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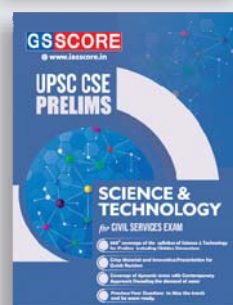
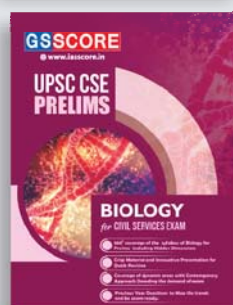
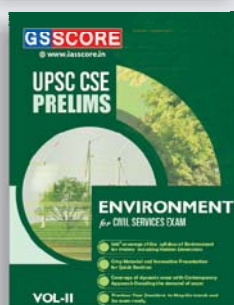
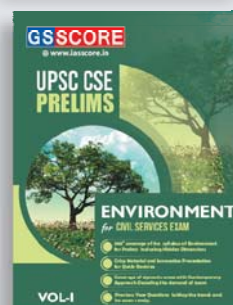
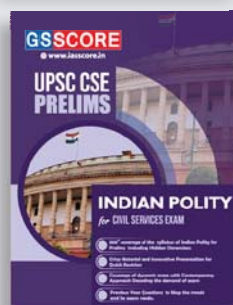
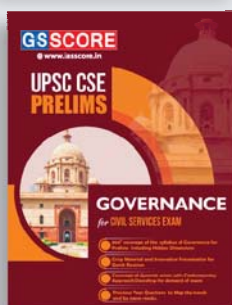
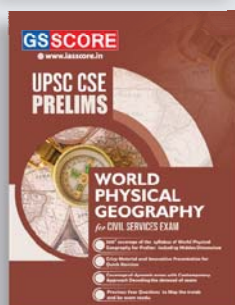
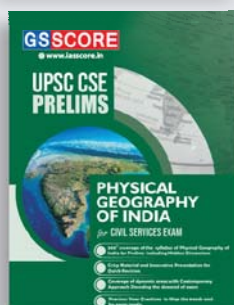
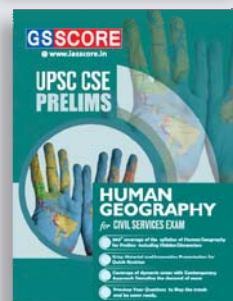
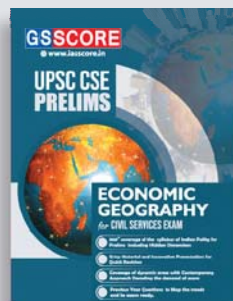
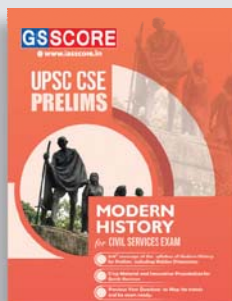
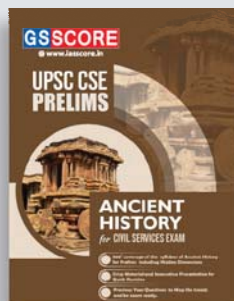
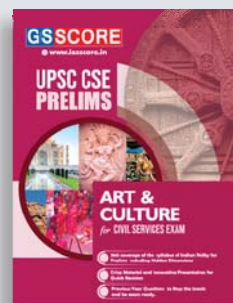
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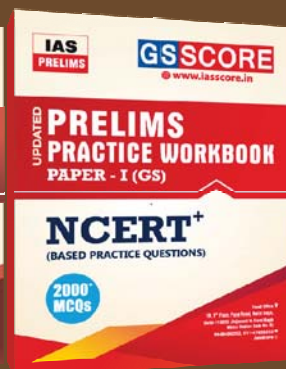
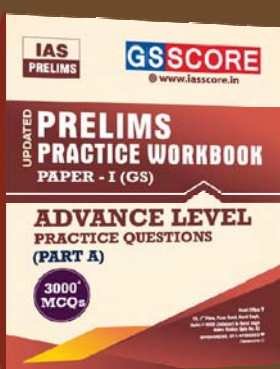
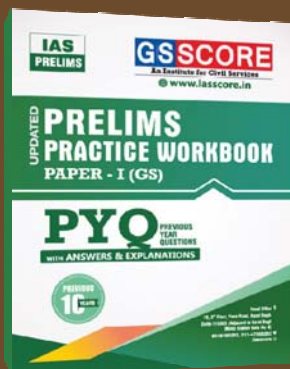
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ENVIRONMENT

PREVIOUS YEAR QUESTIONS

ECOLOGY & ENVIRONMENT

1. Consider the following statements:

1. Some mushrooms have medicinal properties.
2. Some mushrooms have psycho-active properties.
3. Some mushrooms have insecticidal properties.
4. Some mushrooms have bioluminescent properties.

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

2. Which one of the following is the best example of repeated falls in sea level, giving rise to present-day extensive marshland?

- (a) Bhitarkanika Mangroves
- (b) Marakkanam Salt Pans
- (c) Naupada Swamp
- (d) Rann of Kutch

3. Consider the following statements:

Statements-I:

The soil in tropical rain forests is rich in nutrients.

Statements-II:

The high temperature and moisture of tropical rain forests cause dead organic matter in the soil to decompose quickly.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I
- (b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I
- (c) Statement-I is correct but Statement-II is incorrect
- (d) Statement-I is incorrect but Statement-II is correct

4. Which of the following leaf modifications occur(s) in the desert are as to inhibit water loss?

1. Hard and waxy leaves
2. Tiny leaves
3. Thorns instead of leaves

Select the correct answer using the code given below:

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

5. Which one of the following is the best description of the term 'ecosystem'?

- (a) A community of organisms interacting with one another
- (b) That part of the Earth which is inhabited by living organisms
- (c) A community of organisms together with the environment in which they live
- (d) The flora and fauna of a geographical area

6. Which one of the following is the correct sequence of a food chain?

- (a) Diatoms-Crustaceans-Herrings
- (b) Crustaceans-Diatoms-Herrings
- (c) Diatoms-Herrings-Crustaceans
- (d) Crustaceans-Herrings-Diatoms

7. Consider the following:

1. Bats
2. Bears
3. Rodents

The phenomenon of hibernation can be observed in which of the above kinds of animals?

- (a) 1 and 2 only
- (b) 2 only
- (c) 1, 2 and 3
- (d) Hibernation cannot be observed in any of the above

8. With reference to food chains in ecosystems, consider the following statements:

1. A food chain illustrates the order in which a chain of organisms feed upon each other.
2. Food chains are found within the populations of a species.
3. A food chain illustrates the numbers of each organism which are eaten by others.

Which of the above statements is/are correct?

- (a) 1 only (c) 1, 2 and 3
(b) 1 and 2 only (d) None

9. Which one of the following terms describes not only the physical space occupied by an organism, but also its functional role in the community of organisms?

- (a) Ecotone (c) Habitat
(b) Ecological niche (d) Home range

10. In the grasslands, trees do not replace the grasses as a part of an ecological succession because of:

- (a) Insects and fungi
(b) Limited sunlight and paucity of nutrients
(c) Water limits and fire
(d) None of the above

11. Which one of the following is the correct sequence of ecosystems in the order of decreasing productivity?

- (a) Oceans, lakes, grasslands, mangroves
(b) Mangroves, oceans, grasslands, lakes
(c) Mangroves, grasslands, lakes, oceans
(d) Oceans, mangroves, lakes, grasslands

12. Which of the following leaf modifications occurs/ occur in desert areas to inhibit water loss?

1. Hard and waxy leaves
2. Tiny leaves or no leaves
3. Thorns instead of leaves

Select the correct answer using the code given below:

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

13. With reference to the food chains in ecosystems, which of the following kinds of organism is/are known as decomposer organism/organisms?

1. Virus
2. Fungi
3. Bacteria

Select the correct answer using the code given below:

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

14. Which of the following adds/add nitrogen to the soil?

1. Excretion of Urea by animals
2. Burning of coal by man
3. Death of vegetation

Select the correct answer using the code given below:

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

15. With reference to the wetlands of India, consider the following statements:

1. The country's total geographical area under the category of wetlands is recorded more in Gujrat as compared to other states
2. In India, the total geographical area of coastal wetlands is larger than that of inland wetlands

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:

1. Photosynthesis.
2. Respiration.
3. Decay of organic matter.
4. Volcanic action.

Which of the above add carbon dioxide to the carbon cycle on earth?

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

17. In the context of ecosystem productivity, marine upwelling zones are important as they increase the marine productivity by bringing the:

1. Decomposer microorganisms to the surface.
2. Nutrients to the surface.
3. Bottom-dwelling organisms to the surface.

Which of the above statements is/are correct?

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

18. The 2004 Tsunami made people realize that mangroves can serve as a reliable safety hedge against coastal calamities. How do mangroves function as a safety hedge?

- (a) The mangrove swamps separate the human settlements from the sea by a wide zone in which people neither live nor venture out.
(b) The mangroves provide both food and medicines which people are in need of after any natural disaster.

- (c) The mangrove trees are tall with dense canopies and serve as an excellent shelter during a cyclone or tsunami.
- (d) The mangrove trees do not get uprooted by storms and tides because of their extensive roots.

19. A pesticide which is a chlorinated hydrocarbon is sprayed on a food crop. The food chain is: Food crop – Rat – Snake – Hawk. In this food chain, the highest concentration of the pesticide would accumulate in which one of the following?

- (a) Food crop (c) Snake
(b) Rat (d) Hawk

20. What is the use of biochar in farming?

1. Biochar can be used as a part of the growing medium in vertical farming.
2. When biochar is a part of the growing medium, it promotes the growth of nitrogen-fixing microorganisms.
3. When biochar is a part of the growing medium, it enables the growing medium to retain water for longer time.

Which of the statements given above is/are correct?

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

21. In case of which one of the following biogeochemical cycles the weathering of rocks is the main source of release of nutrient to enter the cycle?

- (a) Carbon cycle
(b) Nitrogen cycle
(c) Phosphorus cycle
(d) Sulphur cycle

22. Which of the following are detritivores?

1. Earthworms
2. Jellyfish
3. Millipedes
4. Seahorses
5. Woodlice

Select the correct answer using the code given below:

- (a) 1, 2 and 4 only

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

23. Which of the following have species that can establish symbiotic relationship with other organisms?

1. Cnidarians
2. Fungi
3. Protozoa

Select the correct answer using the code given below:

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

24. Which one of the following lakes of West Africa has become dry and turned into a desert ?

- (a) Lake Victoria
(b) Lake Faguibine
(c) Lake Oguta
(d) Lake Volta

25. “If rainforests and tropical forests are the lungs of the Earth, then surely wetlands function as its kidneys.” Which one of the following functions of wetlands best reflects the above statements?

- (a) The water cycle in wetlands involves surface runoff, subsoil percolation and evaporation.
(b) Algae from the nutrient base upon which fish, crustaceans, molluscs, birds, reptiles and mammals thrive.
(c) Wetlands play a vital role in maintaining sedimentation balance and soil stabilization.
(d) Aquatic plants absorb heavy metals and excess nutrients.

26. The “Miyawaki method” is well known for the:

- (a) Promotion of commercial farming in arid and semi-arid areas.
(b) Development of gardens using genetically modified flora.
(c) Creation of mini forests in urban areas.
(d) Harvesting wind energy on coastal areas and on sea surfaces.

BIODIVERSITY

1. Which one of the following makes a tool with a stick to scrape insects from a hole in a tree or a log of wood?
 - (a) Fishing cat
 - (b) Orangutan
 - (c) Otter
 - (d) Sloth bear

2. Consider the following statements regarding the Indian squirrels:
 1. They build nests by making burrows in the ground.
 2. They store their food materials like nuts and seeds in the ground.
 3. They are omnivorous.
 How many of the above statements are correct?
 - (a) Only one
 - (b) Only two
 - (c) All three
 - (d) None

3. Which of the following organisms perform waggle dance for others of their kin to indicate the direction and the distance to a source of their food?
 - (a) Butterflies
 - (b) Dragonflies
 - (c) Honeybees
 - (d) Wasps

4. Consider the following fauna:
 1. Lion-tailed Macaque
 2. Malabar Civet
 3. Sambar Deer
 How many of the above are generally nocturnal or most active after sunset?
 - (a) Only one
 - (b) Only two
 - (c) All three
 - (d) None

5. Invasive Species Specialist Group' (that develops Global Invasive Species Database) belongs to which one of the following organizations?
 - (a) The International Union for Conservation of Nature
 - (b) The United Nations Environment Programme
 - (c) The United Nations World Commission for Environment and Development
 - (d) The World Wide Fund for Nature

6. Consider the following trees:
 1. Jackfruit (*Artocarpus heterophyllus*)
 2. Mahua (*Madhuca indica*)
 3. Teak (*Tectona grandis*)
 How many of the above are deciduous trees?
 - (a) Only one
 - (b) Only two
 - (c) All three
 - (d)

7. Which one of the following National Parks lies completely in the temperate alpine zone?
 - (a) Manas National Park
 - (b) Namdapha National Park
 - (c) Neora Valley National Park
 - (d) Valley of Flowers National Park

8. Consider the following statements:
 1. Asiatic lion is naturally found in India only.
 2. Double-humped camel is naturally found in India only.
 3. One-horned rhinoceros is naturally found in India only.
 Which of the statements given above is/are correct?
 - (a) 1 only
 - (b) 2 only
 - (c) 1 and 3 only
 - (d) 1, 2 and 3

9. Which of the following are in Agasthyamala Biosphere Reserve?
 - (a) Neyyar, Peppara and Shendurney Wildlife Sanctuaries; and Kalakad Mundanthurai Tiger Reserve
 - (b) Mudumalai, Sathyamangalam and Wayanad Wildlife Sanctuaries; and Silent Valley National Park
 - (c) Kaundinya, Gundla Brahmeswaram and Papikonda Wildlife Sanctuaries; and Mukurthi National Park
 - (d) Kawal and Sri Venkateswara Wildlife Sanctuaries; and Nagarjunasagar-Srisailem Tiger Reserve

10. Consider the following statements:
 1. Some species of turtles are herbivores.
 2. Some species of fish are herbivores.
 3. Some species of marine mammals are herbivores.
 4. Some species of snakes are viviparous.
 Which of the statements given above are correct?
 - (a) 1 and 3 only
 - (b) 2, 3 and 4 only
 - (c) 2 and 4 only
 - (d) 1, 2, 3 and 4

11. Consider the following pairs:

<i>Wildlife</i>	<i>Naturally found in</i>
1. Blue-finned Mahseer	: Cauvery River
2. Irrawaddy Dolphin	: Chambal River
3. Rusty-spotted Cat	: Eastern Ghats

- | | |
|------------------------|-----------------|
| 1. Blue-finned Mahseer | : Cauvery River |
| 2. Irrawaddy Dolphin | : Chambal River |
| 3. Rusty-spotted Cat | : Eastern Ghats |

Which of the pairs given above are correctly matched?

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

12. Consider the following statements:

- Most of the world's coral reefs are in tropical waters.
- More than one third of the world's coral reefs are located in the territories of Australia, Indonesia and Philippines.
- Coral reefs host far more number of animal phyla than those hosted by tropical rainforests.

Which of the above statements is/are correct?

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

13. Why is a plant called *Prosopis juliflora* often mentioned in news?

- Its extract is widely used in cosmetics.
- It tends to reduce the biodiversity in the area in which it grows.
- Its extract is used in the synthesis of pesticides.
- None of the above

14. In which one of the following State Pakhui Wildlife Sanctuary is located?

- | | |
|-----------------------|---------------|
| (a) Arunachal Pradesh | (c) Meghalaya |
| (b) Manipur | (d) Nagaland |

15. Recently there was a proposal to translocate some of the lions from their natural habitat in Gujarat to which one of the following sites?

- Corbett National Park
- Kuno Palpur Wildlife Sanctuary
- Mudumalai Wildlife Sanctuary
- Sariska National Park

16. Due to some reasons, if there is a huge fall in the population of species of butterflies, what could be its likely consequence/consequences?

- Pollination of some plants could be adversely affected.
- There could be a drastic increase in the fungal infections of some cultivated plants.
- It could lead to a fall in the population of some species of wasps, spiders and birds.

Select the correct answer using the code given below:

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

17. With reference to 'Red Sanders', sometimes seen in the news, consider the following statements:

- It is a tree species found in a part of South India.
- It is one of the most important trees in the tropical rain forest areas of South India.

Which of the above statements is/are correct?

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

18. What is/are unique about 'Kharai camel', a breed found in India?

- It is capable of swimming up to three kilometers in seawater.
- It survives by grazing on mangroves.
- It lives in the wild and cannot be domesticated.

Select the correct answer using the code given below:

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

19. Recently, our scientists have discovered a new and distinct species of banana plant which attains a height of about 11 metres and has orange-coloured fruit pulp. In which part of India has it been discovered?

- Anadaman Islands
- Anamalai Forests
- Maikala Hills
- Tropical rain forests of northeast

20. In which of the following regions of India are you most likely to come across the 'Great Indian Hornbill' in its natural habitat?

- Sand deserts of northwest India
- Higher Himalayas of Jammu and Kashmir
- Salt marshes of western Gujarat
- Western Ghats

21. Which of the following National Parks is unique in being a swamp with floating vegetation that supports a rich biodiversity?

- Bhitarkanika National Park
- Keibul Lamjao National Park
- Keoladeo Ghana National Park
- Sultanpur National Park

22. With reference to 'dugong', a mammal found in India, which of the following statements is/are correct?

- It is a herbivorous marine animal.
- It is found along the entire coast of India.

3. It is given legal protection under Schedule I of the Wildlife (Protection) Act, 1974.

Select the correct answer using the code given below:

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

23. Which one of the following is the national aquatic animal of India?

- (a) Saltwater crocodile
(b) Olive ridley turtle
(c) Gangetic dolphin
(d) Gharial

24. Which one of the following regions of India has a combination of mangrove forest, evergreen forest and deciduous forest?

- (a) North Coastal Andhra Pradesh
(b) South-West Bengal
(c) Southern Saurashtra
(d) Andaman and Nicobar Islands

25. Which one of the following National Parks has a climate that varies from tropical to subtropical, temperate and arctic?

- (a) Khangchendzonga National Park
(b) Nandadevi National Park
(c) Neora Valley National Park
(d) Namdapha National Park

26. Other than poaching, what are the possible reasons for the decline in the population of Ganges River Dolphins?

1. Construction of dams and barrages on rivers
2. Increase in the population of crocodiles in rivers
3. Getting trapped in fishing nets accidentally
4. Use of synthetic fertilizers and other agricultural chemicals in crop-fields in the vicinity of rivers

Select the correct answer using the code given below:

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

27. If you walk through countryside, you are likely to see some birds stalking alongside the cattle to seize the insects, disturbed by their movement through grasses. Which of the following is/are such bird/birds?

1. Painted Stork
2. Common Myna
3. Black-necked Crane

Select the correct answer using the code given below:

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

28. The most important strategy for the conservation of biodiversity together with traditional human life is the establishment of

- (a) Biosphere reserves
(b) Botanical gardens
(c) National parks
(d) Wildlife sanctuaries

29. Lichens, which are capable of initiating ecological succession even on a bare rock, are actually a symbiotic association of:

- (a) Algae and bacteria (c) Bacteria and fungi
(b) Algae and fungi (d) Fungi and mosses

30. With reference to 'Eco-Sensitive Zones', which of the following statements is/are correct?

1. Eco-Sensitive Zones are the areas that are declared under the Wildlife (Protection) Act, 1972
2. The purpose of the declaration of Eco-Sensitive Zones is to prohibit all kinds of human activities, in those zones except agriculture.

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

31. Which of the following have coral reefs?

1. Andaman and Nicobar Islands
2. Gulf of Kachchh
3. Gulf of Mannar
4. Sunderbans

Select the correct answer using the code given below:

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

32. Consider the following animals:

1. Sea cow
2. Sea horse
3. Sea lion

Which of the above is/are mammal/ mammals?

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

33. In which of the following States is lion-tailed macaque found in its natural habitat?

1. Tamil Nadu
2. Kerala
3. Karnataka
4. Andhra Pradesh

Select the correct answer using the codes given below:

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

34. Consider the following :

1. Star tortoise
2. Monitor lizard
3. Pygmy hog
4. Spider monkey

Which of the above found in India?

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

35. Consider the following fauna of India:

1. Gharial
2. Leatherback turtle
3. Swamp deer

Which of the above is/are endangered?

- (a) 1 and 2 only (c) 1, 2 and 3
(b) 3 only (d) None

36. Government of India encourages the cultivation of 'sea buckthorn'. What is the importance of this plant?

1. It helps in controlling soil erosion and in preventing desertification.
2. It is a rich source of biodiesel.
3. It has nutritional value and is well-adapted to live in cold areas of high altitudes.
4. Its timber is of great commercial value.

Which of the above statements is/ are correct?

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

37. Other than resistance to pests, what are the prospects for which genetically engineered plants have been created?

1. To enable them to withstand drought
2. To increase the nutritive value of the produce
3. To enable them to grow and do photosynthesis in spaceships and space stations
4. To increase their shelf life

Select the correct answer using the code given below

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

38. Consider the following protected areas:

1. Bandipur
2. Bhitarkanika
3. Manas
4. Sunderbans

Which of the above are declared Tiger Reserves?

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

39. In which one among the following categories of protected areas in India are local people not allowed to collect and use the biomass?

- (a) Biosphere reserves
(b) National parks
(c) Wetlands declared under Ramsar convention
(d) Wildlife sanctuaries

40. Which one of the following groups of animals belongs to the category of endangered species?

- (a) Great Indian Bustard, Musk Deer, Red Panda, Asiatic Wild Ass
(b) Kashmir Stag, Cheetah, Blue Bull, Great Indian Bustard.
(c) Snow Leopard, Swamp Deer, Rhesus Monkey, Saras (Crane)
(d) Lion Tailed Macaque, Blue Bull, Hanuman Langur, Cheetah

41. Which of the following can be threats to the biodiversity of a geographical area?

1. Global warming
2. Fragmentation of habitat
3. Invasion of alien species
4. Promotion of vegetarianism

Select the correct answer using the code given below:

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

42. Consider the following:

1. Black necked crane
2. Cheetah
3. Flying squirrel
4. Snow leopard

Which of the above are naturally found in India?

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

43. What would happen if phytoplankton of an ocean is completely destroyed for some reason?

1. The ocean as a carbon sink would be adversely affected.
2. The food chains in the ocean would be adversely affected.
3. The density of ocean water would drastically decrease.

Select the correct answer using the code given below:

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

44. What is the difference between the antelopes Oryx and Chiru?

- Oryx is adapted to live in hot and arid areas like Africa and Arabia whereas Chiru is adapted to live in steppes and semi-desert areas of cold high mountains of Tibetan Plateau.
- Oryx is poached for its antlers whereas Chiru is poached for its musk
- Oryx exists in western India only whereas Chiru exists in north east India only.
- None of the statements (a), (b) and (c) given above is correct.

45. Consider the following kinds of organisms:

- Bat
- Bee
- Bird

Which of the above is/are pollinating agent/agents?

- 1 and 2 only
- 2 only
- 1 and 3 only
- 1, 2 and 3

46. Biodiversity forms the basis for human existence in the following ways:

- Soil formation
- Prevention of soil erosion
- Recycling of waste
- Pollination of crops

Select the correct answer using the code given below:

- 1, 2 and 3 only
- 2, 3 and 4 only
- 1 and 4 only
- 1, 2, 3 and 4

47. A sandy and saline area is the natural habitat of an Indian animal species. The animal has no predators in that area but its existence is threatened due to the destruction of its habitat. Which one of the following could be that animal?

- Indian Wild Buffalo
- Indian Wild Ass
- Indian Wild Boar
- Indian Gazelle

48. Three of the following criteria have contributed to the recognition of Western Ghats-Sri Lanka and Indo-Burma regions as hotspots of biodiversity:

- Species richness
- Vegetation density
- Endemism
- Ethno-botanical importance
- Threat perception
- Adaptation of flora and fauna to warm and humid conditions

Which three of the above are correct criteria in this context?

- 1, 2 and 6
- 2, 4 and 6
- 1, 3 and 5
- 3, 4 and 6

49. Consider the following statements:

- Biodiversity is normally greater in the lower latitudes as compared to the higher latitudes.
- Along the mountain gradients, biodiversity is normally greater in the lower altitudes as compared to the higher altitudes.

Which of the above statements is/are correct?

- 1 only
- 2 only
- Both 1 and 2
- Neither 1 nor 2

50. Some species of plants are insectivorous. Why?

- Their growth in shady and dark places does not allow them to undertake sufficient photosynthesis and thus they depend on insects for nutrition
- They are adapted to grow in nitrogen deficient soils and thus depend on insects for sufficient nitrogenous nutrition
- They cannot synthesize certain vitamins themselves and depend on the insects digested by them
- They have remained in that particular stage of evolution as living fossils, a link between autotrophs and heterotrophs

51. Consider the following statements:

- The Taxus tree is naturally found in the Himalayas
- The Taxus tree is listed in the Red Data Book ?
- A drug called "taxol" is obtained from Taxus tree is effective against Parkinson's disease

Which of the above statements is/are correct?

- 1 only
- 1 and 2 only
- 2 and 3 only
- 3 only

52. King Cobra is the only snake that makes its own nest. Why does it make its nest?

- It is a snake-eater and the nest helps attract other snakes
- It is a viviparous snake and needs a nest to give birth to its offspring
- It is an oviparous snake and lays its eggs in the nest and guards the nest until they are hatched
- It is a large, cold blooded animal and needs a nest to hibernate in the cold season

53. Consider the following statements:

- Biodiversity hotspots are located only in tropical regions.
- India has four biodiversity hotspots i.e., Eastern Himalayas, Western Himalayas, Western Ghats and Andaman and Nicobar Islands.

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. Consider the following statements:

1. The boundaries of a National Park are defined by legislation.
2. A Biosphere Reserve is declared to conserve a few specific species of flora and fauna.
3. In a Wildlife Sanctuary, limited biotic interference is permitted.

Which of the above statements is/are correct?

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

55. Consider the following pairs:

<i>Protected area</i>	<i>Well-known for</i>
1. Bhiterkanika, Orissa	Salt Water Crocodile
2. Desert National Park, Rajasthan	Great Indian Bustard
3. Eravikulam, Kerala	Hoolak Gibbon

Which of the above pairs is/are correctly matched?

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

56. Which of the following Protected Areas are located in Cauvery basin?

1. Nagarhole National Park
2. Papikonda National Park
3. Sathyamangalam Tiger Reserve
4. Wayanad Wildlife Sanctuary

Select the correct answer using the code given below:

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

57. With reference to India's biodiversity, Ceylon frogmouth, Coppersmith barbet, Gray-chinned minivet and White-throated redstart are

- (a) Birds
(b) Primates
(c) Reptiles
(d) Amphibians

58. Which one of the following protected areas is well-known for the conservation of a sub-species of the Indian swamp deer (Barasingha) that thrives well on hard ground and is exclusively graminivorous?

- (a) Kanha National Park
(b) Manas National Park
(c) Mudumalai Wildlife Sanctuary
(d) Tal Chhapar Wildlife Sanctuary

59. Which of the following are the most likely places to find the musk deer in its natural habitat?

1. Ascot Wildlife Sanctuary
2. Gangotri National Park
3. Kishanpur Wildlife Sanctuary
4. Manas National Park

Select the correct answer using the code given below:

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

60. With reference to India's Desert National Park, which of the following statements are correct?

1. It is spread over two districts
2. There is no human habitation inside the park.
3. It is one of the natural habitats of Great Indian Bustard.

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

61. Among the following Tiger Reserves, which one has the largest area under "Critical Tiger Habitat"?

- (a) Corbett
(b) Ranthambore
(c) Nagarjunsagar-Srisailem
(d) Sunderbans

62. Which one of the following is a filter feeder?

- (a) Catfish (c) Oyster
(b) Octopus (d) Pelican

63. With reference to "Gucchi" sometimes mentioned in the news, consider the following statements:

1. It is a fungus.
2. It grows in some Himalayan forest areas.
3. It is commercially cultivated in the Himalayan foothills of north-eastern India.

Which of the statements given above is/are correct?

