

# UPSC MCQ's 2021

## IAS Prelims MCQ's On Environment & Ecology

### Environment & Ecology

1. Consider the following statements with regard to Biosphere –

- i. Biosphere includes both biotic and abiotic components that are present in the lithosphere, hydrosphere and the atmosphere.
- ii. In a biosphere there are established pathways for movement of energy and matter.

Which of the above statements are true?

- A. i only
- B. ii only
- C. Both i and ii
- D. None of the above.

**Ans: C**

**Explanation:** Biosphere is that part of lithosphere, hydrosphere and atmosphere where plants and animals live. Biosphere contains all life forms on earth. The biosphere consists of - the biotic component and the abiotic component. There are continuous interactions between the living organisms and their physical environment and among the living organisms themselves via established pathways for movement of energy and matter.

2. Match the following –

- |              |               |
|--------------|---------------|
| i. Earthworm | a. Scavenger  |
| ii. Vulture  | b. Decomposer |
| iii. Fungi   | c. Detrivore  |

- |    |    |     |      |
|----|----|-----|------|
|    | i. | ii. | iii. |
| A. | c  | a   | b    |
| B. | a  | b   | c    |
| C. | a  | c   | b    |
| D. | c  | b   | a    |

**Ans: A**

**Explanation:** Detritivores directly feed on small quantities of dead plant and animal material (millipedes, earthworms, sea cucumbers etc.). Decomposers, such as bacteria and fungi promote decay of organic matter through enzymatic action. Scavengers are typically not thought to be detritivores, as they directly consume large quantities of dead organic matter.

3. In an ecosystem, a flowering plant is being consumed by a caterpillar which in turn is eaten by a frog. The frog is preyed upon by a snake which in turn is consumed by a higher predator such as an eagle. What type of a food chain does this feeding pattern represent?

- A. Detritus food chain
- B. Grazing food chain
- C. Omnivorous food chain
- D. None of the above

**Ans: B**

**Explanation:** In a grazing food-chain, the first level starts with plants as producers and ends with carnivores as consumers at the last level, with the herbivores being at the intermediate level.

4. Which of the following functions of a black bear can be categorized as its ecological niche?

- i. Feeds on nuts, fruits, insects and small animals.
  - ii. Feeds on blood-feeding parasites.
  - iii. Helps disperse seeds of berries over long distances and helps in propagation.
- A. i and ii
  - B. i and iii
  - C. iii only
  - D. i, ii and iii

**Ans: D**

**Explanation:** The role and position that an organism takes in the ecosystem is known as its ecological niche. It includes its consumption pattern, contributions to the ecosystem, dwelling preferences etc.

5. Which of the following is **NOT** a Bio-Magnifier?

- A. Mercury
- B. Cyanide
- C. Cadmium
- D. Lithium

**Ans: D**

**Explanation:** Following substances have the potential to bio magnify - Polychlorinated Biphenyls, Poly nuclear aromatic hydrocarbons, Heavy metals like Mercury, copper, cadmium, chromium, lead, nickel, zinc, tin (TBT or tributyltin) and Cyanides.

6. Which of the following are the direct consequences of Mercury poisoning?

- i. Affects the nervous system.
- ii. Affects the development of foetuses.
- iii. Degenerates renal cells

- A. i only
- B. ii only
- C. i and ii only
- D. i, ii and iii.

**Ans: C**

**Explanation:** Mercury poisoning interferes with the nervous system and development of foetuses.

7. Consider the following statements with regard to Bio-geochemical cycles –

- i. The flow of energy in ecosystems is uni-directional.
- ii. Oxygen, carbon, hydrogen and nitrogen are needed in small quantities to sustain life and hence they are known as micronutrients.
- iii. In gaseous cycles the reservoir pool is the atmosphere and in sedimentary cycles the reservoir pool is the Earth's crust

Which of the above statements are true?

- A. i only
- B. iii only
- C. Both i and ii
- D. Both i and iii.

**Ans: D**

**Explanation:** Oxygen, carbon, hydrogen and nitrogen are needed in large quantities to sustain life and hence they are known as macronutrients.

8. Upwelling of ocean currents plays a role in which of the following bio-geochemical cycles?

- A. Carbon cycle
- B. Phosphorous cycle
- C. Nitrogen cycle
- D. Oxygen cycle

**Ans: B**

**Explanation:** Phosphorus is removed from the reservoir pool due to surface run-off and gets deposited on the ocean floor as sediments and it is brought back to the reservoir pool by upwelling ocean currents. These bring phosphorus to the surface waters, where it is taken into marine food chains.

9. Consider the following statements with regard to Ecological succession –

- i. Ecological succession is the process of change in the species structure of an ecological community over time.
- ii. Ecological succession leads to a stable, self-perpetuating community, called the seral stage.
- iii. Secondary succession is faster than primary succession

Which of the above statements are true?

