VISIONIAS

www.visionias.in

Test 18

Ecology & Environment (Basic Concepts & Biodiversity)

- Basic Concepts & Components of the Environment
- Understanding of the Environment and Ecology
- Biodiversity

+ Current Affairs (November 2021)

Environment and its components

Ecology and Functions of an ecosystem

- Terrestrial ecosystem
- Aquatic ecosystem

Biodiversity

- Basic Concepts
- Plant and Animal Diversity
- Marine Organisms
- Threat to Biodiversity
- Protected Area Network: National parks, Wildlife sanctuaries, Biospher Reserved and protected forests, Conservation and community reserves, Village and panchayat Forests, Private protected areas, Conservation areas
- Biodiversity Conservation efforts
- Indian Biodiversity and conservation efforts
- Bioprospecting, Biosafety, Biopiracy

2022

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE ASKED TO DO SO

VISIONIAS

www.visionias.in

Test Booklet Series

C

TEST BOOKLET

GENERAL STUDIES (P) 2022 – Test – 3487

Time Allowed: Two Hours **Maximum Marks: 200**

INSTRUCTIONS

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS BOOKLET DOES **NOT** HAVE ANY UNPRINTED OR TURN OR MISSING PAGES OR ITEMS, ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.

2. ENCODE CLEARLY THE TEST BOOKLET SERIES **A, B, C** OR **D** AS THE CASE MAY BE IN THE APPROPRIATE PLACE IN THE ANSWER SHEET.

3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. **Do NOT** write anything else on the Test Booklet.

4. This Test Booklet contains **100** items (Questions). Each item is printed in **English.** Each item comprises four responses (answers). You will select the response which you want to mark on the Answer Sheet. In case you feel that there is more than one correct response with you consider the best. In any case, choose **ONLY ONE** response for each item.

5. You have to mark all your responses ONLY on the separate Answer Sheet provided. See direction in the answers sheet.

6. All items carry equal marks. Attempt all items. Your total marks will depend only on the number of **correct responses** marked by you in the answer sheet. For **every incorrect** response **1/3rd of the allotted marks** will be deducted.

7. Before you proceed to mark in the Answer sheet the response to various items in the Test booklet, you have to fill in some particulars in the answer sheets as per instruction sent to you with your Admission Certificate.

8. After you have completed filling in all responses on the answer sheet and the examination has concluded, you should hand over to Invigilator only the answer sheet. You are permitted to take away with you the Test Booklet.

9. Sheet for rough work are appended in the Test Booklet at the end.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE ASKED TO DO SO

1. Consider the following statements about Crocodile Conservation in India:

1. Project Crocodile was started in 1975 in India.
2. Crocodile Breeding and Management Training Institute was set up in Delhi in 1980 to train managers of crocodile stations.
3. Gharial is now listed as Endangered by the IUCN Red List.

Which of the statements given above is/are correct?

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

2. Consider the following statements about the Tundra biome:

1. For most of the year, there are no trees in this biome.
2. Reptiles and amphibian species are few in number.
3. Most of the animals exhibit the presence of thick cuticle and epidermal hair or fur.

Which of the statements given above is/are correct?

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

3. Which of the following statements is ***not*** correct regarding an ecotone?

(a) It is the zone where two communities meet and integrate.
(b) A grassland is an ecotone between marine and terrestrial ecosystem.
(c) It has a far greater productivity than an individual natural ecosystem.
(d) Changes in population or community structures is observed in this region.

4. Which of the following Indian Ramsar site(s) is/are human-made wetlands?

1. Pong Dam Lake
2. Nandur Madhameshwar
3. Thol Lake

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

5. When researchers or research organisations take biological resources without official sanction, largely from less affluent countries or marginalised people, it is refers to:

(a) Biopatenting
(b) Bioprospecting
(c) Biopiracy
(d) None of the above

6. Which of the following wetlands of North Eastern India are included in the Ramsar list of wetlands?

1. Manas
2. Deepor Beel
3. Kaziranga
4. Rudrasagar

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) 2 and 4 only

7. Consider the following pairs:

Protected Area		*River*
1. Manas National park	:	Barak
2. Panna National Park	:	Ken
3. Papikonda National Park	:	Krishna
4. Silent Valley National Park	:	Cauvery

Which of the pairs given above is/are correctly matched?

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

8. Consider the following statements with respect to differences between pioneer community and climax community:

1. Growth rate in pioneer community is lower than climax community.
2. Species diversity in pioneer community is higher than climax community.

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

9. Recently seen in the news, the Logistics Ease Across Different States (LEADS) index is released by which one of the following agencies?

(a) NITI Aayog
(b) Ministry of Commerce and Industry
(c) Ministry of Finance
(d) Tata Institute of Social Sciences

10. With reference to the India-Bhutan bilateral trade, consider the following statements:

1. India is the largest trading partner of Bhutan after China.
2. Electricity is one of the import items from Bhutan to India.
3. Since 2014, trade between India and Bhutan has more than doubled.

Which of the statements given above is/are correct?

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

11. With reference to India's recent National Action Plan for Vulture Conservation, consider the following statements:

1. Vulture conservation and breeding centre will be set up in Uttar Pradesh.
2. It is proposed to have at least one vulture safe zone in every district in India.

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

12. Consider the following statements with respect to the energy flow in the ecosystem:

1. Plants capture more than 50% of energy of the incident sunlight that falls on them.
2. Energy pyramid is always upright.
3. The number of trophic levels in an ecosystem is independent of the amount of energy lost in each trophic level.

Which of the statements given above is/are correct?

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

13. Consider the following statements regarding the UNESCO Creative Cities Network (UCCN):

1. It was created to promote cooperation among cities that have identified creativity as a strategic factor for sustainable urban development.
2. At present, only Hyderabad, Jaipur and Srinagar are part of the UCCN from India.

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

14. With reference to the revised Prompt Corrective Action (PCA) framework of the Reserve Bank of India that will be applicable from January 2022, consider the following statements:

1. The PCA excludes Small Finance Banks and Payment Banks from its purview.
2. Banks will be evaluated on Return on Assets and Leverage Ratio.

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

15. *It is the earth's most severe known extinction event, with up to 96% of all marine species and 70% of terrestrial vertebrates species becoming extinct. It is the only known mass extinction of insects. It is also known as the Great Dying.*

Which of the following extinction events is being described by the above passage?

(a) Permian-Triassic extinction event
(b) Triassic-Jurassic extinction event
(c) Late Devonian extinction event
(d) Cretaceous-Palaeocene event

16. Consider the following pairs:

Wildlife Sanctuary		***State***
1. Tirthan Wildlife Sanctuary	:	Uttarakhand
2. Bhadra Wildlife Sanctuary	:	Karnataka
3. Turtle Wildlife Sanctuary	:	West Bengal

Which of the pairs given above is/are correctly matched?

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

17. Consider the following statements regarding the Forest (Conservation) Act, 1980:

1. It made it necessary for the States to get the Centre's permission for using forest land for non-forestry purposes.
2. The provisions of the Act were applicable only to the forests under the management or control of the State Forest Department.

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

18. Consider the following statements regarding peatlands:

1. They are one of the largest natural terrestrial carbon stores.
2. Peatland acts as a natural filter for removing water pollution.
3. A bog is a type of peatland.

Which of the statements given above is/are correct?

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

19. Consider the following statements about the National Tiger Conservation Authority (NTCA):

1. It is a statutory body, established under the Wildlife Protection Act, 1972.
2. Prime Minister of India is the chairperson of NTCA.
3. It takes care of the livelihood interests of local people in areas surrounding Tiger Reserves.

Which of the statements given above is/are correct?

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

20. Which of the following statements is/are correct about National Biodiversity Authority (NBA)?

1. It is a statutory body, established under the Biological Diversity Act (2002).
2. The headquarters of NBA is in New Delhi.

Select the correct answer using the codes given below.

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

21. Consider the following statements regarding Sea Buckthorn:

1. It is a native plant species of India, found predominantly in the Krishna and Godavari delta.
2. It has an extensive root system which can fix atmospheric nitrogen and also help in soil conservation.

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

22. He is known as the father of Indian Ornithology. The bestsellers from his collection include Book of Indian Birds and the Handbook of the Birds of India and Pakistan. He was a key figure in Bombay Natural History Society and was helped create the Bharatpur Bird Sanctuary and the Ranganathittu Bird Sanctuary.

Which of the following personalities is best described in the passage given above?

(a) Lawrence Hugh Jenkins
(b) Suleman Ali
(c) Salim Ali
(d) Sir William Jones

23. The number and relative abundance of species found in a given biological organisation refers to:

(a) Genetic Diversity
(b) Species Diversity
(c) Ecosystem Diversity
(d) None of the above

24. Which of the following is/are the features of the Agni-5 ballistic missile?

1. It has a maximum range of 1000 km.
2. It is a surface to air missile.
3. It is a nuclear-capable missile.

Select the correct answer using the code given below.

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

25. In which among the following National Parks, one is likely to found Snow Leopard in India?

1. Hemis National Park
2. Dachigam National Park
3. Gangotri National Park
4. Govind Pashu Vihar National Park

Select the correct answer using the code given below.

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

26. Recently seen in the news, the Strait of Hormuz connects which of the following water bodies?

(a) Red Sea and Mediterranean Sea
(b) Persian Gulf and the Gulf of Oman
(c) Red Sea and Dead Sea
(d) Persian Gulf and Red Sea

27. Consider the following statements regarding the Sedimentary Nutrient Cycle:

1. Most sedimentary cycles are generally considered perfect cycles.
2. The phosphorus cycle is a sedimentary cycle.
3. The reservoir of sedimentary nutrients is located in the earth's crust.

Which of the statements given above is/are correct?

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

28. A Ramsar site in India has the following characteristics:

1. This site is a mix of salt swamps, mangroves, backwaters, mudflats, grasslands and tropical dry evergreen forests.
2. It harbours the single largest stretch of the unique dry-evergreen forest in the country.
3. It was created as a sanctuary essentially for the conservation of the endangered blackbuck antelope.

Which one of the following Ramsar Sites has all of the above characteristics?

(a) Kolleru lake
(b) Vembanad Kol Wetland
(c) Sunderbans Wetland
(d) Point Calimere Wildlife and Bird Sanctuary

29. Which of the following statements best describes the term 'Allopatric Speciation'?

(a) It is the formation of new species due to genetic modification of a single ancestor.
(b) It occurs when small groups of individuals break off from the larger group and form a new species.
(c) It occurs when a group of species separates into two separate groups which are isolated from one another due to a geographical barrier.
(d) It occurs when there are no physical barriers preventing any members of a species from mating with another, and all members are in close proximity to one another.

30. With reference to Biodiversity Heritage Sites, consider the following statements:

1. They are notified under the Environment (Protection) Act of 1986.
2. The State Governments are empowered to notify Biodiversity Heritage Sites in consultation with local bodies.

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

31. The Cheetah is proposed to be reintroduced in the Kuno National Park of Madhya Pradesh. With reference to the Kuno National Park consider the following statements:

1. Saharia tribal community inhabit this national park.
2. The national park has wet deciduous type vegetation.

Which of the statements given above is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 and 2

32. With reference to 'Eco-Sensitive Zones', which of the following statements is/are ***not*** correct?

1. These are fragile areas that exists within 10 kilometres of protected areas like National Parks and Wildlife Sanctuaries.
2. Eco-Sensitive Zones are declared under the Wildlife (Protection) Act, 1972.
3. All kinds of human activities except agriculture are prohibited in Eco-Sensitive Zones.

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

33. Consider the following passage:

It is a National Park as well as a Biosphere Reserve situated on the south bank of the river Brahmaputra. It is located at the confluence where three of India's eastern-most rivers, Siang, Dibang and Lohit, meet the mighty Brahmaputra river. This park is a complex of wetlands, grasslands, littoral swamps and semi-evergreen forests, including the largest salix swamp forest in Northeast India. It is also an identified Important Bird Area (IBA).

The above-mentioned passage refers to which of the following National Park?

(a) Kaziranga National Park
(b) Manas National Park
(c) Namdapha National Park
(d) Dibru-Saikhowa National Park

34. Recently the Char Dham Mahamarg Vikas Pariyojana was in the news. In this context, which of the following group of temples form a part of the Char Dham Temples?

(a) Badarinath, Kedarnath, Gangotri and Yamunotri.
(b) Badarinath, Kedarnath, Amarnath and Vaishno Devi
(c) Akshardham, Neel Kanth Mahadev, Gangotri and Yamunotri.
(d) Jagannatha Puri, Lingaraja, Badarinath and Kedarnath

35. Consider the following statements with respect to biotic potential:

1. Biotic potential is the maximum rate of increase in the population of a species under optimum environmental conditions.
2. Biotic potential of elephants is much higher than mice.

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

36. Consider the following statements regarding Tiger Reserves in India:

1. Tiger Reserves are notified by State Governments as per provisions of the Wildlife (Protection) Act, 1972.
2. No alteration in the boundaries of a tiger reserve can be made except on a recommendation of the Tiger Conservation Authority.

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

37. With reference to the ecosystem, consider the following statements:

1. No two species in a habitat can have the same ecological niche.
2. A wetland is an example of ecocline.
3. An ecotype is a population that is adapted to local environmental conditions.

Which of the statements given above is/are correct?

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

38. Consider the following pairs:

Bird species		***Region***
1. Jerdon's courser	:	Arunachal Pradesh
2. Black-necked crane	:	Ladakh
3. Great Indian Bustard	:	Rajasthan

Select the correct answer using the code given below.

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

39. With reference to the Padma Awards, consider the following statements:

1. Among the Padma Awards, Padma Shri is the highest honour.
2. Self-nomination is not allowed for the consideration for the awards.
3. Doctors and scientists working in Government Public Service Undertakings (PSUs) are not eligible for these awards.

Which of the statements given above is/are correct?

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

40. Which of the following is/are correct regarding Caracal?

1. It is a medium-sized wild cat endemic to the Indian sub-continent only.
2. It is listed as critically endangered on the IUCN Red List.
3. It is recently included in the species recovery programme for critically endangered species in India.

Select the correct answer using the code given below.

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

41. Consider the following statements regarding Mangroves:

1. They are a salt tolerant evergreen forest ecosystem.
2. They exhibit only oviparity mode of reproduction.
3. They produce blind roots to secrete excess salt.

Which of the statements given above is/are correct?

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

42. Consider the following statements with respect to Earth's biodiversity:

1. Plants comprise more than 40% of all the species on Earth.
2. The number of fungi species in the world is more than that of amphibians.
3. Among animals, insects are the most species rich taxonomic group.

Which of the statements given above are correct?

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

43. Which of the following are in Nilgiri Biosphere Reserve?

1. Wayanad Wildlife Sanctuary
2. Neyyar Wildlife Sanctuary
3. Silent Valley National Park
4. Shendurney Wildlife Sanctuary

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) 3 and 4 only

44. Consider the following pairs:

Elephant Reserves		***State***
1. Mayurjharna Elephant Reserve	:	West Bengal
2. Baitarni Elephant Reserve	:	Odisha
3. Lemru Elephant Reserve	:	Arunachal Pradesh
4. Mahanadi Elephant Reserve	:	Chhattisgarh

Which of the above-given pairs is/are correctly matched?

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

45. Consider the following statements regarding Tiger Reserves in India:

1. Sunderbans Tiger Reserve has the largest area under "Critical Tiger Habitat".
2. Jim Corbett Tiger Reserve (CTR) has the highest tiger density among all reserves.

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

46. Consider the following statements regarding habitat:

1. Several habitats can be a part of an ecosystem.
2. There is no natural habitat on earth that is inhabited only by a single species.

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

47. Consider the following passage:

It is a Critically Endangered bird species, restricted to the terai grassland regions of the Indo-Gangetic floodplain and the Brahmaputra floodplains. It is found in India, Cambodia and Nepal. This bird is a grassland habitat specialist which acts as an indicator of a healthy grassland ecosystem.

Which of the avian species have been described in the passage given above?

(a) Sarus Crane
(b) Great Indian Bustard
(c) Bengal Florican
(d) Black-Necked Crane

48. Consider the following statements about the nitrogen cycle:

1. Nitrogen in the atmosphere cannot be directly used as a nutrient by any plants or animals.
2. Ammonia can be a direct source of nitrogen for some plants.
3. The nitrates present in the soil are reduced to nitrous oxide gas by the process of ammonification.

Which of the statements given above is/are correct?

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

49. Kendrapara district of Odisha, was recently in news, because:

(a) it is the first district to achieve 100% vaccination.
(b) it is the only district to have to all three species of crocodilians found in India.
(c) it is the only district added to the Montreux Record.
(d) it is India's first Water Plus district.

50. Consider the following scales of measuring species diversity:

1. Alpha diversity refers to the diversity within a particular area or ecosystem and is usually express in number of species.
2. Beta diversity is a comparison of diversity between the ecosystems and different communities, usually measured as change in amount of species.

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

51. Which of the following are the ideal conditions for the growth of corals?

1. Optimal sea water temperature between 23°–29° Celsius.
2. Deep dark waters near ocean bed.
3. Abundance of plankton.

Select the correct answer using the code given below.

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

52. With reference to National Parks in India, consider the following statements:

1. State governments can declare an area of ecological importance as a National Park under the Wild Life (Protection) Act of 1972.
2. Grazing of livestock is permitted in a National Parks.
3. No alteration of boundaries of a National Park shall be made except on the recommendation of the National Biodiversity Authority.

Which of the statements given above is/are correct?

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

53. With reference to Biosphere Reserves in India, consider the following statements:

1. Biosphere Reserves emphasise on conservation of overall biodiversity and landscape, rather than some specific flagship species.
2. The National Biodiversity Authority identifies new sites, advises on policies and programmes for Biosphere Reserves in India.

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

54. Which of the following statements is ***not*** correct about seagrass?

(a) They are flowering plants that produce seeds.
(b) They don't have roots and are always floating on the surface.
(c) They are found from the tropics to the Arctic circle.
(d) They can reproduce sexually like terrestrial grasses.

55. Consider the following statements with reference to the relationship between corals and zooxanthellae:

1. The zooxanthellae are fast growing plants where as corals are slow growing colonies of animals.
2. The coral and zooxanthellae share a symbiotic relationship.

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

56. In which of the following ecosystems, the ecological pyramid of number can be spindle-shaped?

(a) Forest
(b) Grassland
(c) Pond
(d) Ocean

57. Consider the following animals:

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

Which of the above are marine mammals?

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

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

(a) Alga - Waterflea - Stickleback - Pike
(b) Alga - Stickleback - Waterflea - Pike
(c) Pike - Alga - Waterflea - Stickleback
(d) Stickleback - Alga - Waterflea – Pike

59. Consider the following statements regarding the Malayan giant squirrel or Black giant squirrel:

1. It is endemic to Indonesia.
2. It is the largest flying squirrel in the world.

Which of the statements given above is/are correct?

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

60. Why does the tropical region have high biodiversity?

1. The tropical soils are high in fertility.
2. Seasonal variation in tropical climate is less.
3. Solar energy is abundantly available in tropics.
4. Tropical areas had a long evolutionary time for species diversification.

Select the correct answer using code given below.

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

61. Consider the following statements with reference to the Estuaries:

1. Estuaries mostly do not have any source of fresh water.
2. Estuaries are influenced by high tides and low tides of the sea.
3. Estuaries are among the most productive environments on earth.

Which of the statements given above is/are correct?

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

62. With reference to Methane, consider the following statements:

1. It is more than twenty-five times as potent as carbon dioxide at trapping heat in the atmosphere.
2. It is the most abundant anthropogenic Green House Gas, accounting for about twenty per cent of global emissions.
3. The International Methane Emissions Observatory is an initiative by India that was launched at the COP 26, United Nations Climate Change Conference, Glasgow.

Which of the statements given above is/are correct?

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

63. Consider the following statements regarding Conservation Reserves:

1. These are protected areas involving private or community land particularly the areas adjacent to National Parks and sanctuaries.
2. The Central Government constitutes a conservation reserve management committee to advise on matters related to conserving the conservation reserve.

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

64. Which of the following National Parks in India is often compared to the Grand Canyon National Park of the United States of America and is home to one of the rarest animals in the world - the Lesser Panda.?

