Biodiversity and Conservation

Class 12 Biology · 24 NEET MCQs with answers & explanations

Biodiversity and Conservation covers the three levels of biodiversity (genetic, species, ecosystem), patterns of biodiversity, causes of biodiversity loss (the 'Evil Quartet'), conservation strategies (in-situ and ex-situ) and hotspots. NEET questions are factual — species-area relationship, the number of known species, and specific conservation examples are commonly tested.

Key Biodiversity Facts

Concept	Key Fact
Three levels	Genetic diversity, species diversity, ecosystem diversity
Species-area relationship	log S = log C + Z·log A; Z = 0.1–0.2 (small areas), ~0.6–0.7 (continents)
Evil Quartet	Habitat loss (#1 cause), overexploitation, alien species invasion, co-extinctions
Hotspots	34 global; India has 4: Western Ghats, Himalayas, Indo-Burma, Sundaland
In-situ conservation	National parks, wildlife sanctuaries, biosphere reserves, sacred groves
Ex-situ conservation	Zoos, botanical gardens, seed banks, cryopreservation

Questions

Q1. According to the rivet-popper hypothesis, the rivets in an aeroplane are analogous to which component of a biological community?

(A) Genes within a species
(B) Trophic levels
(C) Individual species
(D) Abiotic factors

Q2. Which feature most directly distinguishes a biodiversity hotspot from a region that is merely species-rich?

(A) High species richness alone
(B) High endemism combined with severe habitat loss
(C) High number of introduced species
(D) Absence of human disturbance

Q3. Which of the following correctly identifies the major cause of biodiversity loss that is described in NCERT as the most important cause driving plants and animals to extinction?

(A) Over-exploitation
(B) Alien species invasion
(C) Co-extinction
(D) Habitat loss and fragmentation

Q4. The passenger pigeon, once numbering in billions, became extinct in 1914. Which cause of biodiversity loss does this exemplify?

(A) Habitat destruction by deforestation
(B) Overexploitation through mass hunting
(C) Introduction of competing alien species
(D) Co-extinction due to food source loss

Q5. Which term describes the extinction of a species that occurs because another species on which it is obligately dependent has gone extinct?

(A) Habitat fragmentation
(B) Competitive exclusion
(C) Overexploitation
(D) Co-extinction

Q6. Which invasive fish species, introduced into Lake Victoria, caused the extinction of over 200 species of native cichlid fishes?

(A) African catfish
(B) Largemouth bass
(C) Nile perch
(D) Tilapia

Q7. Which set correctly represents the three levels of biodiversity as defined by NCERT?

(A) Genetic, species and ecosystem diversity
(B) Population, community and biome diversity
(C) Morphological, physiological and behavioural diversity
(D) Habitat, climate and geographic diversity

Q8. Which example best represents genetic diversity within a species?

(A) Different plant species in a rainforest
(B) Thousands of rice varieties in India
(C) Forests, wetlands and grasslands coexisting
(D) Different animal phyla in the biosphere

Q9. A region containing forests, wetlands, grasslands and deserts demonstrates which level of biodiversity?

(A) Genetic diversity
(B) Species richness
(C) Ecosystem diversity
(D) Population diversity

Q10. Which of the following correctly represents the species-area relationship?

(A) Species richness decreases with increasing area
(B) Species richness increases with area as S = CA^z
(C) Species richness is unrelated to area
(D) Species richness depends only on latitude

Q11. Which of the following is correctly classified as an in-situ conservation method?

(A) Sacred grove
(B) Seed bank
(C) Zoological park
(D) Cryopreservation

Q12. Which of the following represents genetic diversity?

(A) Different ecosystems in a landscape
(B) Different species of birds in a forest
(C) Different trophic levels in a food web
(D) Different varieties of rice within one species

Q13. Lantana camara is an example of which component of the Evil Quartet?

(A) Co-extinction
(B) Over-exploitation
(C) Alien species invasion
(D) Habitat fragmentation

Q14. Which correctly pairs the three levels of biodiversity with examples?

(A) Genetic diversity — forests and deserts
(B) Species diversity — rice varieties only
(C) Genetic — rice varieties; Species — forest species; Ecosystem — forests, deserts, wetlands
(D) Genetic diversity — only endangered species

Q15. Which statement correctly explains why species richness contributes to ecosystem stability?