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

64. Which of the following is not a bird?

- (a) Golden Mahseer (c) Spoonbill
(b) Indian Nightjar (d) White Ibis

65. Which of the following are nitrogen-fixing plants ?

1. Alfalfa
2. Amaranth
3. Chickpea
4. Clover

5. Purslane (Kulfa)
6. Spinach

Select the correct answer using the code given below:

- (a) 1, 3 and 4 only
- (b) 1, 3, 5 and 6 only
- (c) 2, 4, 5 and 6 only
- (d) 1, 2, 4, 5 and 6

66. With reference to Indian laws about wildlife protection, consider the following statements:

1. Wild animals are the sole property of the government.
2. When a wild animal is declared protected, such

animal is entitled for equal protection whether it is found in protected areas or outside.

3. Apprehension of a protected wild animal becoming a danger to human life is sufficient ground for its capture or killing.

Which of the statements given above is/are correct?

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

67. Certain species of which one of the following organisms are well known as cultivators of fungi?

- (a) Ant
- (b) Cockroach
- (c) Crab
- (d) Spider

RESOURCE DEGRADATION & MANAGEMENT

1. Ilmenite and rutile, abundantly available in certain coastal tracts of India, are rich sources of which one of the following?

- (a) Aluminium
- (b) Copper
- (c) Iron
- (d) Titanium

2. Consider the following statements:

1. Carbon fibres are used in the manufacture of components used in automobiles and aircrafts.
2. Carbon fibres once used cannot be recycled.

Which of the statements given above is/are correct?

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

3. Consider the following statements:

Statement-I:

According to the United Nations' 'World Water Development Report, 2022', India extracts more than quarter of the world's groundwater withdrawal each year.

Statement-II:

India needs to extract more than a quarter of the World's groundwater each year to satisfy the drinking water and sanitation needs of almost 18% of world's population living in its territory.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I

(b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I

- (c) Statement-I is correct but Statement-II is incorrect
- (d) Statement-I is incorrect but Statement-II is correct

4. Consider the following States:

1. Chhattisgarh
2. Madhya Pradesh
3. Maharashtra
4. Odisha

With reference to the States mentioned above, in terms of percentage of forest cover to the total area of State, which one of the following is the correct ascending order?

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

5. In the context of which one of the following are the terms 'pyrolysis and plasma gasification' mentioned?

- (a) Extraction of rare earth elements
- (b) Natural gas extraction technologies
- (c) Hydrogen fuel-based automobiles
- (d) Waste-to-energy technologies

6. As per the Solid Waste Management Rules, 2016 in India, which one of the following statements is correct?

- (a) Waste generator has to segregate waste into five categories.
- (b) The Rules are applicable to notified urban local bodies, notified towns and all industrial townships only.

- (c) The Rules provide for exact and elaborate criteria for the identification of sites for landfills and waste processing facilities.
- (d) It is mandatory on the part of waste generator that the waste generated in one district cannot be moved to another district.

7. With reference to agricultural soils, consider the following statements:

1. A high content of organic matter in soil drastically reduces its water holding capacity.
2. Soil does not play any role in the sulphur cycle.
3. Irrigation over a period of time can contribute to the salinization of some agricultural lands.

Which of the above statements is/are correct?

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

8. With reference to the circumstances in India agriculture, the concept of "Conservation Agriculture" assumes significance. Which of the following fall under the Conservation Agriculture?

1. Avoiding the monoculture practices.
2. Adopting minimum tillage
3. Avoiding the cultivation of plantation crops
4. Using crop residues to cover soil surface
5. Adopting spatial and temporal crop sequencing/ crop rotations

Select the correct answer using the code given below:

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

9. Which of the following practices can help in water conservation in agriculture?

1. Reduced or zero tillage of the land
2. Applying gypsum before irrigating the field
3. Allowing crop residue to remain in the field

Select the correct answer using the code given below:

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

10. The term 'Domestic Content Requirement' is sometimes seen in the news with reference to

- (a) Developing solar power production in our country.
- (b) Granting licenses to foreign T.V. channels in our country.
- (c) Exporting our food products to other countries.
- (d) Permitting foreign educational institutions to set up their campuses in our country.

11. It is possible to produce algae based biofuels, but what is/are the likely limitation(s) of developing countries in promoting this industry?

1. Production of algae based biofuels is possible in seas only and not on continents.
2. Setting up and engineering the algae based biofuel production requires high level of expertise/technology until the construction is completed.
3. Economically viable production necessitates the setting up of large scale facilities which may raise ecological and social concerns.

Select the correct answer using the code given below:

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

12. Which of the following is/are the advantage/ advantages of practicing drip irrigation?

1. Reduction in weed
2. Reduction in soil salinity
3. Reduction in soil erosion

Select the correct answer using the code given below:

- (a) 1 and 2 only
- (b) 3 only
- (c) 1 and 3 only
- (d) None of the above is an advantage of practicing drip irrigation

13. 'Net metering' is sometimes seen in the news in the context of promoting the

- (a) production and use of solar energy by the households/consumers
- (b) use of piped natural gas in the kitchens of households
- (c) installation of CNG kits in motor-cars
- (d) installation of water meters in urban households

14. Why does the Government of India promote the use of 'Neem-coated Urea' in agriculture?

- (a) Release of Neem oil in the soil increases nitrogen fixation by the soil microorganisms
- (b) Neem coating slows down the rate of dissolution of urea in the soil
- (c) Nitrous oxide, which is a greenhouse gas, is not at all released into atmosphere by crop fields
- (d) It is a combination of a weedicide and a fertilizer for particular crops

15. What can be the impact of excessive/inappropriate use of nitrogenous fertilizers in agriculture?

1. Proliferation of nitrogen-fixing microorganisms in soil can occur.
2. Increase in the acidity of soil can take place.

3. Leaching of nitrate to the ground-water can occur.

Select the correct answer using the code given below:

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

16. In India, the problem of soil erosion is associated with which of the following?

1. Terrace cultivation
2. Deforestation
3. Tropical climate

Select the correct answer using the code given below:

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

17. With reference to two non-conventional energy sources called 'coalbed methane' and 'shale gas', consider the following 'statements':

1. Coalbed methane is the pure methane gas extracted from coal seams, while shale gas is a mixture of propane and butane only that can be extracted from fine-grained sedimentary rocks.
2. In India abundant coalbed methane sources exist, but so far no shale gas sources have been found.

Which of the statements given above is/are correct?

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

18. With reference to Neem tree, consider the following statements:

1. Neem oil can be used as a pesticide to control the proliferation of some species of insects and mites.
2. Neem seeds are used in the manufacture of biofuels and hospital detergents.
3. Neem oil has applications in pharmaceutical industry.

Which of the above statements is/are correct?

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

19. Consider the following statements:

1. Maize can be used for the production of starch.
2. Oil extracted from maize can be a feedstock for biodiesel.
3. Alcoholic beverages can be produced by using maize.

Which of the above statements is/are correct?

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

20. In India, cluster bean (Guar) is traditionally used as a vegetable or animal feed, but recently the cultivation of this has assumed significance. Which one of the following statements is correct in this context?

- (a) The oil extracted from seeds is used in the manufacture of biodegradable plastics
- (b) The gum made from its seeds is used in the extraction of shale gas
- (c) The leaf extract of this plant has the properties of anti-histamines
- (d) It is a source of high quality biodiesel

21. Consider the following organisms:

1. Agaricus
2. Nostoc
3. Spirogyra

Which of the above is/are used as biofertiliser/biofertilisers?

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

22. Consider the following agricultural practices:

1. Contour bunding
2. Relay cropping
3. Zero tillage

In the context of global climate change, which of the above helps/help in carbon sequestration/storage in the soil?

- (a) 1 and 2 only (c) 1, 2 and 3
(b) 3 only (d) None

23. Consider the following kinds of organisms:

1. Bacteria
2. Fungi
3. Flowering plants

Some species of which of the above kinds of organisms are employed as bio-pesticides?

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

24. Biomass gasification is considered to be one of the sustainable solutions to the power crisis in India. In this context, which of the following statements is/are correct?

1. Coconut shells, groundnut shells and rice husk can be used in biomass gasification.
2. The combustible gases generated from biomass gasification consist of hydrogen and carbon dioxide only.
3. The combustible gases generated from biomass gasification can be used for direct heat generation but not in internal combustion engines.

Select the correct answer using the codes given below:

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

25. Given below are the names of four energy crops. Which one of them can be cultivated for ethanol?

- (a) Jatropha (c) Pongamia
(b) Maize (d) Sunflower

26. Which feature of some species of blue-green algae helps promote them as bio-fertilizers?

- (a) They convert atmospheric methane into ammonia which the crop plants can absorb readily
(b) They induce the crop plants to produce the enzymes which help convert atmospheric nitrogen to nitrates
(c) They have the mechanism to convert atmospheric nitrogen into a form that the crop plants can absorb readily
(d) They induce the roots of the crop plants to absorb the soil nitrates in larger quantities

27. Other than *Jatropha curcas*, why is *Pongamia pinnata* also considered a good option for the production of bio-diesel in India?

1. *Pongamia pinnata* grows naturally in most of the arid regions of India
2. The seeds of *Pongamia pinnata* are rich in lipid content of which nearly half is oleic acid

Which of the statements given above is/are correct?

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

28. What is/are the advantage/advantages of zero tillage in agriculture?

1. Sowing of wheat is possible without burning the residue of previous crop.
2. Without the need for nursery of rice saplings, direct planting of paddy seeds in the wet soil is possible.
3. Carbon sequestration in the soil is possible.

Select the correct answer using the code given below:

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

29. According to India's National Policy on Biofuels, which of the following can be used as raw materials for the production of biofuels?

1. Cassava
2. Damaged wheat grains
3. Groundnut seeds
4. Horse gram
5. Rotten potatoes
6. Sugar beet

Select the correct answer using the code given below:

- (a) 1, 2, 5 and 6 only (c) 2, 3, 4 and 5 only
(b) 1, 3, 4 and 6 only (d) 1, 2, 3, 4, 5 and 6

30. Consider the following statements:

1. 36% of India's districts are classified as "overexploited" or "critical" by the Central Ground Water Authority (CGWA).
2. CGWA was formed under the Environment (Protection) Act.
3. India has the largest area under groundwater irrigation in the world.

Which of the statement given above is/are correct?

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

31. "System of Rice Intensification" of cultivation, in which alternate wetting and drying of rice fields is practised, results in :

1. Reduced seed requirement
2. Reduced methane production
3. Reduced electricity consumption

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

32. With reference to polyethylene terephthalate, the use of which is so widespread in our daily lives, consider the following statements:

1. Its fibres can be blended with wool and cotton fibres to reinforce their properties.
2. Containers made of it can be used to store any alcoholic beverage.
3. Bottles made of it can be recycled into other products.
4. Articles made of it can be easily disposed of by incineration without causing greenhouse gas emissions.

Which of the statements given above are correct?

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

33. "Biorock technology" is talked about in which one of the following situations?

- (a) Restoration of damaged coral reefs
(b) Development of building materials using plant residues
(c) Identification of areas for exploration/extraction of shale gas
(d) Providing salt licks for wild animals in forests/protected areas

ENVIRONMENTAL POLLUTION**1. Consider the following:**

1. Aerosols
2. Foam agents
3. Fire retardants
4. Lubricants

In the making of how many of the above are hydrofluorocarbons used?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

2. With reference to green hydrogen, consider the following statements:

1. It can be used directly as a fuel for internal combustion.
2. It can be blended with natural gas and used as fuel for heat or power generation.
3. It can be used in the hydrogen fuel cell to run vehicles.

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

3. Consider the following statements regarding mercury pollution:

1. Gold mining activity is a source of mercury pollution in the world.
2. Coal-based thermal power plants cause mercury pollution.
3. There is no known safe level of exposure to mercury.

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

4. Which reference to the role of biofilter in Recirculating Aquaculture System, consider the following statement:

1. Biofilters provide waste treatment by removing uneaten fish feed.
2. Biofilters convert ammonia present in fish waste in nitrate.
3. Biofilters increase phosphorus as nutrient for fish in water.

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

5. “Wolbachia method” is sometimes talked about with reference to which one of the following?

- (a) Controlling the viral diseases spread by mosquitoes.
- (b) Converting crop residues into packing material
- (c) Producing biodegradable plastics.
- (d) Producing biochar from thermo-chemical conversion of biomass.

6. With reference to coal-based thermal power plants in India, consider the following statements:

1. None of them uses seawater.
2. None of them is set up in water-stressed district.
3. None of them is privately owned.

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

7. Consider the following statements:

1. Agricultural soils release nitrogen oxides into environment.
2. Cattle release ammonia into environment.
3. Poultry industry releases reactive nitrogen compounds into environment.

Which of the statements given above is/are correct?

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

8. In the context of proposals to the use of hydrogen-enriched CNG (H-CNG) as fuel for buses in public transport, consider the following statements:

1. The main advantage of the use of H-CNG is the elimination of carbon monoxide emissions.
2. H-CNG as fuel reduces carbon dioxide and hydrocarbon emissions.
3. Hydrogen up to one-fifth by volume can be blended with CNG as fuel for buses.
4. H-CNG makes the fuel less expensive than CNG.

Which of the statements given above is/are correct?

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

9. Which of the following statements are correct about the deposits of 'methane hydrate'?

1. Global warming might trigger the release of methane gas from these deposits.
2. Large deposits of 'methane hydrate' are found in Arctic Tundra and under the seafloor.
3. Methane in atmosphere oxidizes to carbon dioxide after a decade or two.

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

10. Consider the following:

1. Carbon monoxide
2. Methane
3. Ozone
4. Sulphur dioxide

Which of the above are released into atmosphere due to the burning of crop/biomass residue?

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

11. In India, the use of carbofuran, methyl parathion, phorate and triazophos is viewed with apprehension. These chemicals are used as

- (a) Pesticides in agriculture
(b) Preservatives in processed foods
(c) Fruit-ripening agents
(d) Moisturizing agents in cosmetics

12. Why is there a great concern about the 'microbeads' that are released into environment?

- (a) They are considered harmful to marine ecosystems.
(b) They are considered to cause skin cancer in children.
(c) They are small enough to be absorbed by crop plants in irrigated fields.
(d) They are often found to be used as food adulterants.

13. Which of the following is/are the possible consequence/s of heavy sand mining in riverbeds?

1. Decreased salinity in the river.
2. Pollution of groundwater
3. Lowering of the water table

Select the correct answer using the code given below:

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

14. Biological Oxygen Demand (BOD) is a standard criterion for:

- (a) Measuring oxygen levels in blood
(b) Computing oxygen levels in forest ecosystems
(c) Pollution assay in aquatic ecosystems
(d) Assessing oxygen levels in high altitude regions

15. Consider the following pairs:

**Commonly used
or materials**

**Unwanted
controversial
chemicals likely to be
found in them:**

- | | |
|----------------------|---------------------------|
| 1. Lipstick | Lead |
| 2. Soft drinks | Brominated vegetable oils |
| 3. Chinese fast food | Monosodium glutamate |

Which of the above pairs is/are correctly matched?

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

16. In the cities of our country, which among the following atmospheric gases are normally considered in calculating the value of Air Quality Index?

1. Carbon dioxide
2. Carbon monoxide
3. Nitrogen dioxide
4. Sulphur Dioxide
5. Methane

Select the correct answer using the code given below:

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

17. With reference to 'fly ash' produced by the power plants using coal as fuel, which of the following statements is/are correct?

1. Fly ash can be used in the production of bricks for building construction.
2. Fly ash can be used as a replacement for some of the Portland cement contents of concrete.
3. Fly ash is made up of silicon dioxide and calcium oxide only, and does not contain any toxic elements.

Select the correct answer using the code given below:

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

18. **Brominated flame retardants are used in many household products like mattresses and upholstery. Why is there some concern about their use?**

1. They are highly resistant to degradation in the environment.
2. They are able to accumulate in humans and animals.

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

19. **Which of the following adds/add carbon dioxide to the carbon cycle on the planet Earth?**

1. Volcanic action
2. Respiration
3. Photosynthesis
4. Decay of organic matter

Select the correct answer using the code given below:

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

20. **Which of the following are some important pollutants released by steel industry in India?**

1. Oxides of sulphur
2. Oxides of nitrogen
3. Carbon monoxide
4. Carbon dioxide

Select the correct answer using the code given below:

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

21. **Acid rain is caused by the pollution of environment by:**

- (a) Carbon dioxide and nitrogen
- (b) Carbon monoxide and carbon dioxide
- (c) Ozone and carbon dioxide
- (d) Nitrous oxide and Sulphur dioxide

22. **Photochemical smog is a resultant of the reaction among:**

- (a) NO_2 , O_3 and peroxyacetyl nitrate in the presence of sunlight
- (b) CO , O_2 and peroxyacetyl nitrate in the presence of sunlight
- (c) CO , CO_2 and NO_2 at low temperature
- (d) High concentration of NO_2 , O_3 and CO in the evening

23. **Which of the following can be found as pollutants in the drinking water in some parts of India?**

1. Arsenic
2. Sorbitol
3. Fluoride
4. Formaldehyde
5. Uranium

Select the correct answer using the codes given below:

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

24. **Consider the following:**

1. Carbon dioxide.
2. Oxides of nitrogen.
3. Oxides of Sulphur

Which of the above is/are the emission/emissions from coal combustion at thermal power plants?

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

25. **Lead, ingested or inhaled, is a health hazard. After the addition of lead to petrol has been banned, what still are the sources of lead poisoning?**

1. Smelting units
2. Pens pencils
3. Paints
4. Hair oils and cosmetics

Select the correct answer using the codes given below:

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

26. **Consider the following statements: Chlorofluorocarbons, known as ozone depleting substances are used:**

1. In the production of plastic foams
2. In the production of tubeless tyres
3. In cleaning certain electronic components
4. As pressurizing agents in aerosol cans

Which of the statements given above is/are correct?

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

27. **The increasing amount of carbon dioxide in the air is slowly raising the temperature of the atmosphere, because it absorbs**

- (a) The water vapour of the air and retains its heat
- (b) The UV part of the solar radiation
- (c) All the solar radiations
- (d) The infrared part of the solar radiation

28. Due to improper / indiscriminate disposal of old and used computers or their parts, which of the following are released into the environment as e-waste?

1. Beryllium
2. Cadmium
3. Chromium
4. Heptachlor
5. Mercury
6. Lead
7. Plutonium

Select the correct answer using the codes given below:

- (a) 1, 3, 4, 6 and 7 only
- (b) 1, 2, 3, 5 and 6 only
- (c) 2, 4, 5 and 7 only
- (d) 1, 2, 3, 4, 5, 6 and 7

29. There is a concern over the increase in harmful algal blooms in the sea waters of India. What could be the causative factors for this phenomenon?

1. Discharge of nutrients from the estuaries.
2. Run-off from the land during the monsoon.
3. Upwelling in the seas.

Select the correct answer from the codes given below:

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

30. Human activities in the recent past have caused the increased concentration of carbon dioxide in the atmosphere, but a lot of it does not remain in the lower atmosphere because of:

1. Its escape into the outer stratosphere.
2. The photosynthesis by phyto-plankton in the oceans.
3. The trapping of air in the polar ice caps.

Which of the statements given above is/are correct?

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

31. Recently, "oil zapper" was in the news. What is it?

- (a) It is an eco-friendly technology for the remediation of oily sludge and oil spills.
- (b) It is the latest technology developed for under-sea oil exploration.
- (c) It is a genetically engineered high biofuel-yielding maize variety.
- (d) It is the latest technology to control the accidentally caused flames from oil wells.

32. Consider the following:

1. Oxides of Hydrogen
2. Oxides of Nitrogen
3. Oxides of Sulphur

Which of the above causes/cause acid rain?

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

33. Excessive release of the pollutant carbon monoxide (CO) into the air may produce a condition in which oxygen supply in the human body decrease. What causes this condition?

- (a) When inhaled into the human body, CO is converted into CO₂
- (b) The inhaled CO has much higher affinity for haemoglobin as compared to oxygen
- (c) The inhaled CO destroys the chemical structure of hemoglobin
- (d) The inhaled CO adversely affects the respiratory center in the brain

34. Hydrogen fuel cell vehicles produce one of the following as "exhaust":

- (a) NH₃
- (b) CH₄
- (c) H₂O
- (d) H₂O₂

35. Which of the following are the reasons/factors for exposure to benzene pollution?

1. Automobile exhaust
2. Tobacco smoke
3. Wood burning
4. Using varnished wooden furniture
5. Using products made of polyurethane

Select the correct answer using the code given below:

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

36. In rural road construction, the use of which of the following is preferred for ensuring environmental sustainability or to reduce carbon footprint?

1. Copper slag
2. Cold mix asphalt technology
3. Geotextiles
4. Hot mix asphalt technology
5. Portland cement

Select the correct answer using the code given below:

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

37. Consider the following statements:

1. Coal ash contains arsenic, lead and mercury.
2. Coal-fired power plants release sulphur dioxide and oxides of nitrogen into the environment.

3. High ash content is observed in Indian coal.

Which of the statements given above is/are correct?

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

38. Which one of the following statements best describes the term 'Social Cost of Carbon'? It is a measure, in monetary value, of the

- (a) Long-term damage done by a tone of CO₂ emissions of a given year.
(b) Requirement of fossil fuels for a country to provide goods and services to its citizens, based on the burning of those fuels.
(c) Efforts put in by a climate refugee to adapt to live in a new place.
(d) Contribution of an individual person to the carbon footprint on the planet Earth.

39. Magnetite particles suspected to cause neurodegenerative problems, are generated as environmental pollutants from which of the following?

1. Brakes of motor vehicles
2. Engines of motor vehicles
3. Microwave stoves within homes
4. Power plants
5. Telephone lines

Select the correct answer using the code given below:

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

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

40. Why is there a concern about copper smelting plants?

1. They may release lethal quantities of carbon monoxide into environment.
2. The copper slag can cause the leaching of some heavy metals into environment.
3. They may release sulphur dioxide as a pollutant.

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

41. Among the following crops, which one is the most important anthropogenic source of both methane and nitrous oxide?

- (a) Cotton (c) Sugarcane
(b) Rice (d) Wheat

42. Consider the following

1. Carbon monoxide
2. Nitrogen oxide
3. Ozone
4. Sulphur dioxide

Excess of which of the above in the environment is/are cause(s) of acid rain?

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

CLIMATE CHANGE

1. In the context of mitigating the impending global warming due to anthropogenic emission of carbon dioxide, which of the following can be the potential sites for carbon sequestration?

1. Abandoned and Uneconomic coal seams
2. Depleted oil and gas reservoirs
3. Subterranean deep saline formations

Select the correct answer using the code given below:

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

2. The formation of ozone hole in the Antarctic region has been a cause of concern. What could be the reason for the formation of this hole?

- (a) Presence of prominent tropospheric turbulence; and inflow of chlorofluorocarbons
(b) Presence of prominent polar front and stratospheric clouds; and inflow of chlorofluorocarbons
(c) Absence of polar front and stratospheric clouds; and inflow of methane and chlorofluorocarbons

- (d) Increased temperature at polar region due to global warming

3. The 'Common Carbon Metric', supported by UNEP, has been developed for

- (a) Assessing the carbon footprint of building operations around the world
(b) Enabling commercial farming entities around the world to enter carbon emission trading
(c) Enabling governments to assess the overall carbon footprint caused by their countries
(d) Assessing the overall carbon footprint caused by the use of fossil fuels by the world in a unit time

4. What is blue carbon?

- (a) Carbon captured by oceans and coastal ecosystems
(b) Carbon sequestered in forest biomass and agricultural soils

- (c) Carbon contained in petroleum and natural gas
- (d) Carbon present in atmosphere

5. Consider the following statements:

1. "The Climate Group" is an international non-profit organization that drives climate action by building large networks and runs them.
2. The International Energy Agency in partnership with the Climate Group launched a global initiative "EP100".

3. EP100 brings together leading companies committed to driving innovation in energy efficiency and increasing competitiveness while delivering on emission reduction goals.
4. Some Indian companies are members of EP100.
5. The International Energy Agency is the Secretariat to the "Under2 Coalition".

Which of the statements given above are correct?

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

ENVIRONMENTAL GOVERNANCE

1. Consider the following statements:

Statement-I:

Carbon markets are likely to be one of the most widespread tools in the fight against climate change

Statement-II:

Carbon markets transfer resources from the private sector to the State.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I
- (b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I
- (c) Statement-I is correct but Statement-II is incorrect
- (d) Statement-I is incorrect but Statement-II is correct

2. Consider the following statements:

1. In India, the Biodiversity Management Committees are key to the realization of the objectives of the Nagoya Protocol.
2. The Biodiversity Management Committees have important functions in determining access and benefit sharing, including the power to levy collection fees on the access of biological resources within its jurisdiction.

Which of the statements given above is/are correct?

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

3. Consider the following statements :

1. Under Ramsar Convention, it is mandatory on the part of the Government of India to protect and conserve all the wetlands in the territory of India.
2. The Wetlands (Conservation and Management) Rules, 2010 were framed by the Government of

India based on the recommendations of Ramsar Convention.

3. The Wetlands (Conservation and Management) Rules, 2010 also encompass the drainage area or catchment regions of the wetlands as determined by the authority.

Which of the statements given above is/are correct?

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

4. In the context of which of the following do some scientists suggest the use of cirrus cloud thinning technique and the injection of sulphate aerosol into stratosphere?

- (a) Creating the artificial rains in some regions
- (b) Reducing the frequency and intensity of tropical cyclones
- (c) Reducing the adverse effects of solar wind on the Earth
- (d) Reducing the global warming

5. Consider the following statements:

1. As per law, the Compensatory Afforestation Fund Management and Planning Authority exists at both National and State levels.
2. People's participation is mandatory in the compensatory afforestation programmes carried out under the Compensatory Afforestation Fund Act, 2016.

Which of the statements given above is/are correct?

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

6. Consider the following statements:

1. As per recent amendment to the Indian Forest Act, 1927, forest dwellers have the right to fell the bamboos grown on forest areas.

2. As per the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, bamboo is a minor forest produce.
3. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 allows ownership of minor forest produce to forest dwellers.

Which of the statements given above is/are correct?

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

7. **Consider the following statements :**

The Environment Protection Act, 1986 empowers the Government of India to

1. state the requirement of public participation in the process of environmental protection, and the Procedure and manner in which it sought
2. lay down the standards for emission or discharge of environmental pollutants from various sources

Which of the statements given above is/are correct?

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

8. **In India, 'extended producer responsibility' was introduced as an important feature in which of the following?**

- (a) The Bio-medical Waste (Management and Handling) Rules, 1998
(b) The Recycled Plastic (Manufacturing and Usage) Rules, 1999
(c) The e-Waste (Management and Handling) Rules, 2011
(d) The Food Safety and Standard Regulations, 2011

9. **The Partnership for Action on Green Economy (PAGE), a UN mechanism to assist countries transition towards greener and more inclusive economies, emerged at:**

- (a) The Earth Summit on Sustainable Development 2002, Johannesburg
(b) The United Nations Conference on Sustainable Development 2012, Rio de Janeiro
(c) The United Nations Framework Convention on Climate Change 2015, Paris
(d) The World Sustainable Development Summit 2016, New Delhi

10. **Consider the following statements:**

1. The definition of "Critical Wildlife Habitat" is incorporated in the Forest Rights Act, 2006.
2. For the first time in India, Baigas have been given Habitat Rights.

3. Union Ministry of Environment, Forest and Climate Change officially decides and declares Habitat Rights for Primitive and Vulnerable Tribal Groups in any part of India.

Which of the above statements is/are correct?

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

11. **Consider the following:**

1. Birds
2. Dustblowing
3. Rain
4. Windblowing

Which of the above spread plant diseases?

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

12. **With reference to organic farming in India, consider the following statements:**

1. 'The National Programme for Organic Production' (NPOP) is operated under the guidelines and directions of the Union Ministry of Rural Development.
2. 'The Agricultural and Processed Food Products Export Development Authority' (APEDA) functions as the Secretariat for the implementation of NPOP.
3. Sikkim has become India's first fully organic State.

Which of the above statements is/are correct?

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

13. **How is the National Green Tribunal (NGT) different from the Central Pollution Control Board (CPCB)?**

1. The NGT has been established by an Act whereas the CPCB has been created by an executive order of the Government.
2. The NGT provides environmental justice and helps reduce the burden of litigation in the higher courts whereas the CPCB promotes cleanliness of streams and wells, and aims to improve the quality of air in the country.