(a) Balpakram National Park
(b) Satpura National Park
(c) Nanda Devi National Park
(d) Neora Valley National Park

65. Consider the following statements regarding the International Law Commission:

1. It was established in 2004 to make recommendations for the purpose of the progressive development of international law and its codification.
2. It is represented by a single member from every United Nations member country.

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

66. Recently seen in the news, the First Movers Coalition has been launched by which one of the following organisations?

(a) World Bank
(b) World Trade Organisation
(c) Worldwide Fund for Nature
(d) World Economic Forum

67. Consider the following statements regarding Jute:

1. It is produced only in West Bengal and Assam in India.
2. Compared to rice, jute requires less water and fertiliser.
3. A hundred per cent of all foodgrains and sugar is to be compulsorily packed in jute bags in India.

Which of the statements given above is/are correct?

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

68. Consider the following protected areas in India:

1. Srivilliputhur Megamalai, Tamil Nadu
2. Sathyamangalam, Western Ghats
3. Similipal, Odisha

Which of the above have been declared as Tiger Reserves?

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

69. With reference to the dairy industry in India, consider the following statements:

1. India is the largest producer of milk globally.
2. Dairy is the largest single agricultural commodity with a four per cent share in the Indian economy.
3. Under Dairy Sahakar Scheme only non-financial support will be extended to eligible cooperatives for milk procurement and processing.

Which of the statements given above is/are correct?

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

70. Which of the following are the functions of a wetland?

1. Filtration of harmful waste including heavy metals from water
2. Groundwater recharge
3. Recycling of nutrients
4. Flood Control

Select the correct answer using the code given below.

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

71. Which of the following is ***not*** correct regarding the Ganges river dolphin?

(a) Ganges river dolphin primarily live in freshwater.
(b) Ganges river dolphin are essentially blind and hunt by emitting ultrasonic sounds.
(c) Females Ganges dolphins are larger than males.
(d) It is the only species of river dolphin found in India.

72. Consider the following statements with reference to the ecosystem productivity:

1. Gross primary productivity of an ecosystem is the rate of production of organic matter during photosynthesis.
2. Net primary productivity is always less than the gross primary productivity.
3. Primary productivity depends on the plant species inhabiting a particular area.

Which of the statements given above is/are correct?

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

73. Which of the following activities is/are categorically prohibited in wildlife sanctuaries declared under the Wild Life (Protection) Act of 1972?

1. Use of chemicals and explosives endangering wildlife
2. Construction of roads, bridges and building
3. Construction of commercial tourist lodges and hotels
4. Immunisation of livestock

Select the correct answer using the code given below.

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

74. Which of the following statements best describes the term 'ecosystem'?

(a) It is the only region on earth that supports life.
(b) It is a zone of the earth where land, water and air interact with each other.
(c) It is functional unit of nature, where living organisms interact among themselves and also with the surrounding physical environment.
(d) It is a large naturally occurring community of flora and fauna occupying a major a habitat.

75. Consider the following statements regarding ecological succession:

1. Allogenic succession is driven by the biotic component of an ecosystem.
2. Xerarch succession usually takes place in a fresh water body.

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

76. With reference to genetically modified plants, consider the following statements:

1. The DNA changes made to a genetically modified plant are passed on to its seeds also.
2. World's First Genetically Modified Rubber plant has been planted in India.

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

77. Consider the following statements regarding the Kedarnath temple, one of the jyotirlingas recently seen in the news:

1. It was originally built by Adi Shankaracharya.
2. It is located on the banks of Alaknanda.

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

78. In the context of biodiversity, what do you understand by the term 'Vavilov center'?

(a) It refers to a geographical area where the particular group of crops (either domesticated or wild) first originated on earth.

(b) It is a biogeographic region with significant levels of biodiversity that is threatened by human habitation.

(c) It is a region in which the fitness of one species depends on interactions with the second species.

(d) A geographical region where the primary productivity is almost zero.

79. Which of the following is/are included in the list of National Sports Award in India?

1. Major Dhyan Chand Khel Ratna Award
2. Arjuna Award
3. Rashtriya Khel Protsahan Puruskar

Select the correct answer using the code given below.

(a) 1 and 2 only

(b) 2 only

(c) 3 only

(d) 1, 2 and 3

80. Which one of the following is the best description of adaptive radiation?

(a) It is a gradual change in an organism to survive in an environment.

(b) It is the process by which new species are formed abruptly through genetic mutation.

(c) It is the small changes that take place in the body of single organism over short periods to overcome minor problems.

(d) It is a process in which organisms diversify from an ancestral species into a multitude of new forms.

81. Pollutants tend to concentrate as they move from one trophic level to the next in the food chain resulting in Biomagnification. In order for biomagnification to occur, which of the following characteristics should be exhibited by a pollutant?

1. Long-lived
2. Mobile
3. Soluble in water

Select the correct answer using code given below.

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

82. Consider the following statements with reference to the ecological succession:

1. A seral community is a transitional community that is formed and replaced during succession.
2. Lichens and Mosses are pioneer species of a primary succession.

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

83. Which one of the following is best associated with the Clydebank Declaration, signed at the COP26 of the UNFCCC in Glasgow?

(a) Establishing Marine Protected Areas in the Antarctica and Southern Ocean

(b) Establishment of green shipping corridors

(c) Pledge of technological companies to provide $1 Billion to financing climate projects

(d) Using Renewable Energy for powering the national capitals of all United Nations members

84. With reference to Asiatic elephants, consider the following statements:

1. India is home to the largest number of Asiatic Elephants.
2. Both male and female Asian elephants can have tusks.
3. Elephants have the longest gestation period for any mammal.

Which of the statements given above is/are correct?

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

85. Consider the following statements regarding Reserved Forests:

1. Reserved Forests (RFs) are areas notified under the Forest (Conservation) Act, 1980.
2. More than half of the total forest land has been declared reserved forests.

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

86. 'It refers to an interconnected network of feeding relationships. It illustrates all possible transfers of energy and nutrients among the organisms and species in an ecosystem.'

Which of the following is being described in the above passage?

(a) Food Chain
(b) Energy Pyramid
(c) Food Web
(d) Homeostasis

87. Consider the following statements regarding the Board of Major Port Authority:

1. It was established recently under the Major Port Authority Act, 2021.
2. It has to seek the prior sanction of the Central Government to raise any loan.
3. It will adjudicate the disputes or claims related to rights and obligations of major ports.

Which of the statements given above is/are correct?

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

88. Which of the following statements is/are correct about the Taiga biome?

1. It is a forest of the cold and subarctic region.
2. The soil of the taiga biome is rich in nutrients.
3. The vegetation is dominated by coniferous forest.

Select the correct answer using the code given below.

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

89. Consider the following statements regarding 'Forest Village':

1. These are the settlements that have been established inside the forests by the State Government.
2. Forest village is defined under the Forest Rights Act, 2006.

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

90. Which of the following countries are members of both the G-7 and G-20 grouping?

1. India
2. China
3. United States of America
4. Japan
5. Mexico

Select the correct answer using the code given below.

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

91. Which of the following are considered natural UNESCO's World Heritage Sites?

1. Keoladeo National Park
2. Nilgiri Biosphere Reserve
3. The Western Ghats
4. Similipal Biosphere Reserve

Select the correct answer using the code below.

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

92. Which of the following statements is ***not*** correct about the Asian Palm Civet species?

(a) It is both terrestrial and arboreal animal.
(b) It is endemic to the Indian Subcontinent.
(c) It is protected under Schedule II of the Wildlife (Protection) Act, 1972.
(d) It is categorised as least concern on IUCN Red List.

93. What is common to the species 'Lantana, Parthenium and African catfish'?

(a) These species have high medicinal value.
(b) All the three species are found southern India only.
(c) They are invasive species.
(d) They are critically endangered species in India.

94. What is common to the following animals: Springtail, Fiddler crab, Slug?

(a) They are mammals found in India.
(b) They are carnivores present in the top trophic level in the ecosystem.
(c) They are part of a detritus food chain.
(d) They are part of all grazing food chains.

95. Consider the following statements regarding the Double Asteroid Redirection Test (DART) Mission:

1. Its aim is to allow a spacecraft to crash into an asteroid change its course.
2. It is a joint mission of Japan Aerospace Exploration Agency (JAXA) and Indian Space Research Organisation (ISRO).
3. It will be launched aboard GSLV-MK III of ISRO.

Which of the statements given above is/are correct?

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

96. Consider the following statements regarding an aquatic ecosystem:

1. Both photosynthesis and respiration activities take place in aphotic zone.
2. Neuston are organisms which live at the air-water interface such as floating plants.
3. The limnetic zone is dominated by both phytoplankton and zooplankton.

Which of the statements given above is/are correct?

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

97. With reference to crocodile species in India, consider the following statements:

1. Only three types of crocodile species are found in India.
2. Uttar Pradesh is the only state to house all species of crocodiles found in India.

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

98. With reference to Bioprospecting, consider the following statements:

1. Bioprospecting activities must comply with the definition of utilization of genetic resources of the Nagoya Protocol.
2. Bioprospecting activities are possible only in the terrestrial environments.

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

99. Which of the following training exercises is/are conducted between India and France?

1. Mitra Shakti
2. Garuda
3. Yudh Abhyas

Select the correct answer using the code given below.

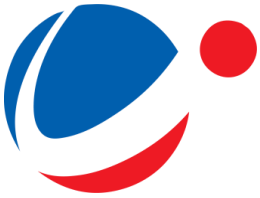
(a) 1 and 2 only
(b) 2 only
(c) 3 only
(d) 1, 2 and 3

100. Recently the Minerals (Other than Atomic and Hydro Carbons Energy Mineral) Concession (Fourth Amendment) Rules, 2021 were published. Which of the following have been allowed under these rules?

1. Transfer of composite licence or mining lease of all types of mine.
2. Part surrender of mining lease only in case of non-grant of forest clearance.
3. Disposal of waste rock/ mineral below the threshold value, which is generated during the course of mining.

Which of the options given above is/are correct?

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



VISIONIAS

www.visionias.in

ANSWERS & EXPLANATIONS
GENERAL STUDIES (P) TEST – 3487 (2022)

Q 1.C

- Crocodile conservation in India started in early 1970s after some reports of extensive poachings of Crocodile surfaced. After this Indian Government took some serious steps for Crocodile protection.
- The **Gharial** was accorded protection under the **Wildlife Protection Act (WPA), 1972**.
- **Project Crocodile** was started in **1975** with the aid of the United Nations Development Programme and Food and Agriculture Organisation. **Hence statement 1 is correct.**
- Stretches of the Mahanadi, Ganga, Girwa and other rivers inhabited by gharials were declared protected areas.
- The project included an intensive captive breeding and rearing programme to create a large crocodile population that would be ultimately translocated.
- An acute shortage of gharial eggs was overcome by their purchase from Nepal, each egg costing Rs 200. A male gharial was flown in from a zoo in Frankfurt, West Germany, to get the breeding programme going.
- Sixteen crocodile rehabilitation centres and five crocodile sanctuaries -- National Chambal Sanctuary (ncs), Katerniaghat Wildlife Sanctuary (kws), Satkosia Gorge Wildlife Sanctuary, Son Gharial Sanctuary and Ken Gharial Sanctuary -- were established between 1975 and 1982.
- A Crocodile Breeding and Management Training Institute was set up in **Madras** in 1980 to train managers of crocodile stations. **Hence statement 2 is not correct.**
- The gharial is listed as **Critically Endangered** by the IUCN Red List as a result of catastrophic population declines, which have seen the population decline by up to 98% since the 1940s. There are now though to be fewer than 250 adult individuals remaining in the wild. **Hence statement 3 is not correct.**

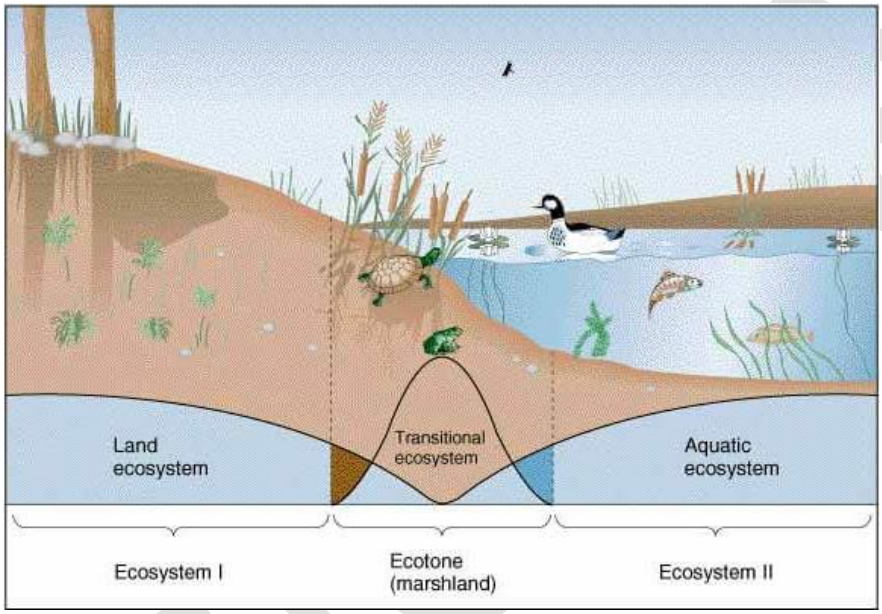
Q 2.B

- **For most of the year, the tundra biome is a cold, frozen landscape. It is a treeless polar desert. This biome has a short growing season, followed by harsh conditions that the plants and animals in the region need special adaptations to survive. Hence statement 1 is correct.**
- Tundra form in two distinct cold and dry regions.
  - Arctic tundra are found on high-latitude landmasses, above the Arctic Circle.
  - Alpine tundra are located at very high elevations atop mountains, where overnight temperatures fall below freezing.
- Tundra regions typically get less than 25 centimeters (10 inches) of precipitation annually, which means these areas are also considered deserts.
- The soil in the Arctic is largely permafrost or soil that remains frozen year-round, leaving only a thin surface layer of thawed soil in summer for plant roots to grow in. Tundra soil is also scarce in many of the nutrients that plants need to grow. **Reptiles and amphibians are few or absent because of the extremely cold temperatures**. **Hence statement 2 is correct.**
- Most of the animals have long life. They are protected from chillness by the presence of thick cuticle and epidermal hair or fur. Mammals have a large body size and small tail and ears to avoid the loss of heat from the surface. **Hence statement 3 is correct.**

Q 3.B

- An ecotone is a **zone of junction or a transition area** between two biomes (diverse ecosystems). Ecotone is the zone where two communities meet and integrate. For e.g. the **mangrove forests** represent an ecotone between marine and terrestrial ecosystem.
- Other examples are **grassland** (between forest and desert), **estuary** (between fresh water and salt water) and **riverbank or marshland** (between dry and wet). **Hence option (b) is the correct answer.**

- It may be narrow (between grassland and forest) or wide (between forest and desert).
- It has **conditions intermediate** to the adjacent ecosystems. Hence it is a **zone of tension**.
- Usually, the number and the population density of the species of an outgoing community decreases as we move away from the community or ecosystem.
- A well-developed ecotone contains some organisms which are entirely different from that of the adjoining communities.
- Ecotone regions like mangroves, wetlands, estuaries **etc have far greater productivity than natural ecosystem like a forest ecosystem, ocean ecosystem, pond ecosystem, riverine ecosystem etc.**
  - This is because of the wide-ranging species from the adjacent ecosystem being present in the ecotone.
- Edge effect:
  - Edge effect refers to the **changes in population or community** structures that **occur at the boundary of two habitats (ecotone).**
  - Sometimes the number of species and the population density of some of the species in the ecotone is much greater than either community. This is called **edge effect.**
  - The organisms which occur primarily or most abundantly in this zone are known as **edge species**. In the terrestrial ecosystems edge effect is especially applicable to **birds**. For example, **the density of birds is greater in the ecotone** between the forest and the desert.



Q 4.D

- India currently has 46 sites designated as Wetlands of International Importance (Ramsar Sites), with a surface area of 1,083,322 hectares. Some of the Ramsar Sites are human-made wetlands. These include:
  - **Pong Dam Lake in Himachal Pradesh is a water storage reservoir created in 1975 on the Beas River in the low foothills of the Himalaya on the northern edge of the Indo-Gangetic plain.** The avian habitats formed by the creation of the Pong Dam assume a great significance" - given the site's location on the trans-Himalayan flyway, more than 220 bird species have been identified, with 54 species of waterfowl.
  - Nandur Madhameshwar is a mosaic of lakes, marshes and riparian forest on the Deccan Plateau. **Construction of the Nandur Madhameshwar Weir at the confluence of the Godavari and Kadwa Rivers helped create a thriving wetland.** It was originally designed to overcome water shortages in the surrounding area. The Site now also serves as a buffer against floodwaters and as a biodiversity hotspot. With 536 species recorded, its diverse habitats contrast with the surrounding semi-arid conditions caused by the rain shadow of the Western Ghats mountain range. The Site hosts some of India's most iconic species, such as the leopard and Indian sandalwood (Santalum album). It also provides sanctuary to critically endangered species including Deolali minnow etc.
  - **Thol Lake is a shallow reservoir dominated by open water areas that was originally constructed for irrigation in 1912.** In 1988, it was declared as a wildlife sanctuary to protect the birdlife found there: it is on the Central Asian Flyway and more than 320 bird species can be found, making up some 57% of all the bird species of Gujarat. More than 110 waterbird species have been recorded, about 43% of India's waterbird species, with almost 30% of those species being migratory waterbirds.
- **Hence, option (d) is the correct answer.**

Q 5.C

- As genetic research becomes more sophisticated, so does our ability to use plants and animals to develop new drugs or modify crops to meet food security needs.
- Often, in the search for new bioresources, researchers draw on local people's traditional knowledge about the properties of a particular plant, animal or chemical compound. When researchers use traditional knowledge without permission, or exploits the cultures they're drawing from – it's called biopiracy.
- **Biopiracy happens when researchers or research organisations take biological resources without official sanction, largely from less affluent countries or marginalised people.**
- Biopiracy is not limited to drug development. It also occurs in agricultural and industrial contexts. Indian products such as the neem tree, tamarind, turmeric, and Darjeeling tea have all been patented by foreign firms for different lucrative purposes.
- **Hence option (c) is the correct answer.**

Q 6.D

- The Ramsar Convention is an international treaty for the conservation and sustainable utilization of wetlands, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific, and recreational value.
- The aim of the Ramsar list is to develop and maintain an international network of wetlands which are important for the conservation of global biological diversity and for sustaining human life through the maintenance of their ecosystem components, processes and benefits. Wetlands declared as Ramsar sites are protected under strict guidelines of the convention.
- India currently has 46 sites designated as Wetlands of International Importance (Ramsar Sites), with a surface area of 1,083,322 hectares. The Ramsar list also includes 3 wetlands from the North Eastern States od India. These are
    - **Deepor Beel** located about 10 km Southwest of Guwahati city is considered one of the large and important riverine wetlands in the Brahmaputra Valley of lower Assam, India. Deepor Beel has also been designated as a Ramsar Site in November 2002.
    - The largest freshwater lake in Northeast India, the pristine **Loktak Lake** is known for its floating circular swamps, which are called phumdis in the local tongue. The lake houses the only floating national park in the world, the Keibul Lamjao National Park, which is the last refuge of the endangered brow-antlered deer or sangai, Manipur's state animal. It was also listed under the Montreux Record on 16 June 1993.
    - **Rudrasagar Lake**, also known as Twijilikma, is a lake located in Melaghar, Tripura, India. A lowland sedimentation reservoir in the northeast hills, fed by three perennial streams discharging to the River Gomti. The Ramsar Convention has declared Rudrasagar Lake as a wetland of international importance.
- **Hence, option (d) is correct answer.**

Q 7.B

- **Pair 1 is not correctly matched:** Located in the Himalayan foothills in western Assam, Manas was originally a game reserve since 1928 and became a Tiger Reserve in 1974, a World Heritage Site in 1985, and a Biosphere Reserve in 1989 then was declared as a National Park in 1990. The park is contiguous with the Buxa Tiger Reserve in West Bengal, and in 2003 it was declared part of the Chirang-Ripu Elephant Reserve which serves as the international corridor for elephant migration between India and Bhutan. **The Manas river flows through the west of the park and is the main river within it.**
- **Pair 2 is correctly matched:** Panna National Park is located in the Panna and Chhatarpur districts of Madhya Pradesh in India. It was declared as a National Park in the year of 1981. The park is known worldwide for its wildlife including tigers, deer, antelope, vultures, wolves, Chinkara, Cheetal and lots more. **Ken River flows through this reserve and creates beautiful waterfalls on its way to the valley.** The biodiversity in this national park is extremely rich.
- **Pair 3 is not correctly matched:** Papikonda National Park spreads over 1012.86 square kilometres in East and West Godavari districts of Andhra Pradesh. **The park lies on the left and right banks of the river Godavari and cuts through the Papikonda hill range of Eastern Ghats.** The River Godavari enriches Papikonda Park with its natural beauty. The majority of the area of the park is covered with moist deciduous forest and include animal species such as tigers, mouse deer, gaur etc.
- **Pair 4 is not correctly matched:** Silent Valley National Park is a national park in Kerala, India. It is located in the Nilgiri hills, has a core area of 89.52 km², which is surrounded by a buffer zone of 148 km². This national park has some rare species of flora and fauna. It is a beautiful representation of the last remaining rainforest of Kerala. Silent Valley is home to the largest population of Lion-tailed macaques, an

endangered of primate. **Kuntipuzha River divides the park into a narrow eastern sector of width 2 kilometres and a wide western sector of 5 kilometres.** The river is characterized by its crystal clear water and perennial nature.

