

Organisms and Population

Q1:- What is ecology?

Ans- Ecology is the branch of biology that deals with the study of interaction between organisms and their environment.

Q2- What are stenothermals?

Ans Organisms restricted to a narrow range of temperature are called stenothermals.

Q3- Name three features of the soil which determine the water holding capacity of the soil.

Ans- Soil composition, grain size and aggregation of soil particles are the features of the soil which determine the water holding capacity of the soil.

Q.4- What are conformers?

Ans Plants and animals which cannot maintain constant internal environment are called conformers. Their body temperature changes with the ambient temperature. In aquatic animals, the osmotic concentration of the body fluids changes with that of ambient water osmotic concentration.

Q5- Name two unique habitats where the average temperature exceeds 100°C .

Ans Deep sea hydrothermal vents and thermal springs.

Q6- What is diapause?

Ans- In zooplankton species, the state of suspended growth and development in stressful conditions is called diapause.

Q7- Why is it said that a predator is nature's prudent?

Ans The predator is called prudent if a

predator is too efficient and over exploits its prey, then the prey might become extinct and following it, the predator will also become extinct for lack of food.

Q8 - How do predators help in maintaining species diversity in a community?

Ans - The predators help in maintaining the species diversity in a community by reducing the intensity of competition among competing prey species.

Q9 - Give one morphological and one chemical defence of plants against herbivores.

Ans - Morphological defence - Thorns of Acacia and Cactus

Chemical defence - Calotropis produces cardiac glycosides

Q10 - How is the pollination in orchid-oophrys guaranteed?

Ans - It employs 'sexual deceit' to get pollination done by a species of bee. One of its petals bears an uncanny resemblance to the female of the bee in size, color and marking. The male bee is attracted to what it perceives as a female 'pseudocopulates' with the flower. When the same bee goes to another flower, it transfers the pollen to it.

Q11 - Why does an exotic species, when introduced into a geographical area, become invasive?

Ans - An exotic species, when introduced into a geographical area, becomes invasive because, it does not have a natural predator.

Q12 - Give an example of co-evolution for mutualism.

Ans- Plant-animal relationships are examples of mutualism. Plants need the help of animals for pollinating their flowers and dispersing their seeds. Animals in return get the pollen and nectar and fruits from plants. This is an example of co-evolution.

Q 13 - Which one of the two, stenothermal or eurythermals - shows wide range of distribution on earth and why?

Ans - Eurythermals organisms can tolerate and thrive in wide range of temperature.

Q 14 - Between amphibians and birds, which will be able to cope with global warming? Give reason.

Ans Birds will be able to cope up with global warming because they are eurythermals and they can tolerate and thrive in a wide range of temperature.

Q 15 - List any two physiological responses that help you to gradually get acclimatised to high altitudes when you go from the plains?

Ans 1. In high altitude there is low atmospheric pressure. The body does not enough oxygen. So the body compensate low oxygen availability by increasing red blood cell production.

II. There is decrease in binding affinity of haemoglobin and by increasing the breathing rate.

Q 16 - Give the equation for logistic growth curve.

Ans - $\frac{dN}{dt} = rN(K - N/K)$

Q 17 - What is population ecology?

Ans - Area of ecology which links ecology to population genetics and evolution.

Q.18 - *Eichhornia crassipes* is an alien hydrophyte introduced in India. Mention the problem posed by this plant.

Ans - *Eichhornia crassipes* an exotic/alien species introduced in India turned into invasive and caused in decline and extinction of indigenous species. They are threat to the native species.

Q.19 - Name the interaction in each of the following.

- (a) Cuckoo lays her eggs in the crow's nest
- (b) orchid grows on a mango tree
- (c) Ticks live on the skin of dogs
- (d) Sea anemone is often found on the shell of hermit crab.

Ans. (a) Brood parasitism
(b) Commensalism
(c) Parasitism
(d) Mutualism.

Q.20 - In a pond there were 40 lotus plants. After a year number rose to 56. Calculate the birth rate of lotus plant.

Ans - Lotus plant = 40

current population = 56

New plant added = $56 - 40 = 16$

Birth rate - No. of new plants / original no. of plants = $16/40 = 0.4$

Ecosystem

Q.1 - When is the decomposition process slower?

Ans - When detritus is rich in lignin and chitin, the decomposition process is slower.

Q.2 - What is detritus?

Ans - Dead plants remains such as leaves, bark, flower and dead remains of animals including faecal matter is called detritus.

Q.3 - What is ecological succession?

Ans - The gradual and fairly predictable change in the species composition of a given area is called ecological succession.

Q.4 - Why is the secondary succession faster than the primary succession?