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. **Which of the following statement best describes "carbon fertilization"?**

- (a) Increased plant growth due to increased concentration of carbon dioxide in the atmosphere
(b) Increased temperature of Earth due to increased concentration of carbon dioxide in the atmosphere

- (c) Increased acidity of oceans as the result of increased concentration of carbon dioxide in the atmosphere
- (d) Adaptation of all living beings on Earth to the climate change brought about by the increased concentration of carbon dioxide in the atmosphere

15. With reference to the 'Global Alliance for Climate Smart Agriculture (GACSA)', which of the following statements is/are correct?

1. GACSA is an outcome of the Climate Summit held in Paris in 2015
2. Membership of GACSA does not create any binding obligations.
3. India was instrumental in the creation of GACSA

Select the correct answer using the code given below:

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

16. In India, if a species of tortoise is declared protected under Schedule I of the Wildlife (Protection) Act, 1972, what does it imply?

- (a) It enjoys the same level of protection as the tiger.
- (b) It no longer exists in the wild, a few individuals are under captive protection; and how it is impossible to prevent its extinction.
- (c) It is endemic to a particular region of India.
- (d) Both (b) and (c) stated above are correct in this context.

17. With, reference to 'Global Climate Change Alliance' which of the following statements is/are correct?

1. It is an initiative of the European Union.
2. It provides technical and financial support to targeted developing countries to integrate climate change into their development policies and budgets.
3. It is coordinated by World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD).

Select the correct answer using the code given below:

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

18. According to the Wildlife (Protection) Act, 1972, which of the following animals cannot be hunted by any person except under some provisions provided by law?

1. Gharial
2. Indian wild ass
3. Wild buffalo

Select the correct answer using the code given below:

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

19. Consider the following statements:

1. Climate and Clean Air Coalition (CCAC) to Reduce Short Lived Climate Pollutants is a unique initiative of G20 group of countries;
2. The CCAC focuses on methane, black carbon and hydrofluorocarbons.

Which of the above statements is/are correct?

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

20. Consider the following statements in respect of Trade Related Analysis of Fauna and Flora in Commerce (TRAFFIC):

1. TRAFFIC is a bureau under United Nations Environment Programme (UNEP).
2. The Mission of TRAFFIC is to ensure that trade in wild plants and animals is not a threat to the conservation of nature.

Which of the above statements is/are correct?

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

21. The term 'M-STrIPES' is sometimes seen in the news in the context of:

- (a) Captive breeding of Wild Fauna
- (b) Maintenance of Tiger Reserves
- (c) Indigenous Satellite Navigation System
- (d) Security of National Highways

22. On which of the following can you find the Bureau of Energy Efficiency Star Label?

1. Ceiling fans
2. Electric geysers
3. Tubular fluorescent lamps

Select the correct answer using the code given below:

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

23. Consider the following statements:

1. The International Solar Alliance was launched at the United Nations Climate Change Conference in 2015.
2. The Alliance includes all the member countries of the United Nations.

Which of the above statements is/are correct?

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

24. Consider the following statements:

1. The Sustainable Development Goals were first proposed in 1972 by a global think tank called the 'Club of Rome'.

2. The Sustainable Development Goals have to be achieved by 2030.

Which of the above statements is/are correct?

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

25. What is/are the importance/importances of the 'United Nations Convention to Combat Desertification'?

1. It aims to promote effective action through innovative national programmes and supportive inter-national partnerships.
2. It has a special/particular focus on South Asia and North Africa regions, and its secretariat facilitates the allocation of major portion of financial resources to these regions.
3. It is committed to bottom-up approach, encouraging the participation of local people in combating the desertification.

Select the correct answer using the code given below:

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

26. With reference to the Agreement at the UNFCCC Meeting in Paris in 2015, which of the following statements is/are correct?

1. The Agreement was signed by all the member countries of the UN and it will go into effect in 2017.
2. The Agreement aims to limit the greenhouse gas emissions so that the rise in average global temperature by the end of this century does not exceed 2 degree Centigrade or even 5 degree Centigrade above pre-industrial levels.
3. Developed countries acknowledged their historical responsibility in global warming and committed to donate dollar 1000 billion a year from 2020 to help developing countries to cope with climate change.

Select the correct answer using the code given below:

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

27. With reference to 'Agenda 21', sometimes seen in the news, consider the following statements:

1. It is a global action plan for sustainable development.
2. It originated in the World Summit on Sustainable Development held in Johannesburg in 2002

Which of the statements given above is/are correct?

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

28. What is 'Greenhouse Gas Protocol'?

- (a) It is an international accounting tool for government and business leaders to understand, quantify and manage greenhouse gas emissions.
- (b) It is an initiative of the United Nations to offer financial incentives to developing countries to reduce greenhouse gas emissions and to adopt eco-friendly technologies.
- (c) It is an inter-governments agreement ratified by all the member countries of the United Nations to reduce greenhouse gas emissions to specified levels by the year 2022.
- (d) It is one of the multilateral REDD+ initiatives hosted by the World Bank.

29. The term Intended Nationally Determined Contribution is sometimes seen in the news in the context of:

- (a) Pledge made by the European countries to rehabilitate refugees from the war-affected Middle East.
- (b) Plan of nation outlined by the countries of the world to combat climate changes.
- (c) Capital contributed by the member countries in the establishment of Asian Infrastructure Investment Bank.
- (d) Plain of action outlined by the countries of the regarding Sustainable Developments Goals.

30. Which of following statements is/are correct? Proper design and effective implementation of UN-REDD+ Programme can significantly contribute to

1. Protection of biodiversity
2. Resilience of forest ecosystems
3. Poverty reduction

Select the correct answer using the code given below

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

31. With reference to an initiative called 'The Economics of Ecosystems and Biodiversity (TEEB)', which of the following statements is/are correct?

1. It is initiative hosted by UNEP, IMF and World Economic Forum.
2. It is a global initiative that focuses on drawing attention to the economic benefits of biodiversity.
3. It presents an approach that can help decision-makers recognize, demonstrate and capture the value of ecosystems and biodiversity.

Select the correct answer using the code given below

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

32. Which of the following best describe the aim of 'Green India Mission' of the Government of India?

1. Incorporating environment benefits and costs into the Union and State Budgets thereby implementing the 'green accounting'.
2. Launching the second green revolution to enhance agriculture output so as to ensure food security to one and all in the future.
3. Restoring and enhancing forest cover and responding to climate change by a combination of adaptation and mitigation measures.

Select the correct answer using the code given below

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

33. Consider the following pairs:

<i>Terms sometimes seen in the news</i>	<i>Their origin</i>
1. Annex-I Countries	Cartagena Protocol
2. Certified Emissions Reductions	Nagoya Protocol
3. Clean Development Mechanism	Kyoto Protocol

Which of the above pairs is/are correctly matched?

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

34. The FAO accords the status of 'Globally Important Agricultural Heritage Systems (GIAHS)' to traditional agricultural systems. What is the overall goal of this initiative?

1. To provide modern technology, training in modern farming methods and financial support to local communities of identified GIAHS so as to greatly enhance their agricultural productivity.
2. To identify and safeguard eco-friendly traditional farm practices and their associated landscapes, agricultural biodiversity and knowledge systems of the local communities
3. To provide Geographical Indication status to all the varieties of agricultural produce in such identified GIAHS

Select the correct answer using the code given below:

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

35. Which of the following are the key features of 'National Ganga River Basin Authority (NGRBA)'?

1. River basin is the unit of planning and management.
2. It spearheads the river conservation efforts at the national level.

3. One of the Chief Ministers of the State through which the Ganga flows becomes the Chairman of NGRBA on rotation basis.

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

36. With reference to the International Union for Conservation of Nature and Natural Resources (IUCN) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which of the following statements is/are correct?

1. IUCN is an organ of the United Nations and CITES is an international agreement between governments.
2. IUCN runs thousands of field projects around the world to better manage natural environments.
3. CITES is legally binding on the States that have joined it, but this Convention does not take the place of national laws.

Select the correct answer using the code given below:

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

37. Which one the following is associated with the issue of control and phasing out of the use of ozone depleting substances?

- (a) Bretton Woods Conference
(b) Montreal Protocol
(c) Kyoto Protocol
(d) Nagoya Protocol

38. What is Rio+20 Conference, often mentioned in the news?

- (a) It is the United Nations Conference on Sustainable Development.
(b) It is a Ministerial Meeting of the World Trade Organization.
(c) It is a Conference of the Inter-governmental Panel on Climate Change.
(d) It is a Conference of the Member Countries of the Convention on Biological Diversity.

39. Which of the statements regarding 'Green Climate Fund' is/are correct?

1. It is intended to assist the developing countries in adaption and mitigation practices to counter climate change.
2. It is founded under the aegis of UNEP, OECD, Asian Development Bank and World Bank.

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

40. 'Bio-Carbon Fund Initiative for Sustainable Forest Landscapes' is managed by the:

- (a) Asian Development Bank
(b) International Monetary Fund
(c) United Nations Environment Programme
(d) World Bank

41. With reference to 'Forest Carbon Partnership Facility', which of the following statements is/are correct?

1. It is a global partnership of governments, businesses, civil society and indigenous peoples.
2. It provides financial aid to universities, individual scientists and institutions involved in scientific forestry research to develop eco-friendly and climate adaptation technologies for sustainable forest management.
3. It assists the countries in their 'REDD+ (Reducing Emissions from Deforestation and Forest Degradation)' efforts by providing them with financial and technical assistance.

Select the correct answer using the code given below:

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

42. With reference to an organization known as 'Bird Life International', which of the following statements is/are correct?

1. It is a Global Partnership of Conservation Organizations.
2. The concept of 'biodiversity hotspots' originated from this organization.
3. It identifies the sites known/referred to as 'Important Bird and Biodiversity Areas'.

Select the correct answer using the code given below:

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

43. Which one of the following best describes the main objective of 'Seed Village Concept'?

- (a) Encouraging the farmers to use their own farm seeds and discouraging them to buy the seeds from others
(b) Involving the farmers for training in quality seed production and thereby to make available quality seeds to others at appropriate time and affordable cost
(c) Earmarking some villages exclusively for the production of certified seeds
(d) Identifying the entrepreneurs in villages and providing them technology and finance to set up seed companies

44. The term 'IndARC', sometimes seen in the news, is the name of:

- (a) An indigenously developed radar system inducted into Indian Defence
(b) India's satellite to provide services to the countries of Indian Ocean Rim
(c) A scientific establishment set up by India in Antarctic region
(d) India's underwater observatory to scientifically study the Arctic region

45. The Genetic Engineering Appraisal Committee is constituted under the:

- (a) Food Safety and Standards Act, 2006
(b) Geographical Indications of Goods (Registration and Protection) Act, 1999
(c) Environment (Protection) Act, 1986
(d) Wildlife (Protection) Act, 1972

46. With reference to Bombay Natural History Society (BNHS), consider the following statements:

1. It is an autonomous organization under the Ministry of Environment and Forests.
2. It strives to conserve nature through action-based research, education and public awareness.
3. It organizes and conducts nature trails and camps for the general public.

Which of the statements given above is/are correct?

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

47. Consider the following international agreements:

1. The International Treaty on Plant Genetic Resources for Food and Agriculture.
2. The United Nations Convention to Combat Desertification.
3. The World Heritage Convention.

Which of the above has/have a bearing on the biodiversity?

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

48. Consider the following statements:

1. Animal Welfare Board of India is established under the Environment (Protection) Act, 1986.
2. National Tiger Conservation Authority is a statutory body.
3. National Ganga River Basin Authority is chaired by the Prime Minister.

Which of the above statements is/ are correct?

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

49. With reference to 'Global Environment Facility', which of the following statements is/are correct?
- It serves as financial mechanism for 'Convention on Biological Diversity' and 'United Nations Framework Convention on Climate Change'.
 - It undertakes scientific research on environmental issues at global level.
 - It is an agency under OECD to facilitate the transfer of technology and funds to underdeveloped countries with specific aim to protect their environment.
 - Both (a) and (b)
50. Consider the following statements regarding 'Earth Hour':
- It is an initiative of UNEP and UNESCO.
 - It is a movement in which the participants switch off the lights for one hour on a certain day every year.
 - It is a movement to raise the awareness about the climate change and the need to save the planet.
- Which of the above statements is/are correct?
- 1 and 3 only
 - 2 only
 - 2 and 3 only
 - 1, 2 and 3
51. If a wetland of international importance is brought under the 'Montreux Record', what does it imply?
- Changes in ecological character have occurred, are occurring or are likely to occur in the wetland as a result of human interference.
 - The country in which the wetland is located should enact a law to prohibit any human activity within five kilo metres from the edge of the wetland
 - The survival of the wetland depends on the cultural practices and traditions of certain communities living in its vicinity and therefore the cultural diversity therein should not be destroyed
 - It is given the status of 'World Heritage Site'
52. With reference to conservation organization called Wetlands International, which of the following statements is/are correct?
- It is an intergovernmental organization formed by the countries which are signatories to Ramsar Convention.
 - It works at the field level to develop and mobilize knowledge, and use the practical experience to advocate for better policies.
- Select the correct answer using the code given below:
- 1 only
 - 2 only
 - Both 1 and 2
 - Neither 1 nor 2
53. Under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, who shall be the authority to initiate the process for determining the nature and extent of individual or community forest rights or both?
- State Forest Department
 - District Collector/Deputy Commissioner
 - Tahsildar/Block Development Officer/Mandal Revenue Officer
 - Gram Sabha
54. How does National Biodiversity Authority (NBA) help in protecting the Indian agriculture?
- NBA checks the bio piracy and protects the indigenous and traditional genetic resources.
 - NBA directly monitors and supervises the scientific research on genetic modification of crop plants.
 - Application for Intellectual Property Rights related to genetic/biological resources cannot be made without the approval of NBA.
- Which of the above statements is/are correct?
- 1 only
 - 2 and 3 only
 - 1 and 3 only
 - 1, 2 and 3
55. If national water mission is properly and completely implemented how will it impact the country?
- Part of the water needs of urban areas will be met through recycling of waste water.
 - The water requirements of coastal cities with inadequate alternative sources of water will be met by adopting appropriate technologies that allow for the use of ocean water.
 - All the rivers of Himalayan origin will be linked to the rivers of peninsular India
 - The expenses incurred by farmers for digging bore wells and for installing motors and pump sets to draw groundwater will be completely reimbursed by the Government.
- Select the correct answer using the code given below:
- 1 only
 - 1 and 2 only
 - 3 and 4 only
 - 1, 2, 3 and 4
56. The Millennium Ecosystem Assessment describes the following major categories of ecosystem services-provisioning, supporting, regulating, preserving and cultural. Which one of the following is supporting service?
- Production of food and water
 - Control of climate and disease
 - Nutrient Cycling and crop pollinator
 - Maintenance of diversity

57. Regarding “carbon credits”, which one of the following statements is not correct?
- The carbon credit system was ratified in conjunction with the Kyoto Protocol
 - Carbon credits are awarded to countries or groups that have reduced greenhouse gases below their emission quota
 - The goal of the carbon credit system is to limit the increase of carbon dioxide emission
 - Carbon credits are- traded at a price fixed from time to time by the United Nations Environment Programme
58. The “Red Data Books” published by the International Union for Conservation of Nature and Natural Resources (IUCN) contain lists of:
- Endemic plant and animal species present in the biodiversity hotspots,
 - Threatened plant and animal species.
 - Protected sites for conservation of nature and natural resources in various countries.
- Select the correct answer using the codes given below:
- 1 and 3 only
 - 2 only
 - 2 and 3 only
 - 3 only
59. With reference to India, consider the following Central Acts:
- Import and Export (Control) Act, 1947
 - Mining and Mineral Development (Regulation) Act, 1957
 - Customs Act, 1962
 - Indian Forest Act, 1927
- Which of the above acts have relevance to/bearing on the biodiversity conservation in the country?
- 1 and 3 only
 - 2, 3 and 4 only
 - 1, 2, 3 and 4
 - None of the above
60. India is a party to the Ramsar Convention and has declared many areas as Ramsar Sites. Which of the following statements best describes as to how we should maintain these sites in the context of this Convention?
- Keep all the sites completely inaccessible to man so that they will not be exploited
 - Conserve all the sites through ecosystem approach and permit tourism and recreation only
 - Conserve all the sites through ecosystem approach for a period without any exploitation, with specific criteria and specific period for each site, and then allow sustainable use of them by future generations
 - Conserve all the sites through ecosystem approach and allow their simultaneous sustainable use
61. Sustainable development is described as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. In this perspective, inherently the concept of sustainable development is intertwined with which of the following concepts?
- Social justice and empowerment
 - Inclusive Growth
 - Globalization
 - Carrying capacity
62. “Momentum for change: climate neutral now” is an initiative launched by :
- The Intergovernmental Panel on Climate Change
 - The UNEP Secretariat
 - The UNFCCC Secretariat
 - The World Meteorological Organization
63. If a particular plant species is placed under Schedule VI of The Wildlife Protection Act, 1972, what is the implication?
- A licence is required to cultivate that plant.
 - Such a plant cannot be cultivated under any circumstances.
 - It is a Genetically Modified crop plant.
 - Such a plant is invasive and harmful to the ecosystem.
64. Consider the following statements:
- Statement 1:**
- The United Nations Capital Development Fund (UNCDF) and the Arbor Day Foundation have recently recognized Hyderabad as 2020 Tree City of the World.
- Statement 2:**
- Hyderabad was selected for the recognition for a year following its commitment to grow and maintain the urban forests.
- Which one of the following is correct in respect of the above statements?
- Both Statement 1 and Statement 2 are correct and Statement 2 is the correct explanation for Statement 1
 - Both Statement 1 and Statement 2 are correct but Statement 2 is not the correct explanation for Statement 1
 - Statement 1 is correct but Statement 2 is not correct
 - Statement 1 is not correct but Statement 2 is correct

65. With reference to 'Water Credit', consider the following statements:
1. It puts microfinance tools to work in the water and sanitation sector.
 2. It is a global initiative launched under the aegis of the World Health Organization and the World Bank.
 3. It aims to enable the poor people to meet their water needs without depending on subsidies.
- Which of the statements given above are correct?
- (a) 1 and 2 only (c) 1 and 3 only
(b) 2 and 3 only (d) 1, 2 and 3
66. 'R2 Code of Practices' constitutes a tool available for promoting the adoption of:
- (a) Environmentally responsible practices in electronics recycling industry
 - (b) Ecological management of 'Wetlands of International Importance' under the Ramsar
 - (c) Sustainable practices in the cultivation of agricultural crops in degraded lands
 - (d) 'Environmental Impact Assessment' in the exploitation of natural resources
67. With reference to the New York declaration on Forests, which of the following statements are correct?
1. It was first endorsed at the United Nations Climate Summit in 2014.
 2. It endorses a global timeline to end the loss of forests.
 3. It is a legally binding international declaration.
 4. It is endorsed by governments, big companies and indigenous communities.
 5. India was one of the signatories at its inception.
- Select the correct answer using the code given below.
- (a) 1, 2 and 4 only
(b) 1, 3 and 5 only
(c) 3 and 4 only
(d) 2 and 5 only
68. "Climate Action Tracker" which monitors the emission reduction pledges of different countries is a:
- (a) Database created by coalition of research organisations
 - (b) Wing of "International Panel of Climate Change"
 - (c) Committee under "United Nations Framework Convention on Climate Change"
 - (d) Agency promoted and financed by United Nations Environment Programme and World Bank
69. In the context of WHO Air Quality Guidelines, consider the following statements:
1. The 24-hour mean of PM_{2.5} should not exceed 15 µg/m³ and annual mean of PM_{2.5} should not exceed 5 µg/m³.
 2. In a year, the highest levels of ozone pollution occur during the periods of inclement weather.
 3. PM₁₀ can penetrate the lung barrier and enter the bloodstream.
 4. Excessive ozone in the air can trigger asthma.
- Which of the statements given above are correct?
- (a) 1, 3 and 4 only
(b) 1 and 4 only
(c) 2, 3 and 4 only
(d) 1 and 2 only
70. Which one of the following has been constituted under the Environment (Protection) Act, 1986?
- (a) Central Water Commission
 - (b) Central Ground Water Board
 - (c) Central Ground Water Authority
 - (d) National Water Development Agency
71. Which one of the following best describes the term "greenwashing"?
- (a) Conveying a false impression that a company's products are eco-friendly and environmentally sound.
 - (b) Non-inclusion of ecological/environmental costs in the Annual Financial Statements of a country.
 - (c) Ignoring the disastrous ecological consequences while undertaking infrastructure development.
 - (d) Making mandatory provisions for environmental costs in a government project/programme.

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ENVIRONMENT

ANSWERS

ECOLOGY & ENVIRONMENT

1. Ex. (d)

- All statements are correct.

Properties and Benefits of Mushrooms

- Mushrooms Decrease the risk of cancer, Research shows that shiitake mushrooms, in particular, help to keep cholesterol levels low. Effects of eating mushrooms on mild cognitive impairment (MCI). In a study in Singapore, participants who ate more than two cups of mushrooms a week had a 50% lower risk of developing MCI.
- Magic mushrooms (also called shrooms or mushrooms) are a type of mushroom that contains the drugs psilocybin or psilocin. Multiple clinical trials support psilocybin's ability to reduce depression symptom severity, including in people with treatment-resistant depression.
- Many mushroom species are substantial sources of biologically active compounds, including those that possess insecticidal activities.
- The mushrooms only glow at night. They don't glow bright enough during the day to be extra visible. The glowing parts of the fungi can come from the mycelia, the mushrooms, or both parts. Bioluminescent Fungi. Fungi produce an eerie green light on the mushroom caps.

2. Exp. (d)

- The Rann of Kutch is a vast salt marsh located in the Thar Desert of Gujarat, India. It is known for its unique ecosystem and is characterised by extensive marshy areas.
- The region has experienced multiple cycles of sea level fluctuations over time, leading to the formation of the marshland in the present day.
- The Rann was once a shallow part of the Arabian Sea until a geological shift closed off the connection with the sea. The region became a seasonal marshy salt desert over the years. During monsoons, the region fills up with water and forms a wetland. In the summer the water dries to create a bed of white salty land.

3. Exp. (d)

- Statement-I is incorrect: Tropical rain forest soil is very poor in nutrient which are required

by plants to grow. This is due to acidic nature of soil and incessant rains. Potassium, calcium, magnesium and phosphorous are lost away due to leaching. Thus, regeneration is very slow.

- Statement-II is correct: The high levels of precipitation and year-round warmth in tropical rainforest regions contribute to the breakdown of organic matter and the rapid recycling of nutrients within the ecosystem. This process, known as nutrient cycling, leads to the accumulation of nutrients in the soil. Tropical rainforest soils are often classified as "oxisols" or "ultisols." Oxisols are typically found in older rainforest regions and are characterized by their highly weathered nature. Despite being highly weathered, oxisols can still contain substantial amounts of nutrients due to the efficient nutrient cycling processes.

4. Exp. (d)

Adaptations in Desert Areas

- To survive, desert plants have adapted to the extremes of heat and aridity by using both physical and behavioral mechanisms, much like desert animals. Plants that have adapted by altering their physical structure are called xerophytes. **They have long roots, thick barks, hard and waxy leaves, thorns and little leaves.**

5. Exp. (c)

Ecosystem

- **An ecosystem is a community of organisms together with the environment in which they live.** An ecosystem thus includes all of the living things (plants, animals and organisms) in a given area, interacting with each other, and also with their non-living environments (weather, earth, sun, soil, climate, and atmosphere).

6. Exp. (a)

Food Chain

- Considering the feeding relationship of organisms in a food chain it is found that the Herrings feed on Crustaceans (consumers/heterotrophs) and the crustaceans feed on diatoms (primary producers / autotrophs). Thus the correct sequence of a food

chain is **Diatoms-Crustaceans-Herrings** in the increasing order of food level.

7. **Exp. (c)**

Hibernation

- Hibernation, a state of greatly reduced metabolic activity and lowered body temperature adopted by certain mammals as an adaptation to adverse winter conditions.
- Few animals that hibernate are: **Bats, Gila Monsters, Wood frogs, Snails, Bears, snakes, Bees, Rodents etc.**

8. **Exp. (a)**

Food Chain

- **Food chain is the sequence of transfers of matter and energy in the form of food from organism to organism.**
- Food chains are not found within the populations of a species, rather among populations of different species.
- **It gives no information about the numbers of each organism which are eaten by others.**

9. **Exp. (b)**

Ecological Niche

- An ecotone is a transition area between two biomes. It is where two communities meet and integrate.
- **Ecological niche is a term for the position or the physical space of a species within an ecosystem, describing both the range of conditions necessary for persistence of the species, and its ecological and functional role in the ecosystem.**
- A habitat is an ecological or environmental area that is inhabited by a particular species of animal, plant or other type of organism.
- A home range is the area in which an animal lives and moves on a periodic basis.

10. **Exp. (c)**

Grasslands

- **In the grasslands, trees do not replace the grasses as a part of an ecological succession because of water limits and fire.** Grass ecosystems are an early stage of succession in regions where the mature ecosystems are forests. However, grass ecosystems are climax ecosystems in grassland regions, where there is not enough rainfall to support a forest. Extreme continental climate leading to limited supply of water and human activities mainly burning of vegetation thus limits the succession of grasses by trees.

11. **Exp. (c)**

Productivity

- Productivity is the rate of organic matter or biomass production. The productivity of an ecosystem is of two types: primary and secondary.
- Mangroves < grasslands < lakes < oceans

12. **Exp. (d)**

Adaptations in Desert Areas

- To survive, desert plants have adapted to the extremes of heat and aridity by using both physical and behavioral mechanisms, much like desert animals. Plants that have adapted by altering their physical structure are called xerophytes. They have long roots, thick barks, hard and waxy leaves, thorns and little leaves.

13. **Exp. (b)**

Decomposers

- Decomposers are organisms that break down dead plants or animals into water, carbon dioxide, minerals and other simple chemicals that plants need for growth. These are namely bacteria and fungi. **Viruses aren't decomposers. A virus is a small infectious agent that replicates only inside the living cells of other organisms.** Viruses can infect all types of life forms, from animals and plants to microorganisms, including bacteria and archaea.

14. **Exp. (c)**

Source of Nitrogen in Soil

- Nitrogenous waste products of living organisms such as urea and uric acid and dead remains of organisms are converted back to inorganic ammonia by the bacteria. In this way nitrogen is added to the soil.
- Burning of coal by man leads to release of carbon dioxide majorly. Although some coal-burning power stations are responsible for emissions of millions of tons of sulfur and nitrous oxide, but this adds nitrogen into the "atmosphere" and not "soil" as such.

15. **Exp. (a)**

Wetlands

- **The country's total geographical area under the category of wetlands is recorded more in Gujrat as compared to other states.**
- In India, the total geographical area of inland wetlands is larger than that of coastal wetlands.

16. **Exp. (c)**

Source of Carbon Dioxide

- Photosynthesis is a process by virtue of which the green plants and some other organisms use

sunlight to synthesize nutrients from carbon dioxide and water. Photosynthesis in plants generally involves the green pigment chlorophyll and generates oxygen as a by-product.

- Respiration is a process by virtue of which living organisms involving the production of energy, typically with the intake of oxygen and the release of carbon dioxide from the oxidation of complex organic substances.
- In the decomposition process, different products released are carbon dioxide (CO₂), energy, water, plant nutrients and resynthesized organic carbon compounds. This release process is called mineralization. The waste products produced by micro-organisms are also soil organic matter.
- Volcanic activity ranges from emission of gases, non-explosive lava emissions to extremely violent explosive bursts that may last many hours. Volcanoes have occasionally contributed to global warming by producing significant amounts of carbon dioxide and other greenhouse gases.

17. Exp. (b)

Marine Upwelling Zones

- These are regions experiencing oceanographic phenomenon of upwelling that involves wind-driven motion of dense, cooler, and usually nutrient-rich water towards the ocean surface, replacing the warmer, usually nutrient-depleted surface water. They are important as they increase the marine productivity.
- The marine productivity is not impacted by the presence or absence of decomposer microorganisms and the bottom-dwelling organisms on the surface.

18. Exp. (d)

Mangroves

- Mangroves are trees found in coastal areas near the equator that can easily adapt to live in harsh conditions. They can survive in both saltwater and fresh water conditions, unlike most other species.
- These mangroves can serve as a reliable safety hedge against coastal calamities as they do not get uprooted by storms and tides because of their extensive root system thus providing a natural line of defence against tsunamis.

