

For BioResire students



NEET Biology Material

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REASONS OF CONSERVING BIODIVERSITY

NARROWLY UTILITARIAN

- HUMANS DEPEND ON PLANTS FOR ECONOMIC NEEDS.
- NEARLY 257 DRUGS ARE DERIVED FROM PLANTS



POPPY (OPIUM DRUG)

BROADLY UTILITARIAN


- BIODIVERSITY PLAYS A MAJOR ROLE IN ECOSYSTEM SERVICES.
- AMAZON FORESTS OF BRAZIL IS REFERRED AS LUNGS OF THE PLANTS.



AMAZON FOREST

ETHICAL

- EVERY SPECIES HAS ITS OWN INTRINSIC VALUE
- WE AS A HUMAN HAVE MORAL DUTY TO PROTECT THESE SPECIES.



SAVE PLANET

CONSERVATION OF BIODIVERSITY

METHODS

IN - SITU CONSERVATION

- ANIMALS OR PLANTS PROTECTED IN THEIR NATURAL HABITAT.
- EG- NATIONAL PARK, SANCTUARY, BIOSPHERE RESERVES ETC.



EX- SITU CONSERVATION

- OFF - SITE CONSERVATION, ORGANISMS ARE PROTECTED OUTSIDE THEIR NATURAL ENVIRONMENT EG- BOTANICAL GARDEN, ZOOLOGICAL PARTS, GENE- BANK ETC.




ZOOLOGICAL PARK



BIRD SANCTUARY

NATIONAL PARK

HABITAT LOSS AND FRAGMENTATION

Fragmentation of forest affects the animals that migrate and live in large territories

OVEREXPLOITATION

Conversions of human needs into greed's lead to over exploitation

ALIEN - SPECIES INVASION

Causes decline or extinction of native species by alien species.

CO - EXTINCTION

Species are linked to each other so extinction of one species in the hierarchy leads affects the associated species.

LONGITUDINAL GRADIENTS

- Species diversity decreases from equator to poles.
- Tropical regions (23.5o N to 23.5o S) richer in biodiversity compared to poles.
- Amazon Rain forest is the largest and greatest biodiversity.

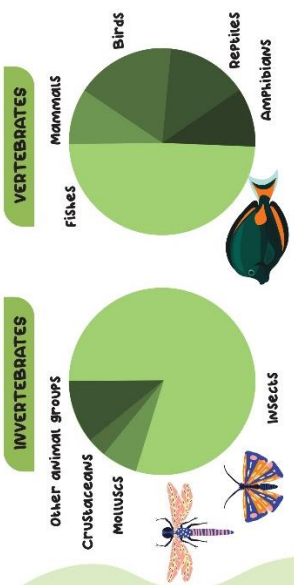
REASONS FOR LOSS OF BIODIVERSITY



PATTERNS OF BIODIVERSITY

SPECIES - AREA RELATIONSHIP


- Alexander von Humboldt suggested that species richness increases with increased in explored area.
- The relation between species- richness and area is Rectangular hyperbola
- $Z =$ Slope of line



BIODIVERSITY-- DIVERSITY OF SPECIES AT ALL LEVELS OF BIOLOGICAL ORGANIZATION

GENETIC DIVERSITY

- Diversity shown by a single species at genetic level.
- India has 50,000 strains of rice and 1,000 varieties of mango.




ECOLOGICAL DIVERSITY

- Diversity at ecosystem level
- In comparison to polar regions tropical is rich in diversity



SPECIES DIVERSITY

- Diversity at species level
- western shots are rich in amphibian diversity compared to eastern shots




Species diversity at global level is around 7 million according to ray



THE EARTH IS HEADING TOWARDS SIXTH MASS EXTINCTION DUE TO ANTHROPOGENIC REASONS.

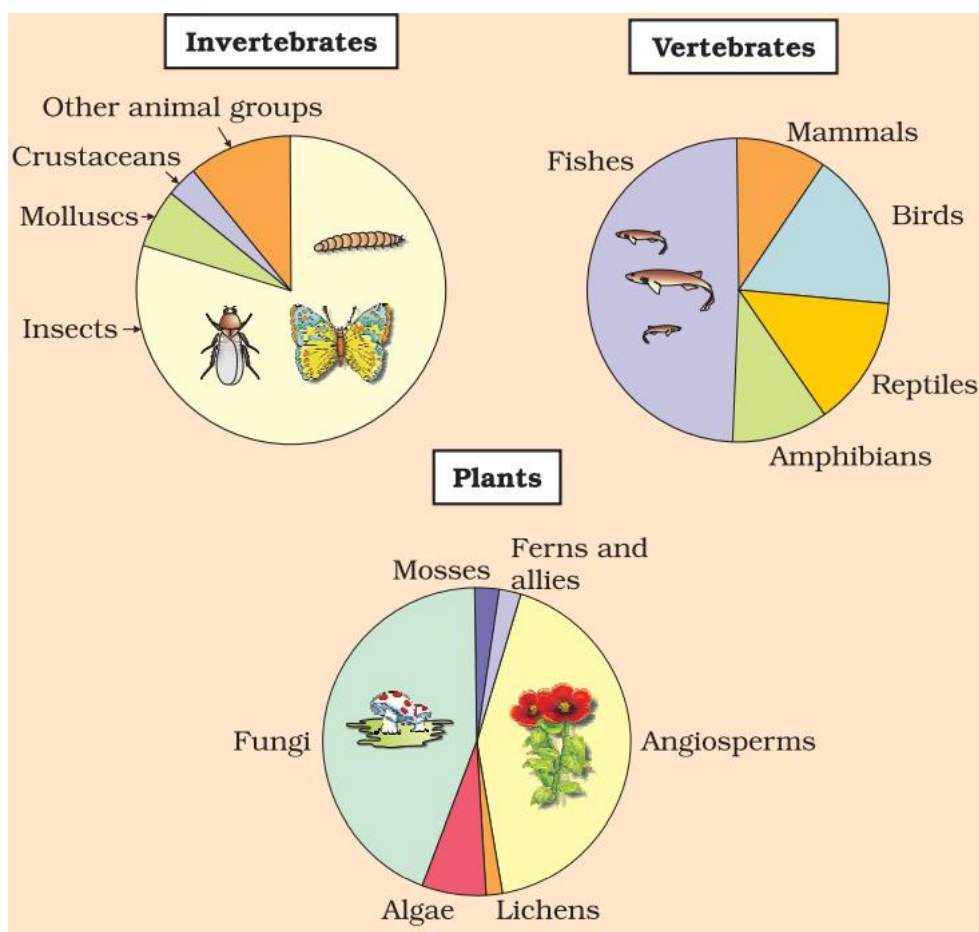
BIODIVERSITY AND CONSERVATION

Biodiversity:

Biodiversity or biological diversity is the occurrence of different types of ecosystems, different species of organisms and their variant like biotypes, ecotypes and gene adapted to different climates and environments of different regions including their interactions and processes. This term was coined by Edward Wilson. The vast array of species of micro-organisms, algae, fungi, plants and animals occurring on the earth either in the terrestrial or aquatic habitats and the ecological complexes of which they are a part comprises biodiversity. Diversity ranges from macromolecules to biomes.