Ans - Secondary succession is faster than the primary succession because the primary succession starts in an area where life ever existed. So it takes more time. The secondary succession is faster than because it starts in an area where life existed before but lost all the living organisms that existed there. So there are some underground stem, seeds etc, may be present and the soil is also present.

Q.5 - Name the factors on which the primary productivity depends.

Ans - The primary productivity depends on -

- I. The plant species inhabiting a particular area.
- II. Also depends on a variety of environmental factors like availability of nutrients.
- III. Photosynthetic capacity of plants.

Q.6 - What is chemosynthesis? Name a chemosynthetic organism.

Ans - The process of synthesising the food utilising

the chemical energy is called chemosynthesis.
eg. iron bacteria and sulphur bacteria are chemosynthetic organisms.

2.7- Among ecosystem services are control of floods and soil erosion. How is this achieved by the biotic components of the ecosystem?

Ans - Control of floods and soil erosion are achieved by -

Cutting of trees - Deforestation leads to change in climatic conditions. So it has to be prevented.

Afforestation - Thick growth of forests prevents the floods and soil erosion.

2.8- What are limitations for the ecological pyramids?

Ans - Ecological pyramids -

- i. Do not take into account the same species belonging to two or more trophic levels.
- ii. It assumes a simple food chain, something that almost never exists in nature.
- iii. It does not accommodate a food web.
- iv. Saprophytes are not given any place in ecological pyramids even though they play a vital role in the ecosystem.

2.9- What is stratification?

Ans - Vertical distribution of different species occupying different levels is called stratification.

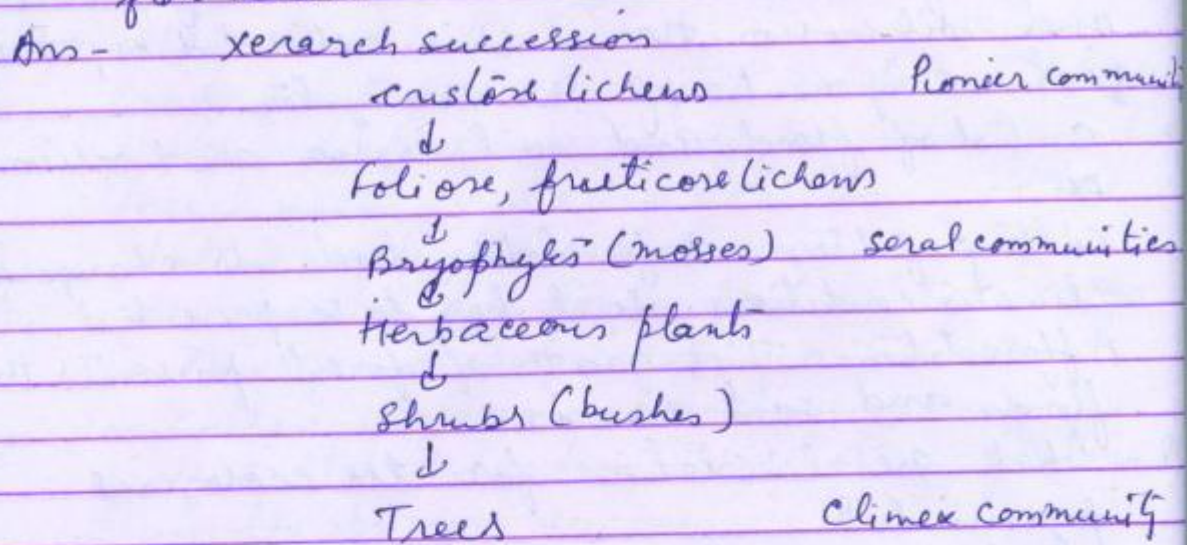
2.10- How do you get net primary productivity?

Ans - Gross primary productivity minus respiration losses is the net primary productivity.

Q 11- What is humification?

Ans - Accumulation of dark coloured, amorphous substance called humus due to the microbial action on detritus is called humification.

Q 12 - Explain how xerarch succession progresses from xeric to mesic condition and forms a stable climax community? you may use flow chart.



Q 13 - What are the differences between food chain and food web -

Food Chain	Food web
1. It is in the form of straight line	1. It is in the form of a interconnected web.
II. It operates at one trophic level.	II. It operates at more than one trophic levels.

Q. 14 - What are the different kind of food chains.

Ans - The different kind of food chains are

1. Grazing food chain - always start with producer

eg. Grasses → Insect → frog → snake → predatory birds

Detritus food chain - starts with detritus

eg. dead organic matter.

eg. Detritus → Earthworm → small birds → big birds.

Q 15 - What is standing crop?

Ans - Each trophic level has a certain mass of living material at a particular time called standing crop.

Q 16 Name the dominant producers in a deep aquatic ecosystem. What other name could you give to a primary consumer?

