

QB365
Model Question Paper - 3
12th Standard CBSE

Biology

Reg.No. :

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Time : 02:00:00 Hrs

Total Marks : 100

Section - A

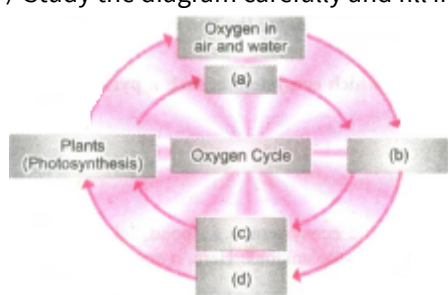
- 1) Lichens are well known combination of an alga and a fungus where fungus has 1
(a) an epiphytic relationship with the alga (b) a parasitic relationship with the alga
(c) a symbiotic relationship with the alga (d) a saprophytic relationship with alga
- 2) Animals have the innate ability to escape from predation. Examples for the same are given below. Select the 1
incorrect example.
(a) colour change in chamaeleon (b) enlargement of body size by swallowing air in puffer fish
(c) poison fangs in snakes (d) melanism in moths
- 3) Small fish get struck near the bottom of a shark and derives its nutrition from it? This kind of association is 1
called as
(a) symbiosis (b) commensalism (c) predation (d) parasitism
- 4) Praying mantis is a good example of 1
(a) camouflage (b) mullerian mimicry (c) warning colouration (d) social insects
- 5) Match the following with correct combination 1
- | Column I | Column II |
|------------------------|-------------------------|
| A. Camouflage | 1. Dendrobates purnilio |
| B. Batesian mimicry | 2. Horse-shoe bat |
| C. Warning colouration | 3. Monarch butterfly |
| D. Echolocation | 4. Praying mantis |
- (a) A-2,B-4,C-3,D-1 (b) A-2,B-4,C-2,D-1 (c) A-4,B-1,C-3,D-2 (d) A-4,B-3,C-1,D-2 (e) A-3,B-4,C-1,D-2
- 6) The second trophic level in a lake is 1
(a) Phytoplankton (b) Zooplankton (c) Benthos (d) Fishes
- 7) What is the percentage of photosynthetically active radiation (PAR) in the incident solar radiation? 1
(a) 100% (b) 50% (c) 1-5% (d) 2-10%
- 8) Photosynthetic active radiation (PAR) has the following range of wavelengths 1
(a) 340-450 nm (b) 400-700 nm (c) 500-600 nm (d) 450-950 nm
- 9) Lichen is the pioneer vegetation in which type of succession? 1
(a) hydrosere (b) lithosere (c) psammosere (d) xerosere

- 10) Consider the following statements concerning food chains 1
- (a) removal of 80% tigers from an area resulted in greatly increased growth of vegetation
 - (b) removal of most of the carnivores resulted in an increased population of deers}
 - (c) the length of food chains is generally limited to 3-4 trophic levels due to energy loss
 - (d) the length of food chains may vary from 2-8 trophic levels
- Which two of the above statements are correct?
- (a) A, D (b) A, B (c) B, C (d) C, D
- 11) Blood analysis of a patient reveals an unusually high quantity of carboxyhaemoglobin content. Which of the 1
- following conclusions is most likely to be correct? The patient has been inhaling polluted air containing unusually high content of
- (a) Chloroform (b) Carbondioxide (c) Carbon monoxide (d) Carbon disulphide
- 12) Common indicator organism of water pollution is 1
- (a) Eichhornia crassipes (b) Escherchia coli (c) Entamoeba histolytica (d) Lemna pancicostata
- 13) The term 'Bio-magnification' refers to the 1
- (a) Growth of organisms due to food consumption
 - (b) Increase in population size
 - (c) Blowing up of environmental issues by man
 - (d) Increase in conc. of non-degradable pollutants as they pass through food chain.
- 14) Which one of the following pairs is mismatched? 1
- (a) fossil fuel burning : release of CO₂
 - (b) nuclear plant : radioactive wastes
 - (c) solar energy : greenhouse effect
 - (d) becomes burning : release of CO₂
- 15) Effect of pollution is observed first on 1
- (a) microorganisms (b) food crop (c) green vegetable (d) herbivores
- 16) Which one of the following statements is incorrect in case of Bhopal tragedy? 1
- (a) methyl isocyanate gas leakage took place
 - (b) thousands of human beings died
 - (c) radioactive fall out engulfed Bhopal
 - (d) it took place in the night of December 2/3,1984.
- 17) 'Good ozone' is found in the 1
- (a) mesosphere (b) troposphere (c) stratosphere (d) ionosphere
- 18) In gobar gas, the maximum amount is that of 1
- (a) butane (b) methane (c) propane (d) carbon dioxide
- 19) If the Bengal tiger becomes extinct 1
- (a) Hyaenas and Wolves will become scarce
 - (b) The wild areas will be safe for man and domestic animals
 - (c) its gene pool will be lost forever
 - (d) The population of beautiful animals like deers will get stabilized
- 20) Which one of the following is not included under in-situ conservation? 1
- (a) National park (b) Sanctuary (c) Botanical garden (d) Biosphere reserve