The important diversity at the levels of biological organization are:

- **Genetic Diversity:** A single species might show high diversity at the genetic level over its distributional range. *Rauwolfia vomitoria* shows genetic variation in terms of concentration and potency of chemical reserpine India has more than 50,000 genetically different strains of rice and 1000 varieties of mango.
- **Species Diversity:** diversity at species level for example, the Western Ghats have more amphibian species diversity than the Eastern Ghats.
- **Ecological Diversity:** deserts, rain forests, mangroves, coral reefs, wetlands, estuaries and alpine meadows are types of ecological diversity.



- Biodiversity and its conservation are vital environmental issues of international concern as more and more people around the world begin to realize the critical importance of biodiversity for survival and well-being on this planet.
- According to the IUCN, the total number of plant and animal species described so far is about 1.5 million but still many species are yet to be discovered and described.
- More than 70% of all the species recorded are animals while the rest are plants including algae, fungi, bryophytes, gymnosperms and angiosperms. Among animals, 70% of total are insects.
- The number of fungi species in the world is more than the combined total of the species of fishes, amphibians, reptiles and mammals.

Biodiversity In India:

- India is one of the twelve mega biodiversity countries of the world.
- India has only 2.4% of the land area of the world, it has 8.1% of the global species biodiversity.
- There are about 45,000 species of plants and about 90,000-1,00,000 species of animals.
- New species are yet to be discovered and named.
- Applying Robert May's global estimate, only 22% of the total species have been recorded, India has probably more than 1,00,000 species of plants and 3,00,000 species of animals to be discovered and described.

Patterns of Biodiversity:

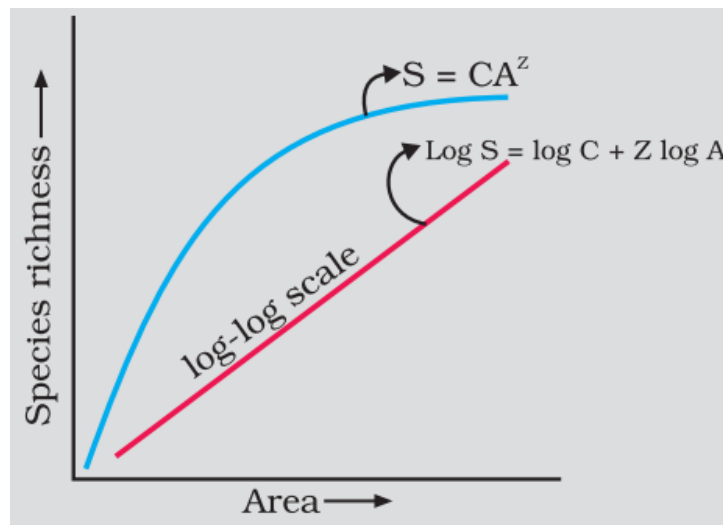
- **Latitudinal gradients:** The diversity of plants and animals is not uniform throughout the world and shows uneven distribution. This distribution pattern is along the latitudinal gradient in diversity. Species diversity decreases as we move away from the equator towards the poles. Tropics harbor more species than temperate or polar areas. Amazonian Rainforest has the greatest biodiversity on earth. It has more than 40,000 species of plants, 1,25,000 species of insects, 300 species of fish, 427 of amphibian and 378 of reptiles, 1,300 species of birds and 427 of mammals. Various hypothesis has been proposed regarding this such as.
- Speciation is a function of time unlike temperate regions subjected to frequent glaciation in past, tropical latitudes have remained relatively undisturbed for millions of years and thus had long evolutionary time for species diversification.
- Tropical environments unlike temperate ones are less seasonal and more constant and predictable which promote niche specialization and lead to a greater species diversity.
- There is more solar energy available in the tropics which contribute to higher productivity this in turn contribute indirectly to greater diversity.

Species-Area relationships:

Alexander Von Humboldt has observed that within a region, species richness gets

increased when explored area is increased, but only up to a limit.

The relationship between species richness and area for a number of taxa like angiospermic plants, fresh water fishes and birds is found to be a rectangular hyperbola.



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

$$\log S = \log C + Z \log A.$$

Where, S = species, A = Area, Z = slope of the line, C = Y intercept.

- Ecologists have discovered that the value of Z lies in range of 0.1 to 0.2 regardless of taxonomic group of the region.
- In very large area like continents, Z value ranges between 0.6 & 1.2.

The importance of Species Diversity to the Ecosystem:

- The communities with more species are generally more stable than those with less species. A stable community should not show too much variation in productivity from year to year.
- Rich biodiversity is essential for ecosystem health and imperative for the very survival of human race on this planet.
- **Rivet popper hypothesis:** Given by Paul Ehrlich. In an airplane (ecosystem) all parts are joined together using thousands of rivets (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. Furthermore, which rivet is removed may also be critical. Loss of rivets on the wings (key species that drive major ecosystem functions) is obviously a more serious threat to flight safety than loss of a few rivets on the seats or windows inside the plane.

Loss of Biodiversity:

The biological wealth of our planets have been declining rapidly due to three factors – Population, Urbanization and Industrialization. The IUCN Red List (2004)

documents the extinction of 784 species (including 338 vertebrates, 359 invertebrates and 87 plants) in the last 500 years. Some examples of recent extinctions include the dodo (Mauritius), quagga (Africa), thylacine (Australia), Steller's Sea Cow (Russia) and three subspecies (Bali, Javan, Caspian) of tiger. In last 20 years, 27 species have been disappeared. In general, loss of biodiversity in a region may lead to.

- Decline in plant production.
- Lowered resistance to environmental perturbations, drought, and flood.
- Increased variability in ecosystem processes such as productivity, water use, and pest and disease cycles.