Q 8.D

- **Primary succession sere begins with lichens.** Lichens and mosses are the first to colonise because they have no roots but schizoids, which fix them on barren rock and can survive without soil. **Lichens** can invade and colonise such areas, coming in, by various methods of dispersal and gaining a foot hold by means of their tenacious, water-seeking **fungal component** and thus forming the **first community,** very appropriately often called the **pioneer community.**
- **Lichens are soil builders,** producing weak acids that very gradually erode the rock surface. As organic products and sand particles accumulate in tiny fissures, **mosses** and larger plants, such as grasses also get an opportunity to establish them and begin a new seral stage. In time, lichens that made the penetration of plant roots possible are no longer able to compete for light, water and minerals and will be succeeded by larger and more nutrient demanding plants such as shrubs and trees.
- Ultimately "the **final stable and self perpetuating community** which is in equilibrium with its environment", is formed and this is called **climax community.** The climax community is the most productive community that the environment can sustain. The animals of such a community also exhibit succession, which to a large extent is governed by the plant succession, but is also influenced by the types of animals that are able to migrate from neighbouring communities.
- **Difference between pioneer and climax communities:**

Characteristic	**Pioneer community**	**Climax community**
Growth rate	**Rapid**	**Slow**
Life span	Short	Long
Relative number of seeds	Many	Few
Food productivity	**Low**	**High**
Biomass	Small	Large
Species diversity	**Low**	**High**
Nutrient supply in soil	Low	High

- **Hence option (d) is the correct answer.**

Q 9.B

- **Recently, Gujarat, Haryana and Punjab emerged as top performers in LEADS 2021.**
- The **Ministry of Commerce and Industry (MoCI)** had launched a study, **"Logistics Ease Across Different States (LEADS)" in 2018** with the main objective of ranking States and UTs on the efficiency of their logistics ecosystem. **Hence option (b) is the correct answer.**
- The first version of the report, LEADS 2018, focused on export-import trade and assessed the efficiency of the logistics ecosystem in each State and Union Territory.
- The second edition of the study – LEADS 2019, covered both international and domestic trade.
- The LEADS 2021 exercise has gone one step ahead in analysing the domestic and EXIM logistics ecosystem of the state. Specifically, two improvements have been done in the overall assessment framework.
- **Gujarat topped the logistics index chart in 2021, a marker of the efficiency of logistical services necessary for promoting exports and economic growth. This is the third year in a row that the state remained on top of the rankings.**
- **Hence option (b) is the correct answer.**

Q 10.C

- **Recently, India and Bhutan have taken a decision to have seven additional entry and exit points for trade as part of measures to increase trade connectivity.**
- India is the **largest trading partner of Bhutan** with a total trade of **$ 1.083 Billion in 2020-21**. **Hence statement 1 is not correct.**
- During the last 24 years, the exports of China to Bhutan have increased at an annualized rate of 18.1%, to $10.7 million in 2019.
- During the last 24 years, the exports of Bhutan to China have increased at an annualized rate of 3.29%, to $45000 in 2019.
- China accounted for only 3 per cent of Bhutan's imports in 2020, while India accounted for 77 per cent.

- Presently, India exports electricity to Nepal, Bangladesh and Myanmar, while **India imports power from Bhutan**. However, sometimes India also exports power to Bhutan during the lean hydro season. **Hence statement 2 is correct.**
- Since 2014, trade between **India and Bhutan has more than doubled** from USD 484 million in 2014-15 to USD 1083 million in 2020-21. **Hence statement 3 is correct.**

Q 11.A

- **The Action Plan for Vulture Conservation (APVC) in India, 2020-2025 is an important measure for the vulture conservation in the country.** With the expiry of the first action plan in 2009, it was imperative that a new document be drafted that outlines the vision for vulture conservation for the coming years.
- **The APVC 2020-2025, has identified priority actions and additional action points for the conservation of vultures than mentioned in the action plan of 2006.** Some of its objectives are:
  - Prevent the poisoning of the principal food of vultures, the cattle carcasses, with veterinary Non-steroidal anti-inflammatory drugs (NSAIDs), by ensuring that sale of veterinary NSAIDs is regulated and is disbursed only on prescription and by ensuring that treatment of livestock is done only by qualified veterinarians.
  - Carry out **safety testing of available molecules** of veterinary NSAIDs on vultures.
  - The DCGI must institute a system that automatically removes a drug from veterinary use if it is found to be toxic to vultures.
  - There is a need to establish additional Conservation Breeding Centres in the country. Currently, there are 8 Vulture Conservation Breeding Centres in different parts of the country. So it is proposed to set up one centre each in **Uttar Pradesh, Tripura, Maharashtra, Karnataka and Tamil Nadu**, which will cover most parts of the country. **Hence statement 1 is correct.**
  - Four rescue centres have been proposed for different geographical areas like Pinjore in the north, Bhopal in Central India, Guwahati in Northeast India and Hyderabad in South India.
  - It is proposed to have at least one vulture safe zone in **each State** for the conservation of the remnant populations in that State. The vulture safe zone shall be created ensuring low prevalence of toxic NSAIDs in an area of 100 km radius from the vulture colony through targeted advocacy and awareness programmes following the established protocol. **Hence statement 2 is not correct.**

Q 12.B

- Except for the deep sea hydro-thermal ecosystem, sun is the only source of energy for all ecosystems on Earth. Of the incident solar radiation less than 50 per cent of it is **photosynthetically active radiation (PAR).** Plants and photosynthetic bacteria (autotrophs), fix Sun's radiant energy to make food from simple inorganic materials. **Plants** in a terrestrial ecosystem **capture about 1% of the energy of sunlight** that falls on their leaves and convert it into food energy. **Hence statement 1 is not correct.**
- When green plants are eaten by primary consumers, a great deal of energy is **lost as heat to the environment,** some amount goes into digestion and in doing work and the rest goes towards growth and reproduction. An **average of 10% of the food eaten is turned into its own body** and made available for the next level of consumer.
- Therefore, 10% can be taken as the average value for the amount of organic matter that is present at each step and reaches the next level of consumers. This is known as "**the 10 percent rule" and it limits the number of trophic levels an ecosystem can support. Since so little energy is available for the next level of consumers, food chains generally consist of only three or four steps**. The loss of energy at each step is so great that very little usable energy remains after four trophic levels. **Hence statement 3 is not correct.**
- To compare the functional roles of the trophic levels in an ecosystem, an energy pyramid is most suitable. An energy pyramid, reflects the laws of thermodynamics, with conversion of solar energy to chemical energy and heat energy at each trophic level and with loss of energy being depicted at each transfer to another trophic level. Hence **the pyramid is always upright,** with a large energy base at the bottom. **Hence statement 2 is correct.**

Q 13.A

- Srinagar, India recently became one of the cities worldwide to join the UNESCO Creative Cities Network (UCCN).
- The **UNESCO Creative Cities Network (UCCN)** was created in 2004 to promote cooperation with and among cities that have identified creativity as a strategic factor for **sustainable urban development. Hence statement 1 is correct.**

- The cities which currently make up this network work together towards a common objective: placing creativity and cultural industries at the heart of their development plans at the local level and cooperating actively at the international level.
- The Network covers seven creative fields: **Crafts and Folk Arts, Media Arts, Film, Design, Gastronomy, Literature and Music.**
- A total of six India cities are a part of the UCCN; **Mumbai** (film), **Hyderabad** (gastronomy), **Chennai** (music)**, Varanasi** (music), **Jaipur** (crafts and folk art) and **Srinagar** (crafts and folk arts). **Hence statement 2 is not correct.**

Q 14.A

- **The RBI recently issued a notification revising norms for commercial banks to be placed under the regulator's Prompt Corrective Action (PCA) framework should any of their key metrics fall out of line. The revision will take effect from January 1, 2022.**
- The objective of the PCA framework is to enable supervisory intervention at the appropriate time and require the supervised entity to initiate and implement remedial measures in a timely manner so as to restore its financial health.
- As per the revised PCA norms issued in 2017, banks were to be evaluated on capital, asset quality, profitability and leverage.
- The **capital adequacy ratio** governs the capital that a bank ought to hold as a percentage of its total assets. The adequacy measure includes buffers such as the capital conservation buffer (2.5%), which may be used to shore up capital in good times, but which may be relaxed to encourage further lending during economic crises.
- **Asset quality** tells us what portion of the loans is unlikely to be paid back, reflected in the net non-performing asset ratio that is the portion of total advances tagged non-performing, after the provisioning for bad loans.
- **Return on assets (RoA) measures profitability,** derived from net income (profit) as a percentage of total assets.
- The **leverage ratio** shows how much a lender has stretched itself in borrowing funds to generate income. The more the leverage, the riskier the turf on which the lender stands.
- The 2021 notification has **removed return on assets as an indicator to qualify for PCA. Hence statement 2 is not correct.**
- Further, the 2017 notification applied to scheduled commercial banks but excluded **Regional Rural Banks from its purview,** while the 2021 version excludes **Small Finance Banks and Payment Banks too**. **Hence statement 1 is correct.**
- In the latest set of rules, the RBI has clearly spelt out that exit from the PCA would be based on four continuous quarterly results, with one being Audited Annual Financial Statement as per the new framework apart from Supervisory Comfort of RBI, assessment on sustainability of profitability.

Q 15.A

- A mass extinction event is when species vanish much faster than they are replaced. This is usually defined as about 75% of the world's species being lost in a 'short' amount of geological time - less than 2.8 million years.
- Five great mass extinctions have changed the face of life on Earth. We know what caused some of them, but others remain a mystery.
    - **The Ordovician-Silurian mass extinction** occurred 443 million years ago and wiped out approximately 85% of all species. Scientists think it was caused by temperatures plummeting and huge glaciers forming, which caused sea levels to drop dramatically. This was followed by a period of rapid warming. Many small marine creatures died out.
    - **The Devonian mass extinction event** took place 383 million years ago and killed about three-quarters of the world's species, most of which were marine invertebrates that lived at the bottom of the sea. This was a period of many environmental changes, including global warming and cooling, a rise and fall of sea levels and a reduction in oxygen and carbon dioxide in the atmosphere. We don't know exactly what triggered the extinction event.
    - **The Permian - Triassic mass extinction**, which happened 250 million years ago, was the largest and most devastating event of the five. Also known as the **Great Dying, it eradicated more than 96% of all marine species and about three of every four species on land died out**. The world's forests were wiped out and didn't come back in force until about 10 million years later. **Of the five mass extinctions, the Permian-Triassic is the only one that wiped out large numbers of insect species. Hence option (a) is the correct answer.**

- **The Triassic mass extinction** event took place 200 million years ago, eliminating about 80% of Earth's species, including many types of dinosaurs. This was probably caused by colossal geological activity that increased carbon dioxide levels and global temperatures, as well as ocean acidification.
- **The Cretaceous mass extinction event** occurred 65 million years ago, killing 78% of all species, including the remaining non-avian dinosaurs. This was most likely caused by an asteroid hitting the Earth in what is now Mexico, potentially compounded by ongoing flood volcanism in what is now India.

Q 16.C

- India has a network of 903 Protected Areas covering about 5 per cent of the total geographic area of the country. Minister for Environment, Forest and Climate Change, recently released the Management Effectiveness Evaluation (MEE) of 146 national parks and wildlife sanctuaries in the country.
- According to the survey, **Tirthan Wildlife Sanctuary and Great Himalayan National Park in Himachal Pradesh** have performed the best among the surveyed protected areas. **The Turtle Wildlife Sanctuary in Uttar Pradesh was the worst performer in the survey.**
  - Located in the Kullu district, **Tirthan wildlife sanctuary is one of the most magnificent sanctuaries in Himachal Pradesh.** Located at a height of 5000 feet and overlooking River Tirthan, this beautiful wildlife sanctuary is one of the most amazing places of Himachal Pradesh. This sanctuary is connected to the famous national park of this area, the Great Himalayan National Park. **Hence, pair 1 is not correctly matched.**
  - **The 'Kachhua' or Turtle Wildlife Sanctuary (TWS), the world's only protected area dedicated to freshwater turtles is in Uttar Pradesh.** The turtle sanctuary was set up in 1989 under the Ganga action plan. Turtles, the Ganges dolphin and other water animals can be found here. **Hence, pair 3 is not correctly matched.**
- **Bhadra Wildlife Sanctuary** is a protected area and tiger reserve as part of the Project Tiger, situated in Chikkamagaluru district, 23 km south of Bhadravathi city, 38 km 20 km from Tarikere town, northwest of Chikkamagaluru and 283 km from Bengaluru city in Karnataka state, India. **Hence, pair 2 is correctly matched.**

Q 17.A

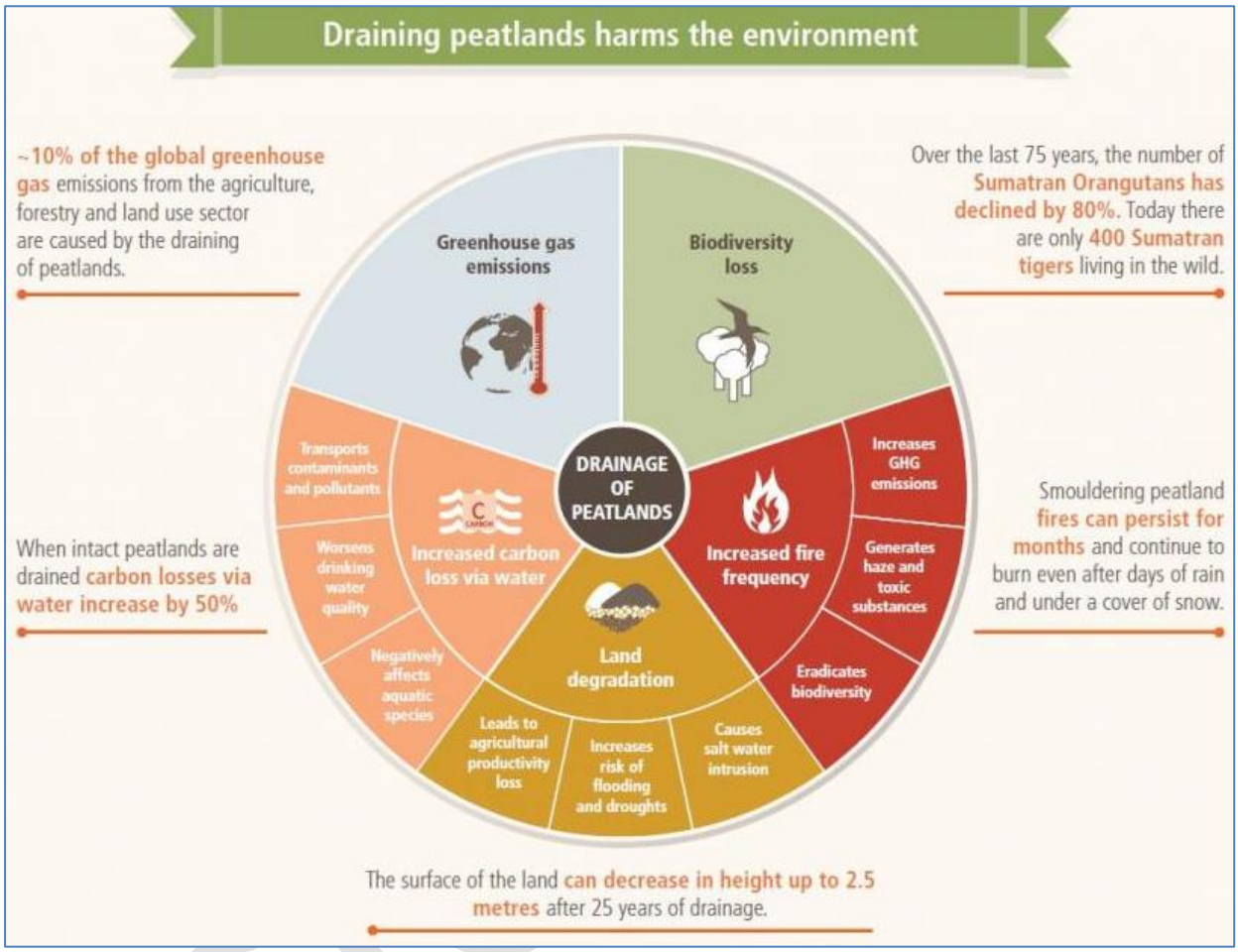
- The Forest (Conservation) Act, (FCA) 1980, came into force to address deforestation. While States had already notified forest land, **the FCA made it necessary to get the Centre's permission for using such forest land for "non-forestry purposes"** and the creation of an advisory committee to recommend such re-classification. **Hence, statement 1 is correct.**
- Till 1996, State Governments, Union Territory Administrations and Central Government used to apply the provisions of the Act only to the forests notified under the Indian Forest Act, 1927 or any other local law, and to forests which were under the management or control of the Forest Department.
- However, what constituted a "forest" was dramatically expanded following a Supreme Court judgment in a petition filed by the late Godavarman Thirumulpad. **Now, "forest" also included all areas recorded as "forest" in any government record, irrespective of ownership, recognition and classification;** all areas that conformed to the "dictionary" meaning of "forest", and all areas which are identified as "forest" by an expert committee constituted by the Supreme Court following the 1996 order. **Hence, statement 2 is not correct.**
- **The Union Ministry of Environment, Forest and Climate Change (MoEF&CC) has recently released a consultation paper on the proposed amendments in Forest Conservation Act, 1980 with reference to the amendments made in 1988 in this Act.**

Q 18.D

- Peatlands are a type of wetlands that occur in almost every country on Earth, currently covering 3% of the global land surface. The term 'peatland' refers to the peat soil and the wetland habitat growing on its surface.
  - In these areas, year-round waterlogged conditions slow the process of plant decomposition to such an extent that dead plants accumulate to form peat.
  - Peatland landscapes are varied – from blanket bog landscapes with open, treeless vegetation.
  - Large amounts of carbon, fixed from the atmosphere into plant tissues through photosynthesis, are locked away in peat soils, representing a valuable global carbon store. At the same time, **peatlands are the largest natural terrestrial carbon store. Hence statement 1 is correct.**
- **Draining peatlands reduces the quality of drinking water due to pollution from dissolved compounds.** Damage to peatlands also results in biodiversity loss. For example, the decline of the

Bornean Orangutan population by 60% within a sixty-year period is largely attributed to the loss of its peat swamp habitat. Peatlands are also a natural form of water purification and flood protection. Acting as a huge sponge, peatlands soak up and retain water in the landscape, holding back potentially dangerous flood waters. When peatlands do release water it is cleaner because peat acts as a filter. **Hence statement 2 is correct.**

- A bog is a freshwater wetland of soft, spongy ground consisting mainly of partially decayed plant matter called peat. Bogs are generally found in cool, northern climates. **Hence statement 3 is correct.**



Q 19.A

- **The National Tiger Conservation Authority (NTCA) is a statutory body under the Ministry of Environment, Forests and Climate Change constituted under enabling provisions of the Wildlife (Protection) Act, 1972, as amended in 2006**, for strengthening tiger conservation, as per powers and functions assigned to it under the said Act. **Hence statement 1 is correct.**
- NTCA has been fulfilling its mandate within the **ambit of the Wildlife (Protection) Act, 1972** for strengthening tiger conservation in the country by retaining an oversight through advisories/normative guidelines, based on appraisal of tiger status, ongoing conservation initiatives and recommendations of specially constituted Committees.
- **The objectives of NTCA are**:
  - Providing statutory authority to Project Tiger so that compliance of its directives become legal.
  - Fostering accountability of Center-State in management of Tiger Reserves, by providing a basis for MoU with States within our federal structure.
  - Providing for an oversight by Parliament.
  - **Addressing livelihood interests of local people in areas surrounding Tiger Reserves. Hence statement 3 is correct.**
- As per the **section 38 L, sub section 2** of the said Act, the authority consists of the **Minister in charge of the Ministry of Environment and Forests (as Chairperson)**, the Minister of State in the Ministry of Environment and Forests (as Vice-Chairperson), three members of Parliament, Secretary, Ministry of Environment and Forests and other members. **Hence statement 2 is not correct.**

Q 20.A

- 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. **Hence statement 1 is correct.**
- The **Biological Diversity Act (2002)** mandates implementation of the provisions of the Act through decentralized system with the NBA focusing on advising the Central Government on matters relating to the conservation of biodiversity, sustainable use of its components and equitable sharing of benefits arising out of the utilization of biological resources.
- The NBA with its headquarters in **Chennai, Tamil Nadu**, India delivers its mandate through a structure that comprises of the Authority, Secretariat, State Biodiversity Boards (SBBs), Biodiversity Management Committees and Expert Committees. **Hence statement 2 is not correct.**

Q 21.B

- The cold deserts of the Himalayas are dotted with the bright red berries of the seabuckthorn plant, popularly known as Leh berries. It is also referred to as sandthorn, sallowthorn, or seaberry. It produces orange-yellow berries, which have been used over centuries as food, traditional medicine, and skin treatment in Mongolia, Russia, Ukraine, and northern Europe, which are its origin regions. **Hence statement 1 is not correct.**
- The Ministry of Environment and Forests and the Defence Research and Development Organisation have launched a major national initiative for seabuckthorn cultivation in the high-altitude, cold desert ecosystems.
- **The Seabuckthorn, also called the "Wonder plant" and "Ladakh gold" has multi-purpose medicinal and nutritional properties, and also helps in soil conservation and nitrogen fixation. Hence statement 2 is correct.**
    - Hardy, drought-resistant and tolerant to extreme temperatures from – 43º C to + 40º C, the plant has an extensive root system which can fix atmospheric nitrogen, making it ideal for controlling soil erosion and preventing desertification.
- The seabuckthorn is the only fruit which contains all types of Omega acids (Omega 3, 6 and 9) as well as the rare Omega 7.
- Long considered a humble shrub of the Himalayas, every part of the plant – fruit, leaf, twig, root and thorn – has been traditionally used for medicine, nutritional supplements, fuel and fencing.

