



CHAPTER 15: Biodiversity and Conservation

Question 1:

Consider the following statements:

1. In our biosphere immense diversity exists only at the species level.
2. A single species might show high diversity at the genetic level over its distributional range.

Which of the statements given above is/are correct?

1. 1 only
2. 2 only
3. Both 1 and 2
4. Neither 1 nor 2

Correct Answer : 2

Explanation

- In our biosphere immense diversity (or heterogeneity) exists not only at the species level but at all levels of biological organisation ranging from macromolecules within cells to biomes.
 - **Genetic diversity:** A single species might show high diversity at the genetic level over its distributional range. The genetic variation shown by the medicinal plant *Rauwolfia vomitoria* growing in different Himalayan ranges might be in terms of the potency and concentration of the active chemical (reserpine) that the plant produces. India has more than 50,000 genetically different strains of rice, and 1,000 varieties of mango. **Hence, statement 1 is correct.**
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Question 2:

Consider the following statements:

1. The Western Ghats have a lesser amphibian species diversity than the Eastern Ghats.
2. At the ecosystem level, India has greater ecosystem diversity than a Scandinavian country like Norway.

Which of the statements given above are correct?

1. 1 only
2. 2 only
3. Both 1 and 2
4. Neither 1 nor 2

Correct Answer : 2

Explanation

Biodiversity is the term popularised by the sociobiologist **Edward Wilson** to describe the combined diversity at all the levels of biological organisation. The most important of them are:

- **Genetic diversity:** A single species might show high diversity at the genetic level over its distributional range. India has more than 50,000 genetically different strains of rice, and 1,000 varieties of mango.
 - **Species diversity:** The diversity at the species level. For example, the Western Ghats have a greater amphibian species diversity than the Eastern Ghats. **Hence, statement 1 is NOT correct.**
 - **Ecological diversity:** At the ecosystem level, India, for instance, with its deserts, rain forests, mangroves, coral reefs, wetlands, estuaries, and alpine meadows has a greater ecosystem diversity than a Scandinavian country like Norway. **Hence, statement 2 is correct.**
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Question 3:

Consider the following statements:

1. More than 70 per cent of all the species recorded are plants, while animals comprise no more than 22 percent of the total.
2. Among animals, insects are the most species-rich taxonomic group.
3. The number of fungi species in the world is more than the combined total of the species of fishes, amphibians, reptiles and mammals.

Which of the statements given above is/are correct?

1. 1 and 2 only
2. 2 and 3 only
3. 1 and 3 only
4. 1, 2 and 3

Correct Answer : 2

Explanation

- 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 percent 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 2 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. **Hence, statement 3 is correct.**
- In Figure below, biodiversity is depicted showing species number of major taxa.

Question 4:

Consider the following statement:

1. India has only 2.4 per cent of the world's land area but its share of the global species diversity is more than 25 percent.
2. India is one of the 12 mega diversity countries of the world.

Which of the statements given above is/are correct?

1. 1 only
2. 2 only
3. Both 1 and 2
4. Neither 1 nor 2

Correct Answer : 2

Explanation

Although India has only 2.4 per cent of the world's land area, its share of the global species diversity is an impressive 8.1 per cent. That is what makes our country one of the 12 mega diversity countries of the world. Nearly 45,000 species of plants and twice as many of animals have been recorded from India.

Hence, statement 1 is NOT correct and 2 is correct.

Question 5:

Consider the following statements:

1. The diversity of plants and animals is not uniform throughout the world but shows a rather uneven distribution.
2. In general, species diversity decreases as we move away from the equator towards the poles.

Which of the statements given above is/are **NOT** correct?

1. 1 only
2. 2 only

3. Both 1 and 2
4. Neither 1 nor 2

Correct Answer : 4

Explanation

Latitudinal Gradients:

- The diversity of plants and animals is not uniform throughout the world but shows a rather uneven distribution. **Hence, statement 1 is correct.**
 - For many group of animals or plants, there are interesting patterns in diversity, the most well-known being the latitudinal gradient in diversity.
 - In general, species diversity decreases as we move away from the equator towards the poles. **Hence, statement 2 is correct.**
 - With very few exceptions, tropics (latitudinal range of 23.5° N to 23.5° S) harbour more species than temperate or polar areas. Colombia located near the equator has nearly 1,400 species of birds while New York at 41° N has 105 species and Greenland at 71° N only 56 species.
 - A forest in a tropical region like Equador has up to 10 times as many species of vascular plants as a forest of equal area in a temperate region like the Midwest of the USA.
 - The largely tropical Amazonian rain forest in South America has the greatest biodiversity on earth- it is home to more than 40,000 species of plants, 3,000 of fishes, 1,300 of birds, 427 of mammals, 427 of amphibians, 378 of reptiles and of more than 1,25,000 invertebrates.
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Question 6:

Which of the following is/are the reasons for greater biological diversity in Tropical area as compared to Temperate areas?

