MULTIPLE-CHOICE QUESTIONS

1. Which of the following countries has the highest biodiversity?
a. South America
b. South Africa
c. Russia
d. India
Solution:
Option (a) is the answer.

2. Which of the following is not a cause for loss of biodiversity?
a. Destruction of habitat
b. Invasion by alien species
c. Keeping animals in zoological parks
d. Over-exploitation of natural resources
Solution:
Option (c) is the answer.

3. Which of the following is not an invasive alien species in the Indian context?
a. Lantana
b. Cynodon
c. Parthenium
d. Eichhornia
Solution:
Option (b) is the answer.

4. Where among the following will you find pitcher plant?
a. The rain forest of North-East India
b. Sunderbans
c. The Thar Desert
d. Western Ghats
Solution:
Option (a) is the answer.

5. Which one of the following is not a major characteristic feature of biodiversity hot spots?
a. A large number of species
b. An abundance of endemic species
c. Mostly located in the tropics
d. Mostly located in the polar regions
Solution:
Option (c) is the answer.

6. Match the animals given in column I with their location in column II:

Column I	Column II
A. Dodo	i. Africa
B. Quagga	ii. Russia
C. Thylacine	iii. Mauritius
D. Stellar's sea cow	iv. Australia

Choose the correct match from the following:
a. A-i, B-iii, C-ii, D-iv
b. A-iv, B-iii, C-i, D-ii
c. A-iii, B-i, C-ii, D-iv
d. A-iii, B-i, C-iv, D-ii
Solution:
Option (d) is the answer.

7. What is common to the following plants: Nepenthes, Psilotum, Rauwolfia and Aconitum?
a. All are ornamental plants
b. All are phylogenic link species
c. All are prone to overexploitation
d. All are exclusively present in the Eastern Himalayas.
Solution:
Option (c) is the answer.

8. The one-horned rhinoceros is specific to which of the following sanctuary
a. Bitar Kanika
b. Bandipur
c. Kaziranga
d. Corbett park
Solution:
Option (c) is the answer.

9. Amongst the animal groups given below, which one appears to be more vulnerable to extinction?
a. Insects
b. Mammals
c. Amphibians
d. Reptiles
Solution:
Option (c) is the answer.

10. Which one of the following is an endangered plant species of India?
a. Rauwolfia serpentina
b. Santalum album (Sandalwood)
c. Cycas beddonei
d. All of the above
Solution:
Option (d) is the answer.

11. What is common to Lantana, Eichhornia and African catfish?
a. All are endangered species of India.
b. All are keystone species.
c. All are mammals found in India.
d. All the species are neither threatened nor indigenous species of India
Solution:
Option (d) is the answer.

12. The extinction of passenger pigeon was due to:
a. Increased number of predatory birds.
b. Overexploitation by humans.
c. Non-availability of the food.
d. Bird flu virus infection.
Solution:
Option (b) is the answer.

13. Which of the following statements is correct?
a. Parthenium is an endemic species of our country.
b. African catfish is not a threat to indigenous catfishes.
c. Steller's sea cow is an extinct animal.
d. Lantana is popularly known as carrot grass.
Solution:
Option (c) is the answer.

14. Among the ecosystem mentioned below, where can one find maximum biodiversity?
a. Mangroves
b. Desert
c. Coral reefs
d. Alpine meadows
Solution:
Option (c) is the answer.

15. Which of the following forests is known as the 'lungs of the planet Earth'?
a. Taiga forest
b. Tundra forest
c. Amazon rain forest
d. Rain forests of North East India
Solution:
Option (c) is the answer.

16. The active chemical drug reserpine is obtained from:
a. Datura
b. Rauwolfia
c. Atropa
d. Papaver

Solution:
Option (b) is the answer.

17. Which of the following group exhibit more species diversity?
a. Gymnosperms
b. Algae
c. Bryophytes
d. Fungi
Solution:
Option (d) is the answer.

18. Which of the below-mentioned regions exhibit less seasonal variations?
a. Tropics
b. Temperates
c. Alpines
d. Both (a) & (b)
Solution:
Option (a) is the answer.