Causes of biodiversity losses:

Faster rates of species extinctions are largely due to human activities. The four major causes are called 'The Evil Quartet'.

- **Habitat loss and fragmentation:** Is the most important cause of animals and plants extinction. The amazon rain forest (lungs of the planet) having millions of species is being cut and cleared for cultivating soya beans or for conversion to grasslands. When large habitats are broken up into small fragments due to various human activities, mammals and birds requiring large territories migrate and badly affected.
- **Over-exploitation:** When biological system is over exploited by man for the natural resources, it results in degradation and extinction of the resources, e.g. Steller's sea cow, passenger pigeon etc. Many marine fish populations are over harvested, endangering the continued existence of some important species.
- **Alien species invasions:** When alien species enters intentionally or unintentionally, some of them turn invasive and cause decline or extinction of indigenous species. 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 weeds species like carrot grass (parthenium), Lantana and water hyacinth causing threats to indigenous species.
- **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 becomes extinct.

Biodiversity Conservation:

We should conserve the biodiversity due to following groups of regions:

- **The narrowly utilitarian:** Human obtain countless direct economic benefits from nature like food, firewood, fibers, construction material, medicinal plants and industrial products. With increasing resources put into 'bio-prospecting' nations endowed with rich biodiversity can expect to reap enormous benefits.
- **The Broadly Utilitarian:** Biodiversity plays a major role in ecosystem services that nature provides. Productions of Oxygen during photosynthesis, pollination without natural pollinator, pleasure from nature are priceless.
- **Ethical:** For conserving biodiversity relates to what we own to millions of plants,

animals and microbes species with whom we share this planet. Every species has an intrinsic value although it may not be of current or any economic value to us. It is our moral duty to care for their well-being and pass on our biological legacy in good order to future generations.

When whole ecosystem is conserved, all its biodiversity is also protected.

There are two ways of conservation of biodiversity:

In situ (on site) conservation: Conservationists have identified for maximum protection certain 'biodiversity hotspots' regions with very high levels of species richness and high degree of endemism, species found in that region and not found anywhere else. There are 34 biodiversity hot spots in the world. These hotspots are also regions of accelerated habitat loss. India has 14 biosphere reserves, 90 national parks and 448 wildlife sanctuaries.

Ex situ (off site) conservation: In this method, threatened animals and plants are taken out from their natural habitat and placed in special setting when they be protected and given special care . Zoological parks, Botanical Gardens and wildlife safari parks are used for this purpose. Now gametes of threatened species can be preserved in viable and fertile condition for long periods of time using cryopreservation technique. Eggs can be fertilized in vitro and plants can be propagated using tissue culture methods.

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 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.

NCERT LINE BY LINE QUESTIONS

15.1 Biodiversity

- Term 'Biodiversity' popularized by (Pg. 258, E)
A) Robert hook B) Ernst Haeckel C) Edward Wilson D) G. Tansley
- Edward Wilson was a - (Pg. 258, E)
A) Mathematician B) Sociobiologist C) Psychologist D) None of the above
- 'Biodiversity' was popularized (Pg. 259, E)
A) To describe the combined diversity B) to describe individual diversity
C) To describe plant diversity D) None of the above
- Types of Biodiversity is/are- (Pg. 259, E)
A) Genetic diversity B) Species diversity
C) Ecological diversity D) All of these
- The genetic variation shown in (Pg. 259, E)
A) *Rauwolfia vomitoria* B) Rice
C) Mango D) All of the above
- Active chemical in *Rauwolfia vomitoria* (Pg. 259, E)
A) Terpene B) Reserpine C) Asprine D) None of the above
- Which one is correct about Genetic diversity (Pg. 259, E)
A) Genetic variation shown by *Rauwolfia vomitoria*
B) Genetic variation shown in western ghats.
C) India has less than 5000 genetically different strain of rice
D) India has 1,000 varieties of rice
- India has more than..... genetically different strains of rice, and ...varieties of Mango. (Pg. 259, E)
A) 50,000, 1,000 B) 1,000 & 50,000 C) 5,000, 1,000 D) 1,000 & 5,000
- The diversity at the species level is c/a (Pg. 259, E)
A) Ecological diversity B) Genetic diversity
C) Species diversity D) None of these
- TheGhats have a greater amphibian species diversity than the Ghats. (Pg. 259, E)
A) Eastern, Western B) Western, Eastern C) Western, Southern D) Eastern, Southern
- Ecological diversity is in (Pg. 259, E)
A) Deserts B) Rain forests, Mangroves
C) Coral reefs, Wetlands D) All of the above
- Biodiversity and its conservation is of (Pg. 259, E)
A) national concern B) concern in some states of india
C) international concern D) all of these

15.1.1 How many species are there on Earth How many in India.

- IUCN stands for- (Pg. 259, E)
A) International unity for conservation of Nature
B) Indian union for conservation of Nature
C) Italian union for conservation at Nature
D) International Union for conservation of Nature and Natural Resources
- Robert may estimates the global species diversity at about (Pg. 259, E)
A) 7 billion B) 70 million C) 7 million D) 70 billion
- Most species rich taxonomic group are (Pg. 260, E)
A) Crustaceans B) Insects C) Molluscs D) None of the above
- In all available species more than 70% of all the species recorded are _____ which _____ comprise no more than 22% of the total (Pg. 260, E)
A) Invertebrates, Plants B) Plants, Animal
C) Animal, Plants D) Plant, Invertebrates
- Highest variation of species in plants is in- (Pg. 260, E)

18. In vertebrates maximum No. of species found in **(Pg. 260, E)**
 A) Fungi B) Mosses C) Algae D) Lichens
 A) Birds B) Mammals C) Fishes D) Reptiles
19. Problem behind no given figures about prokaryotes is **(Pg. 260, E)**
 A) Conventional taxonomic methods are not suitable for identifying microbial species
 B) Many species are simply not culturable under laboratory conditions
 C) Because prokaryotes are non-living
 D) A & B both are correct
20. India has only percent at the world's land area. Its share of the global species diversity in an impressive....percent. **(Pg. 261, E)**
 A) 2.4, 8.1 B) 8.1, 2.4 C) 4.1, 8.2 D) 8.4, 2.1
21. India is one of themega diversity countries of the world. **(Pg. 261, E)**
 A) 13 B) 14 C) 12 D) 11
22. How many plant species found in India roughly **(Pg. 261, E)**
 A) 1,00,000 B) 45,000 C) 3,00,00 D) None of the above
23. According to May's global estimate there are probably....plant species & more thananimal species. **(Pg. 261, E)**
 A) 3,00,000 & 1,00,000 B) 30,000 & 10,000
 C) 1,00,000 & 3,00,000 D) 10,000 & 30,000

