2. Biological classification

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

Answer:

I. The first classification was given by Aristotle to classify herbs, shrubs and trees. Animals were classified on the presence or absence of red blood cells.
II. Linnaeus proposed two kingdom classification with two kingdoms, Plantae and Animalia.
III. Ernst Haeckel separated unicellular eukaryotes in kingdom Protista and proposed three kingdom classification.
IV. Four kingdom classification was given by Copeland where a kingdom Monera was added.
V. RH Whittaker gave five kingdom classification where the kingdoms were, Monera, Protista, Fungi, Plantae and Animalia.
VI. Stanley later on described viruses, viroids, etc.

Question 2. State two economically important uses of: (a) heterotrophic bacteria (b) archaebacteria

Answer:

a) Heterotrophic bacteria : The bacteria that survive by deriving energy from the organic matter from other sources. Bacteria such as *Lactobacillus* helps in the production of curd and cheese from the milk. *Pseudomonas* help in decomposing organic matter and formation of the humus. Some bacteria such as *Streptomyces, Bacillus* help in formation of antibiotics. *Rhizobium, Acetobacter* help in nitrogen fixation.
b) Archaebacteria : They are the group of prokaryotes that survive in very harsh and hostile environment. They are used in many applications of biotechnology. Methane gas is produced from the dung of the ruminants by some methanogens. They are also involved in the production of biogas and sewage treatment.

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

Answer: The cell walls are constructed by diatoms possess Frustule which has two thin overlapping shells fitted into one another such as a soap box. The walls are made up of silica which gets deposited as diatomaceous earth when they die.

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

Answer: Algal bloom, as the name suggests is the increase in population of algae or blue green algae in water by enrichment of the nutrients which discolours the water body. This increases the biological oxygen demand (BOD) causing death of the aquatic animals because of suffocation. Red tide occurs due to algal blooms in which the number of algae increases to discolour the aquatic bodies.

Question 5. How are viroids different from viruses?

Answer:

(i) Virus consists of protein encapsulation the genetic material whereas the viroids are free RNA particles.
(ii) Viroids have a smaller size than virus.
(iii) Virus infects all types of organisms while viroids can only infect plants.

Question 6. Describe briefly the four major groups of Protozoa.

Answer:

(i) Amoeboid protozoans: They use pseudopodia for movement such as *Entamoeba.*
(ii) Flagellated protozoans: They have flagella for locomotion such as *Trypanosoma.*
(iii) Ciliated protozoans: They possess numerous cilia for coordinated movement of organism such as *Paramoecium*.
(iv) Sporozoans: They cannot move but are carried around by the flow of fluids. They are parasites such as *Plasmodium*.

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

Answer: Plants are autotrophs as they can synthesize their own food by the process of photosynthesis because of the presence of green pigments. Some plants such as insectivores are partially heterotrophic derive their nutrition by capturing insects to supplement their diet with nitrogen from insects such as Pitcher plant (*Nepenthes*), venus fly trap.

Question 8. What do the terms phycobiont and mycobiont signify?

Answer: Algae lives with fungi in a symbiotic association known as lichens, where both of them are benefitted from each other. The algae prepares food for fungi while fungus provides shelter to the algae

and absorbs water and nutrients from the soil. The algal portion is known is Phycobiont whereas the fungal portion is Mycobiont.

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

(i) mode of nutrition (ii) mode of reproduction

Answer: The table provides an example of taxonomical hierarchy as mango and frog as an example.

Fungal class	Mode of nutrition	Mode of reproduction
Phycomycetes	Obligate parasites	Asexual reproduction by motile zoospores or non-motile aplanospores. Sexual reproduction may be isogamous, anisogamous or oogamus.
Ascomycetes	Saprophytic, decomposers, parasitic or coprophilus	Asexual reproduction by asexual spores produced exogenously such as conidia. Sexual reproduction by ascospores in sac like asci and arranged in ascospores.
Basidiomycetes	Parasites	Asexual reproduction by fragmentation. Spores are absent. Sex organs are absent but reproduction occurs through plasmogamy.
Deuteromycetes	Saprophytes, Parasites	Asexual reproduction by conidia.

Question 10. What are the characteristic features of Euglenoids?

Answer: The characteristics are as follows:

(i) Unicellular protists found in freshwater.

(ii) Pellicle is present instead of cell wall.

(iii) Presence of two flagella on the anterior end of the body.

(iv) Light sensitive eye spot is present.

(v) Presence of photosynthetic pigments such as chlorophyll and are able to prepare their own food. They can also act as heterotrophs by capturing small aquatic organisms.

(vi) Presence of plant and animal like features.

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

Answer: Viruses are small microscopic, infectious nucleoprotein particles that are able to infect all the living organisms. The virus has a protein encapsulated genetic material. Most of the viruses have single stranded RNA as the genetic material. The virus infecting the bacteria are known as bacteriophages. They have double stranded DNA as the genetic material. The protein coat is known as capsid made up of capsomere subunits which are arranged in helical or polyhedral fashion.

Viral diseases are Small pox, mumps, influenza and so on.

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

Answer: Viruses are intermediate between living and non-living.
They are considered non-living on the basis of non-cellular organisation, inactive outside the host organism, lack or respiration and lack of cellular metabolism. They can also be crystallised as non-living organisms.
They are considered living on the basis of presence of genetic material, presence of mutation, irritability, growth and multiplication inside the host cell. They are intracellular obligate parasites which attack specific hosts.