19. Exp. (d)

Biomagnification

- Biomagnification refers to the tendency of pollutants to concentrate as they move from one trophic level to another. Thus in biomagnification there is an increase in the concentration of a pollutant from one link in a food chain to another.

- Since the hawk occupies the highest position in the food chain (Food crop-Rat-Snake-Hawk) the highest concentration of the pesticide accumulates within the hawk.

20. Exp: (d)

21. Exp: (c)

Phosphorus cycle

- Much of the phosphorus on Earth is tied up in rock and sedimentary deposits, from which it is released by weathering, leaching, and mining.
- The phosphorus cycle is slow compared to other biogeochemical cycles such as the water, carbon, and nitrogen cycles.
- In nature, phosphorus is found mostly in the form of phosphate ions. Phosphate compounds are found in sedimentary rocks, and as the rocks weather—wear down over long time periods—the phosphorus they contain slowly leaches into surface water and soils. Volcanic ash, aerosols, and mineral dust can also be significant phosphate sources, though phosphorus has no real gas phase, unlike other elements such as carbon, nitrogen, and sulfur.

22. Exp: (c)

Detritivores

- Typical detritivorous animals include millipedes, springtails, woodlice, dung flies, slugs, many terrestrial worms, sea stars, sea cucumbers, fiddler crabs, and some sedentary polychaetes such as worms of the family Terebellidae.
- Jellyfish feed on phytoplankton and zooplanktons.
- Seahorses are predators and are fed mostly on crustacean prey; small caridean shrimps and amphipods as adults (both species), and copepods and larval meroplankton as juveniles.

23. Exp: (d)

Symbiosis

- Symbiosis is a close ecological relationship between the individuals of two (or more) different species.
- The relationship between cnidarians and dinoflagellate algae is termed as “symbiotic”.
- Two common mutualistic relationships involving fungi are mycorrhiza and lichen.
- Symbiosis in protozoa mostly represents a close mutualistic association between a protozoan and unicellular symbionts (bacteria, cyanobacteria or/and unicellular algae) or protozoans and a multicellular organism (ruminants, lower termites, wood-eating cockroaches, plants).

24. Exp. (b)

Lakes of West Asia

- One example of increasing aridity in Mali appears in Lake Faguibine. These false-color Landsat

satellite images of the lake show how it changed over the decades.

- Lying at the end of a series of basins watered by the Niger River when it floods, Lake Faguibine has experienced widely fluctuating water levels since the turn of the twentieth century but, at its fullest, has ranked among the largest lakes in West Africa. In 1974, this lake covered roughly 590 square kilometers (230 square miles). Starting in the late 1980s, a drop in precipitation steadily dried the lake. By the late 1990s, the traditional livelihoods of fishing, agriculture, and livestock herding became impractical. Even though normal rainfall resumed after the year 2000, the lake remained nearly dry.

25. **Exp. (d)**

Wetlands

- **The water cycle in wetlands involves surface runoff, subsoil percolation and evaporation.**
- Your kidneys remove wastes and extra fluid from your body. Your kidneys also remove acid that is produced by the cells of your body and maintain a healthy balance of water, salts, and minerals. In the same manner As sediment, excess nutrients and chemicals flow off of the land, wetlands filter the run off before it reaches open water. Nutrients are stored and absorbed by plants or microorganisms. Sediment settles at the bottom after reaching an area with slow water flow.

26. **Exp. (c)**

Miyawaki technique

- The method involves planting two to four trees per square metre. Miyawaki forests grow in two to three years and are self-sustaining.

BIODIVERSITY

1. **Exp. (b)**

- Orangutans are among the most intelligent primates. They have human-like long-term memory, routinely use a variety of sophisticated tools in the wild and construct elaborate sleeping nests each night from foliage and branches

2. **Exp. (c)**

- The Indian palm squirrel or three-striped palm squirrel (*Funambulus palmarum*) is a species of rodent in the family Sciuridae (includes tree squirrels, ground squirrels (including chipmunks and prairie dogs, among others), and flying squirrels.) found naturally in India (south of the Vindhyas) and Sri Lanka.
- Nesting mostly in self-dug burrows underground, but also make dens in rocky outcroppings and in cavities at the bottom of trees. Ground squirrels nest on the ground, digging burrows, a system of tunnels underground, to live in. They hibernate during the winter in these underground burrows.
- Tree squirrels hide away in nests or dens in trees and food to keep warm during the winter. Most tree squirrel nests are called dreys, which are made up of clumped-together collections of leaves, twigs, bark, moss, and other compressed materials.
- They are usually very protective of their food sources, often guarding and defending them from birds and other squirrels. Unlike some other species of squirrel, Indian palm squirrel do not hibernate.

- **Indian palm squirrels are omnivores.** They feed mainly on nuts and fruits but will also eat seeds, insects, small mammals and reptiles, eggs, and even sometimes chicks of birds.

3. **Exp. (c)**

- **Option a is correct:** Waggle dance is a term used in beekeeping and ethology for a particular figure-eight dance of the honey bee. By performing this dance, successful foragers can share information about the direction and distance to patches of flowers yielding nectar and pollen, to water sources, or to new nest-site locations with other members of the colony.
- The waggle dance and the round dance are two forms of dance behaviour that are part of a continuous transition. As the distance between the resource and the hive increases, the round dance transforms into variations of a transitional dance, which, when communicating resources at even greater distances, becomes the waggle dance.

4. **Exp. (b)**

- **Option 1 is incorrect:** Lion-tailed macaque is **diurnal**, meaning it is **active exclusively in daylight hours**. When they're active, they will spend half the day foraging, and the other half will be spent resting or finding new areas to forage.[4] Unlike other macaques, it typically avoids humans when possible. In group behavior, the lion-tailed macaque is much like other macaques, living in hierarchical groups of usually 10 to 20 members,

which usually consist of few males, typically 1-3, and many females.

- **Option 2 is correct:** The Malabar civet is **considered nocturnal and so elusive that little is known about its biology and ecology apart from habitat use.** The Malabar Civet is a critically endangered species found in the Western Ghats of India. It is a solitary and secretive animal that inhabits dense tropical forests and is known for its distinctive black or dark brown fur with large white spots. It has a long body, a pointed snout, and a long tail. Being primarily nocturnal, the Malabar Civet has adaptations such as excellent night vision and acute senses that allow it to navigate and hunt in low-light conditions. It feeds on a variety of small mammals, birds, insects, fruits, and other vegetation.

- **Option 3 is correct:** Sambar is nocturnal or crepuscular. During the day, Sambar Deer typically seek shade and rest in dense vegetation or near water bodies to avoid the heat. As the evening approaches, they become more active and start foraging for food, such as grasses, leaves, shoots, fruits, and other plant materials. They may continue their activities into the night, making them partially nocturnal. The Sambar Deer (*Rusa unicolor*) is a large deer species found in various parts of South and Southeast Asia, including India. While Sambar Deer are primarily crepuscular, meaning they are most active during dawn and dusk, their activity patterns can vary depending on factors such as habitat, climate, and predation risk.

5. Exp. (a)

- **Option a is correct:** The Invasive Species Specialist Group (ISSG) is a global network of scientific and policy experts on invasive species, organized under the auspices of the Species Survival Commission (SSC) of the **International Union for Conservation of Nature (IUCN)**. It was developed between 1998 and 2000 as part of the global initiative on invasive species led by the erstwhile Global Invasive Species Programme (GISP).

6. Exp. (b)

- **Statement 1 is incorrect:** Jackfruit are **evergreen tree** that are native to India and Malaysia, that have spread to Sri Lanka, China, South-east Asia and to tropical Africa. They are cultivated for the large fruits that can vary in shape and size, and for timber.
- **Statement 2 is correct:** Mahua is a **medium-sized deciduous tree**, which grows to a height of 16-20 m.

- Statement 3 is correct: teak, (genus *Tectonagrandis*), **large deciduous tree** of the family Verbenaceae, or its wood, one of the most valuable timbers. Teak has been widely used in India for more than 2,000 years.

7. Exp. (d)

National Park

- **Manas National Park:** About Grasslands of Terai and Bhabar type cover the half of the Park, the riparian areas have colonizing grasslands and woodlands of several species. The thick woodlands are called Eastern Moist Deciduous Forests of various types. The undergrowths are very thick. There are more than 650 species of Angiosperms alone. The commonly seen trees are the Simul, Oxi, Sissoo, Khaie, Gamari, etc.
- **Manas** is the only landscape in the world where pristine Terai Grasslands are seen merging with the Bhabar grasslands interspersed with diverse habitats ascending to Semi-Evergreen forests and then to Bhutan Himalayas. The Biodiversity is very rich here. The last population of the Pygmy Hog survives in the wilds of Manas and nowhere else in the world.
- **Namdapha National Park:** Namdapha National Park is the largest protected area in the Eastern Himalaya biodiversity hotspot and is located in Arunachal Pradesh in Northeast India. It is also the third largest national park in India in terms of area. It is located in the Eastern Himalayan sub-region and is recognized as one of the richest areas in biodiversity in India. The park harbours the northernmost lowland evergreen rainforests in the world at 27°N latitude. The area is also known for extensive Dipterocarp forests.
- **Neora Valley National Park:** Neora Valley National Park was established in the year of 1986. This park falls in the catchment area of the Neora River. Neora Valley National Park is distinct for its pristine scenic beauty and rich bio-diversity. Due to wide range of altitude variation, the climate condition of the park varies from tropical to temperate or even Sub-alpine in Rachilla Danda area. Its floral diversity is noteworthy with mixed species of rhododendrons, bamboo, sal etc. along with several species of orchids.
- **Valley of flowers National park:** Valley of Flowers is a vibrant and splendid national park reposing in West Himalayas. Nestled in Uttarakhand, this alluring place is famous for its charming meadows of alpine flowers. Endowed with a diverse range of endemic flora, it is picturesque in its beauty. This lush region is also home to some rare and endangered animal species. You may spot animals like Asiatic black deer, snow leopard, musk deer, red fox, brown bear and blue sheep. High in the lofty Himalayas of the Garhwal region sprawls this enchanting valley. Legends believe it to be

the place from where Hanuman had collected the Sanjeevani buti for curing Lakshmana. This place has floral pastures, running streams and beautiful backdrop of the mountains.

8. **Exp. (a)**

Biodiversity of India

- The Great one horned rhino is commonly found in Nepal, Bhutan, Pakistan and in Assam, India. It is confined to the tall grasslands and forests in the foothills of the Himalayas. Double humped camel also known as Bactrian camel is a native to the steppes of Central Asia, though it is also found in Numbra valley in India. However Asiatic Lion is naturally found in India only.

9. **Exp. (a)**

Agasthyamala biosphere reserve

- ABR is situated at the southern-most end of the Western Ghats and spread over two southern states Kerala and Tamil Nadu. It covers Peppara and Shendurney wildlife sanctuaries and parts of the Neyyar sanctuary in Kerala and the Kalakad Mundanthurai Tiger Reserve of Tamil Nadu. Thus option a is correct

10. **Exp. (d)**

Species Diversity

- Marine herbivores are found within four groups of species in the animal kingdom -- invertebrates, fish, reptiles and mammals -- and include zooplankton, mollusks, the green sea turtle, the marine iguana and some fish species. Manatees and dugongs are the only herbivores among marine mammals.
- **Viviparous:** This is when there is no egg at all. Snakes that are viviparous nourish their developing young through a placenta and yolk sac, something that is highly unusual among reptiles. Boa constrictors and green anacondas are two examples of viviparous snakes, meaning they give birth to live young with no eggs involved at any stage of development.

11. **Exp. (c)**

Wild/etc

- Irrawaddy Dolphin is found in coastal areas in South and Southeast Asia, and Irrawaddy River, it is also found in India's Ganges, and Southeast Asia's Mekong River. They are also found in Chilika lake in Orissa. They are not found in Chambal.

12. **Exp. (d)**

Coral Reefs

- Coral reefs are found in circumtropical shallow tropical waters along the shores of islands and continents. The reef substrate is mainly composed

of calcium carbonate from living and dead corals. Many other invertebrates, vertebrates, and plants live in close association to the corals, with tight resource coupling and recycling, allowing coral reefs to have extremely high productivity and biodiversity, such that they are referred to as 'the Tropical Rainforests of the Oceans'. Coral reefs are believed by many to have the highest biodiversity of any ecosystem on the planet—even more than a tropical rainforest.

- Globally, three major regions of coral reef development are generally recognized, each with a somewhat distinctive biota. These are:
 - ▶ The Indo Pacific includes most of the Indian Ocean (excluding the Red Sea), and the western Pacific. As per United Nations Environment Programme (UNEP) coral reefs in Indonesia 18%, Australia: 17% and Philippines: 9% so collectively that'll be more than 33%. **Thus Australia, Indonesia and Philippines cover one third area.**
 - ▶ The Wider Caribbean (tropical western Atlantic) includes Florida, The Bahamas, Caribbean Sea proper, and coastal waters off northeastern S. America.
 - ▶ The Red Sea

13. **Exp. (b)**

Prosopis juliflora

- Prosopis juliflora (P. juliflora), an exotic tree, is one of the top invaders in India. A native of South and Central America, it was introduced in India to meet the fuel wood requirement of the rural poor and to restore degraded lands. It tends to reduce the biodiversity in the area in which it grows.

14. **Exp. (a)**

Pakhui Wildlife Sanctuary

- **Option (a) is correct:** Pakhui Wildlife Sanctuary (862 km², 92°36' – 93°09'E and 26°54' – 27°16'N) lies in the foothills of the Eastern Himalaya in the East Kameng District of Arunachal Pradesh.

15. **Exp. (b)**

Kuno Palpur Wildlife Sanctuary

- An environment ministry's expert committee has approved Kuno Palpur in Madhya Pradesh as the second home for Asiatic lions found only in Gir national park.

16. **Exp. (c)**

Impact of huge fall in the population of species of butterflies

- Butterflies are one of the very effective pollinators thus pollination will be affected adversely.

- It does not have any impact on fungal infection of cultivated plants.
- The predators (some species of wasps, spiders and birds) of butterflies are also affected since their prey quantity diminishes.

17. Exp. (a)

Red Sanders

- It is a tree species found in a part of south India. Red Sanders has a highly restrictive distribution in the South Eastern portion of Indian peninsula to which it is endemic.
- The red sanders tree grows in tropical dry deciduous region and falls in the eco-terrestrial regions of Deccan Thorn Scrub Forests as well as Central Deccan Plateau Dry Deciduous Forests.

18. Exp. (a)

Kharai camel

- Gujarat is the only home to Kharai camel who have adapted to the extreme climate of Rann and shallow seas and high salinity.
- The breed is identified as endangered. The life of maaldhari community is dependent highly on the livelihood of the animal.
- One of its main characteristics is, it can swim through deep sea waters. During low tide, adult camels walk through the sea water, while the young ones swim through. During high tide, both adult and young camels swim in deep-sea waters. Ponds, wells and village cattle troughs are the main sources of water for the camels.
- The breed feeds on mangroves and other saline plants, and is also the main source of livelihood of Jat and Rabari communities in several of the villages.
- Nearly 72 cattle breeders or maldharis from 10 villages — rear this camel breed by refusing to interfere in the typical feeding habit of the breed.

19. Exp. (a)

Musa Indandamanensis (species of banana)

- Scientists at the Botanical Survey of India (BSI) discovered a new species of banana from a remote tropical rain forest on the Little Andaman islands. The species, *Musa indandamanensis*, was located about 16 km inside the Krishna Nalah forest in the island.
- It is a distinct global species with unique green flowers and fruit bunch lux (axis) thrice the size of a regular banana species.
- The new species is about 11 metres high, whereas as the usual banana species is about three to four metres high. The fruit lux of the new species is about one metres, which is thrice the size of regular species.

- The species is edible and very sweet. The fruit pulp is orange in colour, distinctive from the white and yellow colour of regular bananas.
- Unlike the other banana species whose flowers are conical, its flowers are cylindrical.

20. Exp. (d)

Great Indian Hornbill

- The great hornbill has a wide distribution and can be found in China, India, Nepal, Bhutan, Bangladesh Myanmar, Thailand, Laos, Vietnam, Cambodia, Malaysia and Indonesia. **The large majority of the population is found in India with a significant proportion of them being found in the Western Ghats and the Nilgiris.** The nesting grounds of the birds in the Nilgiris North Eastern Range are also believed to support some of the highest densities of
- **Status IUCN: Vulnerable**

21. Exp. (b)

The Keibul Lamjao National Park

- The Keibul Lamjao National Park is a national park in the Bishnupur district of the state of Manipur.
- **Keibul Lamjao National Park is the world's only floating national park.** The park is a swamp with floating mass of vegetation (called phumdis), at the south-eastern side of the Loktak Lake, which has been declared a Ramsar site. It was initially declared as a Sanctuary in 1966, but subsequently declared as National Park in 1977.

22. Exp. (c)

Dugong

- The dugong (*Dugong dugong*) is a herbivorous marine mammal, often called the "sea cow" for its habit of grazing on seagrass meadows.
- The habitats of Dugong in India include major reef regions of Gulf of Mannar, Palk Bay, Andaman and Nicobar Islands and Gulf of Kachchh (not the entire coast).
- It has been protected under Schedule I (Rare and endangered species which are totally protected) of Wild Life (Protection) Act, 1972

23. Exp. (c)

National aquatic animal of India

- The Gangetic Dolphin has been included in the Schedule I of the Wildlife (Protection) Act, 1972
- In 1982, the dolphin population in the Ganga was estimated to be between 5,000 and 6,000. But, by 2010, it had dwindled to less than 2,000. In 2009, the government notified the Gangetic Dolphin as the national aquatic animal to channel attention and resources towards conserving the species.

- The dolphins are an indicator species for the river ecosystem and are considered the mascot of a healthy aquatic environment.

24. Exp. (d)

Forests

- The South Andaman forests have a profuse growth of epiphytic vegetation, mostly ferns and orchids. The Middle Andaman harbors mostly moist deciduous forests. North Andaman is characterised by the wet evergreen type, with plenty of woody climbers. Typical forest coverage of Andaman & Nicobar is made-up of twelve types namely:

- Giant evergreen forest
- Andamans tropical evergreen forest
- Southern hilltop tropical evergreen forest
- Cane brakes
- Wet bamboo brakes
- Andamans semi-evergreen forest
- Andamans moist deciduous forest
- Andamans secondary moist deciduous forest
- Littoral forest
- Mangrove forest
- Brackish water mixed forest
- Submontane hill valley swamp forest.

25. Exp. (d)

National Park

- The climate of Khangchendzonga and Nandadevi National Parks varies from temperate to arctic and that of Neora National Park is subtropical. **Only Namdapha National Park has a climate that varies from tropical to subtropical, temperate and arctic.** It is tropical and subtropical in the southern region while it is of arctic type in the northern part of the park.

26. Exp. (c)

Decline in the population of Ganges River Dolphin

- Ganges River Dolphin was declared India's National Aquatic Animal in 2009.
- As per World Wildlife Fund (WWF) the Ganges River dolphin or Susu, lives in one of the most densely populated regions of the world. It inhabits the Ganges-Brahmaputra-Meghna and Karnaphuli-Sangu river systems of Nepal, India, and Bangladesh. This vast area has been altered by the construction of more than 50 dams and other irrigation-related projects. **One of the main threats to the species is loss of habitat due in large part to the creation of dams and irrigation projects.**
- Activities like construction of dams and barrages, embankments etc besides unsustainable

obstruction of river water, accidental caught-up in fishnets, use of synthetic fertilizers and other agricultural chemicals in crop-fields in the vicinity of rivers and sand mining among others are mainly responsible for shrinking of habitat and decline of Ganga river dolphins.

- Increase in the population of crocodiles in rivers has no impact on the decline in population of the Ganges River dolphin.
- The mammal is listed in the schedule I of the Indian Wildlife (Protection) Act, 1972, and categorized as "endangered" by the World Conservation Union and enjoys high level of legal protection, nationally and internationally.

27. Exp. (b)

- Painted Stork is a fish eating bird. They forage in flocks in shallow waters along rivers or lakes. They immerse their half open beaks in water and sweep them from side to side and snap up their prey of small fish that are sensed by touch. As they wade along they also stir the water with their feet to flush hiding fish. They nest colonially in trees, often along with other water birds.
- The Common Myna is closely associated with human habitation and thus easily found in country sides. It is an opportunistic feeder on insects, disturbed by grazing cattle. They are accomplished scavengers, feeding on almost anything, including insects, fruits and vegetables, scraps, pets' food and even fledgling sparrows.
- As the world's only alpine crane species, the black-necked crane is unique among the cranes in that it resides almost exclusively at high altitudes on the Tibetan Plateau and in the Himalaya, where for centuries it has been protected by local religious beliefs that discourage killing. The black-necked crane is tolerant of humans and their livestock, wintering in farming communities where it has grown dependent on grain stubble fields for its very survival. The continued existence of the black-necked crane in its present numbers is directly dependent on human agricultural practices, and the fate of the crane is directly intertwined with that of humans.

28. Exp. (a)

Biosphere reserves

- Biosphere Reserve is an international designation by UNESCO for representation parts of natural and cultural landscapes extending over large area of terrestrial or coastal/marine ecosystems or a combination thereof. They are special environments for both people and the nature and are living examples of how human beings and nature can co-exist while respecting each other's need.

- Human activity is totally prohibited in National Parks while it is partially allowed in wildlife sanctuaries. No person can enter or reside here except under and in accordance with the conditions of a permit granted.

29. Exp. (b)

Lichens

- A lichen looks like a single organism, but it is actually a **symbiotic relationship between different organisms. It is composed of a fungal partner (mycobiont) and one or more photosynthetic partners (photobiont).** The photosynthetic partner is generally green algae or cyanobacteria.
- The dominant partner is the fungus, which gives the lichen the majority of its characteristics, from its thallus shape to its fruiting bodies. The alga can be either a green alga or a blue-green alga, otherwise known as cyanobacteria. Many lichens will have both types of algae.

30. Exp. (d)

Eco-Sensitive Zones (ESAs)

- ESAs are defined as those areas that are ecologically and economically important, but vulnerable even to mild disturbances, and hence demand careful management. Therefore 'ecologically and economically important' areas are those areas that are biologically and ecologically 'rich', 'valuable' and or 'unique', and are largely irreplaceable if destroyed.
- Section 3 of the Environment (Protection) Act 1986 (EPA) gives power to the Central Government i.e. the Union Ministry of Environment and Forests to take all measures that it feels are necessary for protecting and improving the quality of the environment and to prevent and control environmental pollution.** To meet this objective, the Central Government can restrict areas in which any industries, operations or processes or class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards. Thus the government came up with the concept of Eco Sensitive Zones.
- The purpose of declaring Eco-sensitive Zones around National Parks and Sanctuaries is to create some kind of "Shock Absorber" for the Protected Areas. They would also act as a transition zone from areas of high protection to areas involving lesser protection. It does not imply prohibition of all kinds of human activities.

31. Exp. (a)

Coral Reefs

- The major reef formations in India are restricted to the Gulf of Mannar, Palk bay, Gulf of Kutch, Andaman and Nicobar Islands and the Lakshadweep islands. While the Lakshadweep

reefs are atolls, the others are all fringing reefs. Patchy coral is present in the inter-tidal areas of the central west coast of the country.

- Availability of coral reefs in Sundarbans has not been reported in India.

32. Exp. (b)

Mammals

- Mammals are a warm-blooded vertebrate animal of a class that is distinguished by the possession of hair or fur, females that secrete milk for the nourishment of the young, and (typically) the birth of live young. E.g. Sea cow and sea lion.
- Sea horses are classified as fishes, in the genus Hippocampus. They are a type of small fish that has plates armored throughout the body (no scales). There are around 50 different species of seahorses in the world.

33. Exp. (a)

Lion-tailed macaque

- The lion-tailed macaque or the wanderoo, is an Old World monkey endemic to the Western Ghats of South India from the Kalakkadu Hills (8°25'N) north to Anshi Ghat (14°55'N) (Fooden 1975), in the states of Karnataka, Kerala and Tamil Nadu. **Although some sightings of the macaque have been made in Andhra Pradesh, naturally, they are not found in Andhra Pradesh.**

34. Exp. (a)

Animal Species

- The Indian star tortoise (*Geochelone elegans*) is a threatened species of tortoise found in dry areas and scrub forest in India, Pakistan and Sri Lanka.
- The monitor lizards are large lizards in the genus Varanus. They are native to Africa, Asia and Oceania, but are now found also in the Americas as an invasive species. A total of 79 species are currently recognized.
- The pygmy hog (*Porcula salvania*) is a critically endangered suid, previously spread across Bhutan, India and Nepal, but now only found in India (Assam).
- Spider monkeys are New World monkeys belonging to the genus Ateles, part of the subfamily Atelinae, family Atelidae. Like other atelines, **they are found in tropical forests of Central and South America, from southern Mexico to Brazil.** The genus contains seven species, all of which are under threat; the black-headed spider monkey and brown spider monkey are critically endangered.

35. Exp. (d)

Endangered Animals

- The endangered species are the species which faces a high risk of extinction in the near future.

- The IUCN status for all the species mentioned above as of 2013 was endangered.
- However, the current status is as follows:
 - Gharial: Critically Endangered
 - Leatherback turtle: Critically Endangered
 - Swamp deer: Vulnerable

36. Exp. (c)

Sea buckthorn

- Sea buckthorn is a medicinal plant found in the Himalayan region. The fruit grows in the cold deserts of Ladakh region of Jammu and Kashmir, Lahul-Spiti in Himachal Pradesh and some parts of Arunachal Pradesh. They have health-promoting properties and can play a crucial role in preventing soil erosion and help nitrogen fixation in cold and desert areas.
- It was studied as a good option for the manufacture of biodiesel, however as of now, it has not been established that seabuckthorn oil is a "Rich" source of Biodiesel. The major use of seabuckthorn oil is in medicinal and food use.
- Since it is a shrub, it cannot provide timber for commercial value.

37. Exp. (d)

Genetically Engineered Plants

- Genetically modified crops (GM crops or biotech crops) are plants used in agriculture, the DNA of which has been modified using genetic engineering methods. In most cases, the aim is to introduce a new trait to the plant which does not occur naturally in the species. It helps:
 - To enable them to withstand drought
 - To increase the nutritive value of the produce
 - To increase their shelf life

38. Exp. (b)

Tiger Reserves

- Tiger reserves in India are governed by Project Tiger which is administrated by the National Tiger Conservation Authority (NTCA). India is home to 70 percent of tigers in the world.
- Bandipur National Park established in 1974 as a tiger reserve under Project Tiger, is a national park located in the south Indian state of Karnataka, which is the state with the highest tiger population in India.
- Bhitarkanika National Park is the core area of Bhitarkanika Wildlife Sanctuary located in the north-east region of Kendrapara district in the state of Odisha in eastern India. It was designated as national park on 16 September 1998 and as a Ramsar site by UNESCO Gahirmatha Beach and Marine Sanctuary lies to the east, and separates swamp region cover with canopy of mangroves

from the Bay of Bengal. **It is not a tiger reserve.**

- Manas National Park or Manas Wildlife Sanctuary is a national park, UNESCO Natural World Heritage site, a Project Tiger reserve, an elephant reserve and a biosphere reserve in Assam.
- Sunderbans national park is located at the South Eastern tip of the 24 Paraganas district in the state of West Bengal. The Sunderbans are a part of the world's largest delta formed by the rivers Ganges, Brahmaputra and Meghna. Sundarban is a vast area covering 4262 square kms in India alone, with a larger portion in Bangladesh. 2585 sq. kms of the Indian Sundarban forms the largest Tiger Reserve and National Park in India.

39. Exp. (b)

National parks

- Indian subcontinents are not only well known for its Cultural diversity, but also have a diverse range of flora and fauna. **Human activities are permitted in a wildlife sanctuary whereas these are completely restricted in a national park. Hunting is prohibited without permission in a sanctuary;** however, grazing and movement of cattle is permitted. Therefore, India houses a number of wildlife sanctuaries and national parks that help in preserving the wildlife in its natural form. Hunting and grazing are totally prohibited in a national park.

40. Exp. (a)

Endangered species

- The IUCN status for all the species mentioned in Option (a) as of 2012 was endangered. However, the current status is as follows:
 - Great Indian bustard: Critically Endangered
 - Musk Deer: Endangered
 - Red Panda: Endangered
 - Asiatic Wild Ass: Near threatened

41. Exp. (a)

Biodiversity

- Biodiversity is the sum total of all life forms on the planet Earth. In the past it has been affected due to changes in abiotic factors such as mass extinction, changes in oxygen level and sea levels, etc. Current threats include natural extinction, pollution, global warming, fragmentation of habitat, invasion of alien species, etc.
- Promotion of vegetarianism does not affect the survival or threat to a species in general.

