

## Chapter-15

### BIODIVERSITY AND CONSERVATION

#### Model Questions of one mark each

- Q1. Define biodiversity.
- A. The totality of all living organisms OR A collection of variety of all life forms.
- Q2. When did the first life come into existence ?
- A. Around 3.5 bya (billion years ago)
- Q3. Who coined the term biodiversity ?
- A. Walter Rosen.
- Q4. Who developed the concept of biodiversity ?
- A. Edward O. Wilson
- Q5. Name the different levels of biodiversity.
- A. Habitat diversity, species diversity and genetic diversity.
- Q6. What is genetic diversity ?
- A. It is the variation at the level of individual genes.
- Q7. What is species diversity ?
- A. Variety of different species in a given geographical area.
- Q8. Define a species.
- A. A group of closely related organisms which can interbreed to produce viable and fertile offsprings.
- Q9. Define habitat diversity.
- A. It is the various habitats available for organisms in the ecosystem.
- Q10. What is alpha diversity?

A. Diversity of living organisms within the community or different communities sharing the same habitat.

Q11. Define beta diversity .

A. Diversity of organisms between the communities in the given geographic area.

Q12. What is gamma diversity ?

A. It is the diversity of organisms / habitats over a large geographical area.

Q13. Expand SAR as in SAR curve

A. Species Area Relationship curve.

Q14. Which of the Indian region is considered as cradle of speciation ?

A. Eastern Himalayas

Q15. What are biodiversity hotspots ?

A. Habitats with rich endemism and the species are prone to endanger.

Q16. Name the biodiversity hotspots in India.

A. Western Ghats and Eastern Himalayas.

Q17. Expand UNEP.

A. United Nations Environment Programme, 1995.

Q18. What is latitudinal gradient ?

A. Diversity index used to show the distribution of flora and fauna from the poles to the tropics.

Q19. Why does tropics contain rich species diversity than temperate region ?

A. Tropics are subjected to lesser temperature fluctuations and receive more solar energy.

Q20. What is biodiversity depletion ?

A. Loss of life forms is biodiversity depletion.

Q21. What do you mean by co-extinction ?

A. Simultaneous extinction of multiple species where one is dependent on other species.

Q22. Write an example for alien species.

A. Water hyacinth (*Eichhornia sp*), *Lantana camara* etc.

Q23. What are invasive species ?

A. A foreign species that grow and reproduce rapidly causing major disturbance in the habitats.

Q24. What are key stone species ?

A. Organism that helps to maintain species diversity within an ecosystem by keeping the number of other species in a ecosystem constant.

Q25. Expand RDB.

A. Red Data Book.

Q26. Why should we conserve biodiversity?

A. Biodiversity provides economical, ecological and ethical benefits to the mankind.

Q27. What is mass extinction ?

A. Extinction of large scale species due to environmental catastrophe.

Q28. What are threatened species ?

A. The species which are either endangered or vulnerable

Q29. What are vulnerable species ?

A. Species which are likely to become endangered if environmental degradation continue to persist.

Q30. What are rare species ?

A. A small population which are neither endangered nor vulnerable but are at the risk.

Q31. What are endangered species ?

A. Species which are in the dangers of extinction due to the loss of natural habitats.

Q32. What are critically endangered species ?

A. Species which is at extremely high risk of extinction.

Q33. Expand IUCN.

A. International Union for Conservation of Nature and natural resources.

Q34. What is in-situ conservation of wild life ?

A. It is the conservation of wild species in their natural habitats.

Q35. Name any two in-situ conservation methods.

A. National parks, Sanctuaries, Biosphere reserve, hotspots etc.

Q36. What are sacred species ?

A. The species which is traditionally conserved and dedicated to the local deities and are of cultural /religious values.

Q37. What are sacred groves ?

A. They are the small patches of natural forests dedicated to the local deities so that no one harms them.

Q38. What is ex-situ conservation ?

A. Conservation of species out of their natural habitats.

Q39. What is cryopreservation ?

A. Placing the cells / tissues /seeds in liquid nitrogen of  $-196^{\circ}\text{C}$  for indefinite period of time without losing their viability.

Q40. When is International day of Biodiversity celebrated ?

A. 22<sup>nd</sup> May of every year.

Q41. What are endemic species ?

A. A species which is found only in a particular area because of isolation and climatic condition.

Model Questions of two / three marks each.

Q1. What is the importance of species diversity to the ecosystem ?

A. Any community with more species generally tends to be more stable than those with less species. The stable community must be resilient to the occasional disturbances. The stable community should not show any variation in less period of time. Increased diversity contributes to higher productivity of any ecosystem.

Q2. Explain briefly the evil quartet of biodiversity losses.

