
- Glaciers of this type build up at the centre and move outward in all directions.
- Continental glaciers are found mainly in Antarctica and Greenland.
- The precipitation in these regions occurs in the form of snow. It gets accumulated year by year because of the relatively slower rate of its melting.

105. Exp. (a)

- When a mass of ice from the high mountainous regions starts moving down into the pre-existing valleys, it is called **a valley glacier or a mountain glacier**.
- The longest glacier in India is the **Siachen Glacier in Karakoram Range** which is 72 kilometres long.
- **Gangotri Glacier in Uttarakhand** is 25.5 kilometres long. There are many smaller glaciers in other parts of the Himalaya. Their length varies from 5 to 10 kilometres.
- The two important rivers of India, the Ganga and Yamuna, originate from Gangotri and Yamunotri glaciers respectively.

106. Exp. (d)

- As a glacier moves over the land, it drags rock fragments, gravel and sand along with it. These rock fragments become efficient erosive tools. With their help glacier scrapes and scours the

surface rocks with which it comes in contact. This action of glacier leaves behind scratches and grooves on rocks.

- The landforms like Cirque, 'U' shaped valley, Hanging Valley etc are created by the glacial erosion.

107. Exp. (c)

- Hanging valleys are formed as a result of the erosion effects of glaciations. Hanging valleys are shallow canyons formed over a larger canyon, and are tributary valleys to the larger valleys.
- The hanging valleys are so named due to their positioning of being above main valleys. Hanging valleys form a characteristic U-shape above their respective main valleys, and have a steep wall at the point where the two valleys meet.
- Rivers form as the snow from the upper slopes of the mountains melts, and flow along the hanging valleys. Upon reaching the mouth of the hanging valley, where the valley meets the steep walls of the main valley, the river drops to form a waterfall.

108. Exp. (a)

- **Erosional landforms formed by glaciers:** Horns and Serrated ridges
- **Horns are formed through headward erosion of the cirque walls**. If three or more radiating glaciers cut headward until their cirques meet, high, sharp pointed and steep sided peaks called horns form.
- Lateral erosion helps in valley widening and is less intensive than headward erosion due to slow motion of glaciers.
- The divides between cirque side walls or head walls get narrow because of progressive erosion and turn into serrated or saw-toothed ridges sometimes referred to as arêtes with very sharp crest and a zig-zag outline.

109. Exp. (b)

- Glaciated valleys are trough-like and U-shaped with broad floors and relatively smooth, and steep sides. The valleys may contain littered debris or debris shaped as moraines with swampy appearance.
- **Very deep glacial troughs filled with sea water and making up shorelines (in high latitudes) are called fjords/fiords.**

110. Exp. (d)

- **Terminal Moraine** When the glacier melts, the debris is deposited at the end of the valley glacier in the form of a ridge. It is called terminal moraine. Morainic material ranges from fine clay to large angular boulders.
- **Lateral moraine**The moraine which is deposited on either side of a glacier is called lateral moraine.
- **Medial moraine**When two glaciers join each other their lateral moraines also join. Moraines thus formed on the confluence of two glaciers are called medial moraines.
- **Ground moraine**It consists of deposits left behind in areas once covered by glaciers. It is seen only after the glacial ice has disappeared by melting.

111. Exp. (c)

- Eskers are a long, narrow, winding ridge composed of stratified sand and gravel deposited by a subglacial or englacial meltwater stream.
- Very course 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.

112. Exp. (b)

- Drumlins are smooth oval shaped ridge-like features composed mainly of glacial till with some masses of gravel and sand. The long axes of drumlins are parallel to the direction of ice movement.
- One end of the drumlins facing the glacier called the stoss end is blunter and steeper than the other end called tail.
- The drumlins form due to dumping of rock debris beneath heavily loaded ice through fissures in the glacier. The stoss end gets blunted due to pushing by moving ice.
- Drumlins give an indication of direction of glacier movement.

113. Exp. (c)

- When the sea water loaded with rock fragments and sand attack the coastal rocks it is called **abrasion.**
- The rock particles present in the water hit against each other and break into progressively smaller particles. This process is called **attrition.**
- Thirdly the broadening of cracks and crevices in the cliffs along the coast due to the attack of the sea waves is called the **hydraulic action.**

114. Exp. (d)

- Waves, like streams, erode the coastal rocks with the help of rock fragments present in the water. Due to the continued erosion by waves, the coastline keeps retreating and a number of topographical features are formed in the process.
- Some of the important features made through **sea wave erosion** are Sea Cliff, Sea Caves, Sea Arches and Sea Stacks.
- **Sea wave deposition** leads to formation of Bars and Spits

115. Exp. (b)

- **Submergent coastlines** are stretches along the coast that have been inundated by the sea. Features of **submergent coastline** are drowned river valleys or rias and drowned glaciated valleys or **fjords**.

