

Short Answer Questions-II (PYQ)

[3 Marks]

Q.1. Why should biodiversity be conserved? List any two ethical arguments in its support.

Ans. The biodiversity should be conserved because of the following reasons:
(Any two)

- i. Narrowly utilitarian arguments for deriving direct economic benefit from nature.
- ii. Broadly utilitarian arguments as biodiversity plays a major role in many ecosystem services.
- iii. Ethical reasons: There is a need to realise that every species has an intrinsic value and we need to pass on our biological legacy to future generations.

Q.2. Alien species are highly invasive and are a threat to indigenous species. Substantiate this statement with any three examples.

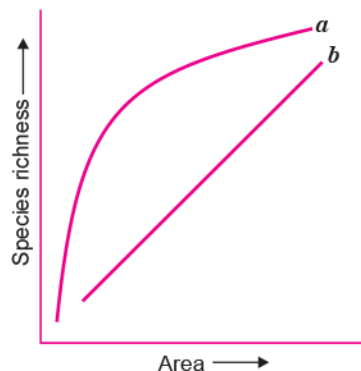
Ans. Exotic species are defined as species that have been introduced from another geographic region to an area outside its natural range. For example,

- i. *Parthenium*, *Lantana* and *Eichhornia* are the exotic species of plants that have invaded the native species of India and caused environmental damage.
- ii. Introduction of African catfish *Clarias gariepinus* for aquaculture purpose is posing threat to many indigenous catfish.
- iii. Nile perch introduced into lake Victoria in East Africa led to the extinction of cichlid fish.

Q.3. Explain 'rivet popper' hypothesis. Name the ecologist who proposed it.

Ans. Paul Ehrlich proposed the rivet popper hypothesis. This hypothesis states that in an airplane (ecosystem) all parts are joined together using thousands of rivet (species). If every passenger travelling in it starts popping a rivet to take home (causing a species to become extinct), it may not affect flight safety (proper functioning of the ecosystem) initially but as more and more rivets are removed, the plane becomes dangerously weak over a period of time. Also, which rivet is removed may also be critical like loss of rivets on the wings (key species) is more serious threat to flight safety than loss of few rivets on the seats or windows inside the plane.

Q.4. The given graph alongside shows species–area relationship. Write the equation of the curve 'a' and explain.



Ans. The equation of the curve 'a' is $S = CA^Z$.

- i. Within a region, species richness increases with increasing explored area but only up to a limit.
- ii. Relationship between species richness and area for a wide variety of taxa turns out to be rectangular hyperbola.

Q.5. Compare narrowly utilitarian and broadly utilitarian approaches to conserve biodiversity, with the help of suitable examples.

Ans.

- i. **Narrowly utilitarian arguments :**
 - Human beings derive direct economic benefits from nature, like food, firewood, fibre, construction material, industrial products (resins, gums, dyes, tannins, etc.) and medicinally important products.
 - More than 25 percent of the drugs are derived from plants and about 25000 species of plants are used by native people as traditional medicines.
- ii. **Broadly utilitarian arguments :**
 - Biodiversity plays a major role in maintaining and sustaining supply of goods and services from various species as well as ecological systems.
 - The different ecological services provided are :
 - a. Amazon forest is estimated to contribute 20 percent of the total oxygen in the atmosphere on earth.
 - b. Ecosystem provides pollinators like bees, bumble bees, birds and bats which pollinate plants to form fruits and seeds.
 - c. Aesthetic pleasures like bird watching, spring flowers in full bloom, walking through the thick forest, waking up to a bulbul's song, etc. are some other benefits of the ecosystem.

Q.6. Many plant and animal species are on the verge of their extinction because of loss of forest land by indiscriminate use by the humans. As a biology student what method would you suggest along with its advantages that can protect such threatened species from getting extinct?

Ans. *Ex-situ* conservation method can be used.

Ex- situ conservation (Off- site conservation)

- This approach involves placing threatened animals and plants in special care units for their protection.
- India has 35 botanical gardens and 275 zoological parks where animals which have become extinct in wild are maintained.
- By using cryopreservation (preservation at -196°C) technique, sperms, eggs, animal cells, tissues and embryos can be stored for long period in genes banks, seed banks, etc.
- Plants are propagated *in vitro* using tissue culture methods (micropropagation).
- It is the desirable approach when urgent measures to save extinction are required.