15.1.2 Patterns of Biodiversity

24. Species diversity decreases as **(Pg. 261, E)**
 A) We move away from the equator towards the poles
 B) We move away from the poles towards equator
 C) We move hill to plane area
 D) None of the above
25. How many species of birds found in India? **(Pg. 261, E)**
 A) 1500 B) 1400 C) 1200 D) 1700
26. Greatest biodiversity on earth is found in **(Pg. 261, E)**
 A) Sundarbans B) Amazon rain forest C) Congo rain forest D) None of the above
27. Amazon Rainforest situated in **(Pg. 261, E)**
 A) North America B) North India C) South America D) West America
28. Choose the correct option **(Pg. 261, E)**

1	Plant	i	378
2	Fishes	ii	40,000
3	Birds	iii	427
4	Mammals	iv	3,000
5	Reptiles	v	1,300

32. The relation b/w species richness & area for a wide variety of taxa turns out to be a **(Pg. 262, E)**
 A) Linear B) Sigmoid
 C) Rectangular Hyperbola D) None of the above
33. Correct equation of species-Area relationship **(Pg. 262, E)**
 A) $\log A = \log S + Z \log C$ B) $\log S = \log C + Z \log A$
 C) $\log S = \log Z + C \log A$ D) $\log S = \log C - Z \log A$
34. In species area relationship equation, Z stands for- **(Pg. 262, E)**
 A) Slope of the line B) Regression coefficient
 C) species richness D) Both a & B are correct
35. Value of Z is **(Pg. 262, E)**
 A) 20-30 B) 1 - 2 C) 0.1 - 0.2 D) None of the above
36. The value of Z in the entire continents **(Pg. 262, E)**
 A) 0.8 - 1.8 B) 0.6 - 1.2 C) 0.1 - 0.2 D) None of the above
37. The value of Z for frugivorous birds & mammals in the tropical forests of different continents **(Pg. 262, E)**
 A) 2.15 B) 0.5 C) 1.15 D) 0.8

38. Concept of species-Area relationship given by **(Pg. 262, E)**
 A) Robert Frost B) Paul Ehrlich C) Alexander hook D) Alexander Von Humboldt
39. Alexander von Humboldt is a **(Pg. 262, E)**
 A) German naturalist B) Philosopher
 C) Geographer D) Both A & C are correct
40. According to Alexander species richness **(Pg. 262, E)**
 A) Increased with increasing explored area, but only up to a limit
 B) Decreased with increasing explored area, but only up to a limit
 C) Increased with decreasing explored area, but there are no limitations
 D) None of the above
41. Find out A and B and also select the correct answer **(Pg. 262, E)**
 A) a = species richness
 b = Area
 B) a = area
 b = species richness
 C) a = Area
 b = Regression coefficient
 D) none of these
42. In species-area relationship equation **(Pg. 262, E)**
 A) S = species richness B) A = area
 C) C = Y – intercept D) All of these
43. Which one is correct about a stable community? **(Pg. 262, E)**
 A) Should not show too much variation in productivity from year to year
 B) It must be either resistant or resilient on surface disturbance
 C) It must also be resistant to invasions by alien species
 D) All of these are correct
44. Find out correct option about David Tilman's long term ecosystem experiments **(Pg. 263, E)**
 A) Plots with more species showed less year-to-year variation in total biomass
 B) Plots with more species show too much variation in productivity
 C) Increased diversity contributed to higher productivity
 D) Both A & C are correct
45. 'Rivet popper hypothesis' is given by **(Pg. 263, E)**
 A) Alexander von Humboldt B) Paul Ehrlich
 C) Tilman D) Robert hook
46. Paul Ehrlich is a **(Pg. 263, E)**
 A) Stanford ecologist B) Stanford psychologist
 C) Stanford micrologist D) Stanford geologist
47. In Rivet popper hypothesis, rivets depict as **(Pg. 263, E)**
 A) Ecosystem B) Extinct species C) Species D) Plants
48. According to Ehrlich's rivet popper hypothesis loss of rivets on the wings affects in ecosystem as- **(Pg. 263, E)**
 A) Loss of key species that drive major ecosystem function
 B) Proper functioning of ecosystem
 C) Species to become extinct
 D) None of these
49. According to rivet popper hypothesis, which one is not correct **(Pg. 263, E)**
 A) Rivet – species
 B) Airplane – Ecosystem
 C) Rivets to take home – species to become extinct
 D) All of these are correct

15.1.4 Loss of Biodiversity

50. The colonization of tropical pacific islands by humans is said to have led to the extinction of more than _____ of native birds **(Pg. 263, E)**
 A) 2000 species B) 1200 species C) 20000 species D) 200 species

51. According to red list (2004) No. of total extinct species in last 500 years **(Pg. 263, E)**
 A) 504 species B) 387 species C) 478 species D) 784 species
52. How many species of invertebrates become extinct in last 500 years **(Pg. 263, E)**
 A) 87 species B) 784 species C) 359 species D) None of these
53. According to recent extinction which one is incorrect option – **(Pg. 263, E)**
 A) Dodo – Mauritius B) Steller’s sea cow – USA
 C) Quagga – Africa D) Thylacine – Australia
54. Subspecies of tiger which become recently extinct **(Pg. 263, E)**
 A) Bali B) Caspian C) Javan D) All of these
55. The last 20 years alone have witnessed the disappearance of _____ **(Pg. 263, E)**
 A) 300 species B) 10 species C) 27 species D) 1000 species
56. Match the following- **(Pg. 264, E)**

Species	% of threat of extinction	
a Birds	1	23%
b Mammals	2	32%
c Amphibians	3	12%
d Gymnosperms	4	31%