Q 22.C

- **In a unique initiative, the forgotten radio broadcasts of legendary ornithologist, the late Dr Salim Ali, have been compiled and brought 'alive' in the form of a book, marking the 125th birth anniversary of the 'Birdman of India'.**
- He was the first Indian to conduct systematic bird surveys across the country. He was a key figure in Bombay Natural History Society and was helped create the Bharatpur Bird Sanctuary and the Ranganathittu Bird Sanctuary.
- Besides the **Padma Bhushan (1958) and the Padma Vibhushan (1976) awards**, he received the Gold Medal of the British Ornithologists' Union in 1967. He was the first non-British citizen to receive the honour.
- The government of India established the Salim Ali Centre for Ornithology and Natural History at Coimbatore (SACON) in 1990.
- The **Book of Indian Birds** is considered a landmark book on Indian ornithology.
- Ali's magnum opus is considered to be the **Handbook of the Birds of India and Pakistan, which he co-authored with S Dillon Ripley.**
- The 10-volume work covers the birds of the subcontinent, their appearance, habitat, breeding habits and migration pattern among other things. **Hence option (c) is the correct answer.**

Q 23.B

- Biodiversity, abbreviated from the terms **'biological' and 'diversity'**, encompasses the variety of lifeforms found at all scales of biological organisation, ranging from genes to species to ecosystems.
- The greatest biodiversity is found in the **tropical regions** of the world, particularly among tropical rainforests and coral reefs.
- Biodiversity is increased by genetic change and evolutionary processes and reduced by habitat destruction, population decline and extinction.

- **Genetic Diversity** is the diversity of genetic characteristics (expressed or recessive) within a species (i.e. between individuals and populations of the same species).
    - This component of biodiversity is important because it allows populations to adapt to environmental changes through the survival and reproduction of individuals within a population that have particular genetic characteristics that enable them to withstand these changes.
- **Species Diversity** is simply the number and relative abundance of species found in a given biological organisation (population, ecosystem, Earth).
    - Species are the basic units of biological classification and hence, this is the measure most commonly associated with the term 'biodiversity'. **Hence option (b) is the correct answer.**
- **Ecosystem Diversity** can be defined as the variety of different habitats, communities and ecological processes.
    - A biological community is defined by the species that occupy a particular area and the interactions between those species. A biological community together with its associated physical environment is termed an ecosystem.

Q 24.C

- **Agni-5 ballistic missile was successfully tested in India recently.**
- Agni 5 is India's **long-range surface-to-surface ballistic missile,** which can hit a target with a precision that is **5,000 km away. Hence statements 1 and 2 are not correct.**
- India began testing the Agni series of missiles in 1989 with the first test for Agni 1, an Intermediate-Range Ballistic Missile, with a range of around 1,000 km.
- Since then, Defence Research and Development Organisation (DRDO) labs have continued to work on it, bringing the latest available Agni 5 to its present capability.
- It is a **"canisterised" missile.** It means that the missile can be launched from road and rail platforms, making it easier for it to be deployed and launched at a quicker pace. The canisterisation, which is an encapsulated system in which the missile is stored and launched from, also gives the missile a longer shelf life, protecting it from the harsher climatic conditions.
- The **nuclear-capable missile** can carry a warhead of around 1,500 kg and has a launch weight of 50,000 kg, making it one of the most potent missiles in the country. **Hence statement 3 is correct.**

Q 25.D

- The mountainous region of the western and eastern Himalayas is the habitat of Snow leopards in India. They are primarily found in the states of **Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh**.
- Rocky outcrops and ravines provide a perfect habitat for snow leopards to conceal themselves and sneak up on the prey. Their beautiful silvery fur marked with black spots helps them camouflage against the snowline and rocks of the mountain.
- Until 2017 the snow leopard was listed as an **endangered species** on the IUCN Red List. However, in 2017 the species' status was changed to **vulnerable**. There are about 450-500 snow leopards in the Indian forests.
- Some of the important national parks where one can find snow leopards are:
    - **Hemis National Park** is the **largest national park** in India spanning an area of 4,400 sq km. It is also known to be the largest national park in South Asia. The park supports a viable breeding population of about 200 snow leopards.
    - **Dachigam National Park** is located 22 km away from the Jammu & Kashmir state capital of Srinagar. The park hosts several species of mammals including the large cat – snow leopard, Kashmir stag, hill fox, Himalayan serow and Himalayan black bear.
    - The **Great Himalayan National Park** is spread across 4 valleys namely, Jiwa Nal valley, Sainj Valley, Tirthan Valley and Parvati Valley. UNESCO declared it as a 'World Heritage Site' in the year 2014. This park is one of the best places to spot the exquisite snow leopards in India.
    - **Gangotri National Park is a national park in Uttarkashi District of Uttarakhand in India.** Established in 1989, this high-altitude wildlife sanctuary protects indigenous fauna and fauna. **Various endangered species like bharal or blue sheep, black bear, brown bear, Himalayan Monal, Himalayan snowcock, Himalayan thar, musk deer and snow leopard are found in the park. It is also a bird-watching zone.**
    - **Govind Pashu National Park s located in the Uttarkashi district of Uttarakhand** and is named after a prominent Indian freedom fighter Govind Ballabh Pant. The Indian Government started the **'Snow Leopard Project'** from this park.
- **Hence option (d) is the correct answer.**

Q 26.B

- **Recently, the US Air Force flew a B-1B strategic bomber over key maritime chokepoints in the Mideast with allies including Israel amid ongoing tensions with Iran.**
- The B-1B Lancer bomber flew over the Strait of Hormuz, Bab el-Mandeb Strait and Egypt's Suez Canal.
- The **Strait of Hormuz** is a strait between the **Persian Gulf and the Gulf of Oman. Hence option (b) is the correct answer.**
- The **Strait of Bab-el-Mandeb** connects the Red Sea to the Gulf of Aden.
- The **Suez Canal** connects the Mediterranean Sea to the Red Sea.

Q 27.D

- The movement of nutrient elements through the various components of an ecosystem is called nutrient cycling. Another name of nutrient cycling is biogeochemical cycles (bio: living organism, geo: rocks, air, water).
- Nutrient cycles are of two types: **Gaseous and Sedimentary**.
  - **The reservoir for gaseous type of nutrient cycle (e.g., nitrogen, carbon cycle) exists in the atmosphere and for the sedimentary cycle (e.g., sulphur and phosphorus cycle), the reservoir is located in Earth's crust. Hence statement 3 is correct.**
  - Environmental factors, e.g., soil, moisture, pH, temperature, etc., regulate the rate of release of nutrients into the atmosphere.
- **Most gaseous cycles are generally considered perfect cycles because in sedimentary cycles, some nutrients are lost from the cycle and get locked into sediments, and so become unavailable for immediate cycling. Hence statement 1 is not correct.**
- **The phosphorus cycle is a sedimentary cycle (unlike carbon, oxygen, and nitrogen), the atmosphere is not a reservoir for phosphorous nor do microorganisms fix phosphorus as they do nitrogen. Phosphorus enters the biosphere almost entirely from the soil through absorption by plant roots. Hence statement 2 is correct.**

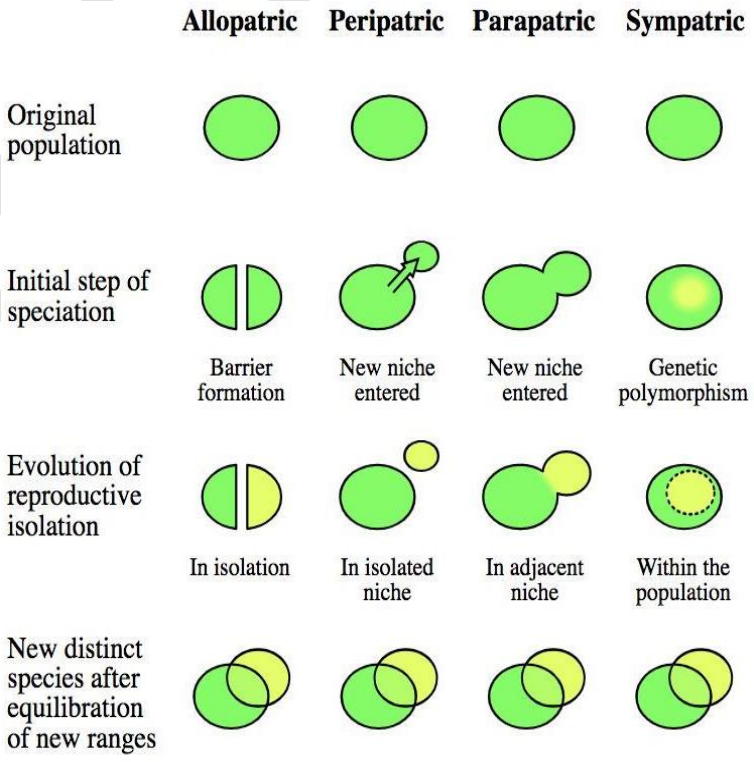
Q 28.D

- Point Calimere Wildlife and Bird Sanctuary in Tamil Nadu, was created as a sanctuary in 196, **essentially for the conservation of the endangered blackbuck antelope**, endemic to the Indian subcontinent. Point Calimere encompasses 17.26 sq km. Though it is a small sanctuary, spread over only 21.5 square kilometres, Point Calimere has mangroves, tropical evergreen forests, and grassland ecosystems.
- **This site is a mix of salt swamps, mangroves, backwaters, mudflats, grasslands and tropical dry evergreen forests. It harbours the single largest stretch of the unique dry-evergreen forest in the country.**
- The sanctuary is famous for its Flamingos and Blackbuck. The site serves as the breeding ground or nursery for many commercially important species of fish, as well as for prawns and crabs.

- **Point Calimere Wildlife & Bird Sanctuary is the only site in Tamil Nadu to be declared as a Ramsar Site** in 2002 and has been designated as Ramsar Site No. 1210. It is located along the Palk Strait covering Nagapattinam, Tiruvarur and Thanjavur.
- **Hence, option (d) is the correct answer.**

Q 29.C

- Speciation is how a new kind of plant or animal species is created.
- There are five types of speciation: allopatric, peripatric, parapatric, and sympatric and artificial.
  - **Allopatric speciation:**
    - ✓ **It occurs when a species separates into two separate groups which are isolated from one another. A physical barrier, such as a mountain range or a waterway, makes it impossible for them to breed with one another.** Each species develops differently based on the demands of their unique habitat or the genetic characteristics of the group that are passed on to offspring. **Hence option (c) is the correct answer.**
  - **Peripatric speciation:**
    - ✓ When small groups of individuals break off from the larger group and form a new species, this is called peripatric speciation. The main difference between allopatric speciation and peripatric speciation is that in peripatric speciation, one group is much smaller than the other. Unique characteristics of the smaller groups are passed on to future generations of the group, making those traits more common among that group and distinguishing them from the others.
  - **Parapatric speciation:**
    - ✓ In parapatric speciation, a species is spread out over a large geographic area. Although it is possible for any member of the species to mate with another member, individuals only mate with those in their own geographic region. Like allopatric and peripatric speciation, different habitats influence the development of different species in parapatric speciation. Instead of being separated by a physical barrier, the species are separated by differences in the same environment.
  - **Sympatric Speciation:**
    - ✓ Sympatric speciation is controversial. Some scientists don't believe it exists.
    - ✓ It occurs when there are no physical barriers preventing any members of a species from mating with another, and all members are in close proximity to one another. A new species, perhaps based on a different food source or characteristic, seems to develop spontaneously. The theory is that some individuals become dependent on certain aspects of an environment—such as shelter or food sources—while others do not.
  - **Artificial Speciation:**
    - ✓ Artificial speciation is the creation of new species by people. This is achieved through lab experiments, where scientists mostly research insects like fruit flies.



Q 30.B

- Biodiversity Heritage Sites (BHS) are areas that are unique, ecologically fragile ecosystems having rich biodiversity comprising of any one or more of the components such as; species richness, high endemism, presence of rare, endemic and threatened species, keystone species, species of evolutionary significance, wild ancestors of domestic/cultivated species or landraces or their varieties, past pre-eminence of biological components represented by fossil beds and having cultural or aesthetic values.
- As per **Section 37 of the Biological Diversity Act 2002, the State Governments are empowered to notify in the official gazette, in consultation with 'local bodies'**, **areas of biodiversity importance as Biodiversity Heritage Sites. Hence, statement 1 is not correct and statement 2 is correct.**
- Under subsection (2) of Section 37 of the BD Act, the State Government in consultation with the Central Government may frame rules for the management and conservation of BHS. The State Governments are empowered to frame schemes for compensating or rehabilitating any person or section of people economically affected by such notification.
- State Biodiversity Boards (SBB) may invite suggestions (or consider those already coming from communities) for the declaration of BHSs, through the Biodiversity Management Committees (BMCs) and other relevant community institutions.

Q 31.A

- **Recent context:** Cheetah, the world's fastest land animal which was declared extinct in India in 1952, is expected to be re-introduced into the country in November this year at the Kuno National Park in Madhya Pradesh.
    - The Supreme Court last year set up a three-member committee to guide the National Tiger Conservation Authority (NTCA) on the cheetah re-introduction project. The Supreme Court had earlier given its approval to introduce African cheetahs to a suitable habitat in India on an experimental basis.
- **African Cheetah is considered vulnerable under the International Union for Conservation of Nature's (IUCN). Asian Cheetah, now found only in Iran, is recognised as critically endangered by IUCN.**
- **Kuno National Park is a protected area in Madhya Pradesh was established in 1981 as a wildlife sanctuary and received the status of national park in 2018**.
- The area surrounding Kuno river has been rich in biodiversity since ancient times. Its importance can be reflected in the more that 20,000-year-old cave paintings in nearby Pahargarh depicting multiple wild animals.
- **Saharia tribe is an ethnic group which lives in this national park. The government of state government of MP declared this tribe a special backward tribe. Hence, statement 1 is correct.**
- Cheetahs live and hunt mainly in open grasslands and bushy areas in parts of Africa. The vegetation of Kuno National Park also includes scrub vegetation, dry savanna forest, grassland and tropical riverine. **Hence, statement 2 is not correct.**

Q 32.B

- **Eco-Sensitive Zones or Ecologically Fragile Areas are areas within 10 km around Protected Areas, National Parks and Wildlife Sanctuaries.** The ESZ is supposed to act as a transition zone from areas of high protection to less protection. **Hence, statement 1 is correct.**
- **ESZs are notified by the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India under the Environment Protection Act 1986. Hence, statement 2 is not correct.**
- The basic aim is to regulate certain activities around National Parks and Wildlife Sanctuaries so as to minimise the negative impacts of such activities on the fragile ecosystem encompassing the protected areas. ESZs would ensure that these areas act as "shock absorbers" to the protected areas by regulating and managing the activities around such areas.
- They also act as a transition zone from areas of high protection to areas involving lesser protection. ESZs help in in-situ conservation, which deals with the conservation of an endangered species in its natural habitat, for example, the conservation of the One-horned Rhino of Kaziranga National Park, Assam.
- As per MoEFCC guidelines broad-based thematic activities have been classified as prohibited, restricted with safeguards and permissible. **Activities like commercial mining, setting of sawmills and industries causing pollution etc. are prohibited.** Felling of trees, drastic change in agriculture systems, setting up of hotels and resorts etc. are regulated. **Activities permitted in the areas include ongoing agriculture and horticulture practices by local communities, rainwater harvesting etc. Hence, statement 3 is not correct.**

Q 33.D

- **Dibru-Saikhowa is a National Park as well as a Biosphere Reserve situated in the south bank of the river Brahmaputra** in the extreme east of Assam state in India. Dibru-Saikhowa, with an area of 340 sq km, is among the most vibrant wildness on earth and is also distinct for its pristine scenic beauty. Situated in the flood plain of Brahmaputra, Dibru-saikhowa is a safe haven for many extremely rare and endangered species of Wildlife.
- **It is located at the confluence where three of India's eastern-most rivers, Siang, Dibang and Lohit, meet the mighty Brahmaputra river at a unique tri-junction near the borders of upper Assam and Arunachal Pradesh.**
- **This park is a complex of wetlands, grasslands, littoral swamps and semi-evergreen forests, including the largest salix swamp forest in Northeast India.** The Park is renowned for natural regeneration of Salix trees.
- Famed for Ferral horses, species of mammals have so far been recorded from the Dibru-Saikhowa National Park. It is an identified Important Bird Area (IBA) having more than 382 species of Birds, some of which are Greater Adjutant Stork, Lesser Adjutant Stork etc.
- **Hence, option (d) is the correct answer.**

Q 34.A

- **Recently, the Supreme Court reserved its judgment on an appeal by the Ministry of Defence (MoD) for relaxing its order that specified the road width under the Char Dham Mahamarg Vikas Pariyojana (Char Dham Highway Development Project) of the Ministry of Road Transport and Highways (MoRTH).**
- Char Dham means four religious places. Char Dham in Uttarakhand is a collective term used for religious circuit covering Holy Hindu pilgrimage centres of **Badarinath, Kedarnath, Gangotri and Yamunotri.**
- This is considered as most sacred religious places to be visited by Hindus, to get rid of their sins and pave path to ultimate goal of human life - the Moksha, that is redemption from cycle of birth & death in this world.
- **All four temple shrines are located in Garhwal Himalayas range of Uttarakhand.**
- **Hence option (a) is the correct answer.**

Q 35.A

- **Inherent capacity of an organism to reproduce, survive and multiply is called biotic potential.** This is also called intrinsic rate of natural increase of a species. This is the **maximum rate of increase of a species under unlimited environmental conditions.** Unlimited environment means that a species does not experience shortage of any resources. The biotic potential is constant for a species. In reality, species always encounter some sort of resource constraints. The biotic potential is thus never realized in nature. **Hence statement 1 is correct.**
- **Species such as bacteria, insects, mice** and other small organisms that can produce a large number of offspring in a short time have a **high biotic potential** while **larger species like elephants,** tigers and humans that produce only a few offspring at a time have a low biotic potential. **Hence statement 2 is not correct.**

Q 36.C

- Project Tiger", now ongoing as a Centrally Sponsored Scheme, was launched by the Government of India in 1973. The project aims at ensuring a viable population of Bengal tigers in their natural habitats, protecting them from extinction, and preserving areas of biological importance as a natural heritage forever represented as close as possible the diversity of ecosystems across the distribution of tigers in the country.