42. Exp. (b)

Animal Species

- The black-necked crane (*Grus nigricollis*) is a medium-sized crane in Asia that breeds on the

Tibetan Plateau and remote parts of India and Bhutan.

- **The cheetah is a large cat that occurs in Southern, North and East Africa, and a few localities in Iran.** The species is IUCN Red Listed as vulnerable, as it suffered a substantial decline in its historic range in the 20th century due to habitat loss, poaching, illegal pet trade, and conflict with humans.
- The Indian giant flying squirrel, also called the large brown flying squirrel or the common giant flying squirrel, is a species of rodent. It is capable of gliding flight using a skin membrane stretched between front and hind legs. **Eleven species of flying squirrels are found in India and mainly concentrated in the Himalayan and Northeast regions, while the Western Ghats remain depauperate with only two species.** The species is native to China, India, Laos, Myanmar, Sri Lanka, Taiwan, Thailand, and Vietnam. It inhabits dry deciduous and evergreen forests, usually at higher elevations from 500m-2000m, and has been recorded on plantations.
- The snow leopard or ounce is a large cat native to the mountain ranges of Central and South Asia. In India, their geographical range encompasses a large part of the western Himalayas including the states of Jammu and Kashmir, Himachal Pradesh, Uttarakhand and Sikkim and Arunachal Pradesh in the eastern Himalayas.

43. Exp. (a)

Phytoplankton

- Phytoplankton are microscopic marine algae. If phytoplankton of an ocean is completely destroyed:
- As plankton die, they suck up less carbon dioxide, thus warming the earth further. Which causes more plankton to die. Thus the ocean as a carbon sink would be adversely affected.
- Phytoplankton is the base of several aquatic food webs. In a balanced ecosystem, they provide food for a wide range of sea creatures including whales, shrimp, snails, and jellyfish. Thus if phytoplanktons die the food chains in the ocean would be adversely affected.
- There is no impact on the density of the ocean water due to the death of the phytoplanktons.

44. Exp. (a)

Antelopes

- Oryx is adapted to live in hot and arid areas whereas Chiru is adapted to live in steppes and semi-desert areas of cold high mountains
- Oryx has horns and not antelers whereas Chiru is poached for its underwool.
- The Chiru or Tibetan Antelope is an endangered animal found in the Ladakh region of Jammu and Kashmir India.

45. Exp. (d)

Pollinating Agents

- Bats feed on the insects in the flowers as well as on the nectar and flower parts Over 300 species of fruit depend on bats for pollination. These fruits include: mangoes.
- Insect pollinators include bees, (honey bees, solitary species, bumblebees); pollen wasps (Masarinae); ants; flies including bee flies, hoverflies and mosquitoes; lepidopterans, both butterflies and moths; and flower beetles.
- Ornithophily or bird pollination is the pollination of flowering plants by birds. This coevolutionary association is derived from insect pollination (entomophily) and is particularly well developed in some parts of the world, especially in the tropics and on some island chains.

46. Exp. (d)

Biodiversity

- Biodiversity is the sum total of all life forms on the planet Earth. It forms the basis for human existence in the following ways:
 - Soil formation
 - Prevention of soil erosion
 - Recycling of waste
 - Pollination of crops

47. Exp. (b)

Indian Wild Ass

- The Indian Wild Ass, also called Ghor Khar or Ghud Khur is found predominantly in the Little Rann of Kutch and its surrounding areas in Gujarat. It is also found in southern Pakistan, Afghanistan, and south-eastern Iran. Saline deserts (Rann), arid grasslands and shrub lands are its preferred environment. A sandy and saline area is the natural habitat of an Indian wild ass.
- The IUCN Red List has moved the Indian wild ass from the 'vulnerable' to 'endangered' category, indicating the need for heightened protection measures. The animal has no predators in that area but its existence is threatened due to the destruction of its habitat.

48. Exp. (c)

Biodiversity hotspots

- Criteria for the recognition of Western Ghats-Sri Lanka and Indo-Burma regions as hotspots are as follows:
 - Species richness and endemism: Contain at least 1,500 species of vascular plants as endemics (> 0.5 percent of the world's total)
 - Threat perception: Loss of at least 70 percent of its original habitat.
 - Vegetation density, ethno-botanical importance and adaptation of flora and fauna to warm

and humid conditions are not the criteria for designation of hotspots.

49. Exp. (c)

Biodiversity

- Biodiversity is normally greater in the lower latitudes as compared to the higher latitudes and along the mountain gradients, biodiversity is normally greater in the lower altitudes as compared to the higher altitudes owing to higher temperature and humid conditions which are conducive for species survival.

50. Exp. (b)

Insectivorous

- An insectivore is a carnivorous plant or animal that eats insects.
- The insectivores plants are adapted to grow in nitrogen deficient soils and thus depend on insects for sufficient nitrogenous nutrition. They derive some of their nutrients from trapping and consuming animals or protozoan. The benefit they derive from their catch varies considerably; in some species it might include a small part of their nutrient intake and in others it might be an indispensable source of nutrients. As a rule, however, such animal food, however valuable it might be as a source of certain critically important minerals, is not the plants' major source of energy, which they generally derive mainly from photosynthesis.

51. Exp. (b)

Taxus tree

- Taxus is a small genus of coniferous trees or shrubs known as yews in the family Taxaceae. They are relatively slow-growing and can be very long-lived, and reach heights of 5–20 metres with trunk girth averaging 5 metres.
- Taxus wallichiana Zucc. known as Himalayan yew, is a medium-sized, temperate, Himalayan forest tree of medicinal importance. In India, this evergreen tree naturally occurs in the Himalayas and is found at altitudes between 1800 and 3300 m above mean sea level (MSL).
- Its legal status is that it has been included in the Red Data Book as endangered by the IUCN.
- The Taxol molecule, however, is very complex, and therefore almost impossible to reproduce in the laboratory. One would have to rely on extractions of the Taxol compound from the taxus tree. Taxol is used to treat breast cancer, lung cancer, and ovarian cancer. It is also used to treat AIDS-related Kaposi's sarcoma.

52. Exp. (c)

King Cobra

- Indian cobras are oviparous and lay their eggs between the months of April and July. The female snake usually lies between 10 and 30 eggs in rat holes or termite mounds and the eggs hatch 48 to 69 days later. The hatchlings measure between 20 and 30 centimetres (8 and 12 in) in length.
- The highly venomous king cobra builds a nest for her eggs, and even stays with the hatchlings for a while after they have hatched. Conclusion: Most of the world's snake species (about 70%) reproduce by laying eggs. But vipers, rattlesnakes, boas, and most of the sea snakes give birth to live young.

53. Exp. (d)

Biodiversity hotspots

- Biodiversity hotspots are located both in tropical and temperate regions.
- India has four biodiversity hotspots i.e., Eastern Himalayas, Indo-Burma, Western Ghats and Sundaland.

54. Exp. (c)

Protected Areas

- Under the Wildlife (Protection) Act, 1972, National Parks are defined by state government via notification. Whenever it appears to the State Government that an area, whether within a sanctuary or not, is, by reason of its ecological, faunal, floral, geomorphological, or zoological association or importance, needed to be constituted as a National Park for the purpose of protecting & propagating or developing wildlife therein or its environment, it may, by notification, declare its intention to constitute such area as a National Park. The notification shall specify, as nearly as possible, the situation and limits of such area.
- Biosphere reserves are areas comprising terrestrial, marine and coastal ecosystems. Each reserve promotes solutions reconciling the conservation of biodiversity with its sustainable use including all species of flora and fauna. A wildlife sanctuary can be declared to conserve a few specific species of flora and fauna.
- The difference between a national park and a sanctuary is that no human activity is allowed inside a national park, while limited activities are permitted within the sanctuary. Certain activities which are regulated in sanctuaries, such as grazing of livestock, are prohibited in National parks.

55. Exp. (b)

Protected area

1. Bhitarkanika, Orissa
2. Desert National Park

Well-known for

- Salt Water Crocodile
Great Indian Bustard,

Rajasthan

3. Eravikulam, Kerala Nilgiri tahr

56. Exp. (c)

- **(c) Option is correct:** Nagarhole National Park is in the Cauvery Basin. Papikonda National Park lies in the River Godavari basin. Sathyamangalam Tiger Reserve lies on the banks of the River Bhavani, a tributary of the River Cauvery in the foothills of the Eastern Ghats. Kabini river (a tributary of Cauvery river) flows through the Wayanad wildlife sanctuary.

57. Exp. (a)

- Cylon Frogmouth is a small, nocturnal bird found in Sri Lanka and the Western Ghats in India. Related to the nightjars, it is nocturnal and is found in forest habitats. The plumage coloration resembles that of dried leaves and the bird roosts quietly on branches, making it difficult to see. Each has a favourite roost that it uses regularly unless disturbed. It has a distinctive call that is usually heard at dawn and dusk. The sexes differ slightly in plumage.
- The coppersmith barbet, also called crimson-breasted barbet and coppersmith, is an Asian barbet with crimson forehead and throat, known for its metronomic call that sounds similar to a coppersmith striking metal with a hammer. It is a resident bird in the Indian subcontinent and parts of Southeast Asia.
- The grey-chinned minivet is a species of bird in the family Campephagidae. It is found from the Himalayas to China, Taiwan and Southeast Asia. Its natural habitat is forests about 1,000–2,000 m in elevation. The International Union for Conservation of Nature has assessed it as a least-concern species.
- The white-throated redstart is a species of bird in the family Muscicapidae. It is found in Nepal, Bhutan, central China and far northern areas of Myanmar and Northeast India. Its natural habitat is temperate forest

58. Exp. (a)

- Swamp deer occur in the Kanha National Park of Madhya Pradesh, in two localities in Assam, and in only 6 localities in Uttar Pradesh. They are regionally extinct in West Bengal. They are also probably extinct in Arunachal Pradesh. A few survive in Assam's Kaziranga and Manas National Park.

59. Exp. (a)

- **Statement 1 is correct:** Askot Musk Deer Sanctuary is located 54 km from Pithoragarh near Askot in Uttarakhand state of India. This sanctuary has been set up primarily with the object of conserving the musk deer (*Moschus*

leucogaster) and its habitat. Intensive efforts have been initiated to conserve this rare species.

- **Statement 2 is correct:** Gangotri National Park is home to the snow leopard. To date, 15 mammal species and 150 bird species have been documented in the park, including Asian black bear (*Ursus thibetanus*), brown bear (*Ursus arctos*), musk deer (*Moschus chrysogaster*), etc.
- **Statement 3 is incorrect:** The Kishanpur Wildlife Sanctuary is a part of the Dudhwa Tiger Reserve near Mailani in Uttar Pradesh, India. Musk deer is not found here.
- **Statement 4 is incorrect:** The fauna of the Manas sanctuary include Indian elephants, Indian rhinoceros, gaurs, Asian water buffaloes, barasingha, Indian tigers, Indian leopards, clouded leopards, Asian golden cats, dholes, capped langurs, golden langurs, Assamese macaques, slow loris, hoolock gibbons, smooth-coated otters, sloth bears, barking deer, hog deer, black panthers, sambar deer and chital.
- Himalayan musk deer occurs in parts of northern Afghanistan, Pakistan, Tibet, Nepal, Bhutan, and in northern India such as in Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh. It inhabits high alpine environments above altitudes of 2,500 m (8,200 ft).

60. Exp. (c)

- **Statement 1 is correct:** The Desert National Park is Situated in Jaisalmer and Barmer districts of Indian state Rajasthan.
- **Statement 2 is incorrect:** The park's vegetation is revered and protected by the local communities specially the 'Bishnois'.
- **Statement 3 is correct:** The endangered great Indian bustard is a magnificent bird found in relatively fair numbers.

61. Exp. (c)

- Manas, Assam - 840 sq km Pakke, Arunachal Pradesh - 683 sq km Nagarjunsagar, Andhra Pradesh - 2595 sq km Periyar, Kerala - 881 sq km

62. Exp. (c)

Filter feeder

- Oysters are filter feeders, meaning they eat by pumping large volumes of water through their body. Water is pumped through the oyster's gills by the beating of cilia. Plankton, algae and other particles become trapped in the mucus of the gills. From there these particles are transported to the oyster's mouth and esophagus to be eaten, then to the stomach to be digested.

63. Exp. (c)

- Guchhi mushroom is a species of fungus in the family Morchellaceae of the Ascomycota.
- Grows in himalayan foothills

- The mushrooms cannot be cultivated commercially and grow in conifer forests across temperature regions, and the foothills in Himachal Pradesh, Uttaranchal, and Jammu and Kashmir.
64. **Exp. (a)**
- Golden Mahseer - a large freshwater fish also called the tiger of the water and found only in the Cauvery river basin.
 - The Indian nightjar species are nocturnal birds with long pointed wings and short legs.
 - The Spoonbill is a unique aquatic bird with an odd-shaped, flattened beak.
 - White Ibises are large wading birds with football-shaped bodies.
65. **Exp. (a)**
- Amaranth, spinach, purslane are not nitrogen fixing plants and we have to provide nitrogen through fertilizers for their proper growth and development.
66. **Exp. (a)**
- **Statement 1 is correct:** In a significant verdict, the Bombay High Court has ruled that wild animals including tiger should be treated as "government property for all purposes" and any damage caused by them should be compensated by the Government.
 - **Statement 2 is correct:** The law governing the subject of wildlife, the Wildlife (Protection) Act, 1972, does not discriminate between animals found in protected areas and outside. It provides for equal protection for wild animals irrespective of where they are found.
 - **Statement 3 is incorrect:** Only if the wild animal becomes a danger to human life or is diseased or disabled beyond recovery can it be allowed to be captured or killed by the competent authority, the Chief Wildlife Warden of the State. This provision is applicable to wild animals listed in Schedule I of the Wildlife (Protection) Act, 1972, which includes leopards. **Mere apprehension or fear that a wild animal could endanger human life is not a ground for capture or killing.**
67. **Exp. (a)**
- Fungi and insects are two hyperdiverse groups of organisms that have interacted for millennia. Over time, some insects have come to rely on fungi for a variety of resources, including room and board. Ants, wasps, beetles and a variety of other insects have adapted to using fungi primarily for reinforcing structures or as sources of food, with the most extreme examples resulting in cultivation of fungal crops. Chief among these examples are the mushroom-farming ants and termites, and the wood-boring beetles and wasps.

RESOURCE DEGRADATION & MANAGEMENT

1. **Exp. (d)**
- **Ilmenite and Rutile** are minerals classified as heavy minerals. They are integral components of beach sand deposits found along the coastal stretches of India. Ilmenite is represented chemically as FeO.TiO_2 and rutile as TiO_2 . Both these minerals are rich in **Titanium**.
 - Titanium dioxide (TiO_2) is the key component in these minerals. These resources have significant industrial applications, particularly in the production of titanium metal, titanium dioxide pigments, and various aerospace and industrial applications.
2. **Exp. (a)**
- Carbon fibres**
- **Statement 1 is correct:** Carbon fibre-reinforced composite materials are used to make aircraft and spacecraft parts, racing car bodies, golf club shafts, bicycle frames, fishing rods, automobile springs, sailboat masts, and many other components where light weight and high strength are needed.
 - **Carbon Fiber Increases Fuel Efficiency:** Using carbon fibre composites to build an airplane reduces its weight by up to 20%, versus the weight of a traditional aluminium plane.
 - **Statement 2 is incorrect:** Carbon fibre waste can be recycled using four types of technologies.
3. **Exp. (c)**
- **Statement 1 is correct:** According to the United Nations World Water Development Report 2022, with an estimated 251 km³ annual withdrawal from an estimated 20 million wells and tube wells, India is the world's greatest groundwater user. This accounts for more than a quarter of the total groundwater extracted internationally.
 - **Statement 2 is incorrect:** India uses about 89% of this groundwater for irrigation. Major share of total groundwater extracted by India is utilized for irrigation purposes and not for drinking and sanitation purposes.
4. **Exp. (c)**
- Following are the percentage of forest area of the four states, according to Indian state of forest report, 2017:**

State	Percentage of forest area
1. Chhattisgarh	41.09%
2. Madhya Pradesh	25.11 %
3. Maharashtra	16.47%
4. Odisha	32.98%

5. **Exp. (d)**

- Like incineration, pyrolysis, gasification and plasma technologies are thermal processes that use high temperatures to break down waste. The main difference is that they use less oxygen than traditional mass-burn incineration. Thus these belong to waste to energy technologies.

6. **Exp. (c)**

Solid Waste Management Rules, 2016

- The new rules have mandated the source segregation of waste in order to channelize the waste to wealth by recovery, reuse and recycle.
- Waste generators would now have to now segregate waste into three streams (not five) - Biodegradables, Dry (Plastic, Paper, metal, Wood, etc.) and Domestic Hazardous waste (diapers, napkins, mosquito repellants, cleaning agents etc.) before handing it over to the collector.
- The Rules are applicable beyond municipal areas and will extend to urban agglomerations, census towns, notified industrial townships, areas under the control of Indian Railways, airports, airbase, port and harbour, defence establishments, special economic zones, State and Central government organizations, places of pilgrims, religious & historical importance.
- Waste processing facilities will have to be set up by all local bodies having a population of 1 million or more within two years. The landfill site shall be 100 meters away from a river, 200 meters from a pond, 500 meters away from highways, habitations, public parks and water supply wells and 20 km away from airports/airbase.
- The construction of landfills on hills shall be avoided. Land for construction of sanitary landfills in hilly areas will be identified in the plain areas, within 25 kilometers.
- The bio-degradable waste should be processed, treated and disposed of through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local authority.

7. **Exp. (b)**

Agricultural Soils

- Each 1 percent increase in soil organic matter helps soil hold 20,000 gallons more water per acre.

- Sulphur Cycle is the circulation of sulphur in various forms through nature. Sulphur is key to protein structure and is released to the atmosphere by the burning of fossil fuels. Sulphur occurs in all living matter as a component of certain amino acids. It is abundant in the soil in proteins and, through a series of microbial transformations, ends up as sulphates usable by plants.
- Sulphur Cycle in Soils:** Sulphur enters the trophic cycle in terrestrial plants via root adsorption in the form of inorganic sulphates (e.g., calcium sulphate, sodium sulphate) or by direct assimilation of amino acids released in the decomposition of dead or excreted organic matter. Bacterial and fungal (*Aspergillus* and *Neurospora*) mineralization of the organic sulphhydryl in amino acids followed by oxidation results in sulphate; this adds to the sulphate pool for root adsorption.
- Sulphur in Sediments:** The sedimentary aspect of the cycle involves the precipitation of sulphur in the presence of such cations as iron (Fe) and calcium (Ca) as highly insoluble ferrous sulphide (FeS) and ferric sulphide (Fe₂S₃, pyrite) or relatively insoluble calcium sulphate (CaSO₄).
- Salinity is also caused due to excessive irrigation over a period of time in dry conditions owing to capillary action.

8. **Exp. (c)**

Conservation Agriculture

- Conservation Agriculture is a set of soil management practices that minimize the disruption of the soil's structure, composition and natural biodiversity. Despite high variability in the types of crops grown and specific management regimes, all forms of conservation agriculture share three core principles. These include:
 - Maintenance of permanent or semi-permanent soil cover (using either a previous crop residue or specifically growing a cover crop for this purpose);
 - Minimum Soil disturbance through tillage (just enough to get the seed into the ground);
 - regular crop rotations to help combat the various biotic constraints;
- Conservation Agriculture also uses or promotes where possible or needed various management practices listed below:
 - utilization of green manures/cover crops (GMCC's) to produce the residue cover;
 - no burning of crop residues;
 - integrated disease and pest management;
 - Controlled/limited human and mechanical traffic over agricultural soils.

9. Exp. (c)

Water conservation in agriculture

- Since water is essential to grow food, a drought situation can pose major problems for agriculture. Hence, farmers often face extreme poverty in drought-prone areas. Efficient water use techniques are very important in the face of climate change. These include:
- **Reduced or zero tillage of the land:** it can reduce or eliminate soil erosion due to wind and water.
- **Applying gypsum before irrigating the field:** It is a source of calcium and sulphur for plant nutrition and helps improve soil structure, acid soils and treats aluminum toxicity. It further improves water infiltration.
- **Allowing crop residue to remain in the field:** It leads to improved water infiltration, reduced labor cost, reduced soil erosion.

10. Exp. (a)

Domestic Content Requirement

- The policy of Domestic Content Requirement is with intent of developing solar power production in our country. It tends to promote the local manufacturing of the components of solar generation equipment which includes the cells and modules.

11. Exp. (b)

Algae based biofuels

- Algae can be grown in land and water not suitable for plant and food production.
- The algal biofuel technology includes selection of specific species for production and extraction of valuable co-products. The algae are bioengineered for achieving advanced photosynthetic efficiencies through continued development of production system. To make the industry commercially viable, researchers have pursued biotech varieties, which could be particularly dangerous if released into nature. Some algae biodiesel proposals involve aquaculture-style operations in open ocean waters, which could have harmful ecological effects, especially if biotech algae is used. Thus setting up and engineering the algae based biofuel production requires high level of expertise/technology until the construction is completed. This may not always be possible in developing countries.
- Water and nutrient use would also be extreme, making any serious scaling up of algae biofuels quite unsustainable. Therefore, economically viable production necessitates the setting up of large scale facilities which may raise ecological and social concerns.

12. Exp. (c)

• **The advantages of drip irrigation :**

- ▶ Possibility of using soluble fertilizers and chemicals.
- ▶ Fertilizer and nutrient loss is minimized due to localized application and reduced leaching.
- ▶ Water application efficiency is high.
- ▶ Field levelling is not necessary. Fields with irregular shapes are easily accommodated.
- ▶ Recycled non-potable water can be safely used.
- ▶ Soil type plays less important role in frequency of irrigation.
- ▶ Soil erosion is lessened.
- ▶ Weed growth is lessened.
- ▶ Water distribution is highly uniform, controlled by output of each nozzle.
- ▶ Labour cost is less than other irrigation methods.
- ▶ Variation in supply can be regulated by regulating the valves and drippers.
- ▶ Plants remains dry, reducing the risk of disease.
- ▶ Usually operated at lower pressure than other types of pressurised irrigation, reducing energy costs.
- ▶ It has no role in reduction in soil salinity.

13. Exp. (a)

Net metering

- Net metering is a billing mechanism that credits solar energy system owners for the electricity they add to the grid. It helps in promoting the production and use of solar energy by the households/consumers.

14. Exp. (b)

Neem-coated Urea

- When ordinary urea is applied, it gets converted to ammonium carbamate. Some of this gets converted to ammonia gas in what is called ammonia volatilization. The rest of the ammonium carbamate undergoes chemical transformation and nitrates are formed. Some of these are absorbed by the plants. The rest are either leached into the underground water or are denitrified to gaseous nitrogen and nitrous oxide under anaerobic conditions (absence of oxygen). Neem has properties that check nitrogen loss at each stage. It slows down the process of nitrate formation and hence excess nitrate is not available for denitrification.

15. Exp. (c)

Nitrogenous fertilizers

- Excess nitrogen leads to proliferation of nitrogen fixing bacteria on entering the water bodies (not in soil), thus causing eutrophication.

- As ammonium builds up in the soil due to excessive application of Nitrogen, it is increasingly converted to nitrate by bacterial action, a process that releases hydrogen ions and helps acidify the soil. The buildup of nitrate enhances emissions of nitrous oxides from the soil and also encourages leaching of highly water-soluble nitrate into streams or groundwater as a result of agricultural run-off. Nitrogen fertilizers break down into nitrates and travel easily through the soil. Because it is water-soluble and can remain in groundwater for decades, the addition of more nitrogen over the years has an accumulative effect.

16. Exp. (b)

Soil erosion

- The top layer of the soil is very light which is easily carried away by wind and water. This removal of topsoil by the natural forces is known as soil erosion due to which the soil becomes less fertile.
- Various agents, like wind, water, deforestation, overgrazing by cattle, etc., cause soil erosion. The various factors of soil erosion are:
 - **Terrace cultivation:** helps in conservation of soil and water.
 - **Deforestation:** Humans have taken land from the forest to cultivate in order to feed the ever-increasing population and to build houses, industries, etc. Cutting down of trees on a large scale for these purposes is deforestation. The roots of trees hold the soil together, thus preventing the soil from getting uprooted. When large areas of the forest are cleared, the topsoil gets eroded by wind and flowing water.
 - **Tropical climate:** Soil erosion due to intense rainfall in the tropics is a prominent factor. However, in the current scheme of question, since there is no option for 2 and 3 only to be correct together, the appropriate answer will be option (b)- 2 only.

17. Exp. (d)

Coalbed methane and Shale gas

- Coalbed methane is a form of natural gas extracted from coal seams while Shale gas contains methane along with propane and butane that can be extracted from fine-grained sedimentary rocks.
- The Gondwana sediments of eastern India host the bulk of India's coal reserves and all the current CBM producing blocks. The vast majority of the best prospective areas for CBM development are in eastern India, situated in Damodar Koel valley and Son valley. Also India has identified six basins as areas for shale gas exploration: Cambay (Gujarat), Assam-Arakan (North East), Gondwana (Central India), Krishna Godavari onshore (East Coast), Cauvery onshore, and Indo-Gangetic basins.

18. Exp. (c)

Neem tree

- It is one of two species in the genus *Azadirachta*, and is native to the Indian subcontinent, i.e. India, Nepal, Pakistan, Bangladesh, Sri Lanka, and Maldives. It is typically grown in tropical and semi-tropical regions. Neem trees also grow in islands located in the southern part of Iran. Its fruits and seeds are the source of neem oil.
- Neem oil can be used as a pesticide to control the proliferation of some species of insects and mites. It reduces insect feeding and acts as a repellent. It also interferes with insect hormone systems, making it harder for insects to grow and lay eggs. Azadirachtin can also repel and reduce the feeding of nematodes. Other components of neem oil kill insects by hindering their ability to feed.
- Neem seeds are used in the manufacture of biofuels and hospital detergents.
- Neem oil has applications in pharmaceutical industry especially in Ayurvedic medicine system.

19. Exp. (d)

Maize

- Maize can be used for the production of starch. The starch is obtained from the endosperm of the kernel.
- Oil extracted from maize can be a feedstock for biodiesel. Biofuels can be produced from many plants, including maize.
- Alcoholic beverages can be produced by using maize. Eg: Corn beer, beer made from corn (maize), is a traditional beverage in various cuisines.

20. Exp. (b)

Cluster bean (Guar)

- The gum made from its seeds is used in the extraction of shale gas. Guar grows well in semiarid areas, but frequent rainfall is necessary. This legume is a valuable plant in a crop rotation cycle, as it lives in symbiosis with nitrogen-fixing bacteria. Agriculturists in semi-arid regions of Rajasthan follow crop-rotation and use guar to replenish the soil with essential fertilizers and nitrogen fixation, before the next crop.

21. Exp. (b)

Biofertilisers

- There has been found no reference of *Agaricus* as a biofertilizer.
- Bio-fertilizers are defined as preparations containing living cells or latent cells of efficient strains of microorganisms that help crop plants' in uptake of nutrients by their interactions in the rhizosphere when applied through seed or soil.

E.g.: Nostoc is a species of blue-green algae used as biofertilizer to fix atmospheric nitrogen and is used as inoculations for paddy crop grown both under upland and low-land conditions.

- Although, the algae grow on their own in the rice fields, but all of them are not beneficial to crop. The green algae like Spirogyra compete with the crop for nutrient and reduce tiling in the crop.

22. Exp. (b)

Carbon sequestration

- Carbon sequestration is the process involved in carbon capture and the long-term storage of atmospheric carbon dioxide and may refer specifically to the process of removing carbon from the atmosphere and depositing it in a reservoir. Some proven sustainable land management practices for marginal, sloping, and hilly land where the soil productivity is very low are Contour bunding, Relay cropping and Zero tillage.