19. The historic convention on Biological Diversity held in Rio de Janeiro in 1992 is known as:
a. CITES Convention
b. The Earth Summit
c. G-16 Summit
d. MAB Programme
Solution:
Option (b) is the answer.

20. What is common to the techniques (i) in vitro fertilisation, (ii) Cryo preservation and (iii) tissue culture?
a. All are in situ conservation methods.
b. All are ex-situ conservation methods.
c. All require ultra-modern equipment and large space.
d. All are methods of conservation of extinct organisms
Solution:
Option (b) is the answer.

VERY SHORT ANSWER TYPE QUESTIONS

1. What characteristics make a community stable?
Solution:
Less year to year variation in the productivity and resistance and resilience to the occasional disturbances that may be natural or manmade.

2. What could have triggered mass extinctions of species in the past?
Solution:

Natural calamities like volcanic eruptions, flood, drought etc.
Due to the change in temperature
Fall in sea level

3. What accounts for the greater ecological diversity of India?
Solution:
Ecological diversity indicates diversity at the ecosystem level.

4. According to David Tilman, the greater the diversity, the greater is the primary productivity. Can you think of a very low diversity man-made ecosystem that has high productivity?
Solution:
Agricultural fields are the best examples of the manmade ecosystem. These are known to show very low diversity but the output productivity is very high.

5. What does 'Red' indicate in the IUCN Red List (2004)?
Solution:
Red indicates the endangered species, which are on the verge of extinction.

6. Explain as to how protection of biodiversity hot spots alone can reduce up to 30% of the current rate of species extinction.
Solution:
Strict protection of hotspot can reduce the rate of ongoing mass extinction by almost 30%.

7. What is the difference between endemic and exotic species?
Solution:
Endemic is the local or native species found in a particular geographical area, whereas exotic species belongs to elsewhere and introduced from one geographical region to the other geographical region.

8. How does species diversity differ from ecological diversity?
Solution:
Species diversity is the diversity at the species level and is resistant to occasional disturbance whereas ecological diversity is at the ecosystem level diversity and changes lead to the biomass change in the ecosystem.

9. Why is genetic variation important in the plant Rauwolfia vomitoria?
Solution:
A genetic variation is important in any species to maintain the quality of progenies.

10. What is Red Data Book?
Solution:
Red Book Data includes records of all endangered animals and plants and almost 784 species are recorded in it there are 338 vertebrates, 359 invertebrate and 87 are plants.

11. Define gene pool.
Solution:
Gene pool is the stock of different genes in interbreeding populations.

12. What does the term 'Frugivorous' mean?
Solution:
Frugivorous are the fruit-eating birds and mammals of tropical forests.

13. What is the expanded form of IUCN?
Solution:
IUCN (International Union of Conservation of Nature) is an international organization which is founded in France in 1948.

14. Define the terms (i) Bioprospecting (ii) Endemism
Solution:
(i) Bioprospecting: The process of discovery for plants and animals species from which medical drugs and other commercially valuable compounds can be obtained.
(ii) Endemism: Ecological state of a species confined to that region and not found elsewhere.

15. What is common to the species shown in figures A and B?

Solution:
In both the pictures, they are angiosperms and that's the similarity between both the pictures.

16. What is common to the species shown in figures A and B?

Solution:

A is a tiger and B is a snake hanging on a tree. Both the animals are vertebrates where one is from mammalian phylum and another one is from reptilian phylum.

SHORT ANSWER TYPE QUESTIONS

1. How is the presently occurring species extinction different from the earlier mass extinctions?
Solution:
Earlier mass extinction was due to the natural causes like flood, volcanic eruption etc. but presently occurring extinction is 100-1000 times faster than the earlier times and it is due to the interference of the humans.

2. Of the four major causes for the loss of biodiversity (Alien species invasion, habitat loss and fragmentation, over-exploitation and co-extinctions which according to you is the major cause for the loss of biodiversity? Give reasons in support.
Solution:
Habitat loss and fragmentation is the major cause of this problem because this causes depletion of the natural resources leading to the scarcity of food for living wildlife. The tropical rain forest reduced to 6% from 14% of the total earth surface.

3. Discuss one example, based on your day-to-day observations, showing how the loss of one species may lead to the extinction of another.
Solution:
An example is of plant-pollinator relationship. In this case, if either one of them gets extinct it results in the ultimate extinction of the other, this phenomenon is called co-extinction.