- A. i only
- B. iii only
- C. Both i and ii
- D. Both i and iii.

**Ans: D**

**Explanation:** Each stage in the ecological succession process is known as a seral stage whereas the stable, self-perpetuating community that is established at the end is known as the climax.

10. Biotic potential of a species is determined by –

- i. reproductive span of the species
- ii. frequency of reproduction
- iii. litter size
- iv. survival rate

- A. i only
- B. ii and iii only
- C. iii and iv only
- D. i, ii, iii and iv

**Ans: D**

**Explanation:** The maximum rate at which a population can increase when resources are unlimited and environmental conditions are ideal is termed as the population's biotic potential. It is determined by all the four factors.

11. Which of the following ecosystems represent an Ecotone?

- A. Wetland ecosystem
- B. Equatorial ecosystem
- C. Marine ecosystem
- D. None of the above.

**Ans: A**

**Explanation:** An ecotone is a transitional area between two different ecosystems and a wetland is a transitional area between terrestrial and aquatic eco-systems.

12. Which of the following global biodiversity hot spots are located in India either partly/completely?

- i. Eastern Himalayas
- ii. Indo-Burma Region
- iii. Western Ghats
- iv. Sundaland

- A. i and iii only
- B. ii, iii and iv
- C. i, iii and iv
- D. i, ii, iii and iv

**Ans: D**

**Explanation:** India has all four global biodiversity hot spots.

- **Himalayas:** Includes the entire Indian Himalayan region (and that falling in Pakistan, Tibet, Nepal, Bhutan, China and Myanmar)
- **Indo-Burma:** Includes entire North-eastern India, except Assam and Andaman group of Islands (and Myanmar, Thailand, Vietnam, Laos, Cambodia and southern China)
- **Sundaland:** Includes Nicobar group of Islands (and Indonesia, Malaysia, Singapore, Brunei, Philippines)
- **Western Ghats and Sri Lanka:** Includes entire Western Ghats (and Sri Lanka)

13. Which of the following organisations designates biodiversity hotspots and megadiverse countries?

- A. Greenpeace
- B. CITES
- C. Convention on Biological Diversity (CBD)
- D. Conservation International (CI)

**Ans: D**

**Explanation:** Conservation International (CI) adopted Myers' hotspots to build a global list of biodiversity hotspots and designate countries as megadiverse based on the principle criterion of endemism in species.

**14. Consider the following statements**

- i. As one approaches the Polar Regions, one finds larger and larger populations of fewer and fewer species.
- ii. Decline in biodiversity richness with latitude may be faster in the Northern than in the Southern Hemisphere.
- iii. The peaks in biodiversity richness may not lie actually at the Equator itself but some distance away.

Which of the above statements are correct?

- A. i only
- B. i and ii only
- C. ii and iii only
- D. i, ii and iii

**Ans: D**

**Explanation:**

- Species diversity decreases as we move towards the North Pole due to decrease in productivity.
- Decline in biodiversity richness with latitude may be faster in the Northern than in the Southern Hemisphere due to greater landmass present in northern hemisphere.
- Even though we witness highest insolation exactly at the equator, productivity is relatively reduced due to erosion of nutrients from the soil caused by high surface run-offs. As a result, peaks in biodiversity richness may not lie actually at the Equator itself but some distance away.

**15. Which of the following is **not** a site for in-situ conservation?**

- A. Biosphere Reserve
- B. Zoological park
- C. National Park
- D. Wildlife sanctuaries

**Ans: B**



**Explanation:** In situ conservation is the approach of protecting an endangered plant or animal species in its natural habitat. Ex: Biosphere Reserves, National Parks and Wild-life Sanctuaries. Zoological Park is a site for ex-situ conservation (where threatened animals and plants are taken out from their natural habitat and placed in special setting where they can be protected and given special care)

16. Which of the following Biosphere Reserve in India is not listed in the Man and Biosphere Program of the UNESCO?

- A. Nokrek
- B. Pachmarhi
- C. Similipal
- D. Dandeli

**Ans: D**

**Explanation:** Dandeli is a national park not a biosphere reserve.

17. Which of the following committees dealt with Eco-sensitive zones in the Western Ghats?

- i. Madhav Gadgil committee
- ii. TSR Subramanian committee
- iii. Kasturirangan committee

- A. i only
- B. ii only
- C. i and iii only
- D. i, ii and iii

**Ans: C**

**Explanation:** Madhav Gadgil committee was setup to recommend the implementation of ESZ in Western Ghats. Its report was opposed by state governments, industry and local communities as it was considered to be prioritizing environment conservation over economic development. So the central government setup the Kasturirangan committee to review the Madhav Gadgil report.