116. Exp. (a)

- Bars, barrier bars and spits are prominent features of high rocky coasts which are formed by depositional activity by receding sea waves.
- Along the high rocky coasts, the rivers appear to have been drowned with highly irregular coastline. The coastline appears highly indented with extension of water into the land where glacial valleys (fjords) are present.
- The hill sides drop off sharply into the water. Shores do not show any depositional landforms initially. Erosion features dominate. Along high rocky coasts, waves break with great force against the land shaping the hill sides into cliffs.
- With constant pounding by waves, the cliffs recede leaving a wave-cut platform in front of the sea cliff. Waves gradually minimise the irregularities along the shore.
- The materials which fall off, and removed from the sea cliffs, gradually break into smaller fragments and roll to roundness, will get deposited in the offshore.
- After a considerable period of cliff development and retreat when coastline turns somewhat smooth, with the addition of some more material to this deposit in the offshore, a wave-built terrace would develop in front of wave-cut terrace.

117. Exp. (b)

- 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.** When waves break over a gently sloping sedimentary coast, the bottom sediments get churned and move readily building bars, barrier bars, spits and lagoons.
- Lagoons would eventually turn into a swamp which would subsequently turn into a coastal plain.
- **Western coast of Indian Peninsula is high rocky coast while eastern coast is low sedimentary coast.** Hence prominent features such as delta can be found alongside eastern coast.

118. Exp. (d)

- Sea cliffs are vertical and steep sided physical features found alongside the coast while terraces are horizontal physical features.
- Wave cut terraces and wave-built terraces are found on the foot of the cliffs.

119. Exp. (d)

- Caves not stacks are wide hollows which are formed by at the base of cliffs due to erosional impact of sea waves.
- Stacks are isolated masses of rocks standing offshore formed due to separation from cliffs by wave action.

120. Exp. (a)

- Beaches are characteristic of shorelines that are dominated by deposition, but may occur as patches along even the rugged shores.
- Beaches and dunes are coastal landforms which are found **alongside low sedimentary coasts not high rocky coasts.**
- **Beaches called shingle beaches contain excessively small pebbles and even cobbles**.

121. Exp. (d)

- Spits are attached to coasts while barriers are not attached but lies off-shore as an independent mass of sand, pebbles, cobbles etc.
- Bars are submerged landforms which are formed due to accumulation of debris, cobbles, pebbles e.t.c due to action of sea waves and are parallel to coasts. Barriers are emerged form of bars and are found on the sea surface.

122. Exp. (a)

- Outwash Plains are made up of glacial-fluvial deposit and differ from alluvial plains which are formed by rivers in composition and structure.
- The plains at the foot of the glacial mountains or beyond the limits of continental ice sheets are covered with glacial-fluvial deposits in the form of broad flat alluvial fans which may join to form outwash plains of gravel, silt, sand and clay.
- When the glacier reaches its lowest point and melts, it leaves behind a stratified deposition material, consisting of rock debris, clay, sand, gravel etc. This layered surface is called till plain or an outwash plain and a downward extension of the deposited clay material is called valley train.

123. Exp. (a)

- Erosion involves the acquisition and transportation of rock debris. **Though weathering aids erosion it is not a pre-condition for erosion to take place.**
- Weathering, mass-wasting, and erosion are degradational processes.
- Denudational processes like erosion and transportation are controlled by kinetic energy.

124. Exp. (d)

List-I	List-II
A. Solution	2. Removal of solids in solution
B. Carbonation	3. Breaking down of feldspar
C. Hydration	4. Minerals take up water and expand
D. Reduction	1. Takes place below the water table

125. Exp. (a)

- **Exfoliated domes are developed from expansion due to unloading and pressure release while exfoliated tors are developed due to differential heating and resulting expansion and contraction of the surface.**
- Due to differential heating and resulting expansion and contraction of surface layers and their subsequent exfoliation from the surface results in smooth rounded surfaces in rocks. In rocks like granites, smooth-surfaced and rounded small to big boulders called tors form due to such exfoliation.

126. Exp. (d)

- **Exfoliation,** separation of successive thin shells, or spalls, from massive rock such as granite or basalt; it is common in regions that have moderate rainfall. The thickness of individual sheet or plate may be from a few millimetres to a few metres.