- **Tiger Reserves are notified by State Governments as per provisions of Section 38V of the Wildlife (Protection) Act, 1972 on advice of the National Tiger Conservation Authority. Hence, statement 1 is correct.**
- The following steps are involved in the notification:
  - Proposal is obtained from the State.
  - In-principle approval is communicated from the National Tiger Conservation Authority, soliciting detailed proposals under section 38V of the Wildlife (Protection) Act, 1972.
  - National Tiger Conservation Authority recommends the proposal to the State after due diligence.
  - The State Government notifies the area as a Tiger Reserve.
- An area of 72749 sq.km. of the country is notified through 51 tiger reserves in 18 tiger range States which constitutes 2.21% of the country's geographical area. Out of this 40145.30 sq.km. is notified as core/critical tiger habitat while 32603.72 sq.km. is notified as buffer.
- These processes are governed by Section 38W of the Wildlife (Protection) Act, 1972 whose provisions are as follows:
  - **No alteration in the boundaries of a tiger reserve shall be made except on a recommendation of the Tiger Conservation Authority and the approval of the National Board for Wild Life. Hence, statement 2 is correct.**
  - No State Government shall de-notify a tiger reserve, except in public interest with the approval of the Tiger Conservation Authority and the National Board for Wild Life

Q 37.C

- In ecology, the term "niche" describes the role an organism plays in a community.
  - It is the unique functional role and position of a species in its habitat or ecosystem.
  - **No two species in a habitat can have the same niche. Hence statement 1 is correct**.
  - A species' niche encompasses both the physical and environmental conditions it requires (like temperature or terrain) and the interactions it has with other species (like predation or competition). Ecological niches are found in all types of ecosystems.
  - It plays an essential role in the conservation of organisms. If we have to conserve species in their native habitat, we should know the niche requirements of the species.
- Ecocline is a zone of gradual but continuous change from one ecosystem to another when there is no sharp boundary between the two in terms of species composition.
  - The ecocline concept was used by vegetation ecologists describing ecological gradients, both spatial continua and time-series, eg. Wetland. **Hence statement 2 is correct.**
- An ecotype is a population (or subspecies or race) that is adapted to local environmental conditions. Thus, the adaptations of these ecotypes are based on the interactions of their own special sets of genes with their own environment. **Hence statement 3 is correct.**

Q 38.C

- **Jerdon's Courser is a nocturnal cursorial bird found only in the State of Andhra Pradesh, India**. It is one of the world's rarest bird species and is classified as Critically Endangered (CR) by the International Union for Conservation of Nature (IUCN). The species was believed to be extinct until it was rediscovered in 1986 near Cuddapah District of Andhra Pradesh. The site where it was rediscovered was designated as the Sri Lankamaleswara Wildlife Sanctuary. **Hence, pair 1 is not correctly matched.**
- **The Black-necked Crane** is a medium-sized crane in Asia that breeds on the Tibetan Plateau and remote parts of India and Bhutan. This species is found in India, China and Bhutan and breeds in high altitude wetlands in the Tibetan plateau at elevations of 2950-4900 m above mean sea level. High altitude marshes and lakes of the Tibetan Plateau (Tibet, Qinghai, Xinjiang, Gansu), Sichuan (China), and eastern Ladakh (India) are the known breeding grounds of black-necked cranes. **In India, the black-necked crane is found in eastern Ladakh. Recently, the Ladakh Union Territory administration has announced a black-necked crane as its state bird. Hence, pair 2 is correctly matched.**
- **Great Indian bustard,** a large bird of the bustard family, one of the heaviest flying birds in the world. The great Indian bustard inhabits dry grasslands and scrublands on the Indian subcontinent. Historically, the great Indian bustard was distributed throughout Western India, spanning 11 states, as well as parts of Pakistan. Its stronghold was once the Thar desert in the northwest and the Deccan plateau of the peninsula. Today, its population is confined mostly to Rajasthan and Gujarat. I**ts largest populations are found in the Indian state of Rajasthan. Hence, pair 3 is correctly matched.**

Q 39.D

- The President of India recently presented four Padma Vibhushan, eight Padma Bhushan and sixty-one Padma Shri Awards for the year 2020, at the Civil Investiture Ceremony-I held at Rashtrapati Bhavan.
- The Government of India instituted two civilian awards-Bharat Ratna & Padma Vibhushan in 1954. The latter had three classes namely Pahela Varg, Dusra Varg and Tisra Varg.
- These were subsequently renamed Padma Vibhushan, Padma Bhushan and Padma Shri vide Presidential Notification issued on January 8, 1955.
- Padma Awards are given in three categories: **Padma Vibhushan** (for exceptional and distinguished service), **Padma Bhushan** (distinguished service of higher-order) and **Padma Shri** (distinguished service). The award seeks to recognize achievements in all fields of activities or disciplines where an element of public service is involved.
- While the **Padma Vibhushan is the highest civilian award after the Bharat Ratna. Hence statement 1 is not correct.**
- The **Padma Awards** are conferred on the recommendations made by the **Padma Awards Committee,** which is constituted by the **Prime Minister every year.**
- The Padma Awards Committee is headed by the Cabinet Secretary and includes Home Secretary, Secretary to the President and four to six eminent persons as members.
- The recommendations of the committee are submitted to the Prime Minister and the President of India for approval.
- Even self-nomination can be made. **Hence statement 2 is not correct.**
- All persons without distinction of race, occupation, position or sex are eligible for these awards.
- However, Government servants including those working with PSUs, **except doctors and scientists,** are not eligible for these awards. **Hence statement 3 is not correct.**

Q 40.C

- **Caracal is a medium-sized wild cat native to Africa, the Middle East, Central Asia, and South Asia including India.** The population of this cat is increasing in Africa while its numbers are declining in Asia. **Hence, statement 1 is not correct.**
- The wildcat has long legs, a short face, long canine teeth, and distinctive ears — long and pointy, with tufts of black hair at their tips. The iconic ears are what give the animal its name — caracal comes from the Turkish karakulak, meaning ‘black ears’.
- The caracal has traditionally been valued for its litheness and extraordinary ability to catch birds in flight; it was a favourite coursing or hunting animal in medieval India.
- **The International Union for Conservation of Nature (IUCN) lists caracals as a species of 'least concern'** mainly due to their large numbers in Africa. **Hence, statement 2 is not correct.**
- **The National Board for Wildlife and Union Ministry of Environment, Forest and Climate Change has included the caracal, in the list of recovery programme for critically endangered species.** The recovery programme for critically endangered species in India now includes 22 wildlife species. **Hence, statement 3 is correct.**

Q 41.C

- Mangrove are **salt tolerant evergreen forest ecosystem** found mainly in the tropical and subtropical inter-tidal regions of the world between approximately 32° N and 38° S latitude and total mangrove cover has been estimated to be approximately 15.6 million hectares globally. **Hence statement 1 is correct.**
- They provide potential contributions in ecological services, provides habitat for many terrestrial and marine species, various food resources, shelter and site for fertilization for variety of aquatic fauna resulting into rich biodiversity.
- Mangroves distribution and abundance in intertidal areas could be considered as a direct indicator of the habitat health of the coastal ecosystem and they are highly sensitive to environmental change.
- Mangroves exhibit **Viviparity mode** of reproduction i.e. seeds germinates in the tree itself (before falling to the ground). This is an adoptive mechanism to overcome the problem of germination in saline water. **Hence statement 2 is not correct.**
- **It produces pneumatophores (blind roots) to overcome respiration problem in the anaerobic soil conditions.** Some mangroves secrete excess salt through their leaves.
- **How mangroves deal with excess salt:** In species from the genera Rhizophora (the red mangrove) and Bruguiera, the plants create a barrier and can almost completely exclude the salt from entering their vascular system—over 90 percent of the salt from seawater is excluded. For many mangroves, the salt is dealt with after it enters the plant. Mangroves categorized as secretors, including species in the black mangrove genus Avicennia, push salt from the ocean water out through special pores or salt glands within

their leaves. As the salty water evaporates, noticeable salt crystals often form on the surface of the leaves. The leaves of some mangrove can also store unwanted salt. Since leaf cells can hold a large volume of water when compared to all other cells, salt is drawn to the leaves as a mechanism to balance the salt concentration. As the leaves age, the cells grow in size since more water is needed to dilute the accumulating salt. This hoarding of water creates thick and fleshy leaves, a characteristic called succulence. Eventually, the leaves age and fall off the tree, taking the salt with them. **Hence statement 3 is not correct.**

Q 42.B

- Following are the facts about the earth's biodiversity based on the currently available species inventories:
  - More than 70 per cent of all the species recorded are animals, while **plants** (including algae, fungi, bryophytes, gymnosperms and angiosperms) **comprise no more than 22 per cent of the total. Hence statement 1 is not correct.**
  - Among animals, **insects are the most species-rich taxonomic group,** making up more than 70 per cent of the total. That means, out of every 10 animals on this planet, 7 are insects. **Hence statement 3 is correct.**
  - The **number of fungi species** in the world is **more than** the combined total of the species of **fishes, amphibians, reptiles and mammals. Arthropoda is the largest phylum in the animal kingdom**, which includes familiar forms as lobsters, crabs, **spiders, mites, insects, centipedes, and millipedes.** About **84 percent of all known species of animals** are members of this phylum. **Hence statement 2 is correct.**

Q 43.C

- The Nilgiri Biosphere Reserve was the first biosphere reserve in India established in the year 1986. It is located in the Western Ghats and includes 2 of the 10 biogeographical provinces of India. Wide ranges of ecosystems and species diversity are found in this region.
- Nilgiri Biosphere Reserve exemplifies the tropical forest biome and falls within the Western Ghats system which portrays the confluence of Afro-tropical and Indo-Malayan biotic zones of the world.
- The total area of the Nilgiri Biosphere Reserve is 5,520 sq. km. The Nilgiri Biosphere Reserve encompasses parts of Tamilnadu, Kerala and Karnataka. The Nilgiri Biosphere Reserve falls under the biogeographic region of the Malabar rain forest. The Mudumalai Wildlife Sanctuary, **Wayanad Wildlife Sanctuary,** Bandipur National Park, Nagarhole National Park, Mukurthi National Park and **Silent Valley are the protected areas present within this reserve.**
- **Neyyar,** Peppara and **Shendurney Wildlife Sanctuaries are located within the Agasthyamalai Biosphere Reserve.**
- **Hence, option (c) is correct answer.**

Q 44.A

- **Indian Elephant (EN) is listed in Schedule I of the Indian Wildlife (Protection) Act, 1972, CITES Appendix I and CMS Appendix I and Convention on the Conservation of Migratory Species of Wild Animals (CMS COP13). It aims:**
  - To protect Elephants and their habitat Government of India launched Project Elephant that is a Central Government sponsored conservation scheme launched in 1992
  - To protect elephant corridors and habitats
  - To mitigate and prevent human-elephant conflict.
- The government also provides technical and financial help to the elephant range states in the protection and management of elephant corridors and elephant habitats declared by the states.
- **Mayurjharna Elephant Reserve** is located in the areas of Midnapore, Bankura, and Purulia District of **West Bengal.** It is contiguous with the Singhbhum Elephant Reserve of Jharkhand State on the west and the Mayurbhanj Elephant Reserve of Odisha on the east. **Hence pair 1 is correctly matched.**
- **Baitami or (Brahmani-Baitarani) Elephant Reserve** is located in **Odisha.** It covers the portions of Keonjhar, Sundargarh, Angul and Dhenkanal districts. **Hence pair 2 is correctly matched.**
- **Lemru Elephant Reserve** is located in **Chhattisgarh.** It was declared as Elephant Reserve in 2019 to preserve the Hasdeo Arand forest (has high-quality coal reserves) and covers the portions of Surguja, Korba, Jashpur and Raigarh districts in Northern Chhattisgarh. The reserve is a refugee for elephants migrating from Jharkhand where open cast mining is rampant. **Hence pair 3 is not correctly matched.**
- **Mahanadi Elephant Reserve** is also located in the state of **Odisha** and consists of Satkosia Tiger Reserve and its adjoining wildlife sanctuaries i.e. Satkosia Gorge Wild Life Sanctuary and Baisipalli Wild Life Sanctuary. **Hence pair 4 is not correctly matched.**

Q 45.B

- According to the report 'Status of Tigers Co-predators and Prey in India', released by Union environment minister on the eve of Global Tiger Day, **Uttarakhand's Corbett Tiger Reserve (CTR) has reported the highest tiger density among India's 50 reserves with 14 tigers per 100 sq km, followed by Kaziranga, Nagarhole and Orang tiger reserves. Hence, statement 2 is correct.**
- According to the report, CTR has the highest tiger numbers with 231 inside the reserve and 266 using the reserve. CTR is followed by Nagarhole tiger reserve in Karnataka with 127 tigers, Bandipur Tiger Reserve (Karnataka) with 126 tigers and Bandhavgarh and Kaziranga tiger reserves with 104 tigers each.
- Critical 'tiger' habitats (CTHs), also known as core areas of tiger reserves—are identified under the Wild Life Protection Act (WLPA), 1972 based on scientific evidence that "such areas are required to be kept as inviolate for the purpose of tiger conservation without affecting the rights of the Scheduled Tribes or such other forest dwellers". The notification of CTH is done by the state government in consultation with the expert committee constituted for the purpose.
- **Nagarjunsagar-Srisailam Tiger Reserve is the largest tiger reserve in India and has the largest area under Critical 'tiger' habitats.** The reserve spreads over five districts, Kurnool District, Prakasam District, Guntur District, Nalgonda District and Mahbubnagar district. The total area of the tiger reserve is 3,728 km2 (1,439 sq mi). **Hence, statement 1 is not correct.**

Q 46.C

- **Habitat is the physical environment in which an organism lives (address of an organism). Many habitats can make up an ecosystem. Hence statement 1 is correct.**
- The habitat is a defined place or area of the environment according to the requirements of a particular life form. Therefore, a habitat is always an environment, but an environment is not always a habitat.
- A habitat always has life in it, whereas the environment does not necessarily have life in it. A habitat is always a preference of one species, whereas an environment could be a preference of many species that could eventually become many habitats.
- Usually, the environment governs the properties of a habitat, but not vice versa.
- A single habitat may be common for more than one organism which have similar requirements.
- For example, a single aquatic habitat may support a fish, frog, crab, phytoplankton and many others.
- The various species sharing a habitat thus have the same 'address'. E.g. Forest, river etc.
- **There is no natural habitat on earth that is inhabited only by a single species and such a situation is even inconceivable.** For any species, the minimal requirement is one more species on which it can feed. Even a plant species, which makes its own food, cannot survive alone; it needs soil microbes to break down the organic matter in soil and return the inorganic nutrients for absorption. **Hence statement 2 is correct.**

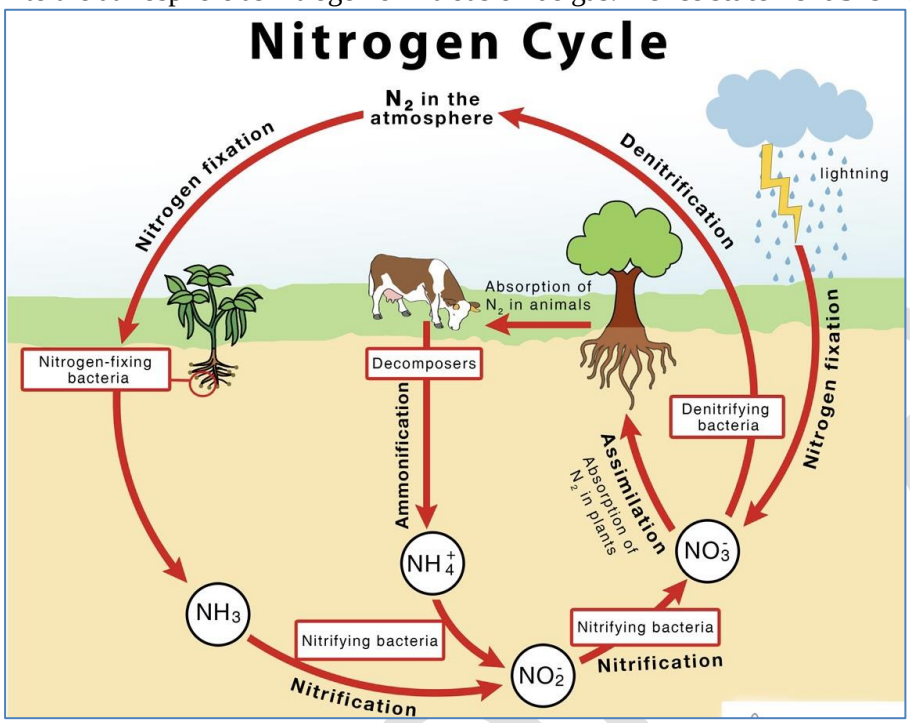
Q 47.C

- The Bengal florican (Houbaropsis bengalensis), also called Bengal bustard, is a bustard species native to the Indian subcontinent. **It is a Critically Endangered bird, restricted to the terai grassland regions of the Indo-Gangetic floodplain and the Brahmaputra floodplains.**
- Globally it is distributed in two isolated and disjunct populations recognized as distinct subspecies- **one in South East Asia in Cambodia (H.b.blandini) and the other in South Asia in India and Nepal (H.b.bengalensis).** The global population of Bengal Florican is estimated at <1000 mature individuals (BirdLife International 2016). **It is already locally extinct from Bangladesh and perhaps from Vietnam as well.**
- Once it was widely distributed from Uttar Pradesh, Bihar, West Bengal, to the foothills of Assam and Arunachal Pradesh in India. However, at present Bengal Florican is found only in the few protected pockets in India viz. Manas National Park, Kaziranga National Park, Orang National Park etc. Populations of Bengal Florican have declined as a result of habitat loss and hunting in the Indian subcontinent, the species no longer occurs outside protected areas.
- **Bengal florican is a grassland habitat specialist which acts as an indicator of a healthy grassland ecosystem. In India, it is protected under Schedule I of the Wildlife Protection Act, 1972.**
- **Hence, option (c) is the correct answer.**

Q 48.B

- **Nitrogen (N2) in the atmosphere cannot be directly used as a nutrient by plants or animals. It must be converted into its compound form of ammonia (NH4), nitrates or nitrites. Hence statement 1 is correct.**
- This occurs through four steps, of fixation, nitrification, ammonification and denitrification.

