

EXERCISE QUESTIONS

CHAPTER -2 BIOLOGICAL CLASSIFICATION

1. Discuss how classification systems have undergone several changes over a period of time?

Ans - (i) Linnaeus offered a two-kingdom classification system, with the kingdoms of Plantae and Animalia constructed to contain all types of plants and animals, respectively. However, this technique was deemed insufficient by scientists since it failed to distinguish between eukaryotes and prokaryotes, unicellular and multicellular creatures, and photosynthetic (green algae) and non-photosynthetic (fungi) species. As a result, classification schemes for living things have changed over time.

(ii) RH Whittaker's two kingdom system of classification was replaced by his three kingdom system, four kingdom system, and lastly five kingdom system (1969).

(iii) The five kingdoms were composed of the following: Monera, Protista, Fungi, Plantae, and Animalia. The most widely used system for classifying living things is this one.

(iv) Whittaker hasn't, however, mentioned lichens or viruses. Then Stanley talked about viroids, viruses, etc. As a result, classification methods have changed considerably over time.

2. State two economically important uses of:

(a) heterotrophic bacteria

(b) archaeobacteria

Ans - (a) Heterotrophic bacteria : These bacteria are natural scavengers. Some saprophytic bacteria, such as lactic acid bacteria and acetic acid bacteria, respectively, are responsible for turning milk into lactic acid and turning alcohol into vinegar.

Many antibiotics, particularly those from the genus *Streptomyces*, are derived from actinomycetes. These include streptomycin, chloramphenicol, oilorotetracycline, erythromycin, and terramycin, among others.

(b) Archaeobacteria live as a symbionts in the rumen of herbivorous animals.

The creation of methane (biogas) from ruminant dung is caused by methanogens, which are found in the guts of numerous ruminant species like cows and buffaloes.

3. What is the nature of cell-walls in diatoms?

Ans - Silica makes up the diatoms' cell walls. Frustule is the name for the way their cell walls are built. It comprises of two thin shells that overlap and fit within one another like a soap box. The silica found in the cell walls of dead diatoms is deposited as diatomaceous earth. This diatomaceous earth is extremely pliable and inert. It is employed in the filtration of sugars and oils as well as for other industrial uses.

4. Find out what do the terms 'algal bloom' and 'red-tides' signify.

Ans - Algal bloom

A water body will become discoloured when there is an algal bloom, which is an increase in the population of algae or blue-green algae in the water. Fish and other aquatic species perish as a result of the rise in the biological oxygen demand (BOD) that is brought on by this.

Red-tides

Crimson dinoflagellates (*Gonyaulax*), which reproduce quickly, are what cause red tides. They are so numerous that the sea looks to be red. They discharge massive quantities of poisons into the water, which can kill a lot of fish.

5. How are viroids different from viruses?

Ans - The smallest known infectious disease agent with a single-stranded RNA molecule is a virus. They have no proteins attached to them and no capsid. Viroids only infect plants. In contrast, the genetic material of viruses is encased in a protein or lipoprotein protective coat.

S.N.	Virus	Viroids
1.	These are smaller than bacteria.	Smaller than viruses.
2.	Both RNA and DNA present.	Only RNA is present.
3.	Protein coat present.	Protein coat absent.
4.	Causes diseases like mumps and AIDS.	Causes plant diseases like spindle tuber diseases – potato.

6. Describe briefly the four major groups of Protozoa.

Ans - Every protozoan is a heterotroph, meaning it lives as a parasite or a predator. They are thought to be extinct animal relatives. Based on the organelles that control locomotion, they are divided into four groups.

(i) Amoeboid protozoans: These organisms can be found in soil that is damp, freshwater, or saltwater. Similar to amoebas, they have pseudopodia (fake feet), which they use to move and catch their prey. Some of them are parasites, like Entamoeba.

(ii) Flagellated protozoans: These organisms can be parasitic or free-living. They can move by using flagella. The parasitic forms, such as Trypanosoma, are what lead to illnesses like sleeping sickness.

(iii) Ciliated protozoans: Due to their abundance of cilia, these creatures are aquatic and constantly moving. They have a hole (gullet) in the cell surface that opens to the outside. The water loaded with food is directed down the gullet, such as in the case of Paramecium, by the coordinated movement of rows of cilia.

(iv) Sporozoans: This contains a variety of parasitic organisms with a life cycle stage that resembles an infectious spore. Organs for locomotion are missing. The most infamous N. is the malarial parasite Plasmodium, which causes malaria and has a devastating impact on the human population.

7. Plants are autotrophic. Can you think of some plants that are partially heterotrophic?

Ans - By using the process of photosynthesis, plants, which are known as autotrophs, make their own nourishment. However, several other plants in nature are somewhat heterotrophic, meaning that they rely on other species in some ways for their nutritional needs.