- A) a-1, b-3, c-2, d-4 B) a-3, b-1, c-2, d-4
 C) a-3, b-1, c-4, d-2 D) a-3, b-4, c-1, d-2
57. Select the correct statement about ‘Sixth Extinction’ **(Pg. 264, E)**
 A) The extinction rates are estimated to be 100 - 1000 times faster than in the pre-human times.
 B) Human activities are responsible for the faster rates.
 C) Half of all the species on Earth might be wiped out within the next 1000 years.
 D) Both A and B option are correct.
58. Loss of biodiversity in a region may lead to **(Pg. 264, E)**
 A) decline in plant production,
 B) lowered resistance to environmental. perturbations such as drought.
 C) Increased variability in ecosystem process.
 D) All of these.
59. ‘The Evil Quartet’ is the term used to describe **(Pg. 264, E)**
 A) Causes of habitat losses B) Causes of biodiversity losses.
 C) Causes of water losses D) All of these.
60. The accelerated rates of species extinctions are largely due to **(Pg. 264, E)**
 A) Natural activities B) Machines activities C) human activities D) none of these
61. Which one is not involved in the evil quartet? **(Pg. 264, E)**
 A) Habitat loss and fragmentation B) Alien species invasions
 C) over - exploitation D) all are involved
62. The most important cause of animals and plants to extinction **(Pg. 265, E)**
 A) Over exploitation B) Alien species invasions
 C) Co-existence D) Habitat loss and fragmentation.
63. Lungs of the planet term used for **(Pg. 265, E)**
 A) Tropical rain forest, B) Amazon rainforest,
 C) temperate reason, D) none of these.
64. The Amazon rainforest harboring probably millions of species to is being cut and cleared for. **(Pg. 266, E)**
 A) For cultivating soya beans. B) Conversion to grassland for raising beef cattle.
 C) Cultivating new forest. D) Both A and B are correct.
65. When large habitats are broken up into small fragments due to various _____, mammals and birds requiring large territories and certain animals with migratory habits are badly affected, leading to _____ **(Pg. 266, E)**
 A) a – Nature activities,
 b – Population declines
 B) a – Human activities,

- b – Population declines
- C) a – Human activities,
- b – Population increasing
- D) none of these

66. Once covering more than _____ percent of Earth’s land surface, these rain forests now cover no more than _____ percent. **(Pg. 264, E)**
 A) 6, 14 B) 14, 8 C) 14, 6 D) 12, 8
67. Species extinct in the last 500 years due to over exploitation by humans. **(Pg. 265, E)**
 A) Steller’s sea cow B) Cichlid fish C) Passenger pigeon D) A & C both are correct
68. How many species of cichlid fish is extinct due to introduction of Nile perch in lake victoria? **(Pg. 265, E)**
 A) 2 B) 20 C) 200 D) 2000
69. The environmental damage caused and threat posed to our native species by invasive weed species like. **(Pg. 265, E)**
 A) Carrot grass B) water hyacinth C) lantana D) all of these.
70. African catfish _____ is posing as threat to the indigenous catfishes. **(Pg. 265, E)**
 A) Parthenium B) Clarias garlepinus
 C) *Clarias branchysoma* D) None of these
71. Which one is correct statement about co-extinction? **(Pg. 265, E)**
 A) When a species become extinct, the plant and animal species associated with it in an obligatory way also become extinct.
 B) When a host becomes extinct, it's unique assemblage of parasites also meets the same fate
 C) In the plant pollinator mutualism, where extinction of one invariably leads to the extinction of the other.
 D) All these statements are correct.
72. Which one is not an example of Alien species invasions? **(Pg. 265, E)**
 A) Parthenium B) Steller’s sea cow C) Catfish D) Lantana
73. Purpose of introducing the African cat fish in the Indian River. **(Pg. 265, E)**
 A) For Aquaculture B) For ornamental purpose
 C) For agriculture D) None of these.

15.2 Biodiversity Conservation

74. Reason behind conserving the biodiversity. **(Pg. 265, E)**
 A) Narrowly utilitarian. B) Broadly utilitarian.
 C) Ethical D) All of these
75. More than 25% of the drugs currently sold in the market worldwide are derived from __i__ and __ii__ species of plants contribute to the traditional medicines used by native peoples around the world. **(Pg. 265, E)**
 A) i- plants, ii- 25,000 B) i- Animals, ii- 25,000
 C) i- Animals, ii- 25,00 D) i- plants, ii- 25,00
76. How much oxygen is produced by Amazon Forest through Photosynthesis? **(Pg. 266, E)**
 A) 20% of the total oxygen. B) 30% of the total oxygen.
 C) 25% of the total oxygen. D) None of these.
77. Select the correct option about ethical argument. **(Pg. 266, E)**
 A) In ethical argument of conserving biodiversity relates to what we are to million of plant, animals and micro species with whom we share this planet.
 B) We need to realize that every species has an intrinsic value.
 C) We have a moral duty to care for their well being and pass on our biological legacy in good order to future generation.
 D) All these statements are correct.

15.2.2 How do we conserve biodiversity?

78. Species confined to that region and not found anywhere else is called as- **(Pg. 266, E)**
 A) In situ B) Exotic C) Endemic D) None of these
79. Initially __i__ biodiversity hotspots were identified, but after some time __ii__ more have been added and the total number of biodiversity hotspot in the world to __iii__ . **(Pg. 266, E)**

- A) i- 25, ii- 9 B) ii- 8, iii- 30 C) i- 23, iii- 34 D) none of these

80. Match the following (Pg. 266, E)

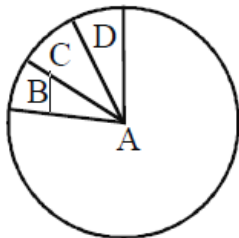
Column I		Column II	
a	Biosphere reserve	1	448
b	National parks	2	14
c	Wildlife sanctuaries	3	90