4. A species-area curve is drawn by plotting the number of species against the area. How is it that when a very large area is considered the slope is steeper than that for smaller areas?
Solution:
According to Alexander Von Humboldt as the species richness increases gradually the exploded are will also increase. This is due to the availability of the natural resources also increasing which supports diversification.

5. Is it possible that productivity and diversity of a natural community remain constant over some time, say one hundred years?
Solution:
No. It is not possible to keep constant the productivity and natural community over 100 years. This is because with time the population size increases resulting in the depletion of the availability of resources.

6. There is greater biodiversity in tropical /subtropical regions than in the temperate region. Explain.
Solution:
Greater biodiversity is found in the tropics and subtropics because of its latitude gradient which is located near to the equator.

7. Why are the conventional methods not suitable for the assessment of biodiversity of bacteria?
Solution:

1. It is very difficult to distinguish bacteria morphologically through our naked eye.
2. There are bacteria's which cannot be cultured in the normal media so that it is difficult to study their biochemistry.
3. The culture media can easily get contaminated with the other nonbacterial organisms also.

8. What criteria should one use in categorizing a species as threatened?
Solution:
a) Rate of the population decline
b) Geographic region
c) Population size is studied

9. What could be the possible explanation for the greater vulnerability of amphibians to extinction as compared to other animal groups?
Solution:
The major cause of the extinction of amphibian is climate change and a disease called chytridiomycosis.

10. How do scientists extrapolate the total number of species on Earth?
Solution:
They make a statistical representation of the temperate – tropical regions and then calculate the gross estimation of a total number of the biomass of the species.

11. Humans benefit from the diversity of life. Give two examples.
Solution:
1. Humans are heterotrophs they depend on natural resources. Amazon rain forest provides about 40% of oxygen to humans and other sources are diatoms.
2. Food like cereals, pulses, fruits it all use to come from plants even tannins, lubricants, dyes, resins, perfumes all are the products comes from nature

12. List any two major causes other than anthropogenic causes of the loss of biodiversity.
Solution:
The two major causes are Habitat Loss and Fragmentation which is an important cause for the extinction of plants and animals and Overexploitation of natural resources by human beings.

13. What is an endangered species? Give an example of an endangered plant and animal species each?
Solution:
An endangered species is a species which has been categorized as very likely to become extinct shortly.
a) Asian Elephant estimation 40,000 – 50,000 remaining.
b) Bengal Tiger estimation 2,500 remaining.
c) Drosera indica.

14. What are sacred groves and their role in biodiversity conservation?
Solution:
Sacred groves are found in Khasi and Jaintia hills in Meghalaya, Aravalli hills of Rajasthan, Western Ghats regions of Karnataka and Maharashtra and the Sarguja and many more. It is a type of in situ conservation where plants are saved in the sacred groves of Meghalaya.

15. Suggest a place where one can go to study coral reefs, mangrove vegetation and estuaries.
Solution:
Coral reefs are found in oceanic places, mangrove vegetation and estuaries are found in coastal areas and it is also present near the ocean. So I suggest Australia study coral reefs, mangroves and estuaries.

16. Is it true that there is more solar energy available in the tropics? Explain briefly.
Solution:
Yes, tropics indeed possess more solar energy because sunlight is straight at the equatorial region and on the other side at the polar region's sunlight comes in slanting type rays.

17. What is co-extinction? Explain with a suitable example?
Solution:
When a species becomes extinct, the plant and animal species associated with it in an obligatory way also become extinct this process is known as co-extinction. An example is coevolved plant-pollinator mutualism where extinction of one invariably leads to the extinction of the other.

LONG ANSWER TYPE QUESTIONS

1. Elaborate how invasion by an alien species reduces the species diversity of an area.
Solution:
A decline or extinction can happen when alien species are introduced with native species. The introduced species change an entire habitat because many native species thrive only in a particular. Other invaders, though they do not change a habitat, endanger single species or even entire groups of them in various ways. e.g. A case study in East Africa suggests that when an alien exotic species Nile perch was introduced in lake Victoria it led to the extinction of 200 species of cichlids in the lake.