1. In tropical regions longer and more stable evolutionary period has resulted in more species diversification.
2. Tropical environments are more seasonal and less predictable.
3. More solar energy is available in the tropics.

Select the correct answer using the code given below:

1. 1 and 3 only
2. 2 and 3 only
3. 1, 2 and 3
4. 1 and 2 only

Correct Answer : 1

Explanation

- Tropics account for their greater biological diversity
 - Ecologists and evolutionary biologists have proposed various hypotheses; 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, statement 1 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, statement 2 is NOT 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, statement 3 is correct.**
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Question 7:

Which of the following are the characteristics of stability for a biological community?

1. Stability in productivity from year to year.
2. Resistance or resilience to occasional disturbances.
3. Resistance to invasions by alien species.

Which of the statements given above is/are correct?

1. 1 and 2 only
2. 2 and 3 only
3. 1 and 3 only
4. 1, 2 and 3

Correct Answer : 4

Explanation

Following are the characteristics of stability for a biological community:

- A stable community should not show too much variation in productivity from year to year. **Hence, statement 1 is correct.**
 - It must be either resistant or resilient to occasional disturbances (natural or man-made). **Hence, statement 2 is correct.**
 - It must also be resistant to invasions by alien species. **Hence, statement 3 is correct.**
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Question 8:

Which of the following species are now extinct?

1. dodo
2. quagga
3. Steller's Sea Cow
4. Caspian tiger
5. Passenger pigeon

Select the correct answer using the code given below:

1. 1, 2 and 3 only
2. 2, 3, 4 and 5 only
3. 1, 4 and 5 only
4. 1, 2, 3, 4 and 5

Correct Answer : 4

Explanation

- The biological wealth of our planet has been declining rapidly and the accusing finger is clearly pointing to human activities.
 - The colonisation of tropical Pacific Islands by humans is said to have led to the extinction of more than 2,000 species of native birds.
 - Some examples of recent extinctions include passenger pigeon, the dodo (Mauritius), quagga (Africa), thylacine (Australia), Steller's Sea Cow (Russia) and three subspecies (Bali, Javan, Caspian) of tiger. The last twenty years alone have witnessed the disappearance of 27 species. **Hence, option (d) is correct.**
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Question 9:

Consider the following statements:

1. Since the origin life on earth six episodes of mass extinction of species have taken place.
2. The current species extinction rate is estimated to be 100 to 1,000 times faster than in the pre-human times.

Which of the statements given above is/are correct?

1. 1 only
2. 2 only
3. Both 1 and 2
4. Neither 1 nor 2

Correct Answer : 2

Explanation

- From a study of the history of life on earth through fossil records, we learn that large-scale loss of species like the one we are currently witnessing have also happened earlier, even before humans appeared on the scene.
 - During the long period (> 3 billion years) since the origin and diversification of life on earth there have been five episodes of mass extinction of species. the 'Sixth Extinction' is presently in progress. **Hence, statement 1 is NOT correct.**
 - The difference is in the rates; the current species extinction rates are estimated to be 100 to 1,000 times faster than in the pre-human times and our activities are responsible for the faster rates. **Hence, statement 2 is correct.**
 - Ecologists warn that if the present trends continue, nearly half of all the species on earth might be wiped out within the next 100 years.
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Question 10:

Which of the following are the consequences of biodiversity loss?

1. Decline in plant production
2. Lowered resistance to environmental perturbations
3. Increased variability in certain ecosystem processes such as plant productivity

Which of the statements given above is/are correct?

1. 1 and 2 only

2. 2 and 3 only
3. 1 and 3 only
4. 1, 2 and 3

Correct Answer : 4

Explanation

In general, loss of biodiversity in a region may lead to

- decline in plant production
 - lowered resistance to environmental perturbations such as drought
 - increased variability in certain ecosystem processes such as plant productivity, water use, and pest and disease cycles. **Hence, option (d) is correct.**
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Question 11:

Which of the following forms 'The Evil Quartet' for biodiversity losses:

1. Habitat loss and fragmentation
2. Over-exploitation
3. Alien species invasions

Select the correct answer using the code given below:

1. 1 and 2 only
2. 2 and 3 only
3. 1 and 3 only
4. 1, 2 and 3

Correct Answer : 4

Explanation

The accelerated rates of species extinctions that the world is facing now are largely due to human

activities. There are four major causes (' The Evil Quartet ' is the sobriquet used to describe them).