- Nitrogen fixing bacteria feed off the root nodules of certain plant species such as beans, peas and alfalfa while they fix nitrogen. **This nitrogen is then converted into ammonia to be used by those plants**. **Hence statement 2 is correct.**
    - Any unused ammonia undergoes nitrification. In the **ammonification** step, specialised bacteria and fungi feed and convert dead material (from animals) into compounds such as ammonia and water-soluble salts containing ammonium ions. These compounds are absorbed by plants for growth. In this manner, nutrients are recycled back from animals to plants.
- Finally, **the denitrifcation** step completes the nitrogen cycle as nitrogen leaves the soil and is released into the atmosphere as nitrogen or nitrous oxide gas. **Hence statement 3 is not correct.**



Q 49.B

- **Odisha's Kendrapara became the only district in India to be home to all three species of crocodilians found in the country** i.e. **Mugger (Crocodylus palustris), Saltwater Crocodiles (Crocodylus porosus) and Gharial (Gavialis gangeticus)** in a river system of the district. **The crocodilian family consists of 27 different species that are subdivided into three families: True crocodiles, alligators and caimans and gharials**.
- All three species of crocodilians in the river systems of Odisha were on the verge of extinction by the 1970s. Efforts were being made from the 1960s onwards to save them such as **the Gharial and saltwater crocodile conservation programme was first implemented in Odisha in early 1975** and subsequently, the mugger conservation programme was initiated. **The Ramatirtha centre, meant for mugger crocodiles within the Similipal Tiger Reserve, initially started with eggs and juveniles of muggers procured from Tamil Nadu.**
- **Hence option (b) is the correct answer.**

Q 50.C

- All the life on earth along with biological variety in all its forms, from the genetic makeup of plants and animals to cultural diversity encompasses biodiversity. It is mainly measured by the components such as species richness and species evenness. Species richness is measure of number of species found in a community whereas species evenness measure the proportion of species on a given site. Species richness is usually measured by Alpha diversity, Beta diversity, Gama diversity
- **Statement 1 is correct: Alpha diversity** refers to the diversity within a particular area or ecosystem and is usually express in number of species. So it will represent the species diversity present within each forest or grassland patch of the slope.
- **Statement 2 is correct: Beta diversity** is a comparison of diversity between the ecosystems and different communities, usually measured as change in amount of species. It will scale the species diversity between any two patches and their communities.
- **Gamma diversity** is a measure of overall diversity for different ecosystem within a region and scale species diversity along the entire range of the mountain slope.

Q 51.C

- Reef-building corals cannot tolerate water temperatures below 18° Celsius. Many grow **optimally in water temperatures between 23°–29°Celsius,** but some can tolerate temperatures as high as 40° Celsius for short periods.
- Most reef-building corals also require very saline (salty) water ranging from 32 to 42 parts per thousand.
- The water must also be clear so that a maximum amount of light penetrates it. This is because most reef-building corals contain photosynthetic algae, called zooxanthellae, which live in their tissues.
    - **Corals require fairly good amount of sunlight to survive. Hence it requires shallow water but at some places it is also found in deep waters as well.**
- Adequate supply of oxygen and microscopic marine food, called **plankton is essential for the growth**. **Hence option (c) is the correct answer.**

Q 52.A

- National Parks are declared in areas that are considered to be of adequate ecological, geomorphological and natural significance. **The Wild Life (Protection) Act (WPA) of 1972 provided for the declaration of National Parks by the State Government** in addition to the declaration of wildlife sanctuaries. The Central Government may also declare an area as a sanctuary/ National Park by notification. **Hence, statement 1 is correct.**
- The State Government shall publish a notification specifying the limits of the area which shall be comprised within the National Park and declare that the said area shall be a National Park on and from such date as may be specified in the notification. **No alteration of the boundaries of a National Park by the State Government shall be made except on a recommendation of the National Board for Wild Life. Hence, statement 3 is not correct.**
- **No grazing of any livestock shall be permitted in a National Park** and no livestock shall be allowed to enter therein except where such livestock is used as a vehicle by a person authorised to enter such National Park. **Hence, statement 2 is not correct.**
- The Chief Wild Life Warden shall be the authority who shall control, manage and maintain all Protected Areas. The National Board for Wild Life may make recommendations on the setting up of and management of National Parks, Sanctuaries and other protected areas.

Q 53.A

- Biosphere reserves are sites established by countries to promote sustainable development based on local community efforts and sound science.
- The National Biosphere Reserve Programme was initiated in 1986 to ensure the participation of local inhabitants for effective management and devise means of improving the livelihood of the local inhabitants through sustainable use.
- **The Biosphere Reserves differ from protected areas due to their emphasis on the conservation of overall biodiversity and landscape, rather than some specific flagship species**, to allow natural and evolutionary processes to continue without any hindrance. **Hence, statement 1 is correct.**
- The Management of Biosphere Reserves is the responsibility of the concerned State/UT with necessary financial assistance, guidelines for management and technical expertise provided by the Central Government.
- **The Indian National Man and Biosphere Committee constituted by the Central Govt. identifies new sites, advises on policies and programmes**, lays down guidelines, reviews progress and guidelines in the light of evaluation studies and feedback. **Hence, statement 2 is not correct.**

Q 54.B

- Seagrasses are found in shallow salty and brackish waters in many parts of the world, from the tropics to the Arctic Circle.
- Seagrasses are so-named because most species have long green, grass-like leaves. They are often confused with seaweeds, but are actually **more closely related to the flowering plants** that you see on land.
    - **Seagrasses have roots, stems and leaves, and produce flowers and seeds**. **Seagrasses have roots and rhizomes (thicker stems), which extend into the sediment below the leaves. The roots and rhizomes absorb and store nutrients, and help to anchor the seagrass plants (and sediment) in place. Hence option (b) is the correct answer.**
- Seagrasses provide shelter and food to an incredibly diverse community of animals, from tiny invertebrates to large fish, crabs, turtles, marine mammals and birds.
- Seagrasses are often called foundation plant species or ecosystem engineers because they modify their environments to create unique habitats. These modifications not only make coastal habitats more suitable

for the seagrasses themselves, but also have important effects on other animals and provide ecological functions and a variety of services for humans.

- They depend on light for photosynthesis, they are most commonly found in shallow depths where light levels are high. Many seagrass species live in depths of 3 to 9 feet (1 to 3 meters), but the deepest growing seagrass (Halophila decipiens (link is external)) has been found at depths of 190 feet (58 meters).
- **Seagrasses reproduce sexually like terrestrial grasses**, but pollination for seagrasses is completed with the help of water.

Q 55.C

- Most reef-building corals contain photosynthetic algae, called zooxanthellae, that live in their tissues. **The coral provides the algae with a protected environment and compounds they need for photosynthesis.** In return, the algae produce oxygen and help the coral to remove wastes. Most importantly, zooxanthellae supply the coral with glucose, glycerol, and amino acids, which are the products of photosynthesis. The coral uses these products to make proteins, fats, and carbohydrates, and produce calcium carbonate.
  - This symbiotic relationship, called a mutualism, benefits both the corals and the algae. **Hence statement 2 is correct.**
  - Because of their intimate relationship with zooxanthellae, reef-building corals respond to the environment like plants. **But the zooxanthellae are fast growing plants where as corals are slow growing colonies of animals. Hence statement 1 is correct.**

Q 56.A

- Pyramid of numbers represents the total number of individuals of different species (population) at each trophic level.
- **In a forest ecosystem**, large sized trees are the producers, which are less in number and so form a narrow base. The trees support large number of herbivores like insects, birds, frogs, etc. including several species of animals that feed upon leaves, fruits, flowers, bark, etc. of the trees. They are large in number than trees and hence form a middle broad level. The secondary consumers like predatory birds (hawks, eagle, etc.), foxes, snakes, lizards, etc. are less in number than herbivores while top carnivores like lion, tiger, etc. are still smaller in number making the pyramid gradually narrow towards apex. So the pyramid assumes a spindle shape with narrow on both sides and broader in the middle. **Hence option (a) is the correct answer.**
- **In grassland and aquatic ecosystems**, pyramid of number is upright. The producers in the grassland are the grasses and in aquatic ecosystems are phytoplanktons (algae etc.) which are small in size and large in number per unit area. So the producers form a broad base in the pyramid. The herbivores in the grassland are the insects; carnivores are frogs, birds, etc. and top carnivores are hawk, eagle, foxes etc. which are gradually less and less in number and so the pyramid apex becomes gradually narrower forming an upright and erect pyramid.
- Similar is the case with herbivores (zooplanktons, etc.), carnivores (small fishes, etc.) and top carnivores (large fishes, crocodile, etc.) in **aquatic ecosystems** (pond, lake or marine ecosystem) which decreases in number at higher trophic levels, thus forming an upright pyramid of numbers.

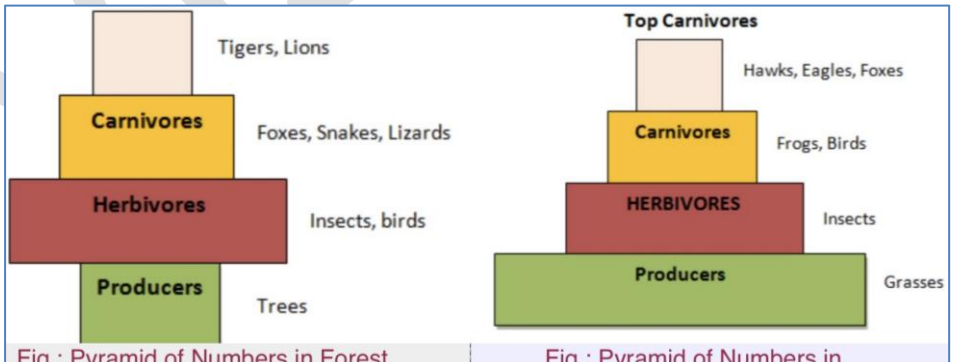


Fig.: Pyramid of Numbers in Forest Ecosystem (Spindle shaped)

Fig.: Pyramid of Numbers in Grassland Ecosystem (Upright)

Q 57.D

- Mammals are vertebrate animals that are endothermic, have hair on their bodies, and produce milk to feed their babies. Many mammals give birth to live young that are small. Regulating their own body temperature and having hair of various thicknesses for protection has also allowed mammals to live in almost every habitat on Earth.

- Marine mammals are found in marine ecosystems around the globe. They are a diverse group of mammals with unique physical adaptations that allow them to thrive in the marine environment with extreme temperatures, depths, pressure, and darkness.
- **Marine mammals are classified into four different taxonomic groups: cetaceans (whales, dolphins, and porpoises), pinnipeds (seals, sea lions, and walruses), sirenians (manatees and dugongs), and marine fissipeds (polar bears and sea otters).**
    - **Sea cow, (Hydrodamalis gigas), also called Steller's sea cow is a very large aquatic mammal.** Steller's sea cow belonged to the same family as the dugong. The extremely large size of Steller's sea cow functioned as an adaptation for survival in cool waters by providing the animal with a smaller ratio of surface area to volume. **Hence option 2 is correct.**
    - **Seals and sea lions are marine mammals called 'pinnipeds'** that differ in physical characteristics and adaptations. They all have flippers at the end of their limbs to help them swim. Like all marine mammals, they have a thick layer of blubber to keep them warm in the chilly ocean. They are found primarily in Pacific waters. **Hence option 4 is correct.**
- **Sea horse or Hippocampus is an example of marine bony fish. They are marine fish belonging to the genus Hippocampus of the family Syngnathidae.** They are found in temperate and tropical waters all over the world. Seahorses range in size from 16 mm to 35 cm. They are notable for being the only species where the males get pregnant. **Hence option 1 is not correct.**
- Jellyfish are one of the oldest animals on Earth. They appeared before dinosaurs, between 500 and 700 million years ago. Jellyfish are found in every ocean, and even in some freshwater ponds and lakes. Most jellyfish prefer warm water, but some inhabit subarctic areas. Despite their name, jellyfish are not fish. **They are a type of zooplankton** that both drift in the ocean and have some swimming ability. Jellyfish are invertebrates; animals without skeletons. About 95% of their bodies are water. Jellyfish not only do not have bones, they have no brains, heads or hearts. **Hence option 3 is not correct.**
- **Hence, option (d) is correct answer.**

Q 58.A

- **Pond ecosystem is a freshwater ecosystem** on which living organisms rely for their survival and food. Ponds are shallow water bodies going about 12–15 feet deep. Due to enough light penetration, ponds can facilitate plant growth.
- All ponds support a wide diversity of plant and animal life that unitedly forms food chains and food web. One of the food chains in pond ecosystems consists of Algae, Water fleas, Sticklback and Pike.
    - **Algae** are a large group of simple organisms. They are **photosynthetic** like land plants.
    - **Water fleas are small crustaceans.** They are found in fresh waters. They mostly eat small algae and microscopic plants.
    - The **stickleback** is a **fish** with no scales, although some have bony armour plates. They **feed on small crustaceans** and fish larvae.
    - **Pike** is a freshwater fish, it **eats smaller fish,** insects and amphibians such as newts or frogs.
    - Hence the correct food chain sequence is **Algae - Wateflea - Stickleback - Pike. Hence option (a) is the correct answer.**
- If farmers remove the pike from the top of food chain then there will initially population explosion of the stikle back. However, these will soon eat all the waterfleas and die of starvation, leaving the algae to grow unchecked and choke up the pond.If a food web has only a few links then the effect of removing one species on the remaining organisms can be severe but if a food web has many links, then **removal of one species may not have such a drastic effect.**

Q 59.D

- **Recent context: A first-of-its-kind study by the Zoological Survey of India (ZSI) under the Union Ministry of Environment, Forest and Climate Change, has projected that numbers of the Malayan Giant Squirrel (Ratufa bicolor) could decline by 90 percent in India by 2050, and if urgent steps are not taken, the species could be extinct in the country in subsequent decades.**
- **The Malayan Giant Squirrel is one of the world's largest squirrel species that has a dark upper body, pale underparts, and a long, bushy tail, is currently found in parts of West Bengal, Sikkim, Assam, Arunachal Pradesh, Meghalaya, and Nagaland.**
    - **It is not a flying squirrel.**
- **Hence, both statements are not correct.**
- The Malayan Giant Squirrel is also distributed through Southern China, Thailand, Laos, Vietnam, Burma, the Malayan Peninsula, Sumatra, and Java.

- It is found mostly in evergreen and semi-evergreen forests, from plains to hills at elevations of 50 m to 1,500 m above sea level.
- **It is listed as Near Threatened on IUCN's list, and it is protected under India's Wildlife Protection Act.**
- Malayan Giant Squirrel and its habitat are under threat from deforestation, fragmentation of forests, crop cultivation and over-harvesting of food, illegal trade in wildlife, and hunting for consumption. Slash-and-burn jhum cultivation in many areas of the Northeast contribute to the destruction of its habitat.
- India is also home to two other giant squirrel species– Indian Giant Squirrel and Grizzled Giant Squirrel – which are found in peninsular India.

Q 60.B

- Ecologists and evolutionary biologists have proposed various hypotheses about greater biological diversity in tropics; some important ones are
  - **Speciation** is generally a function of time, unlike temperate regions subjected to frequent glaciations in the past, tropical latitudes have remained relatively undisturbed for millions of years and thus had a **long evolutionary time for species diversification. Hence option 4 is correct.**
  - **Tropical environments,** unlike temperate ones, are **less seasonal,** relatively more constant and predictable. Such constant environments promote niche specialisation and lead to a greater species diversity. **Hence option 2 is correct.**
  - There is **more solar energy available in the tropics,** which contributes to higher productivity; this in turn might contribute indirectly to greater diversity. **Hence option 3 is correct.**
- Tropical soils are formed in areas with high annual temperature and rainfall. This climate that results in deep, highly weathered soils. The intense weathering causes these **soils to be nutrient poor and low in organic matter and low in fertility. Hence option 1 is not correct.**

Q 61.D

- A lagoon is a shallow body of water that may have an opening to a larger body of water, but is also protected from it by a sandbar or coral reef.
- **Lagoon is a back water system from sea and no connection with fresh water while estuary is a river mouth region regularly influenced by high tides and low tides of sea. Hence statement 2 is correct.**
- **An estuary is a partially enclosed body of water formed where fresh water from land meets and mixes with salt water from the ocean. Hence statement 1 is not correct.**
- Estuaries transport and trap nutrients and sediment through the combined action of freshwater flow, wind, waves and tidal action.
- A basic feature is the instability of an estuary due to the ebb and flood of the tide.
- **Estuaries are among the most productive environments on earth. Hence statement 3 is correct.**
- Formation of estuary: Sea level has slowly risen over the last 15000 years remaining stable over the last 6000 years. As the sea rose it drowned river valleys and filled glacial troughs. Once formed, estuaries make good sediment traps, filling with sediment from both the land and the sea.

Q 62.A

- **Recently, Global Methane Pledge was launched at the UNFCCC COP26 in Glasgow.**
- Methane (CH_4) is a hydrocarbon that is a primary component of natural gas.
- Methane is the **second most abundant anthropogenic Green House Gas** after carbon dioxide (CO_2), accounting for about 20 per cent of global emissions. **Hence statement 2 is not correct.**
- Methane is more than **25 times as potent as carbon dioxide** at trapping heat in the atmosphere. **Hence statement 1 is correct.**
- Launched at the G20 Summit**, the International Methane Emissions Observatory (IMEO)** is a data-driven, action-focused initiative by the **UN Environment Programme (UNEP)** with support from the **European Commission** to catalyse the dramatic reduction of methane emissions, starting with the energy sector. **Hence statement 3 is not correct.**

Q 63.A

- Conservation Reserve and Community Reserves are the outcome of Amendments to the Wildlife protection act in 2003.
- The State Government may, after having consultations with the local communities, **declare any area owned by the Government** particularly the areas adjacent to National Parks and sanctuaries and those areas which link one protected area with another, **as a conservation reserve for protecting landscapes, seascapes, flora and fauna and their habitat. Hence, statement 1 is correct.**

- The State Government may declare **any private or community land** not comprised within a National Park, sanctuary or a **conservation reserve**, as a community reserve, for protecting fauna, flora and traditional or cultural conservation values and practices.

- **The State Government (not Central Government) shall constitute a conservation reserve management committee to advise the Chief Wild Life Warden to conserve, manage and maintain the conservation reserve. Hence, statement 2 is not correct.**
- The committee shall consist of a representative of the forest or Wild Life Department, who shall be the Member-Secretary of the Committee, one representative of each Village Panchayat in whose jurisdiction the reserve is located, three representatives of non-governmental organisations working in the field of wildlife conservation and one representative each from the Department of Agriculture and Animal Husbandry.

Q 64.A

- Balpakram National Park is located in the South Garo Hills of Meghalaya. The literal meaning of Balpakram is the "land of perpetual winds".
- **Balpakram is famous for its forest-covered canyon-cum-gorge and numerous geophysical formations, all of which makes the place a land of mystery. It is often compared to the Grand Canyon National Park of the United States of America**, to the local Garo inhabitants, Balpakram is the abode of the spirits of the dead.
- **It is home to one of the rarest animals in the world - the Lesser Panda or the Red Panda** as it is commonly known. Balpakram is a place of perpetual winds, covering an area of about 220 sq. km with a variety of wildlife including tigers, elephants, bison, black bear, leopards, sambar deer.
- **Hence, option (a) is the correct answer.**

Q 65.D

- **Recently, Professor Bimal Patel, Vice-Chancellor, Rashtriya Raksha University and Member of National Security Advisory Board of India, has been elected to the International Law Commission for a five-year term starting January 1, 2023.**
- The International Law Commission was established by the **United Nations General Assembly in 1947** to undertake the mandate of the Assembly to "initiate studies and make recommendations for the purpose of encouraging the progressive development of international law and its codification". **Hence statement 1 is not correct.**
- The Statute of the International Law Commission provides that the Commission shall consist of **34 members "who shall be persons of recognised competence in international law." Hence statement 2 is not correct.**
- The members of the Commission are to be elected by the General Assembly from a list of candidates nominated by the Governments of States Members of the United Nations.

Q 66.D

- **Recently, global giants like Amazon and Apple as well as Mahindra Group and Dalmia Cement (Bharat) from India have joined as founding members of the 'First Movers Coalition'.** It was launched by the **World Economic Forum.**
- The **First Movers Coalition, which was launched at the Climate Change Conference COP26 of UNFCCC**, brings together global companies with supply chains across carbon-intensive sectors.
- They range from major consumer goods firms that ship, truck and fly their products, to renewable energy companies that use steel to build wind turbines.
- These companies are leveraging their collective buying power to create the market conditions required to unleash innovation which will reduce the amount of carbon emitted in certain particularly pollutant industries.
- **Hence option (d) is the correct answer.**

Q 67.B

- **Recently, the Cabinet Committee on Economic Affairs approved reservation norms for mandatory use of jute in packaging for the Jute Year 2021-22.**
- The mandatory packaging norms approved for Jute Year 2021-22 provide for **100 per cent reservation of foodgrains and 20 per cent of sugar to be compulsorily packed in jute bags. Hence statement 3 is not correct.**
- India is the world's biggest producer of jute, followed by Bangladesh.