2. How can you, as an individual, prevent the loss of biodiversity?
Solution:
Biodiversity can be saved by enforcing strict conservation strategies and policies regarding the management of natural resources. We, human beings should always be aware of the biodiversity and the importance of the ecological system. We should try to spread awareness in the society about the conservation and the management of resources. The conservation like national parks and sanctuaries should be protected. Forest hunting should be banned and Overexploitation of natural resources needs to be avoided.

3. Can you think of a scientific explanation, besides analogy used by Paul Ehrlich, for the direct relationship between diversity and stability of an ecosystem?
Solution:
Paul Ehrlich assumed ecosystem as an aeroplane joined by thousands of rivets which denotes the diverse species. If every passenger starts popping out the rivet, the flight would not be safe, furthermore which rivet is removed is also important. Extinction will occur due to the destruction of natural sources by human beings. This causes an imbalance in the ecosystem. If the ecotone species is removed it would be a more critical factor in the destruction of the ecosystem.

4. Though the conflict between humans and wildlife started with the evolution of man, the

intensity of the conflict has increased due to the activities of modern man. Justify your answer with suitable examples.

Solution:

The conflict between humans and wildlife started with the evolution of man, the intensity of the conflict has increased due to the activities of modern man. This is a true statement. Years ago human started agriculture and started exploiting and late on changed to overexploitation as the population increased. Increased population resulted in increased needs which are leading to the 100 to 1000 times faster exploitation of the natural resources. Increase in the medicinal facility and increased technology, the life span of humans increased which resulted in overexploitation and the intensity of the conflicts increased.

5. What is an ecosystem service? List any four important ecosystem services provided by natural ecosystems. Are you in favour or against levying a charge on the service provided by the ecosystem?

Solution:

The services that are provided by the ecosystem are called the ecosystem services. Four important ecosystem services are

a) Purification of air and water

b) It provides habitat and food to the wildlife.

c) Commercially as well as medicinally important drugs are obtained from forest trees.

d) Provides aesthetic pleasure, have cultural and spiritual values.

6. Describe the consumptive use value of biodiversity as food, drugs and medicines, fuel and fibre with suitable examples.

Solution:

Biodiversity provides a range of goods from agriculture crops to medicines and fibres to which a direct value and cost can be assigned.

a) Food: A large number of wild plants are consumed by human beings as food about 90% of food crops have been domesticated from wild tropical region like Chenopodium (bathua) Melilotus Alva (sangria).

b) Drugs and medicine: The wonder drug penicillin used as an antibiotic is derived from a fungus called penicillium

c) FUEL: The fossil fuels like coal, petroleum and natural gas are all products of fossilized biodiversity.

7. Species diversity decreases as we move away from the equator towards the poles. What could be the possible reasons?

Solution:

Species diversity decreases as we move from equator towards the poles because sunlight is less visible due to slanting rays of the sun but at equator possess straight rays of sunlight. Polar Regions are generally covered with snow till 6-7 meter. So topsoil is completely out of vegetation due to snow and the chilled climate forms icebergs in the seas.

8. Explain briefly the 'rivet popper hypothesis' of Paul Ehrlich.

Solution:

Rivet popper hypothesis is an explanation of the threat of animals and plants. Paul Ehrlich assumed that the airplane is referred to as the ecosystem and aero plane parts are referred to the species of an area. When everyone takes this rivets(species) take to their homes then it may lead a scratch in the safety of flight(Functioning of the ecosystem) and if it continued to remove more and more rivets he planes

become dangerously weak over some time. Soon aeroplane will get to very serious trouble. As a result, the plane never can fly (key species of the ecosystem will also get to an extent).

9. The relation between species richness and area for a wide variety of taxa turns out to be a rectangular hyperbola. Give a brief explanation

Solution:

The German naturalist and geographer Alexandar von Humboldt observed that within a region species richness increased with increasing explored are, but only up to a limit.

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On the logarithmic scale, the relationship is a straight line described by the equation.

Log S = Log C + Z Log A where

S = Species richness A = Area

Z = slope of the line

Y = Y- intercept

The value of Z lies in the range of 0.1 to 0.2 regardless of the taxonomic groups or the regions and this process is called species – relationship area.