Ans - Phytoplankton algae and the floating submerged plants are the producers of the deep aquatic ecosystem. The other name to primary consumer is herbivores.

Q 17 - What is litter?

Ans - The fallen leaves, plants and animal matter that gets collected on the soil surface is called litter.

Q 18 - All primary productivity is not available to a herbivores. Give one reason?

Ans - All primary productivity is not available to a herbivores because a part of primary product is utilised by plant during respiration is lost as heat.

Q 19 What are the processes by which the nitrogen is removed from the soil?

Ans - 1. Green plants absorb the nitrogen from the soil in the form of nitrate ions and hence remove nitrogen content from the soil.

11. Denitrifying bacteria like pseudomonas present in the soil convert the nitrate into molecular nitrogen. The process is called denitrification and it makes the soil infertile by removing nitrate from the soil.

Q 20 - What are the pioneer species in a primary succession?

Ans - lichens.

Biodiversity and Conservation

Q1. What is genetic diversity? Give an example?

Ans Genetic diversity is related to gene variation of genes within species. The mango varieties are more than 1000 in India.

Q2 - What are the major causes of species losses in a geographical region?

Ans Major causes of species losses in a geographical region are hunting, forest fire, destruction of natural habitats and fragmentation and introduction of exotic species.

Q3 - What is ex situ Conservation?

Ans 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. This is called ex situ conservation.

Q4 - Give example of ex situ conservation?

Ans Zoological park and Botanical garden.

Q5 - Name three alien species (Plant) which have environmental damage in India.

Ans Carrot grass - Parthenium, Lantana and water hyacinth.

Q6 - Name the African Cat fish which caused a threat to Indian cat fish.

Ans - *Clarias gariepinus*.

Q7 - What is an endemic species?

Ans Endemic species is the species which is confined to a particular region and not found anywhere else.

Q8 - What is Biodiversity Hot spot?

Ans Biodiversity Hot spot is the region with very high levels of species richness and high degree

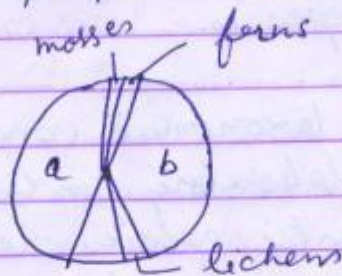
of endemism.

Q9 In the equation $\log S = \log C + Z \log A$, what do the S and Z represent?

Ans - S = species richness

Z = slope of the line (regression coefficient)

Q10 - Name the unlabelled area 'a' and 'b' of the pie chart representing the biodiversity of plants showing their proportionate no. of species of major taxa.



Ans - Area 'a' = fungi

Area 'b' = Angiosperms.

Q11 - Name the two most biodiversity-rich zones of India

Ans - Western Ghats and North-East India.

Q12 - What does MABP stand for.

Ans - Man and Biosphere Programme.

Q13 - What is cryopreservation?

Ans - It is method of conservation of storing animal and plants materials at every low temperature for a long period. Gametes of threatened species can be preserved in viable and fertile condition for long time by this method for future use.

Q14 - What is extinction? what are different types of extinction.

Ans - Disappearance of species from earth when its last surviving member dies.

The extinction may be of -

(1) Natural extinction - with the changing

environments, some species were replaced by other species.

II. Mass extinction - A large No. of species has become extinct during evolution.

III. Anthropogenic extinction - Due to different activities of man some species have become extinct.

Q.15 - Why is it difficult to find out ^{the} no. of prokaryotic species?

Ans. Because -

I. Conventional taxonomic condition is not suitable under laboratory condition.

II. Many prokaryotic species are not culturable under laboratory condition.

Q.16 - Name two animals which are extinct due to over exploitation of natural resources.

Ans - Stellar's sea cow and passenger pigeon.

Q.17 - India has more than 50,000 strains of rice.

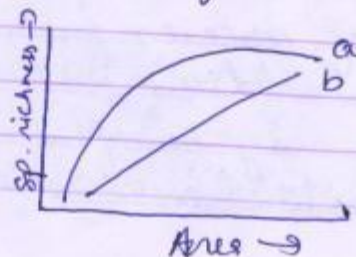
Mention the level of biodiversity it represents.

Ans - It is representing the genetic diversity. It refers to the diversity of genes within a species.

Q.18 - Mention the one application of pollen bank. How is pollen stored in a bank?

Ans - Pollen grains can be used in breeding programs. They are stored in a bank in cryopreservation in ex-situ conservation.

Q.19 - The graph shows species-area relationship. Write the equation of the curve 'a'.



Ans equation -

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

Where - S = species richness

A = Area

Z = slope of line

C = Y-intercept

Q 20 - What are sacred groves?