127. Exp. (c)

Peak	Location
A. Saddle Peak	1. North Andaman
B. Mount Diavolo	3. Middle Andaman
C. Mount Thuiller	4. Great Nicobar
D. Mount Koyob	2. South Andaman

OCEANOGRAPHY

1. Exp. (d)

Components	Processes of the water cycle
1. Water storage in oceans	Evaporation, Evapotranspiration, Sublimation
2. Water in the atmosphere	Condensation, Precipitation
3. Water storage in ice and snow	Snowmelt runoff to streams
4. Surface runoff	Stream flow freshwater storage infiltration
5. Groundwater storage	Groundwater discharge springs

2. Exp. (c)

- **Continental Shelf** is the extended margin of each continent occupied by relatively shallow seas and gulfs.
- **Continental Slope** it connects the continental shelf and the ocean basins. Canyons and trenches are observed in this region.
- **Deep-Sea Plains** are gently sloping areas of the ocean basins. These are the flattest and smoothest regions of the world. These plains are covered with fine-grained sediments like clay and silt.
- **Oceanic Deeps or Trenches** are the deepest parts of the oceans. The trenches are relatively steep-sided, narrow basins.

3. Exp. (b)

- **Seamount is a mountain with pointed summits, rising from the seafloor that does not reach the surface of the ocean.** Seamounts are volcanic in origin.
- **Guyot** is a flat topped seamount. They show evidences of gradual subsidence through stages to become flat topped submerged mountains.

4. Exp. (b)

- **A mid-oceanic ridge (Submarine Ridge) is composed of two chains of mountains separated by a large depression is formed at Divergent Boundary.**
- **Running for a total length of 75,000 km, these ridges form the largest mountain systems on earth.**
- Iceland, a part of the mid-Atlantic Ridge, is an example.

5. Exp. (b)

- A hot spot is a region within the Earth's mantle from which heat rises through the process of convection.
- Some of the important Hotspots are:
  - Reunion
  - Chagos
  - Maldives
  - Hawaii

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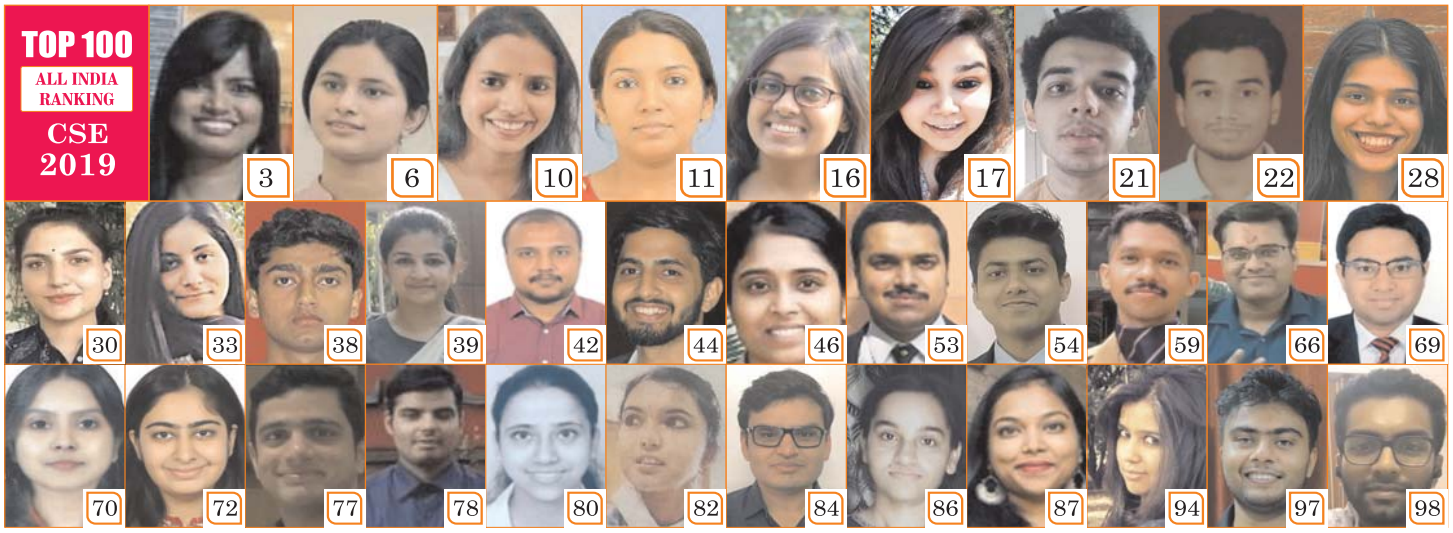

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