(i) Partial stem parasites with leathery leaves include Loranthus and Viscum. They target a variety of fruit and woodland trees and use their haustoria to drain sap from the host's xylem tissue.

(ii) Plants that are insectivorous have unique leaves that capture insects. The proteolytic enzymes released by the epidermis of the leaves, such as those of pitcher plants, kill and digest the trapped insects.

(iii) A parasitic plant, such as Cuscutta, creates haustoria that pierce the host plant's vascular bundles and absorb water and solutes.

8. What do the terms phycobiont and mycobiont signify?

Ans - The terms "phycobiont" and "mycobiont" refer to the lichens' fungal and algal components, respectively. Fungi shelter algae and take up water and nutrients from the soil, whereas algae have chlorophyll and prepare food for fungi. Symbiotic describes this kind of connection.

9. Give a comparative account of the classes of Kingdom Fungi under the following:

(i) mode of nutrition

(ii) mode of reproduction

Ans - (A) Phycomycetes: This class of fungi contains species like Rhizopus, Albugo, and others.

(i) Mode of nutrition

They are either found on plants as obligatory parasites or on decaying materials like wood.

		Phycomycetes	Ascomycetes	Basidiomycetes	Deuteromycetes
(a)	Mode of nutrition	Obligate parasites	Parasitic or coprophilous	Parasitic	Parasitic or saprophytic
(b)	Mode of reproduction	Asexual reproduction by motile zoospore	Asexual reproduction by budding or by spore. Sexual reproduction by hologamy, gametangial contact, spermatisation and somatogamy	Vegetative reproduction is common. Sexual process is represented by plasmogamy and karyogamy.	Asexual reproduction by spores, sexual reproduction is absent.

10. What are the characteristic features of Euglenoids?

Ans -The following characteristics are present in euglenoids:

1. They conserve carbs as paramylon.
2. Euglenoids, like other plants, are green and holophytic.
3. While most are saprophytic and non-green, few are holotropic.
4. They have a gullet close to the base of the flagellum and an eyespot that is red-pigmented.
5. The flagella on all euglenoids, which aid in swimming, are either one or two.
6. Lack of a cell wall but with a flexible protein pellicle.
7. Free-living freshwater species are found in ditches and ponds.

11. Give a brief account of viruses with respect to their structure and nature of genetic material. Also name four common viral diseases.

Ans - Viruses are contagious, sub-atomic, non-cellular particles. Enclosure, capsid, nucleoid, and sporadically one or two enzymes make them up. Viruses have an exterior, flimsy, loose covering that is known as an envelope. A capsid made up of smaller components called capsomeres encircles the nucleoid's core region. The term "nucleoid" refers to the

nucleic acid that viruses contain. The virus's infectious component makes use of the machinery of the host cell.

Four different forms of genetic material exist in viruses:

1. DNA has double strands, such as that in the pox, hepatitis-B, and herpes viruses, among others

2. Coliphage 1, Coliphage x 174 both contain single-stranded DNA (ssDNA).

3. In the Reo virus, double-stranded RNA (dsRNA) is present.

4. Single-stranded RNA (ssRNA) is found in the TMV and polio viruses.

Four common viral diseases are :

1. Polio
2. AIDS
3. Hepatitis-B
4. Rabies.

12. Organise a discussion in your class on the topic – Are viruses living or nonliving?

Ans - Viruses are thought of as a transitional form between inanimate objects and living things. It is exceedingly challenging to determine whether they are alive or not. While many other characters of viruses suggest they are living things, certain characters of viruses suggest they are not.

They are similar to inanimate objects in that:

(i) Protoplast is absent.

(ii) The capacity to crystallise.

(iii) The inability to exist without a living cell.

(iv) Extremely high specific gravity, which is only present in inanimate objects.

(v) The lack of breathing.

(vi) The lack of a system for storing energy.

(vii) The lack of division and expansion. Instead, various components are produced independently.

Viruses are similar to living things in that they

(ii) Genetic material is present.

(iii) Although only inside a living cell, the capacity to proliferate or reproduce

(iv) Mutations can happen

(v) Enzyme transcriptase is present in the majority of viruses.

(vi) Some viruses, such as the chicken pox virus, contain vitamins like biotin and riboflavin.

(vii). Infectivity and host-specificity

(viii) Autoclaving and ultraviolet light both "kill" viruses

(ix) They reproduce in line with their type. Even differences can be passed down.

(x) They take over the host cell's biosynthetic machinery and use it to make the chemicals necessary for their multiplication.

Many infectious diseases, including the common cold, influenza epidemics, and chicken pox, are brought on by viruses.