Section - B

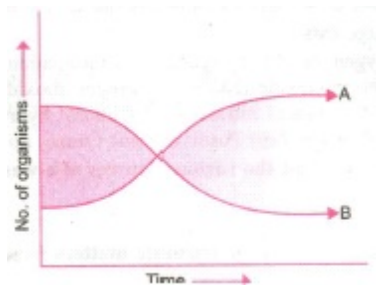
- 21) Name the four levels of organisation that ecology is basically concerned with. 2
- 22) What is meant by sex ratio? Is it a characteristi of individual or population? 2
- 23) What is Resource partitioning? Give an example. 2

- 24) What are saprotrophs? How do they obtain their nutrition? 2
- 25) Mention the uses of phosphorus in living organisms. 2
- 26) How do seeds get dispersed in an ecosystem? 2
- 27) Name any four recent extinctions of animals. 2
- 28) Name any four regions in India, where sacred groves are found. 2
- 29) What can be the effect of discharging hot (thermal) water into a water body on the organisms in it? 2
- 30) Describe chipko movement 2
- 31) What is acid rain? What are its effects on plants? 2
- 32) How do organisms cope with stressful environmental conditions, which are localised or of short duration? 2
- 33) Give one example for each of the following: (a) Migratory animal (b) Predator animal (c) Phytophagous animals (d) Camouflaged animal (e) Chemical defense agent. 2
- 34) Study the diagram carefully and fill in the blanks (a), (b), (c) and (d). 2



- 35) "The energy flow in the ecosystem follows the second law of thermodynamics". Explain 2
- 36) According to the 10% law given by Lindeman, only 10% of the energy is transferred to the next trophic level. 2
- (i) Name the process by which an organism produces energy.
- (ii) What is the most common substrate used in this pathway?
- (iii) Which biomolecule is also known as energy currency of the cell?
- 37) Autotrophs convert inorganic materials into organic material with the help of solar energy. 2
- (i) Name the process depicted by the given statement.
- (ii) Name the pigment which traps solar energy and convert light energy to chemical energy.
- (iii) What do you understand by a photosynthetic unit?
- 38) Sanctuaries are tracts of land where animals are protected from all types of exploitation. Private ownership is permitted. Collection of minor sanctuaries are present in India? (i) How many sanctuaries are present in India? 2
- (ii) How much land area they cover? (iii) Name any three sanctuaries. (iv) List any three human activities are allowed in sanctuaries.
- 39) What are flocs? State their role in effluent treatment and their ultimate fate in sewage treatment tank. 2

- 40) (a) The graph below represents the growth patterns of types of aquatic organisms over a brief period of time in a water body surrounded by an agricultural land extensively supplied with fertilizers. Identify what would represent (i) A and (ii) B.



Section - C

- 41) Water is the most important factor influencing the life of organisms. Life on earth originated in water and cannot be sustained without water. Organisms living in water bodies (ocean, lake, river, etc.) also face water-related problems. (a) How are aquatic animals affected by the quality of water? Explain. (b) Mention any four adaptations the desert plants have, to live there successfully. (c) Represent the value learnt. 5
- 42) No species can exist alone in a habitat. Any species has a minimal requirement of at least one more species, on which it can feed. Interspecific interactions arise from the interaction of populations of two different species. (a) What term is given to the interaction, where one species is benefitted and the other is neutral? (b) Give four examples of the above kind of interaction. (c) How do you call the interaction where one species is neutral and the other is harmed? Give an example of such an interaction. (d) What value do you learn from this? 5
- 43) 'Struggle for existence and survival of the fittest' is Darwin's theory of Natural selection. Interspecific competition, a potent force in organic evolution, is generally believed to occur between closely related species for the same resources, that are limiting, but this is not entirely true. (a) Give an example where totally unrelated species could compete with each other. (b) Resources need not be limiting for competition to occur. Justify with an example. (c) What value is learnt from this? 5
- 44) Describe a pond as an ecosystem. 5
- 45) Describe in detail the species-area relationship of biodiversity 5
- 46) Name the major atmospheric pollutants and their sources. 5
- 47) Why is ozone layer in stratosphere called a protective layer? 5
- 48) On his visit to national park, Harshendra, was very angry as the forest authorities did not allow him to enter a specified area. 5
- On returning back, he discussed the matter with his friend, who explained him the reason.
- (i) Which category of conservation strategy does national park belong?
- (ii) Name India's first national park.
- (iii) At present, there are how many national parks in India?
- (iv) what values are shown by Harshendra's friend?