23. Exp. (d)

Bio-pesticides

- Biopesticides are certain types of pesticides derived from such natural materials as animals, plants, bacteria, and certain minerals. Plant-incorporated-protectants or biopesticides also derive from genetic material that has been incorporated into plants. Such plants manufacture the biopesticide for protection from specific pests.
- Bacterial biopesticides must infect insects or their larvae to kill them. They are usually ingested and then parasitize their host. *Bacillus thuringiensis*, or Bt, is one of the most widely used bacterial biopesticides. The bacterium kills insect larva by producing a toxin that binds to the larval stomach cells.
- Fungal biopesticides don't have to be ingested to inhibit or kill their target pests—physical contact is sufficient. Fungal biopesticides usually consist of fungal spores and are easy to apply with spray equipment.

24. Exp. (a)

Biomass gasification

- Biomass gasification is a process of converting solid biomass fuel into a gaseous combustible gas (called producer gas) through a sequence of thermo-chemical reactions.
- Coconut shells, groundnut shells and rice husk can be used in biomass gasification.
- Biomass gasification involves burning of biomass in a limited supply of air to give a combustible gas

consisting of carbon monoxide, **carbon dioxide, hydrogen, methane, water, nitrogen, along with contaminants like small char particles, ash and tars.**

- Syngas, or synthesis gas, is a fuel gas mixture consisting primarily of hydrogen, carbon monoxide, and very often some carbon dioxide. The name comes from its use as intermediates in creating synthetic natural gas (SNG) and for producing ammonia or methanol. Syngas is usually a product of gasification and the main application is electricity generation. **Syngas is combustible and often used as a fuel of internal combustion engines. It has less than half the energy density of natural gas.**

25. Exp. (b)

Ethanol

- Ethanol is a renewable fuel made from various plant materials collectively known as "biomass."
- Energy crops that can be cultivated for ethanol is maize. It can be produced by ethanol fermentation and distillation. Maize ethanol results in lower greenhouse gas emissions than gasoline and is fully biodegradable.

26. Exp. (c)

Blue-green algae

- Blue-green algae or cyanobacteria occur in an enormous diversity of habitats, freshwater and marine, as plankton (free floating), mats and periphyton. They have the mechanism to convert atmospheric nitrogen into a form that the crop plants can absorb readily.

27. Exp. (c)

Pongamia pinnata

- Pongamia pinnata grows naturally in most of the arid regions of India. It is often used for landscaping purposes as a windbreak or for shade due to the large canopy and showy fragrant flowers.
- The oil and residue of the plant are toxic and induce nausea and vomiting if ingested, the fruits and sprouts, along with the seeds, are used in many traditional remedies. Juices from the plant, as well as the oil, are antiseptic and resistant to pests. In addition *M. pinnata* has the rare property of producing seeds of 25–40% lipid content of which nearly half is oleic acid. Oil made from the seeds, known as pongamia oil, is an important asset of this tree and has been used as lamp oil, in soap making, and as a lubricant for thousands of years.

28. Exp. (d)

29. Exp. (a)

National Policy on Biofuels

- Statements 1,2,5 and 6 are correct: The Policy expands the scope of raw material for ethanol production by allowing use of Sugarcane Juice, Sugar containing materials like Sugar Beet, Sweet Sorghum, Starch containing materials like Corn, Cassava, Damaged food grains like wheat, broken rice, Rotten Potatoes, unfit for human consumption for ethanol production.
- The Policy categorises biofuels as “Basic Biofuels” viz. First Generation (1G) bioethanol & biodiesel and “Advanced Biofuels” - Second Generation (2G) ethanol, Municipal Solid Waste (MSW) to drop-in fuels, Third Generation (3G) biofuels, bio-CNG etc. to enable extension of appropriate financial and fiscal incentives under each category.
- The Policy encourages setting up of supply chain mechanisms for biodiesel production from non-edible oilseeds, Used Cooking Oil, short gestation crops.

30. Exp. (b)

- **(b) Option is correct:** Central Ground Water Authority (CGWA) was constituted under sub-section (3) of Section 3 of the Environment (Protection) Act, 1986. At 39 million hectares (67% of its total irrigation), India has the world's largest groundwater well equipped irrigation system (China with 19 mha is second, USA with 17 mha is third). Out of 6,584 blocks assessed in the country, 1,034 (around 15%) are in the over-exploited category, 253 in the critical category, 681 in the semi-critical category, 96 in the saline category, and 4,520 in the safe category (CGWA).

31. Exp. (d)

- System of Rice Intensification (SRI) includes a method called Alternate Wetting and Drying (AWD) which is a form of controlled or intermittent irrigation of the rice crops. The benefits from the programme include **reduction in methane emissions** from traditional rice cultivation, and significant **reduction in water consumption**. The crop yields are maintained and not affected negatively, and the programme leads to the creation of community organisation and strengthening of networks through the formation of farmer groups. Typically, farmers use diesel to pump large amounts of water to flood their fields. With intermittent flooding, water pumps are run for shorter periods of time, reducing fuel consumption.

Benefits and Impacts of SRI

- To increase paddy yields usually by 20-50% and sometimes 100% or more;
- To reduce required seeds for transplanting by 60-80%;
- To reduce use of chemical fertilizers and agrichemicals;
- To reduce irrigation water by 25-50%;
- To reduce production costs usually by 10-20%; and
- With increased output and reduced costs, farmers' net income is increased.

32. Exp. (a)

- They are often used in durable-press blends with other fibres such as rayon, wool, and cotton, reinforcing the inherent properties of those fibres while contributing to the ability
- PET is completely recyclable, and is the most recycled plastic in the U.S and worldwide. More than 1.5 billion pounds of used PET bottles and containers are recovered in the United States each year for recycling.
- The burning of plastics releases toxic gases like dioxins, furans, mercury and polychlorinated biphenyls (better known as BCPs) into the atmosphere, and poses a threat to vegetation, and human and animal health.
- Liquor becomes carcinogenic when stored in plastic bottles.

33. Exp. (a)

- BIOROCK OR Mineral Accretion Technology is a coral reef restoration technology that utilizes low voltage electricity to improve the health and growth rates of corals and other marine organisms.
- The technology works by passing a small amount of electrical current through electrodes in the water.
- When a positively charged anode and negatively charged cathode are placed on the seafloor, with an electric current flowing between them, calcium ions combine with carbonate ions and adhere to the structure (cathode).
- This results in calcium carbonate formation. Coral larvae adhere to the CaCO₃ and grow quickly.
- Fragments of broken corals are tied to the biorock structure, where they are able to grow at least four to six times faster than their actual growth as they need not spend their energy in building their own calcium carbonate skeletons.

ENVIRONMENTAL POLLUTION

1. Exp. (d)

- Hydrofluorocarbons (HFCs) are greenhouse gases (GHGs) commonly used in a wide variety of applications, including refrigeration, air-conditioning (AC), building insulation, fire extinguishing systems, and aerosols.
- HFCs are entirely man-made. They are primarily produced for use in refrigeration, air-conditioning, insulating foams and aerosol propellants, with minor uses as solvents and for fire protection. Most HFCs are contained within equipment, so emissions are the result of wear, faulty maintenance, or leakage at the end of a product's lifetime.

2. Exp. (c)

- Statement 1 is correct:** Hydrogen can also serve as fuel for internal combustion engines. However, unlike FCEVs, these produce tailpipe emissions and are less efficient. Hydrogen engines burn hydrogen in an internal combustion engine, in just the same way gasoline is used in an engine.
- Statement 2 is correct:** Hydrogen blends of up to 5 percent in the natural gas stream are generally safe.
- Statement 3 is correct:** Cars that run on this clean energy have a hydrogen tank that connects to the fuel cell, where the electricity that powers the engine is generated. Fuel cell electric vehicles (FCEVs) signify a revolution in the energy and transport sector towards using fuel with a carbon-neutral footprint.

3. Exp. (c)

- Statement 1 is correct:** Gold mining is one of the most destructive industries in the world. It can displace communities, contaminate drinking water, hurt workers, and destroy pristine environments. It pollutes water and land with mercury and cyanide, endangering the health of people and ecosystems.
- Statement 2 is correct:** Mercury emitted from the smokestacks of coal-fired power plants can fall from the atmosphere with rain, mist or chemical reactions.
- Statement 3 is correct:** Mercury is a highly toxic element; there is no known safe level of exposure. Ideally, neither children nor adults should have any mercury in their bodies because it provides no physiological benefit.

4. Ex. (c)

Biofilter

- Statement 1 is correct:** The use of biofilters to removal of contaminants from wastewater and waste gases is being developed.
- Statement 2 is correct:** Ammonia is removed from an aquarium system through the use of a biofilter. The biofilter provides a substrate on which nitrifying bacteria grow. These nitrifying bacteria consume ammonia and **produce nitrite**, which is also toxic to fish.
- Statement 3 is correct:** Phosphorus is one of the most essential minerals for fish growth and bone mineralization which function primarily as structural component of hard tissues e.g., bone, exoskeleton, scale and teeth.

5. Exp. (a)

- Option (a) is correct:** *Wolbachia* are extremely common bacteria that occur naturally in 50 per cent of insect species, including some mosquitoes, fruit flies, moths, dragonflies and butterflies.
- The World Mosquito Program's innovative **Wolbachia method** is helping communities around the world prevent the spread of mosquito-borne disease.
- It works everywhere that *Aedes aegypti* is found, it complements other techniques and has proven potential for long-term success.

6. Exp. (d)

- Statement 1 is incorrect:** In India, several coal-fired thermal power plants **employ seawater** for a variety of functions, including **cooling the condenser system**. Seawater is a frequent supply of cooling water for power plants near the coast. It should be noted, however, that not all power plants use seawater; others may rely on freshwater sources.
- Statement 2 is incorrect:** According to a report, **40 per cent of the country's thermal power plants are located in areas facing high water stress**, a problem since these plants use water for cooling. Scarce water is already hampering electricity generation in this region.
- Statement 3 is incorrect:** There are both **privately and publicly owned coal-fired thermal power stations in India**. The country's power generating is a collaboration of corporate and public companies. Many private corporations

have invested in the power industry and run coal-fired thermal power facilities.

7. Exp. (d)

- Nitrous oxide is emitted into the atmosphere as a result of biomass burning, and biological processes in soils. Biomass burning is not only an instantaneous source of nitrous oxide, but it results in a longer term enhancement of the biogenic production of this gas.
- The current belief is that 90% of the emissions come from soils. Nitrous oxide is formed in soils during the microbiological processes nitrification and denitrification. Because nitrous oxide is a gas it can escape from soil during these transformations. Nitrous oxide production is controlled by temperature, pH, water holding capacity of the soil, irrigation practices, fertilizer rate, tillage practice, soil type, oxygen concentration, availability of carbon, vegetation, land use practices and use of chemicals. Nitrous oxide emissions from agricultural soils are increased by the addition of fertilizer.
- Cattle release both ammonia and methane into the atmosphere. Ruminant animals do not efficiently utilize dietary nitrogen. Excess nitrogen fed in the form of feed proteins is excreted in manure (urine + feces). Dairy cows on average secrete in milk 25 to 35 percent of the nitrogen they consume and almost all the remaining nitrogen is excreted in urine and feces with about half of the nitrogen excreted in urine.
- Nitrogen emissions in chicken production occur in several forms but mainly ammonia can contribute directly or indirectly to several environmental and public health hazards. Chicken production also contributes to some extent to climate change through the emissions of nitrous oxide, fine particulate matters, and methane.

8. Exp. (b)

- H-CNG reduces the emission of Carbon Monoxide up to 70% but does not eliminate it.
- H-CNG as a fuel reduces the emission of carbon-di-oxide and hydrocarbon as compared to other fuels. Compared with natural gas, HCNG has many advantages when it comes to performance. Research has shown that the brake effective thermal efficiency increases with an increased percentage of hydrogen. Another effect of the addition of hydrogen is that the brake specific fuel consumption is reduced, the cycle by cycle variations are also reduced, and the thermal efficiency is increased.
- Emissions can also be improved with the addition of hydrogen. Compared to pure natural gas, HCNG reduces the HC emissions, which is in part due to the increased combustion stability that comes with the addition of hydrogen. However, due

to the increased temperature and combustion duration that accompanies the hydrogen addition, an increase in NO_x emissions is observed.

- Compressed Natural Gas (CNG) is methane (CH₄) stored at high pressure. CNG as a fuel can be used in place of gasoline, diesel fuel and propane (C₃H₈) / LPG and its combustion produces fewer undesirable gases than the other mentioned fuels. Combustion is a high temperature exothermic chemical reaction between a fuel and an oxidant that produces oxidized products. When 18-20% of hydrogen as fuel is mixed into the CNG it becomes pollution free as it reduces the emission of carbon-monoxide up to 20%.
- Current cost of H₂ is more than the cost of Natural Gas. Therefore, HCNG's cost is more than CNG. Current price of HCNG is higher than CNG and will cost 72 paisa per kilometer more if implemented in DTC buses.

9. Exp. (d)

Methane Hydrate

- Scientists concerned that global warming may release huge stores of methane from reservoirs beneath Arctic tundra and deposits of marine hydrates -- a theory known as the "clathrate gun" hypothesis -- have turned to geologic history to search for evidence of significant methane release during past warming events.
- Vast amounts of methane hydrate are buried in sediments on the continental shelves and slopes. Four different kinds of geological settings have the temperature and pressure conditions suitable for the formation and stability of methane hydrates:
 - Sediment and sedimentary rock units below Arctic permafrost
 - Sedimentary deposits along continental margins
 - Deep-water sediments of inland lakes and seas, and
 - Under the Antarctic ice.
- Methane in atmosphere oxidizes to carbon dioxide after a decade or two.

10. Exp. (d)

- From- Review Paper Emissions from Crop/Biomass Residue Burning Risk to Atmospheric Quality: it may be safely concluded that crop residue/ biomass residue burning not only emits poisonous gases such as SO₂, CH₄, CO₂, CO, N₂O, NO_x, NO, NO₂, OC, BC, TC, NMHCs, SVOCs, VOCs, O₃ etc; but also influences the quality of environment at large.

11. Exp. (a)

- In India, the use of carbofuran, methyl parathion, phorate and triazophos is viewed

with apprehension. These chemicals are used as Pesticides in Agriculture.

12. Exp. (a)

- Microbeads are itty-bitty plastic orbs that can be found in exfoliating facial scrubs, cosmetics, shower gels and toothpaste, among other products. They are part of a larger class of microplastics, or pieces of plastic less than five millimeters, or 0.2 inch, long.
- Microbeads that wash down drains cannot be filtered out by many wastewater treatment plants, meaning that tiny plastics slip easily into waterways. Fish and other marine animals often eat them, introducing potentially toxic substances into the food chain. Thus they are harmful to marine ecosystem.

13. Exp. (c)

Sand Mining and impact on environment

- Sand Mining is an activity referring to the process of the actual removal of sand from the foreshore including rivers, streams and lakes. Sand is mined from beaches and inland dunes and dredged from ocean beds and river beds.
- Excessive in stream sand and gravel mining causes the degradation of rivers. In stream mining lowers the stream bottom, which may lead to bank erosion. Depletion of sand in the streambed and along coastal areas causes the deepening of rivers and estuaries, and the enlargement of river mouths and coastal inlets. It may also lead to saline water intrusion from the nearby sea. The effect of mining is compounded by the effect of sea level rise. Any volume of sand exported from streambeds and coastal areas is a loss to the system. It is also a threat to bridges, river banks and nearby structures. Sand mining also affects the adjoining groundwater system and the uses of the local people that they make of the river.
- Sand mining transforms the riverbeds into large and deep pits; as a result, the groundwater table drops and becomes polluted leaving the drinking water wells on the embankments of these rivers dry. Bed degradation from in stream mining lowers the elevation of stream flow and the flood plain water table which in turn can eliminate water table dependent woody vegetation in riparian areas, and decrease wetted periods in riparian wetlands. For locations close to the sea, saline water may intrude into the fresh water body.

14. Exp. (c)

Biological Oxygen Demand (BOD)

- Biochemical Oxygen Demand is an important water quality parameter which provides an index to assess the effect discharged wastewater will have on the receiving environment (aquatic ecosystems).

- The higher the BOD value, the greater the amount of organic matter or “food” available for oxygen consuming bacteria.

15. Exp. (d)

- Lead is a natural by-product occurring in cosmetics and food because it is absorbed from the earth and pollution into the raw materials used by both industries.
- Brominated vegetable oils are not used in soft drink manufacturing.
- Monosodium glutamate. Monosodium glutamate (MSG) is a flavour enhancer commonly added to Chinese food, canned vegetables, soups and processed meats. The Food and Drug Administration (FDA) has classified MSG as a food ingredient that’s “generally recognized as safe,” but its use remains controversial.

16. Exp. (b)

Air Quality Index

- The Air quality index in India was developed by the IIT Kanpur. The Index considers eight pollutants —
 - ▶ PM₁₀ (particulate matter 10),
 - ▶ PM₅ (particulate matter 5),
 - ▶ NO₂ (Nitrogen dioxide),
 - ▶ SO₂ (Sulphur dioxide),
 - ▶ CO (Carbon monoxide),
 - ▶ O₃ (Ozone),
 - ▶ NH₃ (Ammonia) and
 - ▶ Pb (Lead).
- Carbon dioxide and Methane are not part of Air Quality Index.

17. Exp. (a)

Fly ash

- Fly ash can be used in the production of bricks for building construction. Fly ash brick (FAB) is a building material, specifically masonry units, containing class C or class F fly ash and water. Owing to the high concentration of calcium oxide in class C fly ash, the brick is described as “self-cementing”.
- Fly ash can be used as a replacement for some of the Portland cement contents of concrete, owing to its pozzolanic properties. Fly Ash has very small particles which makes the concrete highly dense and reduces the permeability of concrete. It can add greater strength to the building. The concrete mixture generates a very low heat of hydration which prevents thermal cracking.
- Fly ash may contain (apart from silicon dioxide and calcium oxide) some toxic elements such as arsenic, lead, mercury etc.

18. Exp. (c)

Brominated flame retardants

- Brominated flame retardants (BFRs) are mixtures of man-made chemicals that are added to a wide variety of products, including for industrial use, to make them less flammable. They are used commonly in plastics, textiles and electrical/electronic equipment.
- Some brominated flame retardants, such as hexabromocyclododecane (HBCD), persist and are highly resistant to degradation in the environment. These bioaccumulate in the environment, potentially having toxic effects on living organisms. As a result, some international regulatory bodies have banned HBCD, which is commonly used in polystyrene foam insulation.

19. Exp. (c)

Carbon Dioxide

- Carbon dioxide is a colorless gas with a density about 60% higher than that of dry air. Some of the processes adding carbon dioxide gas to the earth are:
 - Photosynthesis is a process by virtue of which the green plants and some other organisms use sunlight to synthesize nutrients from carbon dioxide and water. Photosynthesis in plants generally involves the green pigment chlorophyll and generates oxygen as a by-product.
 - Respiration is a process by virtue of which living organisms involving the production of energy, typically with the intake of oxygen and the release of carbon dioxide from the oxidation of complex organic substances.
 - In the decomposition process, different products released are carbon dioxide (CO_2), energy, water, plant nutrients and resynthesized organic carbon compounds. This release process is called mineralization. The waste products produced by micro-organisms are also soil organic matter.
 - Volcanic activity ranges from emission of gases, non-explosive lava emissions to extremely violent explosive bursts that may last many hours. Volcanoes have occasionally contributed to global warming by producing significant amounts of carbon dioxide and other greenhouse gases.

20. Exp. (d)

Steel industry Pollutants

- In steel furnace, coke reacts with iron ore, releasing iron and generating carbon monoxide and carbon dioxide gases. Thus due to use of coal, pollutants such as oxides of sulphur and oxides of nitrogen are released.

21. Exp. (d)

Acid rain

- Acid rain, or acid deposition, is a broad term that includes any form of precipitation with acidic components, such as sulphuric or nitric acid caused by the pollution of environment by nitrous oxide and sulphur dioxide that fall to the ground from the atmosphere in wet or dry forms. This can include rain, snow, fog, hail or even dust that is acidic.

22. Exp. (a)

Photochemical smog

- Photochemical smog, often referred to as summer smog, is the chemical reaction of sunlight, nitrogen oxides, ozone and volatile organic compounds in the atmosphere, which leaves airborne particles and ground-level ozone. Also Peroxyacetyl nitrate is a peroxyacetyl nitrate. It is a secondary pollutant present in photochemical smog. It is thermally unstable and decomposes into peroxyethanoyl radicals and nitrogen dioxide gas. The acidic nature of the smog can also cause environmental damage and structural decay in dwellings.

23. Exp. (c)

Drinking water contaminants

- Contaminant refers to any physical, chemical, biological, or radiological substance or matter in water.
- Examples of physical contaminants are sediment or organic material suspended in the water of lakes, rivers and streams from soil erosion.
- Examples of chemical contaminants include nitrogen, bleach, salts, pesticides, metals (toxins produced by bacteria, and human or animal drugs. Eg: arsenic and fluoride.
- Examples of biological or microbial contaminants include bacteria, viruses, protozoan, and parasites.
- Examples of radiological contaminants include cesium, plutonium and uranium.

24. Exp. (d)

Coal combustion at thermal power plants

- Coal fired thermal power plants are one of the main contributors for atmospheric pollution and greenhouse gases. Emissions that come from these plants could be categorized into three different categories:
- Gaseous emissions: Carbon Dioxide, Carbon Monoxide, Sulphur Dioxide and Nitrogen Dioxide which lead to global warming and acid rain.
- **Particulate emissions:** The fine dust that is emanated from the stacks of power plants is a health hazard.

- Trace elements like Mercury, Cadmium and Lead which are also health hazards.

25. Exp. (b)

Lead Poisoning

- Lead is a highly toxic metal and a very strong poison.
- Lead is found in lead-based paints, including paint on the walls of old houses and toys. It is also found in:
 - art supplies
 - contaminated dust
 - gasoline products sold outside of the United States and Canada
 - Smelting units
 - Pens pencils: lead pencils are graphite pencils. Though inks of some pens cause lead pollution. But it does not really pose a health hazard.
 - Hair oils and cosmetics: In cosmetics, there have been some concerns about lead acetate in Lipsticks in US. However there are varied options of the trace amount causing health hazards.

26. Exp. (c)

Chlorofluorocarbons

- Chlorofluorocarbons (CFCs) are nontoxic, nonflammable chemicals containing atoms of carbon, chlorine, and fluorine. They are used in the manufacture of aerosol sprays, blowing agents for foams, packing materials, as solvents, as refrigerants, degreasing agents and cleaning agents for electronic components.

27. Exp. (d)

Carbon dioxide

- The increasing amount of carbon dioxide in the air is slowly raising the temperature of the atmosphere, because it absorbs the infrared part of the solar radiation
- Among GHGs, only water vapor has the ability to absorb both incoming (UV) and outgoing (infrared) radiation.

28. Exp. (b)

E-wastes

- Electronic waste, or e-waste, is a term for electronic products that have become unwanted, non-working or obsolete, and have essentially reached the end of their useful life.
- Most electronics that are improperly thrown away contain some form of harmful materials such as beryllium, cadmium, chromium, mercury and lead. These materials might be trace elements, but when

added up in volume, the threat to the environment is significant. Besides adding harmful elements to the environment, improper disposal of e-waste is a recycling opportunity lost. Almost all electronic waste contains some form of recyclable material, including plastic, glass and metals.

- Heptachlor is a synthetic chemical that was used in the past for killing insects in homes, buildings, and on food crops.
- Plutonium is a radioactive waste.

29. Exp. (d)

Algal blooms

- There are two major causes of algal blooms, these are high temperatures (attributed to Global Warming) and nutrients runoff. Blooming algae are a result of excess of nutrients, predominantly phosphorus and nitrogen, in the waters. This includes Discharge of nutrients from the estuaries, run-off from the land during the monsoon and upwelling in the seas.

30. Exp. (c)

Carbon dioxide in lower atmosphere

- Human activities in the recent past have caused the increased concentration of carbon dioxide in the atmosphere, but a lot of it does not remain in the lower atmosphere because:
 - The photosynthesis by phyto-plankton in the oceans: involves use of carbon dioxide and release of oxygen.
 - Unlike carbon dioxide and other gases, calcium carbonate is not able to move freely and so remains in the sea ice and polar ice caps. During the warmer summer, when the sea ice melts, the calcium carbonate reacts with CO₂ from the atmosphere and is dissolved. So in this way, CO₂ is removed from the atmosphere

31. Exp. (a)

Oil zapper

- It is an eco-friendly technology for the remediation of oily sludge and oil spills using bacteria.
- There are five different bacterial strains that are immobilized and mixed with a carrier material such as powdered corncob. This mixture of five bacteria is called Oil Zapper. Oilzapper feeds on hydrocarbon compounds present in crude oil and the hazardous hydrocarbon waste generated by oil refineries, known as Oil Sludge and converts them into harmless CO₂ and water.

32. Exp. (d)

Acid rain

- **All the statements are correct:** The acid rain is a result of reactions of Oxides of Hydrogen, Nitrogen and Sulphur. Some of the air pollutants (especially nitrogen oxides and sulphur dioxide)

react with the tiny droplets of water in clouds to form sulphuric and nitric acids. The rain from these clouds then falls as very weak acid - which is why it is known as “acid rain”.

33. Exp. (b)

Carbon monoxide (CO) as pollutant

- Excessive release of the pollutant carbon monoxide (CO) into the air may produce a condition in which oxygen supply in the human body decrease. This is because the inhaled CO has much higher affinity for haemoglobin as compared to oxygen. It displaces oxygen and quickly binds, so very little oxygen is transported through the body cells.

34. Exp. (c)

Hydrogen fuel cell vehicles

- The energy is created in the fuel cell by reacting the hydrogen in the tanks with oxygen from the air over what is called a “proton exchange membrane” and the end result is electricity and water. No other toxic gas is produced.

35. Exp. (d)

- Exposure can occur occupationally and domestically as a result of the ubiquitous use of benzene-containing petroleum products, including motor fuels and solvents. Active and passive exposure to tobacco smoke is also a significant source of exposure.
- Some industries use benzene to make other chemicals that are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of lubricants, rubbers, dyes, detergents, drugs, and pesticides.
- Human exposure to benzene has been associated with a range of acute and long-term adverse health effects and diseases, including cancer and aplastic anaemia.
- Benzene is highly volatile, and exposure occurs mostly through inhalation. 1–3 Public health actions are needed to reduce the exposure of both workers and the general population to benzene.

36. Exp. (a)

37. Exp. (d)

- Statement 1 is correct: Constituents that are found at various concentrations in coal ash are arsenic, cadmium, chromium, cobalt, copper, lead, lithium, mercury, molybdenum, selenium, thallium and uranium.
- Statement 2 is correct: Coal fired power plants lead to significant emissions of particulate matter (PM), sulfur dioxide, nitrogen oxides, carbon monoxide, volatile organic compounds, and carbon dioxide.
- Statement 3 is correct: Ash content of coal produced

in the country is generally 25 to 45 % whereas average ash content of imported coal varies from 10 to 20 %. Indian Coal has comparatively higher ash content than imported coal due to drift theory of formation of coal deposits in India.

38. Exp. (a)

- Option A is correct: The “social cost of carbon” (SCC) is the present value of the future damages from one additional unit of carbon emissions in a particular year. The Social Cost of Carbon is usually estimated as the net present value of climate change impacts over the next 100 years (or longer) of one additional tonne of carbon emitted to the atmosphere today. It is the marginal global damage costs of carbon emissions.
- The model includes the essential ingredients for calculating the SCC at the global scale, and is designed to be transparent and easy to use by decision-makers and non-specialists.

39. Exp. (d)

Magnetite Pollution

- Magnetite can have potentially large impacts on the brain due to its unique combination of redox activity, surface charge, and strongly magnetic behavior.
- Magnetite, a mixed Fe²⁺/Fe³⁺ oxide, is ubiquitous and abundant in PM in urban environments and might play a specific role in both neurodegeneration and cardiovascular disease.
- The specific presence of magnetite in the brain is important because it has been causally linked with potential cellular responses to external magnetic fields (e.g., in magnetic resonance imaging studies), aging, and with neurodegenerative disease.

Sources of the magnetite nanoparticles:

- Biogenic, chemically pure magnetite crystals occur in the bodies of a wide range of organisms within the kingdoms of the Monera, Protista, and Animalia (e.g., magnetotactic microbes, insects, molluscs, fish, birds, mammals). In the human brain, magnetite is also believed to precipitate biologically as part of the iron metabolism.
- Anthropogenically, Magnetite is an abundant constituent of atmospheric PM pollution, especially in the urban environment, where it has been identified in petrol and diesel exhaust, as brake-abrasion particles, in the air of underground stations, along railway lines, at welding workplaces, and in the emissions from industrial combustion processes. Other sources of Magnetite pollution include microwave Stoves within homes, Iron and Steel Plants, Power plants and Telephone lines.