86. A) Biosphere reserves B) National parks C) Zoological parks D) Sacred groves
 Which one is not the hotspot in India? (Pg. 267, E)
87. A) Western ghats B) Indo Burma C) Eastern Ghats D) Himalaya
 Sacred groves are that- (Pg. 267, E)
88. A) Place which are protected for animals.
 B) Place where all people are worship.
 C) Place where religion and cultural traditions that emphasized protection of nature
 D) None of these
89. Sacred groves, Khasi and Jaintia hills located in- (Pg. 267, E)
90. A) Meghalaya B) Manipur C) Mizoram D) Madhya Pradesh
91. What is endangered or threatened? (Pg. 267, E)
92. A) Organisms facing a very high risk of death due to environment.
 B) Organisms facing a very high risk of extinction, in the near future.
 C) Organism facing a very high risk of danger from other organisms.
 D) None of these.
93. Which one of the following is not an example of Ex-situ conservation? (Pg. 267, E)
94. A) Zoological parks B) Botanical Gardens C) Biosphere reserves D) none
95. Gametes of threatened species can be preserved in variable and fertile condition for long period using (Pg. 267, E)
96. A) Heat B) Cryopreservation C) Both D) None of these
97. Threatened plant species can be propagated by- (Pg. 267, E)
98. A) Tissue Culture B) Aquaculture C) Cryopreservation D) None of these
99. The Earth's summit held in Rio de Janeiro in. (Pg. 267, E)
100. A) 2000 B) 1990 C) 1992 D) 2002
101. The world's summit on sustainable development held in 2002 in. (Pg. 267, E)
102. A) Johannesburg, South Africa. B) Cape town South Africa.
 C) Rio de Janeiro. D) East America
103. How many countries pledged in world summit held in 2002 in Johannesburg? (Pg. 267, E)
104. A) 200 B) 180 C) 170 D) 190
105. In which type of conservation threatened animals and plants are taken out from their natural habitat and placed in special setting place where they can be protected and given a special care? (Pg. 267, E)
106. A) Cryopreservation B) Ex-situ conservation
 C) In-situ conservation D) None of these
107. Seeds of different genetic strains of commercially important plants can be kept for long period in (Pg. 267, E)
108. A) Cryopreservation B) Tissue culture C) Seed bank D) None of these
109. Which are involved in In-situ conservation? (Pg. 267, E)
110. (i) Biosphere reserve (ii) Cryopreservation (iii) Tissue culture (iv) Seed bank (v) National park
 (vi) Zoological park (vii) Sacred groves (viii) Safari parks
111. A) iii, vii, v B) ii, iii, i C) i, v, vii D) iv, vi, i
112. Pledge of Earth Summit held in Rio de Janeiro. (Pg. 267, E)
113. A) All nations to take appropriate measure for conservation of biodiversity and sustainable utilization of its benefit.
 B) All nations are free to utilize natural resources and also harm the ecosystem.
 C) Significant reduction in the current rate of biodiversity loss at global, regional and local levels.
 D) None of these
114. What is correct about the historic convention on biological diversity? (Pg. 267, E)

- (i) It held in Rio de Janeiro (ii) In 1992
 (iii) Also called the earth summit (iv) 190 states Pledged in this summit
 (v) Commitment to achieve by 2020
 A) i, ii, iv B) i, ii, iii C) iii, iv, i D) all
101. In recent years, which type of conservation has advanced beyond keeping threatened species in enclosures? (Pg. 267, E)
 A) In-situ conservation B) Ex-situ conservation
 C) None of these D) Both A & B

NEET PREVIOUS YEARS QUESTIONS

1. Niche is [2018]
 (a) all the biological factors in the organism's environment.
 (b) the physical space where an organism lives.
 (c) the functional role played by the organism where it lives.
 (d) the range of temperature that the organism needs to live.
2. All of the following are included in 'ex-situ conservation' except: [2018]
 (a) Wildlife safari parks (b) Sacred groves
 (c) Seed banks (d) Botanical gardens
3. Alexander Von Humboldt described for the first time: [2017]
 (a) Laws of limiting factor. (b) Species area relationships.
 (c) Population Growth equation. (d) Ecological Biodiversity.
4. Which one of the following is related to Ex-situ conservation of threatened animals and plants? [2017]
 (a) Biodiversity hot spots (b) Amazon rainforest
 (c) Himalayan region (d) Wildlife safari parks
5. The region of biosphere reserve which is legally protected and where no human activity allowed, is known as: [2017]
 (a) Buffer zone (b) Transition zone (c) Restoration zone (d) Core zone
6. Which is the national aquatic animal of India? [2016]
 (a) Gangetic shark (b) River dolphin (c) Blue whale (d) Sea-horse
7. Which of the following is the most important cause of animals and plants being driven to extinction? [2016]
 (a) Over – exploitation (b) Alien species invasion
 (c) Habitat loss and fragmentation (d) Co-extinction
8. The species confined to a particular region and not found elsewhere is termed as: [2015]
 (a) alien (b) endemic (c) rare (d) keystone
9. Cryopreservation of gametes of threatened species in viable and fertile condition can be referred to as: [2015]
 (a) advanced ex-situ conservation of biodiversity. (b) in-situ conservation by sacred groves.
 (c) in-situ cryo-conservation of biodiversity. (d) in-situ conservation of biodiversity.
10. In which of the following, both pairs have correct combination? [2015]
 (a) In-situ conservation : Cryopreservation Ex-situ conservation : Wildlife Sanctuary
 (b) In-situ conservation : Seed Bank Ex-situ conservation : National Park
 (c) In-situ conservation : Tissue culture Ex-situ conservation : Sacred groves
 (d) In-situ conservation : National Park Ex-situ conservation : Botanical Garden
11. Given below is the representation of the extent of global diversity of invertebrates. What groups the four portions (A-D) represent respectively? [2014]



	A	B	C	D
(a)	Insects	Crustaceans	Other animal groups	Molluscs
(b)	Crustaceans	Insects	Molluscs	Other animal groups
(c)	Molluscs	Other animal groups	Crustaceans	Insects
(d)	Insects	Molluscs	Crustaceans	Other animal groups

12. An example of *ex situ* conservation is: [2014]
 (a) National park (b) Seed bank (c) Wildlife sanctuary (d) Sacred grove
13. A species facing extremely high risk of extinction in the immediate future is called: [2014]
 (a) vulnerable (b) endemic (c) critically endangered (d) extinct
14. Which one of the following is not a method of in situ conservation of biodiversity? **(NEET-2019)**
 (1) Biosphere Reserve (2) Wildlife Sanctuary (3) Botanical Garden (4) Sacred Grove
15. Which of the following is the most important causes for animals and plants being driven to extinction? **(NEET-2019)**
 (1) Habitat loss and fragmentation (2) Drought and floods
 (3) Economic exploitation (4) Alien species invasion
16. The Earth Summit held in Rio de Janeiro in 1992 was called : **(NEET-2019)**
 (1) to reduce CO₂ emissions and global warming.
 (2) for conservation of biodiversity and sustainable utilization of its benefits.
 (3) to assess threat posed to native species by invasive weed species.
 (4) for immediate steps to discontinue use of CFCs that were damaging the ozone layer.
17. Decline in the population of indian native fishes due to introduction of *Clarias gariepinus* in river Yamuna can be categorised as **(NEET-2019 ODISSA)**
 (1) Co-extinction (2) Habitat fragmentation (3) Over exploitation (4) Alien species invasion
18. Western Ghats have a large number of plant and animal species that are not found anywhere else. Which of the following terms will you use to notify such species? **(NEET-2019 ODISSA)**
 (1) Endemic (2) Vulnerable (3) Threatened (4) Keystone
19. Exploration of molecular, genetic and species level diversity for novel products of economic importance is known as : **(NEET-2019 ODISSA)**
 (1) Biopiracy (2) Bioenergetics (3) Bioremediation (4) Bioprospecting
20. In the following in each set a conservation approach and an example of method of conservation are given **(NEET-2020 COVID-19)**
 (a) In situ conservation - Biosphere Reserve (b) Ex situ conservation - Sacred groves
 (c) In situ conservation - Seed bank (d) Ex situ conservation - Cryopreservation
 Select the option with correct match of approach and method :
 (1) (a) and (c) (2) (a) and (d) (3) (b) and (d) (4) (a) and (b)
21. According to Alexander von Humboldt : **(NEET-2020 COVID-19)**
 (1) Species richness decreases with increasing area of exploration
 (2) Species richness increases with increasing area, but only up to limit
 (3) There is no relationship between species richness and area explored.
 (4) Species richness goes on increasing with increasing area of exploration
22. Which of the following regions of the globe exhibits highest species diversity? **(NEET-2020)**