Section - A

- 1) (c) a symbiotic relationship with the alga 1
- 2) (c) poison fangs in snakes 1
- 3) (b) commensalism 1
- 4) (a) camouflage 1
- 5) (d) A-4,B-3,C-1,D-2 1
- 6) (b) Zooplankton 1
- 7) (b) 50% 1
- 8) (b) 400-700 nm 1
- 9) (b) lithosere 1
- 10) (c) B, C 1
- 11) (c) Carbon monoxide 1
- 12) (b) Escherchia coli 1
- 13) (d) Increase in conc. of non-degradable pollutants as they pass through food chain. 1
- 14) (c) solar energy : greenhouse effect 1
- 15) (a) microorganisms 1
- 16) (c) radioactive fall out engulfed Bhopal 1
- 17) (c) stratosphere 1
- 18) (b) methane 1
- 19) (c) its gene pool will be lost forever 1
- 20) (c) Botanical garden 1

Section - B

- 21) (i) Organisms (ii) Populations (iii) Communities (iv) Biomes. 2
- 22) 2

Sex ratio refers to the ratio between the number of males and the number of females of a given population, at a given time. It is characteristic of a population.

- 23) 2

Resource partitioning:

If two species compete for the same resource, they could avoid competition by choosing different times for feeding or

different foraging patterns, e.g. five closely related species of warblers living on the same tree have been shown to coexist and avoid competition by behavioural differences in their foraging activities

- 24) 2

Saprotrophs are those organisms, which meet their energy requirements by degrading the organic molecules. - They release enzymes which degrade/decompose the organic matter outside their body and absorb the digested nutrients.

- 25) 2
- (i) As phospholipid, it forms a major constituent of membranes. (ii) It is also a constituent of nucleic acids and energy currency of cells, i.e. ATP. (iii) It is necessary for the formation of teeth and bones in vertebrates and shells by molluscs.
- 26) 2
- (i) Some fruits are eaten by birds and their seeds come out with the excreta. (ii) Some seeds stick to the skin of the animals and get dispersed. (iii) Some seeds have adaptations to be carried away by wind. (iv) Seeds of certain aquatic plants are dispersed by water.
- 27) (i) Stellar's sea cow (ii) Dodo (iii) Thylacine (iv) Quagga (v) Three subspecies of tiger. 2
- 28) 2
- Sacred groves are found in (i) Khasi and Jaintia Hills in Meghalaya (ii) Aravalli Hills of Rajasthan. (iii) Western Ghat regions in Karnataka and Maharashtra (iv) Sarguja, Chanda and Bastar areas of Madhya Pradesh.
- 29) 2
- Discharging thermal waste into a waterbody eliminates or reduces the number of organisms sensitive to high temperature. - It may enhance the growth of plants and fish in extremely cold areas, but still cause damage to the indigenous flora and fauna.
- 30) 2
- It is a movement that was started in Garwal Himalayas, by Sh. Sunder Lal Bahuguna in 1974. It aimed at protecting trees. The local women showed enormous bravery in protecting the trees from the axes of the contractors by hugging them.
- 31) 2
- Acid rains.** Sulphur dioxide and sulphur trioxide are produced by oxidation of sulphur in the fossil fuels. These gases react with water and form sulphuric acid or sulphurous acids. These acids when precipitated as rain or snow create acid rain or acid precipitation. The pH of acid rains is less than 5-6 as could be as low as 4. Acid rain adversely affects plant vegetation by causing chlorosis and necrosis.
- 32) 2
- Organisms either migrate or suspend their metabolic functions when the stressful conditions are localised or of short duration. Under such conditions, the organisms follow one of the following alternatives:
- (i), The organism moves away from the stressful habitat to a more hospitable area and return to their habitat when the stressful period is over, e.g. Birds from Siberia and other cold countries migrate to Bharatpur Sanctuary in Rajasthan.
- (ii) Animals which cannot migrate show hibernation during winter (e.g., frogs) or aestivation in summer (e.g., snails) or enter diapause (zooplanktons).
- (iii) In bacteria, fungi and lower groups of plants, various types of thick-walled spores are formed. They germinate under suitable conditions.
- 33) (a) Arctic tern (b) Tiger/Lion (c) Aphid (d) Chameleon (e) Glycosides (in Calotropis). 2