- Jute is primarily grown in **West Bengal, Odisha, Assam, Meghalaya, Tripura and Andhra Pradesh. Hence statement 1 is not correct.**
- The jute industry in India is 150 years old.
- There are about 70 jute mills in the country, of which about 60 are in West Bengal along both the banks of river Hooghly.
- Compared to rice, **jute requires less water and fertiliser. Hence statement 2 is correct.**
- **The daily consumptive use of rice varies from 6-10 mm and total water ranges from 1100 to 1250 mm. While Jute crop requires 500 mm of water.**
- It is largely pest-resistant, and its rapid growth spurt ensures that weeds don't stand a chance.
- To top it all, the monetary returns on jute are twice that of paddy. An acre of land produces approximately nine quintals of fibre.

Q 68.D

- Tiger reserves are areas that are notified for the protection of the tiger and its prey, and are governed by **Project Tiger** which was launched in 1973. Initially 9 tiger reserves were covered under the project, and has currently increased to **51**.
- The **State Government**, on the recommendation of the National Tiger Conservation Authority notify an area as a tiger reserve. **Some of the important tiger reserves includes Jim Corbett, Bandhavgarh, Sariska, Mudumalai, Sathyamangalam, Similipal and the latest one Srivilliputhur Megamalai.**
  - **Srivilliputhur Megamalai Tiger Reserve** is the fifth tiger reserve in Tamil Nadu. An area of 1,01,657.13 hectares or 1016.5713 sq.km in Srivilliputhur Grizzled Giant Squirrel Sanctuary and Megamalai Wildlife Sanctuary have been combined to create the tiger reserve.
  - **Sathyamangalam Tiger Reserve** is a protected area and tiger reserve in the Western Ghats in the Erode District of the Indian state of Tamil Nadu. It has 1,411 sq. km protected area for tiger reserve contiguous to four other areas – Madumalai National Park, Sigur Plateau, Bandipur National Park and Biligiriranga Swamy Temple Wildlife Sanctuary.
  - **Similipal Tiger Reserve** is a compact block of elevated plateau located in central portion of the Mayurbhanj district in Odisha. The stretch of forest including Similipal RF spread over an area of 2750 km2 was declared as 'Tiger Reserve' with effect from 04-12-1973 under 'Project Tiger' Scheme of Government of India.
- **Hence option (d) is the correct answer.**

Q 69.A

- **Recently, the "Dairy Sahakar" scheme has been launched at Anand, Gujarat today, during the function organised by Amul for celebration of 75th Foundation Year of Amul.**
- The Dairy Sahakar with a total investment of Rs 5000 crore will be implemented by National Cooperative Development Corporation (NCDC) under Ministry of Cooperation, Government of India to realize the vision, "from cooperation to prosperity".
- Under Dairy Sahakar, **financial support** will be extended by NCDC to eligible cooperatives for activities such as **bovine development, milk procurement, processing, quality assurance, value addition, branding, packaging, marketing, transportation and storage of milk and milk products, exports of dairy products** within the overall objectives of "Doubling the farmers income" and "Atmanirbhar Bharat. **Hence, statement 3 is not correct.**
- There will also be a convergence with various schemes of Government of India and/or of State Government/UT Administration/Development agencies/ bilateral/multilateral assistance/ CSR mechanism is encouraged.
- Dairy is one of the biggest agri- businesses in India and a significant contributor to Indian economy.
- It is the largest single agricultural commodity with ~4 per cent share in economy. **Hence statement 2 is correct.**
- India is the largest producer of milk globally with an ~188 million MT production in 2019-20. **Hence statement 1 is correct.**

Q 70.D

- Wetlands are unique, productive ecosystems where terrestrial and aquatic habitats meet. Wetlands play a critical role in maintaining many natural cycles and supporting a wide range of biodiversity.
- Wetlands are particularly **important providers of all water-related ecosystem services.** They regulate water **quantity, groundwater recharge**, and can **contribute to regulating floods and the impacts of storms**. Wetlands also help in **erosion control and sediment transport**, thereby contributing to land

formation and increasing resilience to storms. All these ecosystem services improve water security, including security from **natural hazards and climate change adaptation.**

- Wetlands have **high recreational, historical, scientific, and cultural values.** Wetlands have played an important part in human development and are of significant religious, historical or archeological value to many cultures around the world. They are also often inviting places for popular recreational activities including hiking, fishing, bird watching, photography and hunting.
- Wetlands **purify and filter harmful waste from water.** Plants from wetlands help absorb harmful fertilizers and pesticides, as well as **heavy metals and toxins from industry**. They help in **nutrients recycling, groundwater recharge and stabilisation of local climates.**
- Wetlands act as **nature's sponges.** Peatlands, wet grasslands and floodplains in river basins act as natural sponges by **absorbing rainfall and creating wide surface pools that ease flooding in rivers**. The same storage capacity can also safeguard against drought.
- Wetlands **help fight climate change**. Peatlands alone store more than twice as much carbon as all the world's forests. Faced with rising sea levels, coastal wetlands reduce the impact of typhoons and tsunamis. They also bind the shoreline and resist erosion.
- **Hence option (d) is the correct answer.**

Q 71.D

- The Gangetic river system is home to a vast variety of aquatic life, including the Gangetic dolphin (Platanista gangetica). The Gangetic dolphin is one of five species of river dolphin found around the world. It is found mainly in the Indian subcontinent, particularly in Ganga-Brahmaputra-Meghna and Karnaphuli-Sangu river systems.
  - **There are currently two species of river dolphins inhabiting India, the Ganges River Dolphin (Platanista gangetica) and the Indus River Dolphin (Platanista minor). Hence, option (d) is not correct.**
- Ganges river dolphins once lived in the Ganges-Brahmaputra-Meghna and Karnaphuli-Sangu river systems of Nepal, India, and Bangladesh. But the species is extinct from most of its early distribution ranges.
- **The Ganges river dolphin can only live in freshwater and is essentially blind.** They hunt by emitting ultrasonic sounds, which bounces off of fish and other prey, enabling them to "see" an image in their mind. It was found "no sighting record for Gangetic dolphin in waterways wherever the salinity level crosses 10 parts per trillion (ppt)". The researchers believe that rise in salinity in the eastern and central region of Sundarbans has affected the habitat of species.
- They are frequently found alone or in small groups, and generally a mother and calf travel together. **Females are larger than males and give birth once every two to three years to only one calf.**

Q 72.D

- A constant input of solar energy is the basic requirement for any ecosystem to function and sustain. Primary production is defined as the amount of biomass or organic matter produced per unit area over a time period by plants during photosynthesis.
- The rate of biomass production is called productivity.
  - It can be divided into gross primary productivity (GPP) and net primary productivity (NPP).
  - **Gross primary productivity of an ecosystem is the rate of production of organic matter during photosynthesis. Hence statement 1 is correct.**
  - A considerable amount of GPP is utilised by plants in respiration. Gross primary productivity minus respiration losses (R), is the net primary productivity (NPP).
  - **GPP – R = NPP**
  - **Net primary productivity is the available biomass for the consumption to heterotrophs (herbivores and decomposers). Hence statement 2 is correct.**
- Secondary productivity is defined as the rate of formation of new organic matter by consumers.
- Primary productivity depends on the plant species inhabiting a particular area. It also depends on a variety of environmental factors, availability of nutrients and photosynthetic capacity of plants. Therefore, it varies in different types of ecosystems. **Hence statement 3 is correct.**

Q 73.A

- The Wild Life (Protection) Act of 1972 provided for the declaration of certain areas by the State Government as wildlife sanctuaries if the area was thought to be of adequate ecological, geomorphological and natural significance.

- **The Wild Life (Protection) Act of 1972 provides prohibits certain activities in Wildlife sanctuaries. These include**:
  - Causing fire prohibited. – No person shall set fire to a sanctuary, or kindle any fire, or leave any fire burning, in a sanctuary, in such manner as to endanger such sanctuary.
  - Prohibition of entry into the sanctuary with a weapon. – No person shall enter a sanctuary with any weapon except with the previous permission in writing of the Chief Wild Life Warden or the authorised officer.
  - **Ban on use of injurious substances**. – **No person shall use, in a sanctuary, chemicals, explosives or any other substances which may cause injury to, or endanger, any wildlife in such sanctuary. Hence option 1 is correct.**
- Certain activities are regulated in sanctuaries. The Chief Wild Life Warden shall be the authority who shall control, manage and maintain all sanctuaries and for that purpose, within the limits of any sanctuary
  - **may construct such roads, bridges, buildings, fences or barrier gates, and carry out such other works as he may consider necessary for the purposes of such sanctuary. Hence option 2 is not correct.**
  - shall take such steps as will ensure the security of wild animals in the sanctuary and the preservation of the sanctuary and wild animals therein;
  - **The Chief Wild Life Warden shall take such measures in such manner, as may be prescribed, for immunisation against communicable diseases of the livestock kept in or within five kilometres of a sanctuary. Hence option 4 is not correct.**
- **No construction of commercial tourist lodges, hotels, zoos and safari parks shall be undertaken inside a sanctuary except with the prior approval of the National Board for Wild Life. Hence option 3 is not correct.**

Q 74.C

- **An ecosystem is a functional unit of nature, where living organisms interact among themselves and also with the surrounding physical environment. Hence option (c) is the correct answer.**
- Ecosystems contain biotic or living, parts, as well as abiotic factors, or non-living parts. Biotic factors include plants, animals, and other organisms. Abiotic factors include rocks, temperature, and humidity.
- Every factor in an ecosystem depends on every other factor, either directly or indirectly. A change in the temperature of an ecosystem will often affect what plants will grow there, for instance. Animals that depend on plants for food and shelter will have to adapt to the changes, move to another ecosystem, or perish.
- Biosphere is the narrow zone of earth where land, water and air interact with each other to support life. The plant and animal kingdom together make the biosphere. It is a region of earth which supports life. Biome is a large naturally occurring community of flora and fauna occupying a major habitat.

Q 75.D

- **Allogenic Succession:**
  - Succession that results from factors external to the community is called allogenic succession.
  - **In allogenic succession, the principal force of change comes primarily from outside the community. Such external forces may include climate change, changes in temperature and other environmental factors, or other types of massive disturbances. Hence statement 1 is not correct.**
  - Allogenic succession occurs on a time scale which is in accordance or proportionate with the time scale of the disturbance. Allogenic succession resulting from climate change may occur over thousands of years.
- **Autogenic Succession:**
  - Succession that results from changes brought about by the organisms themselves is called autogenic succession.
  - The change from an abandoned agricultural field to a mature forest is an example of autogenic succession.
  - In autogenic succession, the principal force of change comes from within the community. Therefore, autogenic succession occurs on time scales commensurate with the life span of the organisms in the community
- The ecological succession can be broadly classified into two kinds on the basis of the nature of habitat:
  - **Hydrarch (Hydrosere):** A hydrosere is a plant succession which occur in a area of fresh water body such as pond, lakes and marshes**.**
  - **Xerarch (Xerosere):** Succession takes place in Xeric or dry habit like sand deserts, sand dunes or rocks where moisture is present at minimal amount is known as Xerosere. **Hence statement 2 is not correct.**

Q 76.C

- Genetic Modification is a technology that involves inserting DNA into the genome of an organism. To produce a GM plant, new DNA is transferred into plant cells. Usually, the cells are then grown in tissue culture where they develop into plants. Genetic modification of plants involves adding a specific stretch of DNA into the plant's genome, giving it new or different characteristics. This could include changing the way the plant grows or making it resistant to a particular disease. The **new DNA becomes part of the GM plant's genome which the seeds produced by these plants will contain. Hence statement 1 is correct**
- **The world's first genetically modified (GM) rubber plant was planted on the outskirts of Guwahati, Assam, recently.** The GM rubber plant, the first of its kind developed exclusively for the northeast, is expected to thrive in the climatic conditions of the region. The plant is expected to tide over severe cold conditions during winters, a major factor affecting the growth of young plants as natural rubber is a native of warm humid Amazon forests and is not naturally suited for cold conditions in the northeast. The plant, which has additional copies of gene MnSOD (manganese-containing superoxide dismutase) in it, is expected to revolutionize natural rubber production in India. The MnSOD gene has the ability to protect plants from the adverse effects of severe environmental stresses such as cold and drought, The plant was developed at the Kerala-based Rubber Research Institute of India (RRII). **Hence statement 2 is correct**

Q 77.A

- **Recently, the Prime Minister of India unveiled a 12-foot statue of Adi Shankaracharya at Kedarnath, where the acharya is believed to have attained samadhi at the age of 32 in the ninth century.**
- Kedarnath temple is one of the sacred pilgrimage centres in Northern India, located on the **bank of the Mandakini river. Hence statement 2 is not correct.**
- Dedicated to **Lord Shiva, the Kedarnath temple** has exquisite architecture Built of extremely large, heavy and evenly cut grey slabs of stones.
- The temple has a Garbha Griha for worship and a Mandap, apt for assemblies of pilgrims and visitors.
- A conical rock formation inside the temple is worshipped as Lord Shiva in his **Sadashiva form.**
- The temple was originally built in the 8th century A.D. by **Jagad Guru Adi Shankaracharya** and stands adjacent to the site of an even earlier temple built by the Pandavas. **Hence statement 1 is correct.**
- The inner walls of the assembly hall are decorated with figures of various deities and scenes from mythology.
- Outside the temple door, a large statue of the Nandi Bafellow stands as a guard.
- It is a part of **Char Dhams and Panch Kedar in Uttarakhand** and one of the **12 Jyotirlingas of Lord Shiva in India.**

Q 78.A

- **The Vavilov centre of origin** is a geographical area where the **particular group of crops (either domesticated or wild) first originated on earth.** Many people believed that centres of origin are also centres of diversity. But, the centres of diversity may not represent the centres of origin of crop plants. Centers of origin were first identified in 1924 by Nikolai Vavilov.
- He considered that great centres of origin were always **located in lower mountains and hills of tropical, sub-tropical regions.** He also recognizes some secondary centres of origin where two or more species crossed together. Secondary centres of origin are the places where natural and artificial selection occurred on after another. He stated that plants were not domesticated at random but it was a continuous process. Examples of Vavilov centers include: **Chinese center, Mediterranean centre etc.**
- **India is a Vavilov centre of high crop genetic diversity.** Vavilov "classified the world's crop producing regions into eight centres of plant origin. Of these areas of crop genetic diversity, India was central to what he called the '**Hindustan Center of Origin'.**
- **Hence option (a) is the correct answer.**

Q 79.D

- **Recently, the National Sports Awards for 2021 were announced.**
- National Sports Awards are given every year to recognize and reward excellence in sports.
- **Major Dhyan Chand Khel Ratna Award** is given for the spectacular and most outstanding performance in the field of sports by a sportsperson over a period of the previous four years.
- **Arjuna Award for outstanding performance in Sports and Games** is given for good performance over a period of the previous four years and showing qualities of leadership, sportsmanship and a sense of discipline.

- **Dronacharya Award for outstanding coaches in Sports and Games** is given to coaches for doing outstanding and meritorious work on a consistent basis and enabling sportspersons to excel in International events.
- **Dhyan Chand Award for Lifetime Achievement in Sports and Games** is given to honour sportspersons who have contributed to sports by their performance and continue to contribute to the promotion of sports events after their retirement.
- **Rashtriya Khel Protsahan Puruskar** is given to corporate entities (both in the private and public sector), sports control boards, NGOs including sports bodies at the state and national level who have played a visible role in the area of sports promotion and development.
- Overall top performing university in inter-university tournaments is given **Maulana Abul Kalam Azad (MAKA) Trophy.**
- **Hence option (d) is the correct answer.**

Q 80.D

- Adaptive radiation is a rapid increase in the number of species with a common ancestor, characterized by great ecological and morphological diversity. The driving force behind it is the adaptation of organisms to new ecological contexts.
  - The phenomenon of adaptive radiation was first observed by Darwin when he travelled to a place called Galapagos Island. There he observed that there were finches with different types of beaks. So, he concluded that all of these inches radiated on the same island from a single ancestor Finch. All of these finches developed beaks according to the kind of food available to them. Hence, they evolved from the conventional seed-eating finches to vegetarian and insectivorous finches. They later came to be known as Darwin's finches. **Hence option (d) is the correct answer.**
- Gradual change in an organism to survive in an environment is called **evolution**.
- **Speciation** is the process by which new species are formed.
- Small changes that take place in the body of a single organism over short periods to overcome minor problems due to changes in the surroundings is called **acclimatisation**.

Q 81.A

- **Pollutants** specially **nondegradable ones** move through the various trophic levels in an ecosystem. Non degradabale pollutants are those materials, which **cannot be metabolised by the living organisms.** For example chlorinated hydrocarbons. Movement of these pollutants involve two main processes:
  - **Bioaccumulation:** It refers to how pollutants enter a food chain. In bioaccumulation there is an increase in concentration of a pollutant from the environment to the first organism in a food chain.
  - **Biomagnification:** Biomagnification refers to the tendency of pollutants to concentrate as they move from one trophic level to the next. Thus in biomagnification there is an increase in concentration of a pollutant from one link in a food chain to another.
- People are concerned about these phenomena because together they enable even small concentrations of chemicals in the environment to find their way into organisms in high enough dosages to cause problems. In order for **biomagnification to occur, the pollutant must be**
  - **long-lived;**
  - **mobile;**
  - **soluble in fats;**
  - **biologically active.**
- If a pollutant is short-lived, it will be broken down before it can become dangerous. If **it is not mobile**, it will stay in one place and is **unlikely to be taken up by organisms.** If the pollutant is soluble in water, it will be excreted by the organism. **Pollutants that dissolve in fats,** however, may be retained for a long time. It is traditional or customary to measure the amount of pollutants in fatty tissues of organisms such as fish. In mammals, we often test the milk produced by females, since the milk has a lot of fat in it and because the very young are often more susceptible to damage from toxins (poisons). If a **pollutant is not active biologically, it may biomagnify,** but we really do not worry about it much, since it probably, will not cause any problems.
- **Hence option (a) is the correct answer.**

Q 82.C

- **"Ecological succession" is the observed process of change in the species structure of an ecological community over time.** Succession occurs due to large scale changes or destruction (natural or manmade). Within any community some species may become less abundant over some time interval, or they may even vanish from the ecosystem altogether. Similarly, over some time interval, other species within the

community may become more abundant, or new species may even invade into the community from adjacent ecosystems. This observed change over time in what is living in a particular ecosystem is "ecological succession".

- **Primary succession** is an ecological succession where a newly formed area is colonized for the first time by a group of species or a community. This previously uninhabited, barren area is usually lacking topsoil and organic matter.
  - **The species colonizing an uninhabited area for the first time is referred to as the pioneer species and the dominating community is called pioneer community. For example, in primary succession on a terrestrial site, the new site is first colonised by a few hardy pioneer species that are often microbes, lichens and mosses. Hence statement 2 is correct.**
- **Secondary succession occurs when a previously occupied area is colonized by a new dominating group of species or communities**.
  - In secondary succession, the new inhabitants replace the previous communities over a habitat that had been exposed to a particular ecological disturbance. The disturbance may be an external or an internal factor. An example of secondary succession is the recolonization of an area damaged by fire.
  - Primary succession takes a longer period of time to be established and completed, i.e. a thousand or more years. On the contrary, the secondary succession often occurs relatively faster, requiring only a shorter period of time, like a decade or a hundred years. This is because an area that has just been newly formed would be initially unfavorable for most life forms.
- There is a concept in ecological succession called the "climax" community. It is the final stage of succession. The climax community represents a stable end product of the successional sequence. Though forests form the climax community in most of the ecosystems, in the grassland ecosystem grasses form the **climax community.**
  - **The stage leading to the climax community is called successional stages or seres. Each transitional community that is formed and replaced during succession is called a stage in succession or a seral community. Hence statement 1 is correct**.

Q 83.B

- **Recently, the Clydebank Declaration was signed by 19 countries including Britain and the United States at the COP26 Climate Summit in Glasgow.**
- The signatories of the Declaration support the **establishment of green shipping corridors that is zero-emission maritime routes between 2 (or more) ports. Hence option (b) is the correct answer.**
- Its aim is to support the establishment of **at least 6 green corridors by the middle of this decade** while aiming to scale activity up in the following years, by inter alia supporting the establishment of more routes, longer routes and/or having more ships on the same routes.
- In the pursuit of these goals, signatories pledge to:
- Facilitate the establishment of partnerships, with participation from ports, operators and others along the value chain, to accelerate the decarbonisation of the shipping sector and its fuel supply through green shipping corridor projects
- Identify and explore actions to address barriers to the formation of green corridors. This could cover, for example, regulatory frameworks, incentives, information sharing or infrastructure
- Consider the inclusion of provisions for green corridors in the development or review of National Action Plans
- Work to ensure that wider consideration is taken for environmental impacts and sustainability when pursuing green shipping corridors.