- 1) Amazon forests 2) Western Ghats of India 3) Madagascar 4) Himalayas

23. According to Robert may, the global species diversity is about **(NEET-2020)**
1) 7 million 2) 1.5 million 3) 20 million 4) 50 million
24. Which of the following is not a method of ex situ conservation? **(NEET-2022)**
1) In vitro fertilization 2) National Parks
3) Micropropagation 4) Cryopreservation
25. Habitat loss and fragmentation, over exploitation, alien species invasion and co-extinction are causes for: **(NEET-2022)**
1) Population explosion 2) Competition
3) Biodiversity loss 4) Natality
26. *In-situ* conservation refers to: **(NEET-2022)**
1) Protect and conserve the whole ecosystem
2) Conserve only high risk species
3) Conserve only endangered species
4) Conserve only extinct species

27. These are regarded as major causes of biodiversity loss:

- A. Over exploitation
B. Co-extinction
C. Mutation
D. Habitat loss and fragmentation
E. Migration

Choose the correct option:

- (a) A, C and D only
(b) A, B, C and D only
(c) A, B and E only
(d) A, B and D only

[NEET 2024]

28. List of endangered species was released by

- (a) GEAC (b) WWF
(c) FOAM (d) IUCN

[NEET 2024]

29. Which of the following is/are cause(s) of biodiversity losses?

- (a) Over-exploitation, habitat loss and fragmentation.
(b) Climate change only
(c) Over-Exploitation only
(d) Habitat loss and fragmentation only

[NEET 2023 Manipur]

30. Among 'The Evil Quartet', which one is considered the most important cause driving extinction of species?

- (a) Over exploitation for economic gain
(b) Alien species invasions
(c) Co-extinctions

(d) Habitat loss and fragmentation

[NEET 2023]

31. Habitat loss and fragmentation, over exploitation, alien species invasion and co-extinction are causes for:

- (a) Population explosion
- (b) Competition
- (c) Biodiversity loss
- (d) Natality

[NEET 2022 Phase 1]

32. The historic Convention on Biological Diversity, 'The Earth Summit' was held in Rio de Janeiro in the year

- (a) 1992
- (b) 1986
- (c) 2002
- (d) 1985

[NEET 2023]

33. The World Summit on sustainable development held in 2002 in Johannesburg, South Africa pledged for

- (a) Collection and preservation of seeds of different genetic strains of commercially important plants.
- (b) A significant reduction in the current rate of biodiversity loss.
- (c) Declaration of more biodiversity hotspots.
- (d) Increase in agriculture production

[NEET 2022 Phase 2]

34. Match List - I with List - II:

	List - I		List - II
(a)	Carbon dissolved in oceans	(i)	55 billion tons
(b)	Annual fixation of carbon through photosynthesis	(ii)	71%
(c)	PAR captured by plants	(iii)	4×10^3 kg
(d)	Productivity of oceans	(iv)	2 to 10%

Choose the correct answer from the options given below:

- (a) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)
- (b) (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)
- (c) (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)
- (d) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

[NEET 2022 Phase 2]

35. Match the List-I with List-II :

	List - I		List - II
(a)	Sacred groves	(i)	Alien species

(b)	Zoological park	(ii)	Release of large quantity of oxygen
(c)	Nile perch	(iii)	Ex-situ conservation
(d)	Amazon forest	(iv)	Khasi Hills in Meghalaya

Choose the correct answer from the options given below:

- (a) (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)
 (b) (a) - (iv), (b) - (iii), (c) - (i), (d) - (ii)
 (c) (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)
 (d) (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii)

[NEET 2022 Phase 2]

36. Which of the following is not a method of ex situ conservation?

- (a) In vitro fertilization
 (b) National Parks
 (c) Micropropagation
 (d) Cryopreservation

[NEET 2022 Phase 1]

37. In-situ conservation refers to :

- (a) Protect and conserve the whole ecosystem
 (b) Conserve only high-risk species
 (c) Conserve only endangered species
 (d) Conserve only extinct species

[NEET 2022 Phase 1]

38. Which one of the following is an example of ex-situ conservation?

- (a) National Park
 (b) Wildlife Sanctuary
 (c) Zoos and botanical gardens
 (d) Protected areas.

[NEET 2025]

39. Match List-I with List-II.

List-I		List-II	
A.	The Evil Quartet	I.	Cryopreservation
B.	Ex situ conservation	II.	Alien species invasion
C.	<i>Lantana camara</i>	III.	Causes of biodiversity losses
D.	Dodo	IV.	Extinction

Choose the option with all correct matches.