- 34) (a) Organic compounds 2
 (b) Animals and plants (Respiration)
 (c) Carbon dioxide
 (d) Water
- 35) 2
 According to second law of thermodynamics, every activity involving energy transformation is accompanied by dissipation of energy as heat and increase in disorderliness, except in deep hydrothermal ecosystems.
 This can be explained as out of the total PAR only 2-10% is captured by photosynthetic organisms in the synthesis of organic matter. And further this energy is used during various metabolic processes for the formation of food and a very little is stored as biomass. This trapped energy as biomass is transferred to next trophic level according to Lindeman's law. Only 10% of the stored energy is passed from one trophic level to successive trophic level.
- 36) 2
 (i) The process of harvesting chemical energy for metabolic activities by oxidising the food molecules is called respiration.
 (ii) The most common substrate used in the process is glucose.
 (iii) ATP Or Adenosine Triphosphate is also known as energy currency of the cell.
- 37) 2
 (i) The process by which autotrophs convert inorganic materials into organic material with the help of solar energy is called photosynthesis.

$$6CO_2 + 12H_2O \xrightarrow{\text{Light}} C_6H_{12}O_6 + 6H_2O + 6O_2$$

 (ii) The green pigment which traps solar energy and converts light energy into chemical energy is chlorophyll.
 (iii) The three pigments, i.e. chlorophyll, carotenoids and xanthophylls together form a complex of pigments in the thylakoid membrane. These complexes work for the absorption of light and its transfer to a reaction centre. These complexes are called photosynthetic unit of photosystem or pigment system.
- 38) 2
 (i) India has 551 sanctuaries. (ii) 3.6% geographical area. (iii) (a) Keoladeo Ghana Bird Sanctuary, Bharatpur, Rajasthan (b) Sultanpur Lake Bird Sanctuary, Gurgaon, Haryana (c) Periyar Sanctuary, Kerala (iv) (a) Collection of forest products (b) Harvesting of timber (c) Tilling of land (d) Private ownership of land
- 39) 2
 Flocs are the masses of bacteria associated with fungal filaments to form mesh-like structure. For details refer to article 15.10.2, page 205.
- 40) (a) (i) A = Dissolved Oxygen (ii) B = Biochemical oxygen demand (BOD) 2

Section - C

41)

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- The chemical composition and pH of water are important to affect the animals.
- Some animals can tolerate only a narrow range of salinity and are called stenohaline.
- Some animals can tolerate a wide range of salinity and are called euryhaline.
- Many freshwater fishes can not live for long in sea water and vice versa, because of the osmotic problems, they would face in such waters.
- (b) (i) The leaves are reduced to spines.
- (ii) The stem is green, flattened, spongy and takes over the function of photosynthesis .
- (iii) A thick cuticle prevents loss of water.
- (iv) They have a special photosynthetic mechanism (CAM), that enables their stomata to remain closed during day and open during night.
- (c) Water is the most precious resource, use it judiciously and think of programs for its conservation.

42)

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- (a) Commensalism
- (b) (i) Orchids grow as epiphytes on mango tree or other fruit trees.
 - Orchids are benefitted by getting a shelter, while the tree is neither benefitted nor damaged.
- (ii) Barnacles growing on the whale are benefitted 'to move where food is available.
- (iii) The cattle egrets always forage near to where the cattle animals graze; the cattle animals stir up the ground and the insects are flushed out from the vegetation and make it easy for the egrets to catch them.
- (iv) The clown fish living among sea anemones get protection from their predators, which stay away from the stinging tentacles of the sea anemone:
- (c) Amensalism
 - Roots of certain plants secrete chemicals, which are harmful to the soil organisms.
 - The antibiotics secreted by certain soil fungi are harmful to soil . fungi bacteria. . (anyone)
- (d) Interactions should be beneficial to all concerned. Avoid selfish or selfcentered people.