Q.7. There are many animals that have become extinct in the wild but continue to be maintained in Zoological parks.

Q. What type of biodiversity conservation is observed in this case?

Ans. *Ex-situ* conservation

Q. Explain any two other ways which help in this type of conservation.

Ans.

- a. In-vitro fertilisation: Gametes of threatened species can be fertilised for their propagation.
- b. Cryopreservation techniques: Gametes of threatened species can be preserved in viable and fertile condition for long periods.

Q.8. Name and describe any three causes of biodiversity losses.

Ans. Causes of Biodiversity Losses

- i. **Habitat loss and fragmentation**
 - Destruction of habitat is the primary cause of extinction of species.
 - The tropical rainforests initially covered 14 per cent of the land surface of earth, but now cover only 6 per cent of land area.
- ii. **Over-exploitation**
 - When biological system is over-exploited by man for the natural resources, it results in degradation and extinction of the resources.
 - For example, Stellar's sea cow, passenger pigeon and many marine fishes.
- iii. **Alien (exotic) species invasions**
 - Some alien (exotic) species when introduced unintentionally or deliberately, become invasive and cause harmful impact, resulting in extinction of the indigenous species.
 - Nile perch, a large predator fish when introduced in Lake Victoria (East Africa) caused the extinction of an ecologically unique species of Cichlid fish in the lake.
- iv. **Co-extinctions**

- When a species becomes extinct, the plant and animal species associated with it in an obligatory manner, also become extinct.
- For example, if the host fish species becomes extinct, all those parasites exclusively dependent on it, will also become extinct; in plant–pollinator mutualism also, extinction of one results in the extinction of the other.

Q.9. Co-extinction and introduction of alien species too are responsible for the loss of biodiversity. Explain how.

Ans.

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Q.10. 'In-situ' conservation can help endangered/threatened species. Justify the statement.

Ans. In '*in-situ*' conservation threatened organisms are conserved in their natural habitat or ecosystem, and such regions are legally protected. This has been carried out by identifying certain regions as hotspots, biosphere reserves, national parks, sanctuaries, sacred groves and Ramsar sites.

***In situ* conservation (On site conservation)**

This approach involves protection of species in their natural habitat.

- a. **Biodiversity hot spots**
 - These are regions of high levels of species richness and high degree of endemism.
- b. **Protected areas**
 - India has 14 biosphere reserves, 90 national parks and 448 wildlife sanctuaries.
- c. **Ramsar sites**
 - **Ramsar sites** are wetlands which are considered to be of international importance.
- d. **Sacred groves**
 - These are forest patches set aside for worship. All the trees and wildlife within are given total protection by tribal people.

Short Answer Questions-II (OIQ)

[3 Marks]

Q.1. What is meant by the term 'hot spots' in biodiversity? List two criteria used for determining a 'hot spot'. Name two hot spots of India.

Ans. A hot spot is an area having endangered endemic species with very high levels of species richness. Criteria used for determining a hot spot:

- i. Number of endemic species, *i.e.*, species which are not found anywhere else.
- ii. Degree of threat which is measured in terms of habitat loss.

Western Ghats and Eastern Himalayas are two hot spots in India.

Q.2. Differentiate between

Q. Keystone species and endangered species

Ans.

S. No.	Keystone species	Endangered species
(i)	It is a species of lower abundance that plays vital role in sustaining the community	It is a species of lower abundance that may or may not have a vital role in sustaining the community.
(ii)	The species is not threatened, <i>e.g.</i> , Ficus.	The species is at high risk of extinction in near future, <i>e.g.</i> , Red Panda.

Q. Genetic diversity and species diversity.

Ans.

S. No.	Genetic diversity	Species diversity
(i)	It represents the variety of genetic information present in an organism.	It is the variety of species and their relative abundance found within a region.
(ii)	It is trait of an organism.	It is trait of a biotic community.