- (a) A-III, B-II, C-I, D-IV
 (b) A-III, B-I, C-II, D-IV
 (c) A-III, B-IV, C-II, D-I
 (d) A-III, B-II, C-IV, D-I

[NEET 2025]

NCERT LINE BY LINE QUESTIONS – ANSWERS

Q	1	2	3	4	5	6	7	8	9	10
Ans	C	B	A	D	D	B	A	A	C	B
Q	11	12	13	14	15	16	17	18	19	20
Ans	D	C	D	C	B	C	A	C	D	A
Q	21	22	23	24	25	26	27	28	29	30
Ans	C	A	C	A	C	B	C	A	A	D
Q	31	32	33	34	35	36	37	38	39	40
Ans	A	C	B	D	C	B	C	D	D	A
Q	41	42	43	44	45	46	47	48	49	50
Ans	B	D	D	D	B	A	C	A	D	A
Q	51	52	53	54	55	56	57	58	59	60
Ans	D	C	B	D	C	B	D	D	B	C
Q	61	62	63	64	65	66	67	68	69	70
Ans	D	D	B	D	B	C	D	C	D	B
Q	71	72	73	74	75	76	77	78	79	80
Ans	D	B	A	D	A	A	D	C	A	A
Q	81	82	83	84	85	86	87	88	89	90
Ans	D	C	A	C	C	A	D	A	B	C
Q	91	92	93	94	95	96	97	98	99	100
Ans	B	A	C	C	D	B	C	C	A	D
Q	101									
Ans	B									

NEET PREVIOUS YEARS QUESTIONS-ANSWERS

- 1 (c) 2 (b) 3 (b) 4 (d) 5 (d) 6 (b) 7 (c) 8 (b) 9 (a) 10 (d)
 11 (d) 12 (b) 13 (c) 14 (3) 15(1) 16(2) 17(4) 18(1) 19(4) 20(2)
 21 (2) 22 (1) 23 (1) 24 (2) 25(3) 26(1) 27(d) 28(d) 29(a) 30(d) 31(c) 32(a) 33(b) 34(d) 35(b)
 36(b) 37(a) 38(c) 39(b) 40() 41() 42() 43()

NEET PREVIOUS YEARS QUESTIONS-EXPLANATIONS

- (c) Joseph Grinnell in 1917 coined the term niche, which he used as largely equivalent to a species habitat. It refers the functional role played by the organism where it lives.
- (b) *In-situ* conservation is the on-site conservation or the conservation of genetic resources in natural populations of plant or animal species. E.g. sacred groves.
- (b) Alexander Von Humbolt noticed that within a region species richness increases with the increase in area.
- (d) 5. (d) 6. (b) 7. (c)
- (b) Endemic species is confined to a particular area due to special type of adaptation according to that region.
- (a)
- (d) *In-situ* (on site) conservation is within the natural habitat, e.g., sea, river and forest. *Ex-situ* (off site) conservation is outside the natural habitat, e.g. zoological park.
- (d) 12. (b)
- (c) Critically endangered species includes those which taxon face very high risk of extinction in the wild can become extinct any moment in the immediate future, e.g., *Sus salvinus* (Pigmy Hog), *Berberis nilghiriensis*.
- The largely tropical Amazonian rain forest in South America has the greatest biodiversity on the globe
- Robert May estimated global species diversity at about 7 million.
- National Parks in situ conservation

25. Biodiversity loss

26. In situ conservation conserve whole ecosystem

27. Ans. (d)

Explanation

Major causes of biodiversity losses are

(1) Habitat loss and fragmentation

(2) Over-exploitation

(3) Alien species invasions

(4) Co-extinctions

Hence correct option is A, B and D only.

28. Ans.(d)

Explanation

List of endangered species was released by - IUCN.

29. Ans. (a)

Explanation

The correct answer is :

Option a : Over-exploitation, habitat loss and fragmentation.

Each of the factors listed in this option can contribute to biodiversity loss:

Over-exploitation : When species are over-hunted, over-fished, or harvested at rates faster than their natural ability to recover, it can lead to population declines and even extinction.

Habitat loss : This occurs when natural environments are destroyed or significantly altered. It's often due to human activities such as deforestation, urban development, agriculture, and mining. Habitat loss can result in local or even global extinction of species.

Fragmentation : This happens when a large, continuous area of habitat is divided into smaller, isolated patches, often as a result of human activities like road construction or clear-cutting for agriculture.

Fragmentation can isolate populations of species, preventing gene flow and causing a decline in biodiversity.

While climate change (Option b) can also contribute to biodiversity loss, it is not the only cause, and likewise for over-exploitation (Option c) and habitat loss and fragmentation (Option d) alone. So, while these can all contribute to the problem, the option that includes all three (Option a) provides the most comprehensive answer to the question.

30. Ans. (d)

Explanation

Option d : Habitat loss and fragmentation is considered the most important cause driving extinction of species among 'The Evil Quartet'.

The 'Evil Quartet' refers to the four major causes of biodiversity loss: habitat destruction and fragmentation, over-exploitation, pollution, and invasive species. Of these, habitat loss and fragmentation is generally considered the most significant cause, as it directly affects the availability of the resources and space that organisms need to survive. It can be caused by a variety of human activities, including deforestation, urbanization, and agriculture. This loss of habitat leads to smaller, more isolated populations, which are more vulnerable to other threats and have a higher risk of extinction.

31. Ans. (c)

Explanation

Habitat loss and fragmentation, over exploitation, alien species invasion and co-extinction are causes for biodiversity loss.

32.Ans.(a)

Explanation

The Earth Summit, formally known as the United Nations Conference on Environment and Development (UNCED), was indeed held in Rio de Janeiro, Brazil, in 1992. This meeting marked a significant step forward in global conservation efforts, leading to the establishment of the Convention on Biological Diversity, among other important agreements.

33.Ans. (b)

Explanation

In 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.

34.Ans. (d)

Explanation

About 71% of total carbon is found dissolved in oceans.

Annual fixation of carbon through photosynthesis is 4×10^{13} kg.

PAR captured by plants is 2 to 10% of total sunlight.

Productivity of oceans is approximately 55 billion tons.

35.Ans. (b)

Explanation

Khasi Hills in Meghalaya are sacred groves. Zoological Park is an ex-situ conservation strategy.

Nile perch is an alien species.

Amazon forest releases large quantity of O₂.

36.Ans. (b)

Explanation

In-situ conservation means on site conservation i.e. when we conserve and protect the whole ecosystem, its biodiversity at all levels is protected.

National parks are type of in-situ conservation.

Whereas, micropropagation, cryopreservation and in-vitro fertilization are methods of ex-situ conservation.

37.Ans. (a)

Explanation

When we conserve and protect the whole ecosystem, its biodiversity at all levels is protected. This is in-situ or on site conservation strategy.

38.Ans.(c)

Explanation

Ex-situ conservation involves protecting an endangered species by removing part of the population from a threatened habitat and placing it in a new location. Zoos and botanical gardens are prime examples, where organisms are conserved outside their natural habitat.

39.Ans.(b)

Explanation

- Causes of biodiversity losses: 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)
- 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.
- Familiar with the environmental damage caused and threat posed to our native species by invasive weed species like carrot grass (Parthenium), Lantana and water hyacinth (Eicchornia).
- Some examples of recent extinctions include the dodo (Mauritius), quagga (Africa), thylacine (Australia), Steller's Sea Cow (Russia).

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