- **Habitat loss and fragmentation:** This is the most important cause driving animals and plants to extinction. The most dramatic examples of habitat loss come from tropical rainforests. Besides total loss, the degradation of many habitats by pollution also threatens the survival of many species. When large habitats are broken up into small fragments due to various human activities, mammals and birds requiring large territories and certain animals with migratory habits are badly affected, leading to population declines.
 - **Over-exploitation:** Humans have always depended on nature for food and shelter, but when 'need' turns to 'greed', it leads to overexploitation of natural resources. Many species extinctions in the last 500 years (Steller's sea cow, passenger pigeon) were due to overexploitation by humans.
 - **Alien species invasions:** When alien species are introduced unintentionally or deliberately for whatever purpose, some of them turn invasive, and cause decline or extinction of indigenous species. **Hence, option (d) is correct.**
 - **Co-extinctions:** When a species becomes extinct, the plant and animal species associated with it also become extinct. When a host fish species becomes extinct, its unique assemblage of parasites also meets the same fate. Another example is the case of a coevolved plant-pollinator mutualism where extinction of one invariably leads to the extinction of the other.
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Question 12:

Which of the following are Invasive species?

1. The Nile perch
2. Water hyacinth
3. Carrot grass
4. Cichlid fish

Select the correct answer using the code given below:

1. 1 and 2 only
2. 2 and 3 only
3. 1, 2 and 3 only
4. 1, 2, 3 and 4

Correct Answer : 3

Explanation

- 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.
- 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 correct.**
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Question 13:

Which of the following arguments can be put forward as reasons for conserving biodiversity:

1. Narrowly utilitarian
2. Broadly utilitarian
3. Ethical.

Select the correct answer using the code given below:

1. 1 and 2 only
2. 2 and 3 only
3. 1, 2 and 3
4. 1 and 3 only

Correct Answer : 3

Explanation

- There are many reasons for conserving biodiversity which can be grouped into three categories: narrowly utilitarian, broadly utilitarian, and ethical.
 - The narrowly utilitarian arguments for conserving biodiversity are; humans derive countless direct economic benefits from nature food (cereals, pulses, fruits), firewood, fibre, construction material, etc.
 - The broadly utilitarian argument says that biodiversity plays a major role in many ecosystem services that nature provides. The fast-dwindling Amazon forest is estimated to produce, through photosynthesis, 20 percent of the total oxygen in the earth's atmosphere.
 - The ethical argument for conserving biodiversity relates to what we owe to millions of plant, animal and microbe species with whom we share this planet. Philosophically or spiritually, we need to realise that every species has an intrinsic value, even if it may not be of current or any economic value to us. We have a moral duty to care for their well-being and pass on our biological legacy in good order to future generations. **Hence, option (c) is correct.**
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Question 14:

Biodiversity plays a major important role in providing which of the following ecosystem services?

1. Oxygen
2. Pollination
3. Water recharge

Select the correct answer using the code given below:

1. 1 and 2 only
2. 2 and 3 only
3. 1 and 3 only
4. 1, 2 and 3

Correct Answer : 4

Explanation

- Biodiversity plays a major role in many ecosystem services that nature provides.
 - The fast-dwindling Amazon forest is estimated to produce, through photosynthesis, 20 percent of the total oxygen in the earth's atmosphere.
 - Pollination (without which plants cannot give us fruits or seeds) is another service, ecosystems provide through pollinators layer - bees, bumblebees, birds and bats. Wetlands performs the function of water recharge.
 - There are other intangible benefits - that we derive from nature-the aesthetic pleasures of walking through thick woods, watching spring flowers in full bloom or waking up to a bulbul's song in the morning. **Hence, option (d) is correct.**
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Question 15:

Which of the following are examples of Ex-situ conservation?