Ans - In many culture, tracts of forest were set aside and all trees and wild life within were venerated and given total protection. Such places are called sacred groves.

Environmental Issues

Q1:- What is Air Act?

Ans Air (Prevention and control of Pollution) Act came in to force 1981, amended in 1987 to include noise as an air pollutant.

Q2:- What is e-waste? Give example?

Ans Electronic waste are called e-waste. Irreparable computers, mobile and other electronic goods.

Q3:- What is sanitary landfill?

Ans A place where wastes are dumped in a depression trench after compaction and covered with dirt every day.

Q4:- What are agrochemicals?

Ans Inorganic chemicals like chemical fertilizers, pesticides, fungicides, herbicides which are in agricultural field are called agrochemicals.

Q5:- Why is CNG considered as better than petrol and diesel?

Ans - CNG burns more efficiently unlike petrol and diesel, in the automobile and very little amount of this it is left unburnt. Advantages of CNG are -

I - CNG is very cheaper than petrol or diesel.

II - It can not be siphoned off by thieves.

III - It can not be adulterated like petrol and diesel.

Q.6:- What is polyblend? What is its use?

Ans - Ahmad Khan is the man who developed the polyblend. He developed fine powder of recycled modified plastic. This is mixed with the bitumen that is used to lay roads. Blends of polyblend and bitumen when used to lay roads, enhance the bitumen's water repellent properties.

and helped to increase road life considerably.

Q7 - What are the green house gases? Why are they so called?

Ans - CO_2 , methane are called greenhouse gases because they are responsible for greenhouse effect.

Q8 - What are 'Ecosan' toilets? Where are there toilets working?

Ans - The human excreta can be recycled into a resource as natural fertilizer. In Kerala and Sri Lanka.

Q9 - What is Montreal Protocol?

Ans - International treaty signed at Montreal (Canada) in 1987 to control the emission of ozone depleting substance.

Q10 - A crane had DDT level as 5 ppm in its body. What would happen to the population of such bird? Explain giving reasons.

Ans - The concentration of DDT is increased at successive trophic levels. If it starts at 0.003 ppm in water it can ultimately reach 5 ppm in Saras birds through biomagnification. High concentration of DDT disturbs calcium metabolism in birds which causes thinning of egg shell and premature breaking of the shells cause the decline in bird population.

Q11 - How is the radiation given off by nuclear waste - is damaging to living organisms?

Ans Radiation given off by nuclear waste is damaging to living organisms in several ways -

1. It causes mutations to occur at a very high rate.
2. At high doses, it creates various disorders the most frequent of all being cancer.

Q12 - How is the hospital waste disposed off?

Ans - Hospital waste is disposed off with the help of incinerators. Incinerators burn the waste.

Q13 What is snow blindness?

Ans In human eye, cornea absorbs UV-B radiation and high doses of UV-B causes inflammation of cornea called snow blindness.

Q14 - Which of the following is particulate pollutant?
NO₂, smoke, PAN, SO₂

Ans - Smoke.

Q15 - What is referred to as 'bad ozone' and good ozone?

Ans - Ozone formed in lower atmosphere called troposphere harms the plants and animals is called 'bad ozone'. Ozone found in the upper part of the atmosphere called stratosphere act as a shield absorbing the UV radiation from the sun is referred to as 'good ozone'.

Q16 - What is soil erosion? How soil erosion and desertification are caused?

Ans - Removal of fertile top soil is called soil erosion. It can be caused by human activities like over cultivation, unrestricted grazing, deforestation and poor irrigation practices resulting in arid patches of land. The large patches which combine to form the desert leading to desertification of land.

Q17 - Name some pollutants or toxic substances difficult to be removed from the polluted water?

Ans Dissolved nitrates, phosphates, toxic metal ions and organic compounds.

Q.18 What is algal bloom? How is it caused? How it is harmful?

Ans - Presence of large amount of nutrient in water causes excessive growth of planktonic algae. This is called algal bloom. Algal bloom causes deterioration of water quality and fish mortality. Some bloom forming algae are extremely toxic to human being and animals.

Q.19 - What are the different steps taken in Delhi to control the vehicular pollution?

Ans -

- I. Phasing out old vehicles.
- II. Use of unleaded petrol.
- III. Use of low sulphur petrol and diesel.
- IV. Use of catalytic converter in vehicles.
- V. Use of stringent pollution level norms for vehicles.

Q.20 - Name the plant which is called 'Terror of Bengal'. In which water body do they grow? How are they harmful?

Ans - Water hyacinth - world most problematic aquatic weed. They grow abundantly in eutrophic water bodies. They lead to an imbalance in the ecosystem dynamics of the water body. They block the water ways.