43)

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- (a) In some shallow lakes of South America, the visiting flamingoes and the resident fishes compete for their common food, the zooplanktons in the lake
- b) In interference competition, ..the feeding efficiency of one species is reduced by the interfering and inhibitory presence of the other species, even if the resources are abundant and not limiting e.q. the Abingdon tortoise in Galapagos island became extinct within a decade after goats were introduced into the island.
- (c) Work hard and equip yourself to be successful in this competitive world.

Pond --- an Ecosystem - Pond is a fairly self-sustainable unit that shows even complex interactions of an aquatic ecosystem. _ It is a shallow water body in which all the major/basic components of an ecosystem are well exhibited. _ The abiotic components are: (i) Water with all the dissolved inorganic substance. (ii) The rich soil deposit at the bottom. (iii) The solar input. (iv) The cycle of temperature. (v) day length. (vi) Climatic factor. - The producers or autotrophic components include phytoplanktons, some algae, floating and submerged and marginal plants. - The consumers are represented by (i) zooplanktons, (ii) free-swimming animals, (iii) bottom dwelling animals. - The decomposers are the bacteria and fungi that are found at the bottom. - This system performs all the function of an ecosystem. (i) Conversion of inorganic materials into organic compounds with the help of radiant energy of sun. (ii) Consumption of autotrophs by heterotrophs, (food chain/food web), decomposition and mineralisation (nutrient cycling), etc.

Species-Area Relationship

- Alexander Von Humboldt has observed that within a region, species richness increases with increased explored area, but only upto a limit.
- The relationship between species richness and area for a number of taxa like angiospermic plants, freshwater fishes and birds is found to be a rectangular hyperbola.
- On a log scale, the relationship becomes linear (straight line) and is described by the equation:
 $\log S = \log C + Z \log A$, where
 S = Species Richness
 Z = Slope of the line (regression coefficient)
 A = Area and C = Y - intercept
- Ecologists have found that the value of Z-line ranges between 0.1 and 0.2 irrespective of the taxonomic group of the region.
- But in very large areas, like a continent, the Z value ranges between 0.6 and 1.2 and indicate species richness.

Atmospheric pollutants and their sources:

Name of atmospheric pollutant	Sources
1. Sulphur and nitrogen oxides.	1. Domestic burning thermal power plants.
2. Carbon monoxide, lead, smoke, organic vapours, odours.	2. Car, Trucks, Aeroplanes and Railway engines.
3. Fly ash and particulates.	3. Open burning dumps.
4. Hydrogen sulphide, SO_2 , fluorides, organic vapours and dusts.	4. Petroleum refineries, fertilizers, cement, paper mills, ceramics, clay processes and glass manufacturing.
5. Metal fumes; Fluorides and particulates.	5. Aluminium refineries, steel plants.
6. Smoke, Soot, odours, metal fumes.	6. Scrap metal yards, Rendering plants.
7. Organic phosphates, Chlorinated hydrocarbons, Lead, Arsenic.	7. Crop spraying.
8. Smoke, Flash, Soot, SO_2 , Organic vapours.	8. Field burning.
9. Hydrocarbon and other organic vapours.	9. Spray painting, Solvent extraction.
10. Radioactive fallout, Sr^{-99} , Cs^{-137} , Cs^{-14} , $C1..$	10. Nuclear device testing, spent fuel processes.

Ozone layer as protective layer. The ozone layer in the stratosphere is very useful to human beings because it absorbs the major part of harmful ultraviolet radiation coming from the sun. Therefore, it is called **protective layer**. However, it has been observed that the ozone layer is getting depleted. One of the reasons for depletion of ozone layer is action of aerosols spray propellants. These are the chemicals such as **fluorocarbons** and **chloro-fluorocarbons**. These compounds react with ozone gas in the atmosphere thereby depleting it. Scientists all over the world are worried at the destruction of ozone layer. If the ozone layer in the atmosphere is significantly decreased, these harmful radiations would reach the earth and would cause many damages such as skin cancer, genetic disorders in man and other living forms. Efforts are being made to find substitutes of these chemicals which do not react with ozone.

- (i) National Park belongs to In situ conservation method.
- (ii) First national park of India is Haileys National Park which is now called as Jim Corbett National Park.
- (iii) According to National Wildlife Database Cell, Wildlife Institute of India there are 103 national parks till now.
- (iv) His friend is calm and has knowledge about biodiversity.