Q 84.C

- Elephants are ecosystem engineers and play a vital role in their native habitats, helping maintain the rich biodiversity of the spaces they share with other wildlife. Though elephants are native to only Africa and Asia, they hold significant cultural and symbolic meaning around the world.
- India is home to the largest number of Asiatic Elephants. India is home to over 50 per cent population of Asian elephants in the world, making it the last strong-hold of the species. The Indian elephant is one of three extant recognised subspecies of the Asian elephant and native to mainland Asia. Since 1986, the Asian elephant has been listed as Endangered on the IUCN Red List. **Hence, statement 1 is correct.**
- **Not all elephants have tusks. Both male and female African elephants can have tusks, but only male Asian elephants have tusks. Hence, statement 2 is not correct.**
- **Elephants have the longest gestation period of any mammal—22 months.** Females give birth every four to five years. Elephant herds have complex social structures, are led by matriarchs, and are comprised

of a group of other adult females and calves, while male elephants tend to live in isolation or small bachelor groups. **Hence, statement 3 is correct.**

- South India had the highest number of wild elephants in India - 14,612. Among the south Indian states, Karnataka leads the table with 6,049 elephants followed by Kerala.

Q 85.B

- In India, much of its forest and wildlife resources are either owned or managed by the government through the Forest Department or other government departments. These are classified under the following categories.
  - **Reserved Forests: More than half of the total forest land has been declared reserved forests. Reserved forests are regarded as the most valuable as far as the conservation of forest and wildlife resources are concerned. Hence, statement 2 is correct.**
  - Protected Forests: Almost one-third of the total forest area is protected forest, as declared by the Forest Department. This forest land are protected from any further depletion.
  - Unclassed Forests: These are other forests and wastelands belonging to both government and private individuals and communities
- Reserved and protected forests are also referred to as permanent forest estates maintained for the purpose of producing timber and other forest produce, and for protective reasons.
- **Reserved Forests (RFs) are areas notified under the Indian Forest Act, 1927.** There is another category called as State Forests (SFs) which are areas notified under State Forest Acts. Both these categories have the same legal status. The total area of RFs is 4,34,853 sq km or 13.25% of India's land area. **Hence, statement 1 is not correct.**

Q 86.C

- A food web is the natural interconnection of food chains and a graphical representation of what-eats-what in an ecological community. A food web consists of all the food chains in a single ecosystem. Each living thing in an ecosystem is part of multiple food chains. Each food chain is one possible path that energy and nutrients may take as they move through the ecosystem.
- All of the interconnected and overlapping food chains in an ecosystem make up a food web. A food web illustrates, **all possible transfers of energy and nutrients among the organisms in an ecosystem,** whereas a food chain traces only one pathway of the food. **Hence option (c) is the correct answer.**
- Ecological pyramid is a graphical representation designed to show the biomass or bioproductivity at each trophic level in a given ecosystem. A pyramid of energy shows how much energy is retained in the form of new biomass at each trophic level, while a pyramid of biomass shows how much biomass is present in the organisms. There is also a pyramid of numbers representing the number of individual organisms at each trophic level.
- Homeostasis is any self-regulating process by which an organism tends to maintain stability while adjusting to conditions that are best for its survival. If homeostasis is successful, life continues; if it's unsuccessful, it results in a disaster or death of the organism.

Q 87.A

- The **Major Port Authority Act, 2021** seeks to provide for regulation, operation and planning of major ports in India and provide greater autonomy to these ports. It seeks to replace the **Major Port Trusts Act, 1963.**
- The **Major Port Authority Act, 2021** will apply to the **11 major ports** of Chennai, Cochin, Jawaharlal Nehru Port, Kandla, Kolkata, Mumbai, New Mangalore, Mormugao, Paradip, V.O. Chidambaranar, and Vishakhapatnam.
- The 2021 Act provides for the creation of a **Board of Major Port Authority** for each major port. These Boards will replace the existing **Port Trusts. Hence statement 1 is correct.**
- The Board will comprise of a Chairperson and a Deputy Chairperson, both of whom will be appointed by the central government on the recommendation of a selection committee.
- Under the **1963 Act, the Board had to seek the prior sanction from the central government to raise any loan.**
- Under the **2021 Act,** to meet its capital and working expenditure requirements, the Board may raise loans from any: s**cheduled bank or financial institution within India,** or any **financial institution outside India that is compliant with all the laws**. However, for l**oans above 50% of its capital reserves**, the Board will require prior sanction from the central government. **Hence statement 2 is not correct.**
- The **2021 Act** provides for the constitution of an **Adjudicatory Board by the central government.** This Board will replace the existing Tariff Authority for Major Ports constituted under the 1963 Act.

- Functions of the Adjudicatory Board will include: (i) certain functions being carried out by the Tariff Authority for Major Ports, (ii) **adjudicating on disputes or claims related to rights and obligations of major ports and PPP concessionaires,** and (iii) reviewing stressed PPP projects. **Hence statement 3 is not correct.**

Q 88.C

- **The taiga is a forest of the cold, subarctic region. The subarctic is an area of the Northern Hemisphere that lies just south of the Arctic Circle. The taiga lies between the tundra to the north and temperate forests to the south**. **Hence statement 1 is correct.**
- The soil beneath the taiga often contains permafrost—a layer of permanently frozen soil. In other areas, a layer of bedrock lies just beneath the soil. Both permafrost and rock prevent water from draining from the top layers of soil. This creates shallow bogs known as muskegs. Muskegs can look like solid ground, because they are covered with moss, short grasses, and sometimes even trees. However, the ground is actually wet and spongy.
- **Taigas are thick forests. Coniferous trees, such as spruce, pine, and fir, are common**. Coniferous trees have needles instead of broad leaves, and their seeds grow inside protective, woody cones. While deciduous trees of temperate forests lose their leaves in winter, conifers never lose their needles. For this reason, conifers are also called "evergreens." **Hence statement 3 is correct.**
- Taigas have few native plants besides conifers.
- **The soil of the taiga has few nutrients. It can also freeze, making it difficult for many plants to take root. The larch is one of the only deciduous trees able to survive in the freezing northern taiga**. **Hence statement 2 is not correct.**
- Many kinds of animals live in the taiga. All animals have to be well-adapted to the cold. Birds native to the taiga usually migrate south during the freezing winter months. Small animals, mostly rodents, live close to the floor.
- Few large carnivorous animals live in the taiga. Bears and lynx are fairly common. The largest cat in the world, the 300-kilogram (660-pound) Siberian tiger, is a native taiga species. Siberian tigers live in a small part of eastern Siberia. They hunt moose and wild boars.

Q 89.C

- **As per the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, "forest village" means the settlements which have been established inside the forests by the forest department of any State Government for forestry operations or which were converted into forest villages through the forest reservation process. Hence statements 1 and 2 are correct.**
- Hence a forest village is an area wherein people were settled by the forest department in past and were allotted land for cultivation and for residential purposes with a view to getting persons for forestry works.
- Developments work like road, drinking water, school, electrification, sanitation, etc are done in forest settlement villages by the respective line departments and forest department of a State Government.

Q 90.C

- **Recently, the G20 meet ended without a time-bound promise on climate change.**
- The **Group of 7 (G7)** is an informal group of seven countries, **the United States,** Canada, France, Germany, Italy, **Japan** and the United Kingdom**,** the heads of which hold an annual summit with the European Union and other invitees.
  - Together the member countries represent 40% of global GDP and 10% of the world's population.
  - Unlike other bodies such as NATO, the G7 has no legal existence, permanent secretariat or official members.
  - It also has no binding impact on policy and all decisions and commitments made at G7 meetings need to be ratified independently by governing bodies of member states.
- The **G20** is the international forum that brings together the world's major economies.
  - Its members account for more than 80% of world GDP, 75% of global trade and 60% of the population of the planet.
  - The G20 members are Argentina, Australia, Brazil, Canada, **China**, France, Germany, **Japan, India,** Indonesia, Italy, Mexico, Russia, South Africa, Saudi Arabia, South Korea, Turkey, the United Kingdom, the **United States,** and the European Union. **Hence option (c) is the correct answer.**
  - Spain is also invited as a permanent guest.

Q 91.A

- A World Heritage Site is a place that is listed by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) for its special cultural or physical significance. It is maintained by the international **'World Heritage Programme', administered by the UNESCO World Heritage Committee.**
- It seeks to encourage the identification, protection, and preservation of cultural and natural heritage around the world that are considered to be of outstanding value to humanity. This is embodied in an international treaty adopted by UNESCO in 1972 called the **Convention concerning the Protection of the World Cultural and Natural Heritage.**
- There are total 40 world heritage sites India that include 32 Cultural sites, 7 Natural properties and 1 mixed site.
- Following is the list of the Natural World Heritage Sites in India:
- Great Himalayan National Park Conservation Area (2014)
- Kaziranga National Park (1985)
- **Keoladeo National Park (1985)**
- Manas Wildlife Sanctuary (1985)
- Nanda Devi and Valley of Flowers National Parks (1988, 2005)
- Sundarban National Park (1987)
- **Western Ghats (2012)**
- **Hence, option (a) is the correct answer.**

Q 92.B

- **The Asian palm civet it is also called as the common palm civet (Paradoxurus hermaphrodites)** has made a comeback in Odisha after 129 years. Wildlife researchers have stumbled across one in Satkosia Tiger Reserve in the state's Angul district.
- It is a small mammal belonging to the family Viverridae.
- It can be found in **southern and southeastern Asia. Hence option (b) is not correct.**
- **It is found throughout India except Gujarat, Rajasthan and Himalaya.**
- Their long, stocky body is covered with coarse, shaggy hair that is usually grey in colour. It is thought to lead a solitary lifestyle, except for brief periods during mating.
- It is **both terrestrial and arboreal**, and shows a **nocturnal activity pattern** with peaks between late evening until after midnight. It is usually active between dawn and four in the morning, but less active during nights when the moon is the brightest. **Hence option (a) is correct.**
- It is accorded protection under **CITES Appendix-III and Schedule -II of the Wildlife (Protection) Act, 1972. Hence option (c) is correct.**
- It is categorised as **least concern** on IUCN Red List. **Hence option (d) is correct.**

Q 93.C

- When **alien species** are introduced unintentionally or deliberately for whatever purpose, some of them turn invasive, and cause **decline or extinction of indigenous species.** The Nile perch introduced into Lake Victoria in east Africa led eventually to the extinction of an ecologically unique assemblage of more than 200 species of cichlid fish in the lake.
- Environmental damage is caused and threat is posed to our native species by **invasive weed species like carrot grass (Parthenium), Lantana and water hyacinth (Eicchornia).** The recent illegal introduction of the **African catfish** (Clarias gariepinus) for aquaculture purposes is posing a threat to the indigenous catfishes in our rivers.
- **Hence option (c) is the correct answer.**

Q 94.C

- **Detritus Food Chain:** The food chain starts from dead organic matter of decaying animals and plant bodies to the micro-organisms and then to detritus feeding organisms called detrivores or decomposers then to herbivores and then to predators.
  - Example of Detritus Food Chain:
    - ✓ **Litter --> springtail (insect) --> small spiders (carnivore)**
  - For example, forest floors and small streams receive a rain of leaves and other bits of material that the small animals use as a food source. The small pieces of organic matter, such as broken leaves, faeces, and body parts are known as detritus.

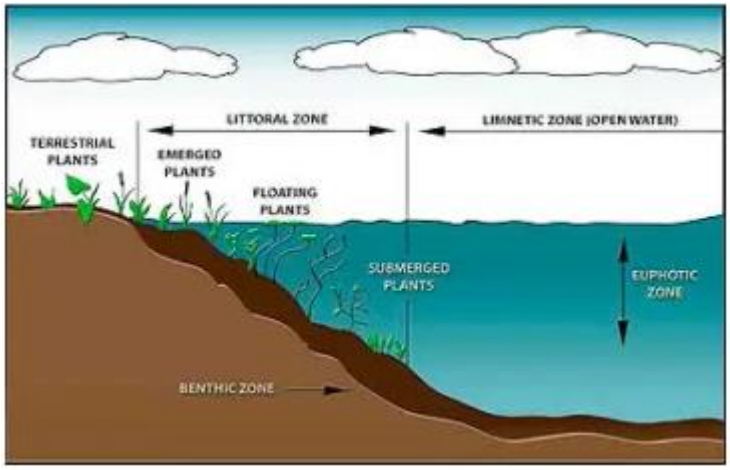
- Typical **detritivorous animals** include **millipedes, springtails, woodlice,** dung flies, **slugs**, many terrestrial worms, **sea stars, sea cucumbers, fiddler crabs,** and some sedentary polychaetes such as worms of the family Terebellidae. **Hence option (c) is the correct answer.**
- The **detrivores break the leaves and other organic material** and thus making them available to still other organisms as a food source. The fungi and bacteria are also eaten by other detritus feeders. Some biologists believe that enormous amount of energy flow through detritus food chains.

Q 95.A

- **On November 24, NASA will launch the agency's first planetary defence test mission named the Double Asteroid Redirection Test (DART).**
- The main aim of the mission is to test the newly developed technology that would allow a spacecraft to crash into an asteroid and change its course.
- The target of the spacecraft is a small moonlet called **Dimorphos (Greek for "two forms").**
- It is about 160-metre in diameter and the spacecraft is expected to collide when it is 11 million kilometres away from Earth.
- Dimorphos orbits a larger asteroid named **Didymos (Greek for "twin")** which has a diameter of 780 metres.
- The asteroid and the moonlet do not pose any threat to Earth and the mission is to test the new technology to be prepared in case an asteroid heads towards Earth in the future. **Hence statement 1 is correct.**
- The spacecraft will navigate to the moonlet and intentionally collide with it at a speed of about 6.6 kilometres per second or 24,000 kilometres per hour.
- The collision is expected to take place between September 26 and October 1, 2022.
- It is a **suicide mission and the spacecraft** will be completely destroyed. Across the globe, various telescopes will work together and observe the event and study the impact of DART – changes in the moonlet's orbit.
- **It is a mission by National Aeronautics and Space Administration (NASA) and not by Japan Aerospace Exploration Agency (JAXA). Hence statement 2 is not correct.** National Aeronautics and Space Administration is an independent agency of the U.S. federal government responsible for the civilian space program, as well as aeronautics and space research. NASA was established in 1958, succeeding the National Advisory Committee for Aeronautics.
- The spacecraft will be launched on a **SpaceX Falcon 9 rocket from Vandenberg Space Force Base in California. Hence statement 3 is not correct.**

Q 96.D

- The topmost zone near the shore of a lake or pond is the littoral zone. This zone is the warmest since it is shallow and can absorb more of the Sun's heat. It sustains a fairly diverse community which can include several species of algae (like diatoms), rooted and floating aquatic plants, grazing snails, clams, insects, crustaceans, fishes, and amphibians.
- The near-surface open water surrounded by the littoral zone is the limnetic zone. The limnetic zone is well-lighted (like the littoral zone) and is dominated by plankton both phytoplankton and zooplankton. **Hence statement 3 is correct.**
- **The deep-water part of the lake or pond is called the profundal zone. This zone is much colder and dense than the other two. Little light penetrates all the way through the limnetic zone into the profundal zone.**
  - Only respiration activity takes place in this zone. **Hence statement 1 is not correct.**
  - **Also known as aphotic zone**.
  - The fauna are heterotrophs, meaning that they eat dead organisms and use oxygen for cellular respiration.
- **Nektons are animals which are swimmer.**
  - They are relatively large and powerful as they have to overcome the water currents.
- Floating plants are called as neuston. These are unattached organisms which live at the air water interface. **Hence statement 2 is correct.**



Q 97.A

- Crocodiles are an indispensable part of the ecosystem, popularly known as the guardians of the marine ecosystem. **There are three known species of crocodiles, found in India, namely**
  - **The Mugger Crocodile (Crocodylus palustris)**
  - **The Gharial (Gavialis gangeticus)**
  - **The Saltwater Crocodile (Crocodylus porosus); Hence, statement 1 is correct.**
- **Mugger Crocodile:** The Mugger crocodiles are one of the three crocodilians, found in the Indian subcontinent. They mostly live in lakes, freshwater ponds, the major rivers of India, or man-made reservoirs.
  - In India, the Anamalai Tiger Reserve, located in the Anaimalai Hills of Tirupur district across the Amaravathi river is notable for housing the largest population of the mugger crocodile. In South India, the Chinnar, Thennar, and Pambar rivers house the largest wild population of Mugger crocodiles. They are also found in the freshwater lakes in the Ranthambore National Park.
- **Gharial Crocodile:** The Gharial crocodiles are found in the northern part of the Indian Subcontinent in major rivers, like the Ganges, Chambal, Mahanadi, and Son.
- **Saltwater Crocodile:** The Saltwater Crocodiles are the largest crocodilians among the crocodile family and the largest of all living reptiles in the world. They are found in the saline and brackish mangrove swamp forest of Bhitarkanika and the Sunderbans.
- **Recently, Odisha emerged as the only state to house all species of crocodiles.** Odisha's Kendrapara became the only district in India to be home to all three species of crocodilians found in the country. With the natural increase in Gharial count in Odisha, the state has emerged as the only state to have all three species of crocodiles. The freshwater Gharials are found at Satakosiya in Mahanadi and the muggers & saltwater crocodiles are found at Bhitar, Kanika National park in the state of Odisha. **Hence, statement 2 is not correct.**

Q 98.A

- Biodiversity prospecting or bioprospecting is the **systematic search for biochemical and genetic information** in nature in order to **develop commercially valuable products** for pharmaceutical, agricultural, cosmetic and other applications.
- Bioprospecting activities must comply with the **definition of utilization of genetic resources** of the **Nagoya Protocol** or as stated in the national law or policy. The Nagoya Protocol applies to the utilization of genetic resources and their derivatives. **Hence statement 1 is correct.**
- The rationale is to extract the maximum commercial value from genetic resources and indigenous knowledge, while creating a fair compensation system that can benefit all.
- Bioprospecting is possible both in **terrestrial and marine environments**. Many molecules, such as trabecetidin (an antitumor agent) and eribulin (used to treat breast cancer), were discovered from marine organisms. **Hence statement 2 is not correct.**

Q 99.B

- The 6th Edition of the biennial training exercise "EX SHAKTI 2021" is being conducted between India and France 2021 in Frejus, France.
- India and France carry out three biennial training exercises namely, **Exercise GARUDA with Indian Airforce, Exercise VARUNA with Indian Navy and Exercise SHAKTI with Indian Army.**
- Yudh Abhyas is a joint military exercise between India and USA.

- **Exercise Mitra Shakti, based on counter insurgency and counter terrorism operations in semi urban terrain is the largest bilateral exercise being undertaken by the Sri Lankan Army and it forms a major part of India and Sri Lanka's growing defence partnership.**
- **Hence option (b) is the correct answer.**

Q 100.B

- **Recently, the Ministry of Mines has notified the Minerals (Other than Atomic and Hydro Carbons Energy Mineral) Concession (Fourth Amendment) Rules, 2021 to amend The Minerals (Other than Atomic and Hydro Carbons Energy Mineral) Concession Rules, 2016.**
- The highlights of amendments in the Rules are as follows:
  - New rules were inserted to provide a manner of sale of 50% of mineral produced from the captive leases. With this amendment, the Government has paved the way for releasing additional minerals in the market by greater utilization of mining capacities of captive mines.
  - Provision has been added to allow the **disposal of overburden/ waste rock/ mineral below the threshold value,** which is generated during the course of mining or beneficiation of the mineral. This will enable ease of doing business for the miners. **Hence option 3 is correct.**
  - **Part surrender of mining lease area allowed in all cases.** Earlier, part surrender was allowed only in case of non-grant of forest clearance. **Hence option 2 is not correct.**
  - Amended rules **allow transfer of composite licence or mining lease of all types of mine. Hence option 1 is correct.**