18. The Zemu glacier which gives birth to the Teesta River is located in which of the following biosphere reserves?

- A. Manas Biosphere Reserve
- B. Kaziranga Biosphere Reserve
- C. Kangchenjunga Biosphere Reserve
- D. Nokrek Biosphere Reserve

**Ans: C**

**Explanation:** The Kangchenjunga biosphere reserve was recently selected as a UNESCO world heritage site and it is the first mixed (both cultural and natural significance) world heritage site in India. It is home to the Zemu Glacier, the endangered snow leopard, red panda and also hosts the Lepcha tribes.

19. The Ramsar Convention on Conservation of Wetlands recognises which of the following type/s of wetlands?

- i. Marine/Coastal Wetlands
  - ii. Inland Wetlands
  - iii. Human-made Wetlands
- 
- A. ii only
  - B. i and iii only
  - C. ii and iii only
  - D. i, ii and iii

**Ans: D**

**Explanation:** According to Ramsar Convention, three major classes of wetlands are identified:

- 1) Marine/Coastal Wetlands
- 2) Inland Wetlands
- 3) Human-made Wetlands

These are further subdivided by the type of water: fresh / saline / brackish / alkaline; and further may be subdivided based on whether they are permanent or temporary.

20. Which of the following represent adaptations in mangroves to thrive in harsh conditions?

- i. Halophytes
  - ii. Pneumatophores
  - iii. Buttress roots
- 
- A. ii only
  - B. iii only
  - C. ii and iii only
  - D. i, ii and iii

**Ans: D**



**Explanation:** Mangroves are salt tolerant and are also called Halophytes. They have a complex salt filtration systems and a complex root system to cope with salt water immersion and wave action. They are adapted to low oxygen (Anoxic) conditions via Pneumatophores, which are specialised root-like structures which stick out of the soil like straws for breathing. They also absorb gases like nitrogen directly and store them. Buttress roots, which are aerial extensions of lateral surface roots and form only in certain species. Buttress roots stabilize the tree, especially in shallow, saturated, nutrient poor soils.

21. Which of the following Ramsar sites in India have been placed under the Montreux Record?

- i. Keoladeo National Park, Rajasthan
  - ii. Chilka Lake, Odisha
  - iii. Kolleru Lake, Andhra Pradesh
  - iv. Loktak Lake, Manipur
- 
- A. i and iii only
  - B. i and iv only
  - C. ii, iii and iv
  - D. i, iii and iv

**Ans: B**

**Explanation:** Montreux Record is a register of wetland sites on the Ramsar list of wetlands of international importance where changes in ecological character have occurred or are occurring, or are likely to occur as a result of technological developments, pollution or other human interference. It is maintained as part of Ramsar List. Currently, two wetlands of India are in Montreux record viz.

1. Keoladeo National Park, Rajasthan and
2. Loktak Lake, Manipur.

Further, Chilka Lake was placed in the record but was later removed from it.

22. According to the wetland distribution map of India, which of the following regions is considered as the largest wetland system in India?

- A. Himalayan wetlands
- B. Indo-Gangetic wetlands
- C. Coastal wetlands
- D. Deccan wetlands

**Ans: B**

**Explanation:** The Indo-Gangetic flood plain is the largest wetland system in India, extending from the river Indus in the west to Brahmaputra in the east. This includes the wetlands of the Himalayan terai and the Indo-Gangetic plains.

23. Arrange the following greenhouse gases in decreasing order of their Global Warming Potential (GWP)

- i. Carbon di oxide
- ii. Sulphur hexafluoride
- iii. Nitrous oxide
- iv. Methane

- A. i ii iii iv
- B. iv iii i ii
- C. ii iii iv i
- D. ii I iv iii

**Ans: C**

**Explanation:** GWP is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO<sub>2</sub>).

Following are the GWP of the above mentioned GHG's - SF<sub>6</sub>: 23,900; N<sub>2</sub>O: 310; CH<sub>4</sub>: 21; CO<sub>2</sub>: 1

24. Which amongst the following is **not** a technique under Geo-engineering methods to mitigate climate change?

- A. Firing sulphur dioxide into atmosphere
- B. Installing huge mirrors in the space
- C. Capturing atmospheric CO<sub>2</sub> and pumping it to deep cavities under the earth's crust for storage.
- D. Covering water surfaces with reflective sheets to reduce evaporation.

**Ans: D**

**Explanation:** Geo-engineering refers to large-scale intervention in the Earth's climatic system with the aim of limiting climate change. Theoretically, there are two major types of interventions

- Carbon Sequestration and
- Solar radiation management

25. The Kigali agreement was an amendment to which of the following international conventions aimed at conserving the environment?

- A. Montreal Protocol
- B. Stockholm Convention
- C. Bonn Convention
- D. Kyoto Protocol

**Ans: A**

**Explanation:** Kigali agreement amended the Montreal Protocol to substantially limit the emission of hydrofluorocarbons (HFCs) that contribute to global warming. The Montreal Protocol is an international treaty designed to protect the ozone layer by phasing out the production of a number of ozone depleting substances.