40. Exp. (b)

Copper smelting plants

- Copper smelting plants separate elemental copper from copper concentrates through multiple sulphide oxidizing stages. The considered smelting process includes a continuously functioning flash smelting furnace (FSF) and several Pierce-Smith converters operated in batches.
- Carbon monoxide is used in copper smelters to reduce copper oxide. $\text{CuO} + \text{CO} \rightarrow \text{Cu} + \text{CO}_2$. Hence, it is unlikely that a smelter will release lethal quantities of carbon monoxide in to the environment.
- The main pollutants are released by the process of smelting. Most copper ores are sulphur-based and smelting releases sulphur dioxide, an air pollutant known to have many harmful effects. Sometimes, depending on the quality of the ore, the concentration of sulphur dioxide is so high that industries are forced to convert it into sulphuric acid, which itself is a water contaminant.
- The other byproduct of smelting is slag, the waste matter separated from metals. This slag may leach heavy metals (arsenic, cadmium, lead or mercury depending on the composition of the ore) into groundwater reservoirs. Water which has a high heavy metal content is very toxic to humans. Slag may also increase the concentration of other, less harmful salts in water resources, which may change the taste of water.

41. Exp. (b)

- Methane and nitrous oxide are emitted from conventional and modified rice cultivation systems.

42. Exp. (b)

- Acid rain results when sulfur dioxide (SO_2) and nitrogen oxides (NOX) are emitted into the atmosphere and transported by wind and air currents. The SO_2 and NOX react with water, oxygen and other chemicals to form sulfuric and nitric acids. These then mix with water and other materials before falling to the ground.
- While a small portion of the SO_2 and NOX that cause acid rain is from natural sources such as volcanoes, most of it comes from the burning of fossil fuels. The major sources of SO_2 and NOX in the atmosphere are:
- Burning of fossil fuels to generate electricity. Two thirds of SO_2 and one fourth of NOX in the atmosphere come from electric power generators.
- Vehicles and heavy equipment.
- Manufacturing, oil refineries and other industries.
- Winds can blow SO_2 and NOX over long distances and across borders making acid rain a problem for everyone and not just those who live close to these sources.

CLIMATE CHANGE

1. Exp. (d)

Carbon sequestration

- Geological storage of CO_2 can be undertaken in a variety of geological settings in sedimentary basins. These include:
 - Depleted oil and gas reservoirs
 - Deep unmineable coal seams/enhanced coalbed methane (ECBM) recovery
 - Oceans
 - Deep unused saline water-saturated formations
 - Other geological media are basalts, shales, and cavities
 - Subterranean deep saline formations

2. Exp. (b)

Ozone hole in the Antarctic

- The severe depletion of the Antarctic ozone layer known as the “ozone hole” occurs because of the special atmospheric and chemical conditions that

exist there. The very low winter temperatures in the Antarctic stratosphere cause polar stratospheric clouds (PSCs) to form. These high altitude clouds form only at very low temperatures help destroy ozone in two ways: They provide a surface which converts benign forms of chlorine into reactive, ozone-destroying forms, and they remove nitrogen compounds that moderate the destructive impact of chlorine.

- The ozone hole is caused by chemicals called CFCs, short for chlorofluorocarbons. CFCs escape into the atmosphere from refrigeration and propellant devices and processes. In the lower atmosphere, they are so stable that they persist for years, even decades. This long lifetime allows some of the CFCs to eventually reach the stratosphere. In the stratosphere, ultraviolet light breaks the bond holding chlorine atoms (Cl) to the CFC molecule. A free chlorine atom goes on to participate in a series of chemical reactions that both destroy ozone and return the free chlorine atom to the atmosphere unchanged, where it can destroy

more and more ozone molecules.

3. Exp. (a)

Common Carbon Metric

- The Common Carbon Metric is the calculation used to define measurement, reporting, and verification for GHG emissions associated with the operation of buildings types of particular climate regions.
- It does not include value-based interpretation of the measurements such as weightings or benchmarking.

4. Exp. (a)

Blue carbon

- Blue carbon is the term for carbon captured by the world's ocean and coastal ecosystems. Our ocean and coasts provide a natural way of reducing the impact of greenhouse gases on our atmosphere, through sequestration. Sea grasses, mangroves, and salt marshes along our coast "capture and hold" carbon, acting as something called a carbon sink.

5. Exp. (b)

- Climate Group is an international non-profit founded in 2003, with offices in London, New York, New Delhi, Amsterdam and Beijing. Their mission is to drive climate action. Fast. This group builds and run networks. Statement 1 is correct.
- EP100 is a global initiative led by the international non-profit Climate Group, bringing together over 120 energy smart businesses committed to measuring and reporting on energy efficiency improvements. Statement 2 is incorrect. Statement 3 is correct.
- Mahindra and Mahindra became the first Indian company to join the EP100 initiative. Statement 4 is correct.
- Climate Group is the Secretariat to the Under2 Coalition and works with governments to accelerate climate action through four work streams: Pathways, Policy action, Transparency, Diplomacy Statement 5 is incorrect.

ENVIRONMENTAL GOVERNANCE

1. Exp. (c)

- **Option 1 is correct:** Carbon markets are a very important tool to reach global climate goals, particularly in the short and medium term. They mobilize resources and reduce costs to give countries and company the space to smooth the low-carbon transition and be able to achieve the goal of net zero emissions in the most effective way possible.
- Carbon markets incentivize climate action by enabling parties to trade carbon credits generated by the reduction or removal of GHGs from the atmosphere, such as by switching from fossil fuels to renewable energy or enhancing or conserving carbon stocks in ecosystems such as a forest. Carbon markets are perhaps one of the most effective mechanisms available to encourage decarbonization of all kinds. Put simply, these markets put a price on carbon to incentivize businesses to reduce their carbon emissions where it is most financially feasible, and act now to manage the negative effects they can't eliminate.
- **Option 2 is incorrect:** Carbon markets transfer resources are mostly from the private sector to the private.

2. Exp. (c)

Both statements are correct.

- Biodiversity Management Committees (BMC) are created as per the Biological Diversity Act 2002 for promoting conservation, sustainable use, and documentation of biological diversity.
- The People's Biodiversity Registers shall be maintained and validated by the Biodiversity Management Committees. It shall then be counter signed by the Board through its authorized officer.
- The BMC shall also maintain a Register giving information about the details of the access to biological resources and traditional knowledge granted, details of the collection fee imposed and details of the benefits derived and the mode of their sharing from area within its jurisdiction.

3. Exp. (c)

- When a country joins the Ramsar Convention, it gets itself listed into the international effort for the conservation and wise use of wetlands. Once a country has joined, there are commitments which it has to fulfil as obligations.
- It has to designate at least one of its wetlands into the List of Wetlands of International Importance called "Ramsar List". Once that is done, it can later designate more such wetlands.
- The above designation has to be based upon criteria that take into account the ecology, botany, zoology, limnology (freshwater science) or

Hydrology. Thus, not every wetland becomes a Ramsar site but only those which have significant values related to these fields.

- The Wetlands (Conservation and Management) Rules, 2010 also encompass the drainage area or catchment regions of the wetlands as determined by the authority.

4. Exp. (d)

- Cirrus clouds do not reflect a lot of solar radiation back into space, but because they form at high altitudes and cold temperatures, they trap long-wave radiation and have a climate impact similar to greenhouse gases. Thus Thinning cirrus clouds would reduce the absorption of infrared radiation and proposed form of climate engineering to reduce global warming.
- Another proposed Geo-engineering technique involves injecting reflective sulfate aerosol particles into Earth's lower stratosphere to cast a small proportion of the inbound sunlight back into space and cool the planet off. Thus both are climate engineering/ Geo-engineering techniques to reduce global warming.

5. Exp. (a)

- The Bill establishes the National Compensatory Afforestation Fund under the Public Account of India, and a State Compensatory Afforestation Fund under the Public Account of each state.
- These Funds will receive payments for: (i) compensatory afforestation, (ii) net present value of forest (NPV), and (iii) other project specific payments. The National Fund will receive 10% of these funds, and the State Funds will receive the remaining 90%.
- These Funds will be primarily spent on afforestation to compensate for loss of forest cover, regeneration of forest ecosystem, wildlife protection and infrastructure development.
- The Bill also establishes the National and State Compensatory Afforestation Fund Management and Planning Authorities to manage the National and State Funds.
- People's participation is not mandatory in compensatory in the compensatory afforestation programmes carried out under the compensatory fund act, 2016.

6. Exp. (b)

- Parliament passed an amendment to the Indian Forest Act, 1927 removing 'bamboo' plant growing on non-forest lands from the definition of 'tree'. The government claimed this would benefit tribals and other dwellers living around forests. The amendment converted into law what had been passed as an ordinance before that. As they enjoy right to fell bamboos in forest areas.

- Section 2(i) of the the scheduled Tribes and other Traditional forest dweller Act defines a Minor Forest Produce (MFP) as all non-timber forest produce of plant origin and includes bamboo, brushwood, stumps, canes, Tusser, cocoon, honey, waxes, Lac, tendu/kendu leaves, medicinal plants and herbs, roots, tuber and the like.
- The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, popularly known as the Forests Rights Act (FRA), was enacted in 2007. The Act recognizes and vests individual forest-dwellers with forest rights to live in and cultivate forest land that was occupied before 13 December 2005 and grants community forest rights to manage, protect and regenerate the forest under section 3(1)(i), and to own and dispose minor forest products from forests where they had traditional access. Section 3(1)(c) of the Forest Rights Act 2006 defines forest rights as inclusive of 'Right of ownership, access to collect, use and dispose of minor forest produce which have traditionally been collected within or outside village boundaries'. Individuals, communities and gram sabhas having rights under this particular section of the Act will not only have the rights to use but also rights of ownership over MFPs. This goes beyond the Provisions of the Panchayats (Extension To The Scheduled Areas) Act, 1996 (PESA Act) which had authorised states to entrust panchayats and gramasabhas as the owners of MFP.

7. Exp. (b)

- **Environment Protection Act, 1986:** The Act empowers the Central Government to take all appropriate measures to prevent and control pollution and to establish effective machinery for the purpose of protecting and improving the quality of the environment and preventing, abating and controlling environmental pollution.
- The Act empowers the center to "take all such measures as it deems necessary".
- By virtue of this Act, Central Government has armed itself with considerable powers which include,
 - coordination of action by state,
 - planning and execution of nationwide programmes,
 - laying down environmental quality standards, especially those governing emission or discharge of environmental pollutants,
 - placing restriction on the location of industries and so on.
 - authority to issue direct orders, included orders to close, prohibit or regulate any industry.
 - power of entry for examination, testing of equipment and other purposes and power to

analyze the sample of air, water, soil or any other substance from any place.

- The Act explicitly prohibits discharges of environmental pollutants in excess of prescribed regulatory standards.
- There is also a specific prohibition against handling hazardous substances except those in compliance with regulatory procedures and standards.
- The Act provides provision for penalties. For each failure or contravention the punishment included a prison term up to five years or fine up to Rs. 1 lakh, or both.
- The Act imposed an additional fine of up to Rs. 5,000 for every day of continuing violation.
- If a failure or contravention occurs for more than one year, offender may be punished with imprisonment which may be extended to seven years.
- Section 19 provides that any person, in addition to authorized government officials, may file a complaint with a court alleging an offence under the Act.
- This "Citizens' Suit" provision requires that the person has to give notice of not less than 60 days of the alleged offence of pollution to the Central Government.

8. Exp. (c)

E-Waste (Management and Handling) Rules, 2011

- The Ministry of Environment, Forest and Climate Change had notified the E-Waste Management Rules, 2016 in supersession of the e-waste (Management & Handling) Rules, 2011.
- Announcing the notification of the rules, Minister of State (Independent Charge) of Environment, Forest and Climate Change, Shri Prakash Javadekar, said that norms had been made more stringent and reflected the government's commitment to environmental governance.
- He pointed out that the E-waste rules will now include Compact Fluorescent Lamp (CFL) and other mercury containing lamps, as well as other such equipment.
- The Minister said that for the first time, the Rules will bring the producers under Extended Producer Responsibility (EPR), along with targets. He added that producers have been made responsible for collection of E-waste and for its exchange.

9. Exp. (b)

The Partnership for Action on Green Economy (PAGE)

- It was launched in 2013 as a response to the call at Rio+20 in 2012 in Rio de Janeiro to support those countries wishing to embark on greener and more inclusive growth trajectories and to assist interested countries in developing, adopting and

implementing inclusive green economy (IGE) policies and strategies.

- PAGE deploys the expertise and broad convening power of five UN agencies – International Labour Organization (ILO), United Nations Environment Programme (UNEP), United Nations Industrial Development Organization (UNIDO), United Nations Institute for Training and Research (UNITAR) and United Nations Development Programme (UNDP) – whose mandates, expertise and networks combined can offer integrated and holistic support to countries on greener and more inclusive growth trajectories, ensuring coherence and avoiding duplication.

10. Exp. (a)

- The Critical Wildlife Habitats have been envisaged in Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006.
- Baigas are considered as a particularly vulnerable tribal group (PVTG) in the Indian Constitution and rely mostly on shifting cultivation, forest produce and fishing for sustenance, spread over forested areas of Madhya Pradesh and Chhattisgarh. In 2016, they became India's first community to get habitat rights.
- Grampanchayats officially decide and declare Habitat Rights for Primitive and Vulnerable Tribal Groups in any part of India.

11. Exp. (d)

Plant diseases

- Most disease-causing viruses are carried and transmitted naturally by insects and mites, which are called vectors of the virus.
- Slugs, snails, birds, rabbits, and dogs also transmit a few viruses, but this is not common. Birds moving through crops can carry pathogens from the infected plant to other plants. Woodpeckers carry spores of tree pathogens.

12. Exp. (b)

Organic Farming

- Ministry of Commerce has implemented the National Programme for Organic Production (NPOP).
- Sikkim has become India's first fully organic state by implementing organic practices on around 75,000 hectares of agricultural land.

13. Exp. (b)

Environmental Organisations

- The NGT has been established under the National Green Tribunal Act, 2010 while the Central Pollution Control Board (CPCB) is a statutory organisation under the Ministry of Environment, Forest and Climate Change (MoE, FCC) and was constituted in September, 1974 under the Water

(Prevention and Control of Pollution) Act, 1974. CPCB is also entrusted with the powers and functions under the Air (Prevention and Control of Pollution) Act.

- The NGT provides environmental justice and helps reduce the burden of litigation in the higher courts whereas the CPCB promotes cleanliness of streams and wells, and aims to improve the quality of air in the country.

14. Exp. (a)

Carbon fertilization

- The CO₂ fertilization effect or carbon fertilization effect suggests that the increase of carbon dioxide in the atmosphere increases the rate of photosynthesis and eventually plant growth in plants. The effect varies depending on the plant species, the temperature, and the availability of water and nutrients.

15. Exp. (b)

The Global Alliance for Climate Smart Agriculture (GACSA)

- The Global Alliance for ClimateSmart Agriculture (GACSA), was launched on 23 September 2014 at the UN Climate Summit.
- GACSA is an inclusive, voluntary and action-oriented multi-stakeholder platform alliance of partners with no binding obligations on Climate-Smart Agriculture (CSA).
- GACSA works towards three aspirational outcomes to:
 - Improve farmers' agricultural productivity and incomes in a sustainable way;
 - Build farmers' resilience to extreme weather and changing climate;
 - Reduce greenhouse gas emissions associated with agriculture, when possible.
- India has not been instrumental in the creation of GACSA.

16. Exp. (a)

Schedule I Wildlife (Protection) Act, 1972

- There are six schedules which give varying degrees of protection.
- Out of the six schedules, Schedule I and part II of Schedule II provide absolute protection and offences under these are prescribed the highest penalties. A species of tortoise declared protected under Schedule I enjoys the same level of protection as the tiger.
- The penalties for Schedule III and Schedule IV are less and these animals are protected.
- Schedule V includes the animals which may be hunted. These are Common crow, Fruit bats, Mice & Rats only.

- Schedule VI contains the plants, which are prohibited from cultivation and planting.

17. Exp. (a)

Global Climate Change Alliance

- The Global Climate Change Alliance (GCCA) is an initiative of the European Union. Its overall objective is to build a new alliance on climate change between the European Union and the poor developing countries that are most affected and that have the least capacity to deal with climate change.
- The GCCA+ aim is to boost the efficiency of its response to the needs of vulnerable countries and groups. Using ambitious and innovative approaches, it will achieve its goals by building on its two mutually reinforcing pillars:
 - Under the first pillar, the GCCA+ serves as a platform for dialogue and exchange of experience between the EU and developing countries, focusing on climate policy and bringing renewed attention to the issue of international climate finance. The results feed into negotiations for a new climate deal under the United Nations Framework Convention on Climate Change (UNFCCC).
 - Under the second pillar, the GCCA+ acts as a source of technical and financial support for the world's most climate-vulnerable countries, whose populations need climate finance the most. Extra efforts will be made to strengthen the strategically important issues of ecosystems-based adaptation, migration and gender equality.
 - GCCA is a EU initiative and funded and administered by European Union and European commission.

18. Exp. (d)

Wildlife (Protection) Act, 1972

- Animals listed in schedule 1 and part II of schedule 2 have absolute protection-offences under these are prescribed the highest penalties.
- Gharialis given legal protection under the Schedule 1 (Part II Amphibians and Reptiles) of Wildlife (Protection) Act, 1972
- Indian Wild Ass is given legal protection under the Schedule 1 (Part I Mammals) of Wildlife (Protection) Act, 1972
- Wild Buffalo is given legal protection under the Schedule 1 (Part I Mammals) of Wildlife (Protection) Act, 1972

19. Exp. (b)

Climate and Clean Air Coalition (CCAC)

- The Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (CCAC) was launched by the United Nations Environment

Programme (UNEP) and six countries—Bangladesh, Canada, Ghana, Mexico, Sweden, and the United States. It is a voluntary partnership of governments, intergovernmental organizations, businesses, scientific institutions and civil society organizations committed to protecting the climate and improving air quality through actions to reduce short-lived climate pollutants.

- It focuses on ozone, methane, Black Carbon, and hydrofluorocarbons.

20. Exp. (b)

- TRAFFIC is governed by the TRAFFIC Committee, a steering group composed of members of TRAFFIC's partner organizations, WWF and IUCN.
- It has an enviable reputation as a reliable and impartial organization, a leader in the field of conservation as it relates to wildlife trade, the wildlife trade monitoring network, works to ensure that trade in wild plants and animals is not a threat to the conservation of nature.
- TRAFFIC was established in 1976 and has developed into a global network, research-driven and action-oriented, committed to delivering innovative and practical conservation solutions based on the latest information.
- TRAFFIC also works in close co-operation with the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

21. Exp. (b)

M-STrIPES

- The full form of M-STrIPES is Monitoring System for Tigers'-Intensive Protection and Ecological Status. It's a software monitoring system launched by the Indian Government in 2010 in some tiger reserves. The aim is to reduce vulnerability of tigers and ensure maintenance of tiger reserves. The system would enable field managers to assist intensity and spatial coverage of patrols in a geographic information system (GIS) domain.

22. Exp. (d)

Bureau of Energy Efficiency Star Label

- The Objectives of Standards & Labeling Program is to provide the consumer an informed choice about the energy saving and thereby the cost saving potential of the marketed household and other equipment.
- The scheme is currently invoked for equipments/appliances Room Air Conditioner (Fixed Speed), Ceiling Fan, Colour Television, Computer, Direct Cool Refrigerator, Distribution Transformer, Domestic Gas Stove, Frost Free Refrigerator, General Purpose Industrial Motor, Monoset Pump, Openwell Submersible Pump Set, Stationary Type Water Heater, Electric geysers, Submersible Pump Set, Tfl, Washing Machine,

Ballast, Solid State Inverter, Office Automation Products, Diesel Engine Driven Monosetpumps For Agricultural Purposes, Diesel Generator Set, Tubular fluorescent lamps, Room Air Conditioner (Variable Speed), Chillers, Agricultural Pumpset.

23. Exp. (a)

International Solar Alliance

- India and France launched an International Solar Alliance to boost solar energy in developing countries. The initiative was launched at the UN Climate Change Conference in Paris on 30 November, 2015
- The alliance includes around 120 countries that support the "Declaration on the occasion to launch the international solar alliance of countries dedicated to the promotion of solar energy."

24. Exp. (b)

The Sustainable Development Goals

- The first report of the Club of Rome was the famous 'The limits to growth', brought out in 197 It highlighted the need for sustainable use of resources through a computer simulation of exponential economic and population growth with a finite supply of resources. There was no such mention of The Sustainable Development Goals then.
- At the United Nations Sustainable Development Summit on 25 September 2015, world leaders adopted the 2030 Agenda for Sustainable Development, which includes a set of 17 SDGs with 169 targets. .

25. Exp. (c)

United Nations Convention to Combat Desertification

- Established in 1994, the United Nations Convention to Combat Desertification (UNCCD) is the sole legally binding international agreement linking environment and development to sustainable land management.
- The convention aims to promote effective action through innovative national programmes and supportive international partnerships, committed to a bottom-up approach, encouraging the participation of local people in combating desertification and land degradation.
- The implementation of the UNCCD is geared around five regional implementation annexes:
 - Annex 1 for Africa,
 - Annex 2 for Asia,
 - Annex 3 for Latin America and the Caribbean,
 - Annex 4 for Northern Mediterranean and
 - Annex 5 for Central and Eastern Europe.

26. Exp. (b)**Paris Agreement is an international agreement to combat climate change.**

- The Paris Agreement came out of the COP21, the 21st Conference of Parties of the UNFCCC (United Nations Framework Convention on Climate Change), held in Paris from November 30th to December 12th, 2015. The agreement was adopted on December 12th, 2015.
- The Agreement has not been signed by all the member countries of the UN.
- The Paris Agreement sets an over-arching target of keeping the emissions in control so that either the rise in global temperature remains below 2°C by the turn of 21st century or as low as 5°C. To achieve this goal, the countries will need to peak their emissions and then bring them down.
- Similar to Kyoto Protocol, the developed countries will need to provide finance to the developing countries for emission reduction actions as well as adaptation. The amount set by Paris Agreement is at least USD 100 billion per year from 2020 onward.

27. Exp. (a)**Agenda 21**

- Agenda 21 is a global action plan for sustainable development into the 21st century. Sustainable development is a process that aims to meet the needs of the present generation without harming the ability of future generations to meet their needs.
- It was initiated in Earth Summit (UN Conference on Environment and Development) held in Rio de Janeiro, Brazil, in 1992.

28. Exp. (a)**Greenhouse Gas Protocol**

- The Greenhouse Gas Protocol (GHGP) provides international accounting and reporting standards, sector guidance, calculation tools, and trainings for business and government. It establishes a comprehensive, global, standardized framework for measuring and managing greenhouse gas emissions from private and public sector operations, value chains, products, cities, and policies.

29. Exp. (b)**Intended Nationally Determined Contribution**

- Countries across the globe adopted a historic international climate agreement at the U.N. Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP21) in Paris in December 2015. In anticipation of this

moment, countries publicly outlined what post-2020 climate actions they intended to take under the new international agreement, known as their Intended Nationally Determined Contributions (INDCs).

- INDCs are the primary means for governments to communicate internationally the steps they will take to address climate change in their own countries. INDCs will reflect each country's ambition for reducing emissions, taking into account its domestic circumstances and capabilities for achieving sustainable development goals.

30. Exp. (d)**UN-REDD+ Programme**

- REDD is set of steps designed in order to reduce emissions of greenhouse gases from deforestation and forest degradation. It is collaborative programme of Food and Agriculture Organization (FAO), United Nations Development Programme (UNDP) and United Nations Environment Programme (UNEP).
- The UN-REDD Programme has identified the following three topics for supporting national REDD+ governance structures, with an overarching principle of stakeholder participation
- Country-led multi-stakeholder governance assessments that contribute to the development and implementation of national REDD+ strategies (for tackling forest degradation and biodiversity loss) and nationally owned monitoring frameworks
- Social standards, including poverty and gender
- Land and/or carbon tenure and the role of REDD+ within national land use strategies

31. Exp. (c)**The Economics of Ecosystems and Biodiversity (TEEB)**

- The Economics of Ecosystems and Biodiversity (TEEB) is a global initiative focused on "making nature's values visible". Its principal objective is to mainstream the values of biodiversity and ecosystem services into decision-making at all levels. It aims to achieve this goal by following a structured approach to valuation that helps decision-makers recognize the wide range of benefits provided by ecosystems and biodiversity, demonstrate their values in economic terms and, where appropriate, capture those values in decision-making.
- Based in Geneva, Switzerland at the International Environment House, the TEEB office is hosted by the United Nations Environment Programme (UNEP) under the Economics and Trade Branch (ETB) of the Division of Technology, Industry and Economics (DTIE).

32. Exp. (c)

Green India Mission Objectives

- To increase forest/tree cover to the extent of 5 million hectares (mha) and restore and improve quality of forest/tree cover on another 5 mha of forest/non-forest lands;
- To improve/enhance eco-system services like carbon sequestration and storage (in forests and other ecosystems), hydrological services and biodiversity; along with provisioning services like fuel, fodder, and timber and non-timber forest produces (NTFPs); and
- To increase forest based livelihood income of about 3 million households.

33. Exp. (c)

Environmental Governance

- Annex I parties are industrialized countries belonging to the Organization for Economic Cooperation and Development (OECD) and countries designated as Economies in Transition under the Framework Convention on Climate Change (FCCC), that pledged to reduce their greenhouse gas emissions to 1990 levels by the year 2000.
- Certified Emission Reductions (CERs) are a type of emissions unit (or carbon credits) issued by the Clean Development Mechanism (CDM) Executive Board for emission reductions achieved by CDM projects and verified by a DOE (Designated Operational Entity) under the rules of the Kyoto Protocol. Each CER unit is equal to one tonne of CO₂
- The Clean Development Mechanism (CDM) allows a country with an emission-reduction commitment under the Kyoto Protocol (Annex B Party) to implement an emission-reduction project in developing countries.

34. Exp. (b)

Globally Important Agricultural Heritage Systems (GIAHS)

- **GIAHS aims to protect traditional agricultural system. it will not provide any modern technology and training.**
- **GIAHS aims to identify and safeguard ecofriendly traditional farm practices and their associated landscapes, agricultural biodiversity and knowledge systems of the local communities.**
- To provide Geographical Indication status to all the varieties of agricultural produce in such identified GIAHS is not under the FAO or the GIAHS authority.

35. Exp. (a)

National Ganga River Basin Authority (NGRBA)

- 'National Ganga River Basin Authority' (NGRBA) as an empowered planning, financing, monitoring

and coordinating authority for the Ganga River, in exercise of the powers conferred under the Environment (Protection) Act, 1986.

- The Prime Minister is ex-officio Chairperson of the Authority.
- **Key Features of the New Approach of NGRBA**
 - River Basin will be the unit of planning and management. This is an internationally accepted strategy for integrated management of rivers. Accordingly, a new institutional mechanism in the form of National Ganga River Basin Authority (NGRBA) will spearhead river conservation efforts at the national level. Implementation will be by the State Agencies and Urban Local Bodies.
 - The minimum ecological flows for the entire Ganga will be determined through modeling exercises. NGRBA will take appropriate measures in cooperation with the States to regulate water abstraction for maintaining minimum ecological flows in the river.
 - Attention would also be paid to the restoration of living parts of the river ecosystem for its holistic treatment to enable conservation of species like dolphin, turtles, fishes and other native and endangered species in their river.

36. Exp. (b)

IUCN and CITES

- IUCN is not an organ of the United Nations but has observer and consultative status at the United Nations. CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between governments.
- IUCN, the International Union for Conservation of Nature, helps the world find pragmatic solutions to our most pressing environment and development challenges. It supports scientific research, manages field projects all over the world and brings governments, non-government organizations, United Nations agencies, companies and local communities together to develop and implement policy, laws and best practice. Its work agenda includes running through thousands of field projects around the world to better manage natural environments.
- CITES aims is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. It is an international agreement to which States and regional economic integration organizations adhere voluntarily. States that have agreed to be bound by the Convention ('joined' CITES) are known as Parties. Although CITES is legally binding on the Parties – in other words they have to implement the Convention – it does not take the place of national laws. Rather it provides a framework to be

respected by each Party, which has to adopt its own domestic legislation to ensure that CITES is implemented at the national level.