A. The four major causes of biodiversity loss are; i) Habitat loss – degradation of natural habitats are threatening the species. ii) Over-exploitation – Need turned greed has led to over exploitation of natural resources. iii) Alien species – Invasion of alien species in the natural habitats cause decline in the native species. iv) Co-extinction – when one organism becomes extinct , the other associated obligatory species also tend to extinct.

Q3. Differentiate in-situ and ex-situ conservation methods of biodiversity conservation.

A.

In-situ conservation	Ex-situ conservation
Conservation of species in the natural habitat	Conservation out of the natural habitat.
Most appropriate method	Alternative method.
Species protection/assemblage protection/habitat preservation/national parks/sanctuaries/reserves/sacred groves/sacred landscape etc.	Botanical gardens/zoo/seed bank/cryopreservation etc.

Q4. What are sacred groves and sacred species ? Give one example each.

A. Sacred groves are traditionally conserved forest patches and are dedicated to the local deity. Ex. Mausmai in Meghalaya, Western Ghat region of Karnataka.

Sacred species are traditionally conserved and protected plant or animal species which are of cultural and religious importance. Ex. Tulsi, Neem, Cow etc.

Q5. Despite having the great biodiversity why is Amazon rain forest is under the risk of desertification.

A. Naturally the soil is not fertile but the continuous falling of leaves from the vegetation cover covers the soil. Deforestation reduces this enrichment. In the deforested areas when the rain water falls directly on to the soil causes erosion. Moreover deforestation does not allow recycling of essential nutrients for the plants. Hence the rainforests and their neighbourhood areas are under the threat of desertification.

Model Questions of five marks each.

Q1. What is the importance of biodiversity. Explain the causes of loss of biodiversity.

A Biodiversity is important for maintaining the balance in the ecosystem. The continuous flow of energy is maintained in the ecosystem.

The loss of biodiversity is the cause of great concern. It includes habitat loss, over exploitation, intensive farming, mining, desertification, erosion, over grazing, deforestation, pollution, acidification of soil and water, urbanization etc. have accelerated the process of biodiversity depletion.

Habitat loss is the destruction of ecosystem by unwanted human activities such as urbanization, intensive farming, deforestation, mining activities and so on. When the vegetation is cleared for human activities the continuous habitats become fragmented. This is called habitat fragmentation. When fragments are formed it restricts the movement of organism across the fragments thereby reducing the gene flow and there will be decline the species composition. Thick forests receive large amount of water thereby evaporation and transpiration maintains water cycle. Disappearance of large habitats makes it vulnerable to draught and desertification.

Over exploitation is the harvesting of renewable resources to the extent of diminishing returns. Such act would lead to complete destruction and extinction of the natural resources.

Alien species invasion into the natural grounds has resulted in thinning the indigenous species. There will be no predation to such alien species and there number keeps increasing causing a problem.

Co extinction is the simultaneous extinction of multiple species when one is directly associated with other. When hosts become extinct the parasites also become extinct.

Q2. Explain the benefits of biodiversity.

A biodiversity is known for the multiple benefits such as economical (narrowly utilitarian), ecological (Broadly utilitarian) and ethical benefits.

Narrow utilitarian includes economical benefits such as food, medicine, industrial and bioprospecting.

Foods include cereals, pulses, fruits, vegetables, wheat, rice, millets, rice etc are obtained from plants. From over 10000 varieties of cereals wheat, rice and corn fulfills

1/3<sup>rd</sup> of the total food demand. IARI identified lesser known plants and animal having food value. Medicines such as morphine from poppy seeds, taxol from bark of yew tree. Indian system of medicine uses over 25000 different plant based formulations as drugs. Majority of cancerous drugs are obtained from the plants itself.

Industrial products such as tannins, dyes, resins are also obtained from the plants.

Bioprospecting is the exploration of molecular, genetic and species level diversity for the products of economic importance.

Broadly utilitarian deals with unlimited ecological services rendered by biodiversity to the mankind. Viz., pollination, release of oxygen, esthetic value related to the integrity of ecosystems.

Pollination by insects, birds, bats and animals is the supreme ecological service which is crucial to the plants. Plants by way of photo-ionization of water during photosynthesis produce elemental oxygen as one of the end products. This oxygen gas is responsible for keeping all the aerobic organisms alive. Modern man has been utilizing habitats for recreational and aesthetic values. The economical upliftment and awareness about the biodiversity conservation comes from activities like hiking, camping, gardening, cliff hanging, mountaineering, bird watching, sport fishing etc.

Peter Raven said biodiversity keeps the planet habitable and the ecosystems functional. These natural services if calculated in terms of money it would be around 3 trillion US \$ per year.

Ethical aspects put certain moral principles to the conservation of biodiversity. These are propagated through cultural, religious and spiritual beliefs.