1. Zoological parks
2. botanical gardens
3. Seed banks
4. Protecting the the entire forest to save the tiger

Select the correct answer using the code given below:

1. 1, 2 and 3 only

2. 2, 3 and 4 only
3. 1, 3 and 4 only
4. 1, 2, 3 and 4

Correct Answer : 1

Explanation

- When we conserve and protect the whole ecosystem, its biodiversity at all levels is protected – we save the entire forest to save the tiger. This approach is called in situ (on site) conservation.
 - Ex situ Conservation – In this approach, 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.
 - Zoological parks, botanical gardens and wildlife safari parks serve this purpose. There are many animals that have become extinct in the wild but continue to be maintained in zoological parks.
 - In recent years ex situ conservation has advanced beyond keeping threatened species in enclosures. Now gametes of threatened species can be preserved in viable and fertile condition for long periods using cryopreservation techniques, eggs can be fertilised in vitro, and plants can be propagated using tissue culture methods.
 - Seeds of different genetic strains of commercially important plants can be kept for long periods in seed banks. **Hence, option (a) is correct.**
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Question 16:

Consider the following statements:

1. 'The Earth Summit' held in Rio de Janeiro in 1992, called upon all nations to take appropriate measures for conservation of biodiversity and sustainable utilisation of its benefits.
2. The World Summit on Sustainable Development held in 2002 in Johannesburg was a follow up to Earth summit.
3. Biopiracy refers to the appropriation of the knowledge and genetic resources of farming and indigenous communities by individuals or institutions that seek exclusive monopoly control over these resources and knowledge

Which of the statements given above is/are correct?

1. 1 and 2 only
2. 2 and 3 only
3. 1 and 3 only
4. 1, 2 and 3

Correct Answer : 4

Explanation

- Biodiversity knows no political boundaries and its conservation is therefore a collective responsibility of all nations.
 - The historic Convention on Biological Diversity ('The Earth Summit') held in Rio de Janeiro in 1992, called upon all nations to take appropriate measures for conservation of biodiversity and sustainable utilisation of its benefits.
 - In a follow-up, the World Summit on Sustainable Development held in 2002 in Johannesburg, South Africa, 190 countries pledged their commitment to achieve by 2010, a significant reduction in the current rate of biodiversity loss at global, regional and local levels.
 - With increasing resources put into 'bioprospecting' (exploring molecular, genetic and species-level diversity for products of economic importance), nations endowed with rich biodiversity can expect to reap enormous benefits.
 - Biopiracy, a term originally coined by ETC Group, refers to the appropriation of the knowledge and genetic resources of farming and indigenous communities by individuals or institutions that seek exclusive monopoly control (patents or intellectual property) over these resources and knowledge.
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Question 17:

Which of these biodiversity hotspots are found in India?

1. Western Ghats and Sri Lanka
2. Indo-Burma
3. Himalaya
4. Sundarban

Select the correct answer using the code given below:

1. 1, 2 and 3 only
2. 2, 3 and 4 only
3. 3 and 4 only
4. 1, 2, 3 and 4

Correct Answer : 1

Explanation

- On a global basis, problem of protection of biodiversity has been addressed by eminent conservationists.
 - They identified for maximum protection certain 'biodiversity hotspots' regions with very high levels of species richness and high degree of endemism (that is, species confined to that region and not found anywhere else).
 - Initially 25 biodiversity hotspots were identified but subsequently nine more have been added to the list, bringing the total number of biodiversity hotspots in the world to 34. These hotspots are also regions of accelerated habitat loss. Four of these hotspots – Western Ghats and Sri Lanka, Indo-Burma, Sundaland and Himalaya – cover our country's exceptionally high biodiversity regions. **Hence, option (a) is correct.**
 - Although all the biodiversity hotspots put together cover less than 2 percent of the earth's land area, the number of species they collectively harbour is extremely high and strict protection of these hotspots could reduce the ongoing mass extinctions by almost 30 per cent.
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Question 18:

In which of the following states sacred groves are found?

1. Meghalaya
2. Rajasthan
3. Karnataka
4. Maharashtra

Select the correct answer using the code given below:

1. 1, 2 and 3 only
2. 2, 3 and 4 only
3. 1, 3 and 4 only
4. 1, 2, 3 and 4

Correct Answer : 4

Explanation

- In India, ecologically unique and biodiversity-rich regions are legally protected as biosphere reserves, national parks and sanctuaries.
- India has also a history of religious and cultural traditions that emphasised protection of nature. In many cultures, tracts of forest were set aside, and all the trees and wildlife within were venerated and given total protection.
- Such sacred groves are found in **Khasi and Jaintia Hills in Meghalaya, Aravalli Hills of Rajasthan, Western Ghat regions of Karnataka and Maharashtra and the Sarguja, Chanda and Bastar areas of Madhya Pradesh.**
- In Meghalaya, the sacred groves are the last refuges for a large number of rare and threatened

plants. **Hence, option (d) is correct.**

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