37. Exp. (b)

Montreal Protocol

- The Montreal Protocol is widely considered as the most successful environment protection agreement. The Protocol sets out a mandatory timetable for the control and phase out of ozone depleting substances. This timetable has been reviewed regularly, with phase out dates accelerated in accordance with scientific understanding and technological advances.
- The Montreal Protocol sets binding progressive phase out obligations for developed and developing countries for all the major ozone depleting substances, including CFCs, halons and less damaging transitional chemicals such as HCFCs.

38. Exp. (a)

Rio+20 Conference

- Rio+20 refers to the United Nations Conference on Sustainable Development which took place in Rio de Janeiro, Brazil in June 2012 – twenty years after the landmark 1992 Earth Summit in Rio.
- At the Rio+20 Conference, world leaders, along with thousands of participants from the private sector, NGOs and other groups, came together to shape how we can reduce poverty, advance social equity and ensure environmental protection on an ever more crowded planet.

39. Exp. (a)

Green Climate Fund

- The Green Climate Fund (GCF) is a fund within the framework of the UNFCCC created to support the efforts of developing countries to respond to the challenge of climate change.
- GCF was founded as a mechanism to redistribute money from the developed to the developing world, in order to assist the developing countries in adaptation and mitigation practices to counter climate change.
- It was set up by the 194 countries who are parties to the United Nations Framework Convention on Climate Change (UNFCCC) in 2010, as part of the Convention's financial mechanism.
- GCF is headquartered in Songdo, Republic of Korea.

40. Exp. (d)

Bio Carbon Fund Initiative for Sustainable Forest Landscapes

- The Bio Carbon Fund Initiative for Sustainable Forest Landscapes (ISFL) is a multilateral fund, supported by donor governments and managed

by the World Bank. It promotes reducing greenhouse gas emissions from the land sector, from deforestation and forest degradation in developing countries (REDD+), and from sustainable agriculture, as well as smarter land-use planning, policies and practices.

41. Exp. (c)

Forest Carbon Partnership Facility

- The Forest Carbon Partnership Facility is a global partnership of governments, businesses, civil society, and indigenous people focused on reducing emissions from deforestation and forest degradation, forest carbon stock conservation, the sustainable management of forests, and the enhancement of forest carbon stocks in developing countries (activities commonly referred to as REDD+).
- The World Bank assumes the functions of trustee and secretariat.
- **One of the four strategic objectives of the FCPF** is to assist countries in their REDD+ efforts by providing them with financial and technical assistance in building their capacity to benefit from possible future systems of positive incentives for REDD+.
- It provide financial incentives to countries in their REDD+ efforts. However, there is no mention of assistance to universities, scientists and institutions.

42. Exp. (c)

BirdLife International

- BirdLife international is a global partnership of conservation organisations that strives to conserve birds, their habitats and global biodiversity, working with people towards sustainability in the use of natural resources. It is the World's largest partnership of conservation organisations, with over 120 partner organisations.
- An Important Bird and Biodiversity Area (IBA) is an area recognized as being globally important habitat for the conservation of birds populations.
- The British biologist Norman Myers coined the term "biodiversity hotspot" in 1988 through the article "The Environmentalist" as a biogeographic region characterized both by exceptional levels of plant endemism and by serious levels of habitat loss.

43. Exp. (b)

Seed Village Concept

- A village, wherein trained group of farmers are involved in production of seeds of various crops and cater to the needs of themselves, fellow

farmers of the village and farmers of neighbouring villages in appropriate time and at affordable cost is called “a seed village”.

44. Exp. (d)

IndARC

- IndARC is India's first underwater moored observatory anchored in the Kongs fjorden fjord, half way between Norway (1100 km away from Norway) and the North Pole at a depth of 192 metre. The data provided by IndARC helps:
- to understand the Arctic processes and their influence on the Indian monsoon system through climate modelling studies; and
- the response of the Arctic to climatic variability.

45. Exp. (c)

Genetic Engineering Appraisal Committee

- The Genetic Engineering Appraisal Committee (GEAC) is the apex body constituted in the Ministry of Environment and Forests under 'Rules for Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms/Genetically Engineered Organisms or Cells 1989', under the Environment Protection Act, 1986.

46. Exp. (c)

Bombay Natural History Society (BNHS)

- Bombay Natural History Society (BNHS) is one of India's biggest Non-Governmental Organizations (NGO) that was founded in 188 The sole aim of this organization is to conduct research activities and observations on natural history and displaying rare specimens.
- BNHS Mission: Conservation of Nature, primarily Biological Diversity through action based on Research, Education and Public Awareness.
- It also organizes and conducts nature trails and camps for the general public.

47. Exp. (d)

International agreements on Biodiversity

- The International Treaty on Plant Genetic Resources for Food and Agriculture: It overlooks the conservation and sustainable use of all plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security.
- The United Nations Convention to Combat Desertification is only legally binding international agreement to address problem of desertification and other land issues. The Convention addresses desertification and land issues specifically arid, semi-arid and dry sub-humid areas, known as dry lands.
- The World Heritage Convention: The most significant feature of the 1972 World Heritage Convention is that it links together in a single

document the concepts of nature conservation and the preservation of cultural properties.

48. Exp. (b)

- Animal Welfare Board of India is a statutory advisory body advising the Government of India's Ministry of Environment, Forest and Climate Change. It was established in 1962 under Section 4 of The Prevention of Cruelty to Animals Act, 1960. Well-known humanitarian Rukmini Devi Arundale was instrumental in setting up the board and was its first chair.
- The National Tiger Conservation Authority (NTCA) is a statutory body of the Ministry, with an overarching supervisory / coordination role, performing functions as provided in the Wildlife (Protection) Act, 197
- National Ganga River Basin Authority' (NGRBA) is an empowered planning, financing, monitoring and coordinating authority for the Ganga River, in exercise of the powers conferred under the Environment (Protection) Act, 1986. It is chaired by the Prime Minister.

49. Exp. (a)

Global Environment Facility

- The GEF also serves as financial mechanism for the following conventions:
 - Convention on Biological Diversity (CBD)
 - United Nations Framework Convention on Climate Change (UNFCCC)
 - UN Convention to Combat Desertification (UNCCD)
 - Stockholm Convention on Persistent Organic Pollutants (POPs)
 - Minamata Convention on Mercury

50. Exp. (c)

Earth Hour

- Earth Hour is people's movement inspiring individuals to take stand against climate change. It is organized by the World Wide Fund for Nature (WWF) with an aim to enable harmonious existence of human and wildlife.
- Starting as a symbolic lights out event in Sydney in 2007, Earth Hour is now the world's largest grassroots movement for the environment, to raise the awareness about the climate change and the need to save the planet and inspire millions of people to take action for our planet and nature.

51. Exp. (a)

Montreux Record

- The Montreux Record is a register of wetland sites on the List of Wetlands of International Importance where changes in ecological character have occurred, are occurring, or are likely to occur as a result of technological developments,

pollution or other human interference.

- It is maintained as part of the Ramsar List.
- Indian sites include Keoladeo National Park, Rajasthan and Loktak Lake, Manipur.

52. Exp. (b)

Wetlands International

- Wetlands International is the only global not-for-profit organization dedicated to the conservation and restoration of wetlands, deeply concerned about the loss and deterioration of wetlands such as lakes, marshes and rivers.
- This organization is in partnership but not formed under the Ramsar convention. It was founded in 1937 as the International Wildfowl Inquiry and the organization was focused on the protection of waterbirds. Later, the name became International Waterfowl & Wetlands Research Bureau (IWRB).
- Wetlands International's work ranges from research and community-based field projects to advocacy and engagement with governments, corporate and international policy fora and conventions. Wetlands International works through partnerships and is supported by contributions from an extensive specialist expert network and tens of thousands of volunteers.

53. Exp. (d)

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006

- It extends to the whole of India except the State of Jammu and Kashmir.
- Under the act, the Gram Sabha shall be the authority to initiate the process for determining the nature and extent of individual or community forest rights or both that may be given to the forest dwelling Scheduled Tribes and other traditional forest dwellers within the local limits of its jurisdiction under this Act by receiving claims, consolidating and verifying them and preparing a map delineating the area of each recommended claim in such manner as may be prescribed for exercise of such rights and the Gram Sabha shall, then, pass a resolution to that effect and thereafter forward a copy of the same to the Sub-Divisional Level Committee.

54. Exp. (c)

National Biodiversity Authority (NBA)

- The National Biodiversity Authority (NBA) was established by the Central Government in 2003 to implement India's Biological Diversity Act (2002). The NBA is a statutory Body and it performs facilitative, regulatory and advisory functions for the Government of India on issues of conservation, sustainable use of biological resources and fair and equitable sharing of benefits arising out of the use of biological resources. Thus NBA checks

the bio piracy and protects the indigenous and traditional genetic resources.

- NBAs approval is required before seeking any IPR based on biological material and associated knowledge obtained from India.

55. Exp. (b)

Impact of National Water mission

- Part of the water needs of urban areas will be met through recycling of waste water
- The water requirements of coastal cities with inadequate alternative sources of water will be met by adopting appropriate technologies that allow for the use of ocean water.
- There is no such provision of interlinking of rivers of Himalayan origin with the rivers of peninsular India and complete reimbursement by the Government of expenses incurred by farmers for digging bore wells and for installing motors and pump sets to draw groundwater .

56. Exp. (c)

- As per The Millennium Ecosystem Assessment, the supporting services are those that are necessary for the production of all other ecosystem services.
- Examples of supporting services are primary production, production of atmospheric oxygen, soil formation and retention, crop pollination, nutrient cycling, water cycling, and provisioning of habitat.

57. Exp. (d)

Carbon credits

- A carbon credit is a permit or certificate allowing the holder to emit carbon dioxide or other greenhouse gases. It is awarded to countries or groups that have reduced greenhouse gases below their emission quota
- Carbon credit prices are traded on an exchange. So their prices are never fixed.

58. Exp. (b)

Red Data Books (IUCN)

- The IUCN Red List of Threatened Species is the world's most comprehensive inventory of the global conservation status of threatened plant and animal species. It uses a set of quantitative criteria to evaluate the extinction risk of thousands of species. These criteria are relevant to most species and all regions of the world. With its strong scientific base, The IUCN Red List is recognized as the most authoritative guide to the status of biological diversity.
- Endemic plant and animal species present in the biodiversity hotspots and protected sites for conservation of nature and natural resources in various countries are not a part of the Red Data Book.

59. Exp. (c)

- Acts regarding biodiversity conservation in the country:
 - Import and Export (Control) Act, 1947
 - Mining and Mineral Development (Regulation) Act, 1957
 - Customs Act, 1962
 - Indian Forest Act, 1927

60. Exp. (d)

Ramsar Convention

- The Ramsar Convention on Wetlands is an international treaty for the conservation and sustainable use of wetlands. It is named after the city of Ramsar in Iran, where the Convention was signed in 197
- It overlooks conservation of all the sites through ecosystem approach and allow their simultaneous sustainable use.

61. Exp. (d)

Sustainable development

- It is described as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
- Inherently the concept of sustainable development is intertwined with the concept of carrying capacity wherein, every ecosystem has a defined maximum population size of the species that the environment can sustain indefinitely, given the food, habitat, water, and other necessities available in the environment

62. Exp. (c)

Momentum for Change: Climate Neutral now

- **It has been launched by the (UNFCCC) United Nations Climate Change Secretariat** that will showcase efforts by individuals, companies and governments that are achieving real results in transitioning to climate neutrality.

63. Exp. (a)

Wildlife (Protection) Act (WPA), 1972**Constitutional Provisions for Wildlife:**

- The 42nd Amendment Act, 1976, Forests and Protection of Wild Animals and Birds was transferred from State to Concurrent List.
- Article 51 A (g) of the Constitution states that it shall be the fundamental duty of every citizen to protect and improve the natural environment including forests and Wildlife.
- Article 48 A in the Directive Principles of State policy, mandates that the State shall endeavor

to protect and improve the environment and to safeguard the forests and wildlife of the country.

- Wildlife (Protection) Act, 1972: The Act was enacted for the protection of plants and animal species.
- It extends to the whole of India except the State of Jammu and Kashmir.
- Prior to this legislation, India had only five designated national parks.
- At present, there are 101 National Parks in India.

Authorities Appointed under the Act:

- The Central Government appoints the Director of Wildlife Preservation and assistant directors and other officers subordinate to the Director.
- The State Governments appoint a Chief Wildlife Warden (CWLW) who heads the Wildlife Wing of the department and exercises complete administrative control over Protected Areas (PAs) within a state.
- The state governments are also entitled to appoint Wildlife Wardens in each district.
- Salient Features of the Act
- Prohibition of hunting: It prohibits the hunting of any wild animal specified in Schedules I, II, III and IV of the act.
- **Exception:** A wild animal listed under these schedules can be hunted/ killed only after getting permission from the Chief Wildlife Warden (CWLW) of the state if:
 - It becomes dangerous to human life or to property (including standing crops on any land).
 - It is disabled or suffering from a disease that is beyond recovery.
- Prohibition of Cutting/Uprooting Specified Plants: It prohibits the uprooting, damage, collection, possession or selling of any specified plant from any forest land or any protected area.
- **Exception:** The CWLW, however, may grant permission for uprooting or collecting a specific plant for the purpose of education, scientific research, preservation in a herbarium or if a person/institution is approved to do so by the central government.
- Declaration and Protection of Wildlife Sanctuaries and National Parks: The Central Government can constitute any area as a Sanctuary, provided the area is of adequate ecological, faunal, floral, geomorphological, natural or zoological significance.
- The government can also declare an area (including an area within a sanctuary) as a National Park.
- A Collector is appointed by the central government to administer the area declared as a Sanctuary.

- **Constitution of Various Bodies:** The WPA act provides for the constitution of bodies to be established under this act such as the National and State Board for Wildlife, Central Zoo Authority and National Tiger Conservation Authority.
- **Government Property:** Hunted wild animals (other than vermin), animal articles or meat of a wild animal and ivory imported into India and an article made from such ivory shall be considered as the property of the Government.

Bodies Constituted under the Act

- **National Board for Wildlife (NBWL):** As per the act, the central government of India shall constitute the National Board for Wildlife (NBWL).
- It serves as an apex body for the review of all wildlife-related matters and for the approval of projects in and around national parks and sanctuaries.
- The NBWL is chaired by the Prime Minister and is responsible for promotion of conservation and development of wildlife and forests.
- The Minister of Environment, Forest and Climate Change is the Vice-Chairperson of the board.
- The board is 'advisory' in nature and can only advise the Government on policy making for conservation of wildlife.
- **Standing Committee of NBWL:** The NBWL constitutes a Standing Committee for the purpose of approving all the projects falling within protected wildlife areas or within 10 km of them.
- The committee is chaired by the Minister of Environment, Forest and Climate Change.
- **State Board for Wildlife (SBWL):** The state governments are responsible for the constitution of the state board of wildlife.
- The Chief Minister of the state/UT is the chairperson of the board.
- The board advises the state government in:
 - The selection and management of areas to be declared as protected areas.
 - The formulation of the policy for protection and conservation of the wild life
 - Any matter relating to the amendment of any Schedule.
- **Central Zoo Authority:** The act provides for the constitution of Central Zoo Authority consisting of a total 10 members including the Chairperson and a Member-Secretary.
- The Environment Minister is the chairperson.
- The authority provides recognition to zoos and is also tasked with regulating the zoos across the country.
- It lays down guidelines and prescribes rules under which animals may be transferred among zoos nationally and internationally.
- **National Tiger Conservation Authority (NTCA):** Following the recommendations of the Tiger Task Force, the National Tiger Conservation Authority (NTCA) was constituted in 2005 for strengthening tiger conservation.
- The Union Environment Minister is the Chairperson of NTCA and the State Environment Minister is the Vice-Chairperson.
- The Central Government on the recommendations of NTCA declares an area as a Tiger Reserve.
- More than 50 wildlife sanctuaries in India have been designated as Tiger Reserves and are protected areas under the Wildlife Protection Act, 1972.
- **Wildlife Crime Control Bureau (WCCB):** The act provided for the constitution of Wildlife Crime Control Bureau (WCCB) to combat organized wildlife crime in the country.
- The Bureau has its headquarters in New Delhi.
- It is mandated to:
 - Collect and collate intelligence related to organized wildlife crime activities and to disseminate the same to the State to apprehend the criminals.
 - Establish a centralized wildlife crime data bank.
 - Assist State Governments to ensure success in prosecutions related to wildlife crimes.
 - Advise the Government of India on issues relating to wildlife crimes having national and international ramifications, relevant policy and laws.

Schedules under the Act

- The Wildlife (Protection) Act, 1972 has divided the protection status of various plants and animals under the following six schedules:

Schedule I:

- It covers endangered species that need rigorous protection. The species are granted protection from poaching, killing, trading etc.
- A person is liable to the harshest penalties for violation of the law under this Schedule.
- Species under this Schedule are prohibited to be hunted throughout India, except under threat to human life or in case of a disease that is beyond recovery.
- Some of the animals granted protection under the Schedule I include:
 - The Black Buck
 - Bengal Tiger
 - Clouded Leopard
 - Snow Leopard
 - Swamp Deer

- Himalayan Bear
- Asiatic Cheetah
- Kashmiri Stag
- Fishing Cat
- Lion-tailed Macaque
- Musk Deer
- Rhinoceros
- Brow Antlered Deer
- Chinkara (Indian Gazelle)
- Capped Langur
- Golden Langur
- Hoolock Gibbon

Schedule II:

- Animals under this list are also accorded high protection with the prohibition on their trade.
- They cannot be hunted except under threat to human life or if they are suffering from a disease/disorder that goes beyond recovery.
- Some of the animals listed under Schedule II include:
- Assamese Macaque, Pig Tailed Macaque, Stump Tailed Macaque
- Bengal Hanuman langur
- Himalayan Black Bear
- Himalayan Newt/ Salamander
- Jackal
- Flying Squirrel, Giant Squirrel
- Sperm Whale
- Indian Cobra, King Cobra

Schedule III & IV:

- Species that are not endangered are included under Schedule III and IV.
- This includes protected species with hunting prohibited but the penalty for any violation is less compared to the first two schedules.
- Animals protected under Schedule III include:
- Chital (spotted deer)
- Bharal (blue sheep)
- Hyena
- Nilgai
- Sambhar (deer)
- Sponges
- Animals protected under Schedule IV include:
- Flamingo
- Hares
- Falcons
- Kingfishers
- Magpie

- Horseshoes Crabs

Schedule V:

- This schedule contains animals that are considered as vermin (small wild animals that carry disease and destroy plants and food). These animals can be hunted.
- It includes only four species of wild animals:
- Common Crows
- Fruit Bats
- Rats
- Mice

Schedule VI:

- It provides for regulation in cultivation of a specified plant and restricts its possession, sale and transportation.
- Both cultivation and trade of specified plants can only be carried out with prior permission of competent authority.
- Plants protected under Schedule VI include:
- Beddome's cycad (Native to India)
- Blue Vanda (Blue Orchid)
- Red Vanda (Red Orchid)
- Kuth (Saussurea lappa)
- Slipper orchids (Paphiopedilum spp.)
- Pitcher plant (Nepenthes khasiana)

64. Exp: (d)

- Statement 1 is incorrect: Hyderabad has become the only city in India to be recognised as a 'Tree City of the World' by the Arbor Day Foundation and the Food and Agriculture Organization (FAO) of the United Nations.

Hyderabad as 2020 Tree City of the World

- To be eligible as a 'Tree City', cities need to conform to the following five standards:

Standard 1: Establish Responsibility

- The city has a written statement by city leaders delegating responsibility for the care of trees within the municipal boundary to a staff member, a city department, or a group of citizens—called a Tree Board.

Standard 2: Set the Rules

- The city has in place a law or an official policy that governs the management of forests and trees. These rules describe how work must be performed—often citing best practices or industry standards for tree care and worker safety—where and when they apply, and penalties for noncompliance.

Standard 3: Know What You Have

- The city has an updated inventory or assessment of the local tree resource so that an effective long-

term plan for planting, care, and removal of city trees can be established.

Standard 4: Allocate the Resources

- The city has a dedicated annual budget for the routine implementation of the tree management plan.

Standard 5: Celebrate Achievements

- The city holds an annual celebration of trees to raise awareness among residents and to acknowledge citizens and staff members who carry out the city tree programme.
 - ▶ Hyderabad City has pledged its commitment by meeting five programme standards that show their dedication and determination towards planting and conserving trees for a greener future. Hyderabad City is demonstrating leadership in management of its urban trees and is serving as part of the solution to many of the global issues we face today.

65. Exp: (c)

Water Credit

- WaterCredit is an initiative of water.org.
- WaterCredit is a powerful solution and the first to put microfinance tools to work in the water and sanitation sector.
- WaterCredit helps bring small loans to those who need access to affordable financing and expert resources to make household water and toilet solutions a reality.

66. Exp: (a)

R2 Code of Practices

- R2 stands for Responsible Recycling and is a standard specifically created for the electronics recycling industry by Sustainable Electronics Recycling International (SERI).

67. Exp: (a)

- The New York Declaration on Forests was endorsed at the 2014 Climate Summit by more than 150 governments, companies, indigenous peoples and civil society organizations committed to doing their part to achieve the Declaration's ten goals and follow its accompanying action agenda.
- It is voluntary in nature.
- Its ten goals include halting natural forest loss by 2030, restoring 350 million hectares of degraded landscapes and forestlands, improving governance, increasing forest finance, and reducing emissions from deforestation and forest degradation as part of a post-2020 global climate agreement.

- India is not its signatory.

68. Exp. (a)

- The Climate Action Tracker is an independent scientific analysis that tracks government climate action and measures it against the globally agreed Paris Agreement aim of "holding warming well below 2°C, and pursuing efforts to limit warming to 1.5°C." A collaboration of two organisations, Climate Analytics and NewClimate Institute, the CAT has been providing this independent analysis to policymakers since 2009.
- CAT quantifies and evaluates climate change mitigation targets, policies and action. It also aggregates country action to the global level, determining likely temperature increases during the 21st century using the MAGICC climate model. CAT further develops sectoral analysis to illustrate required pathways for meeting the global temperature goals.

69. Exp. (b)

- **The updated guidelines state that annual average concentrations of PM2.5 should not exceed 5 µg/m³, while 24-hour average exposures should not exceed 15 µg/m³**
- The highest levels of ozone pollution occur during periods of sunny weather.
- PM10 are capable of penetrating deep into the lungs but PM2.5 can even enter the bloodstream
- **Long-term exposure to ozone is linked to aggravation of asthma, and is likely to be one of many causes of asthma development. Studies in locations with elevated concentrations also report associations of ozone with deaths from respiratory causes.**

70. Exp. (c)

- **Option (c) is correct:** Central Ground Water Authority has been constituted under Section 3 (3) of the Environment (Protection) Act, 1986 to regulate and control development and management of groundwater resources in the country.

71. Exp. (a)

- **Statement (a) is correct:** Greenwashing is the process of conveying a false impression or providing misleading information about how a company's products are more environmentally sound.
- Greenwashing is considered an unsubstantiated claim to deceive consumers into believing that a company's products are environmentally friendly.

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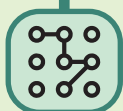
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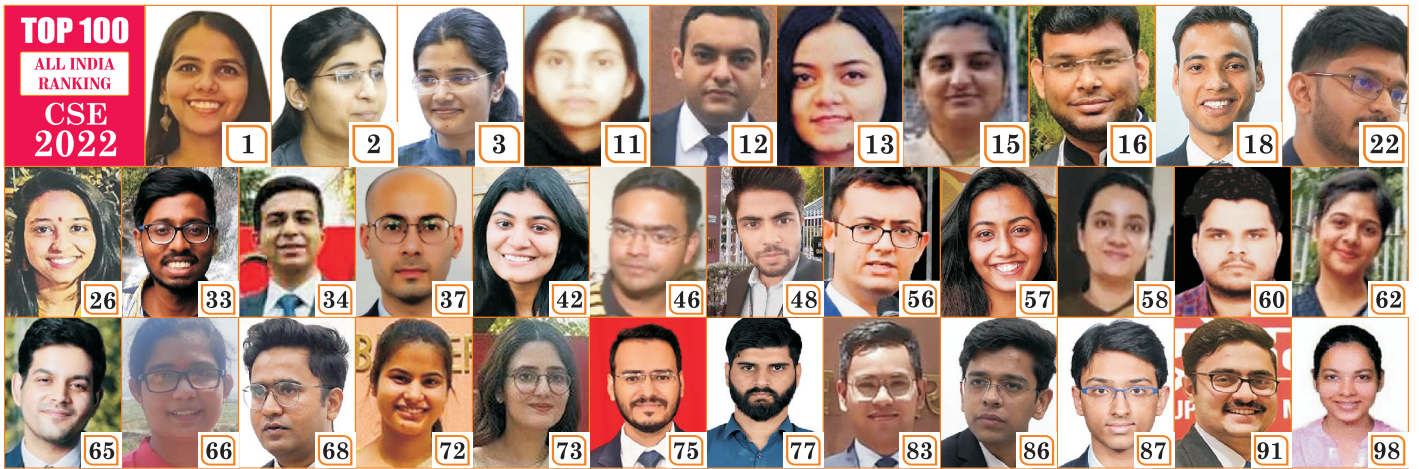
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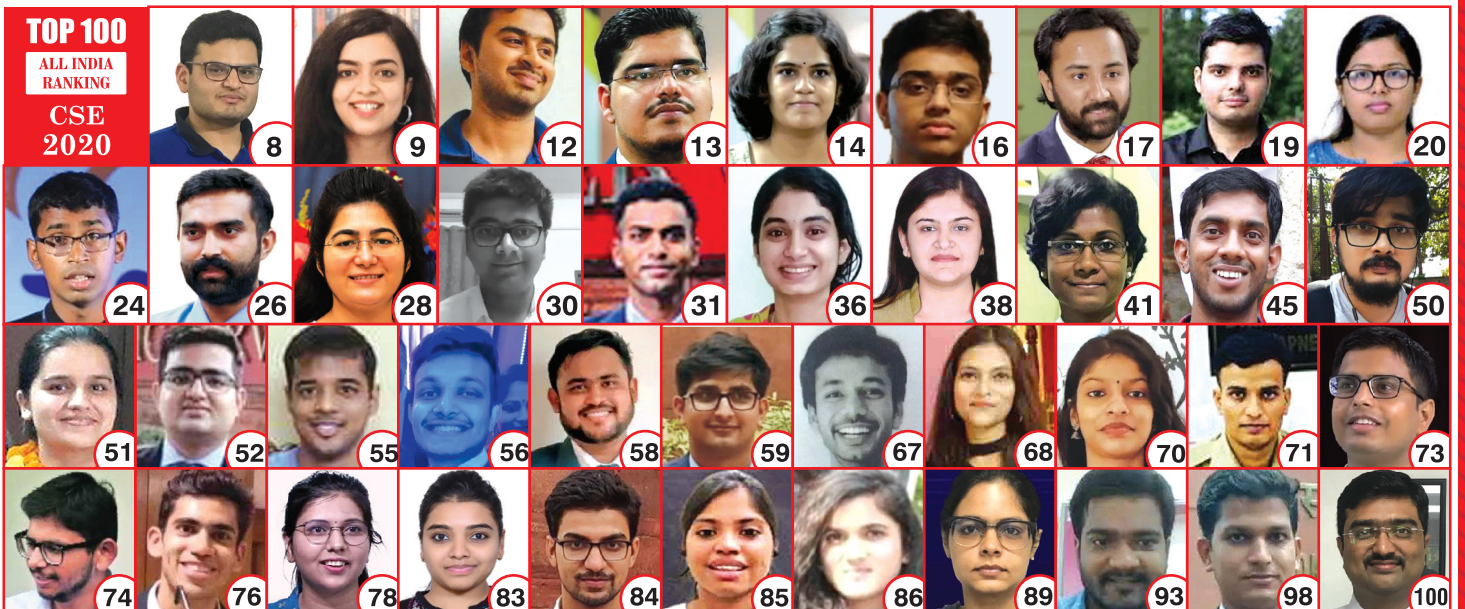
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