(A) High richness eliminates all inter-species competition
(B) High richness guarantees no species will go extinct
(C) Richness matters only for commercial usefulness
(D) Complementary ecological roles among species enhance ecosystem resilience

Q16. Which conservation strategy protects species within their natural ecosystems and habitats?

(A) In situ conservation
(B) Ex situ conservation
(C) Biosphere reserve only
(D) Seed bank storage

Q17. Which of the following is an example of in situ conservation according to NCERT?

(A) Seed bank
(B) Zoological park
(C) National park
(D) Cryopreservation facility

Q18. Which conservation method protects endangered species outside their natural habitats?

(A) In situ conservation
(B) Ex situ conservation
(C) Habitat restoration
(D) Natural selection

Q19. Which pattern describes the increase in species richness from poles toward the equator?

(A) Species-area relationship
(B) Latitudinal gradient in species diversity
(C) Ecological succession
(D) Rivet popper hypothesis

Q20. In the species-area relationship $S = CA^z$, Z is described as the regression coefficient. What does this mean geometrically?

(A) Z sets the Y-intercept of the curve
(B) Z is the slope of the line on a log-log plot
(C) Z represents total species at maximum area
(D) Z is the ratio of species to habitat types

Q21. The species-area relationship is represented mathematically by which equation?

(A) $S = CA$
(B) $S = A + C$
(C) $S = C / A^z$
(D) $S = CA^z$

Q22. Which category of biodiversity value refers to direct economic benefits such as food, fibre, fuel wood, and medicines?

(A) Narrowly utilitarian value
(B) Broadly utilitarian value
(C) Ethical value
(D) Aesthetic value

Q23. Which biodiversity value encompasses indirect ecosystem services such as pollination, nutrient cycling, and climate regulation?

(A) Ethical value
(B) Broadly utilitarian value
(C) Narrowly utilitarian value
(D) Aesthetic value

Q24. Which biodiversity value reflects the principle that all living organisms have an inherent right to exist, regardless of human utility?

(A) Narrowly utilitarian value
(B) Broadly utilitarian value
(C) Ethical value
(D) Aesthetic value

Answer key

1-C	**2-B**	**3-D**	**4-B**	**5-D**	**6-C**	**7-A**	**8-B**
9-C	**10-B**	**11-A**	**12-D**	**13-C**	**14-C**	**15-D**	**16-A**
17-C	**18-B**	**19-B**	**20-B**	**21-D**	**22-A**	**23-B**	**24-C**

Answers with explanations

Q1 — Answer: (C) Individual species
The rivet-popper hypothesis compares species in an ecosystem with rivets in an aeroplane. Removing a few rivets may not immediately cause failure, but continued species loss can impair ecosystem functioning. The trap is confusing species with genetic diversity or trophic levels.

Q2 — Answer: (B) High endemism combined with severe habitat loss
A biodiversity hotspot is identified using both exceptional endemism and substantial loss of original habitat. Species richness alone is insufficient to qualify a region as a hotspot. The attractive trap is treating any species-rich ecosystem as a hotspot.

Q3 — Answer: (D) Habitat loss and fragmentation
Among the Evil Quartet, habitat loss and fragmentation is identified as the most important cause of biodiversity loss. Over-exploitation, alien invasion and co-extinction are also major causes, but they are not the NCERT-identified foremost cause.

Q4 — Answer: (B) Overexploitation through mass hunting
The passenger pigeon was hunted on a massive commercial scale for food. Despite its enormous historical population, hunting intensity exceeded reproductive capacity, driving it to complete extinction — cited in NCERT as a key overexploitation example.

Q5 — Answer: (D) Co-extinction
Co-extinction refers to the loss of a species caused by the extinction of another species it depends upon — a classic example is the obligate mutualism between fig trees and their species-specific fig wasps.

Q6 — Answer: (C) Nile perch
NCERT specifically cites the introduction of Nile perch into Lake Victoria as responsible for driving more than 200 species of native cichlid fishes to extinction — a textbook example of alien species-driven biodiversity loss.

Q7 — Answer: (A) Genetic, species and ecosystem diversity
NCERT defines biodiversity as variability among living organisms encompassing genetic diversity within species, species diversity between species, and ecosystem diversity among ecosystems. The other options describe ecological or morphological categories not used in this framework.

Q8 — Answer: (B) Thousands of rice varieties in India
Genetic diversity refers to variation in genes within a species population; thousands of rice varieties cultivated across India is the NCERT example. Option A represents species diversity; Option C represents ecosystem diversity.

Q9 — Answer: (C) Ecosystem diversity
Ecosystem diversity refers to variety of habitats, communities and ecological processes in a region. Genetic diversity is within-species; species richness counts species, not habitat types.

Q10 — Answer: (B) Species richness increases with area as S = CA^z
Humboldt described the general increase in species richness with increasing area. NCERT expresses this as S = CA^z, where C is a constant and z is the regression coefficient (slope). Species richness does not decrease with area, is not independent of it, and latitude is a separate pattern.

Q11 — Answer: (A) Sacred grove
Sacred groves protect biodiversity within natural habitats and therefore represent in-situ conservation. Seed banks, zoological parks and cryopreservation maintain organisms or germplasm outside natural habitats and are ex-situ methods.

Q12 — Answer: (D) Different varieties of rice within one species
Genetic diversity is variation within a species. Different rice varieties illustrate intraspecific genetic variation. Differences among species represent species diversity, while differences among ecosystems represent ecosystem diversity. Trophic levels are an ecological concept unrelated to genetic diversity.

Q13 — Answer: (C) Alien species invasion
Lantana camara is a notorious alien invasive species introduced into India that outcompetes native flora. Alien species invasion is one of the four major causes of biodiversity loss listed in the Evil Quartet, alongside habitat loss, over-exploitation and co-extinction.

Q14 — Answer: (C) Genetic — rice varieties; Species — forest species; Ecosystem — forests, deserts, wetlands
Genetic diversity occurs within species, exemplified by different rice varieties. Species diversity concerns different species in a region, while ecosystem diversity concerns variation among distinct ecosystems such as forests, deserts and wetlands.

Q15 — Answer: (D) Complementary ecological roles among species enhance ecosystem resilience
Species-rich communities contain organisms performing complementary ecological roles, which can buffer ecosystems against disturbances. However, high richness does not eliminate competition or guarantee against extinction.

Q16 — Answer: (A) In situ conservation
In situ conservation protects species within their natural habitats including wildlife sanctuaries, national parks, and biosphere reserves. Ex situ removes species from their habitat. Seed banks and biosphere reserves alone are narrower categories under the broader in situ umbrella.

Q17 — Answer: (C) National park
National parks protect species within their natural habitats and are the primary example of in situ conservation per NCERT. Zoological parks, seed banks, and cryopreservation facilities all maintain species outside natural habitats, making them ex situ methods.

Q18 — Answer: (B) Ex situ conservation
Ex situ conservation protects species outside their natural habitats in botanical gardens, zoos, seed banks, and cryopreservation facilities. In situ conservation and habitat restoration both work within or toward natural environments; natural selection is not a conservation strategy.

Q19 — Answer: (B) Latitudinal gradient in species diversity
NCERT states species diversity is highest near the equator and decreases progressively toward the poles — this pattern is called the latitudinal gradient in species diversity.

Q20 — Answer: (B) Z is the slope of the line on a log-log plot
When both S and A are plotted on logarithmic scale, the species-area relationship becomes a straight line. Z is the slope of this line (regression coefficient), indicating the rate at which species richness increases with area.

Q21 — Answer: (D) $S = CA^z$
NCERT provides $S = CA^z$ where S is species richness, A is area, C is the Y-intercept constant and Z is the regression coefficient (slope). Option C inverts the relationship incorrectly.

Q22 — Answer: (A) Narrowly utilitarian value
Narrowly utilitarian value covers direct economic uses of biodiversity including food, fibre, fuel wood, and medicines obtained directly from biological resources.

Q23 — Answer: (B) Broadly utilitarian value
Broadly utilitarian value refers to indirect benefits provided by biodiversity through ecosystem services like pollination, nutrient cycling, and atmospheric regulation. Narrowly utilitarian value is limited to direct economic uses only.

Q24 — Answer: (C) Ethical value
Ethical value is rooted in the idea that humans co-inhabit the planet with millions of species, each with an intrinsic right to exist irrespective of economic or ecological benefit to humans.

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