2. Systematics of living Organisms

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1. Choose the correct option.

(A) Which of the following shows single stranded RNA and lacks protein coat ?

(a) Bacteriophage

(b) Plant virus

(c) Viroid

(d) Animal virus

(B) Causative agent of red tide is

(a) Dinoflagellate

(b) Euglenoid

(c) Chrysophyte

(d) Lichen

(C) Select odd one out for heterotrophic bacteria.

(a) Nitrogen fixing bacteria

(b) Lactobacilli

(c) Methanogens

(d) Antibiotic production

(D) Paramecium : Ciliated Protists : :Plasmodium :

(a) Amoeboid protozoan

(b) Ciliophora

(c) Flagellate protozoan

(d) Sporozoan

2. Answer the following

(A) What are the salient features of Monera ?

Ans.(1) Kingdom Monera consists of prokaryotic,unicellular organisms.
(2) They are seen in all types of environmentand thus are called omnipresent.

(3) Mode of nutrition in some is photo autotrophic or chemoautotrophic; but majority areheterotrophic in nature.

(4) They do not have well defined nucleus dueto lack of nuclear membrane. But it is in the formof nucleoid. Nucleoid consists of DNA in the formof simple doublestrandedcircular singlechromosome.

(5) Also plasmids are present which are smallercircular molecule of DNA as extra chromosomalgenetic elements.

(6) Cell wall is made up of peptidoglycan,murein. This is a polymer of sugars and aminoacid.

(7) Membrane bound cell organelles are absent.Ribosomes are smaller in size (70S) than ineukaryotic cells.

(8) Monera reproduce by asexual mode such asbinary fissionorbudding. Rarely,sexualreproduction by conjugation method is seen.

(9) On the basis of evolution, Monera issubdivided into Archaebacteria and Eubacteria.

(10) By shape and morphological charactersthey are divided into four groups, the Coccus(spherical), the bacillus (rod-shaped), vibrio(comma or kidney shaped) and spirillum the(spiral). E.g. Varieties of bacteria.

(B) What will be the shape of bacillus and coccus type of bacteria ?

Ans. Bacillus is rod shaped bacteria whilecoccus is spherical bacteria.

(4) Why is binomial nomenclature important?

Ans. Importance of binomial nomenclature :

(1) The names given by binomial nomenclatureare simple, precise and meaningful.

(2) Binomial names being in Latin or Greekhave universal acceptance.

(3) Binomial names are easy to understand andremember.

(4) Binomial names indicate phylogeny, i.e.,evolutionary history of organisms.

(5) They are helpful in understanding therelationships between organisms and groups oforganisms.

3. Write short notes

(A) Useful and harmful bacteria :
Ans. I. Useful bacteria :

(1) Bacteria that convert milk into curds i.e. Lactobacilli are used in food industry.

(2) Nitrogen fixing bacteria such as Azotobacter, Nitrosomonas, Rhizobium, etc. are very helpful in nitrogen fixation. They provide nitrogen from the soil to the leguminous plants.

(3) Bacteria like Streptomyces is used in production of antibiotics.

(4) Bacteria are used in degradation of crude oil. E.g. Pseudomonas sps. and also in the decomposition process to prepare compost.

(5) Biogas production is done by methanogenic bacteria.

II. Harmful bacteria : (1) Different types of diseases are caused due to pathogenic bacteria in human, animals and also plants.

(2) Typhoid, cholera, tuberculosis, tetanus, leprosy, bacillary dysentery are various diseases that infect human beings.

(3) Plant diseases such as galls and overgrowth, wilt, leaf spots, specks and blight, soft rots, as well as scabs and cankers are produced by bacteria. Most plant pathogenic bacteria belong to the following genera : Erwinia, Pectobacterium, Pantoea, Agrobacterium, Pseudomonas. Ralstonia, Burkholderia. Acidovorax, Xanthomonas, Clavibacter. Streptomyces, Xylella, Spiroplasma, and Phytoplasma.

(4) Animals and pets have bacterial infections such as : Actinobacillosis, Actinomycosis, Anthrax, Bacillary White Diarrhoea, Braxy, Botulism, Botryomycosis, Bumble Foot, Brucellosis (Contagious Abortion of Cattle), Pasteurellosis.

(B) Five Kingdom system :

Ans. (1) In this system of classification, living organisms have been classified into five kingdoms, viz., Monera, Protista, Fungi, Plantae and Animalia.

(2) The five-kingdom system of classification was proposed by R. H. Whittaker in 1969.

(3) This system shows the phylogenetic relationship between the organisms.

(4) This system avoids the confusion created by two kingdom system of classification which was given by Carl Linnaeus.

(5) The criteria used by Whittaker to classify organisms into five kingdoms are as follows: (a) Cell organization - Whether the organism is prokaryotic or eukaryotic. (b) Body organization-Whether the body is made up of only one cell (unicellular) or made up of many cells (multicellular). (c) Mode of nutrition-Whether the mode of nutrition is autotrophic or heterotrophic. (d) Lifestyle-Whether the organism is producer, consumer or decomposer.

(4) Useful Fungi :

Ans. (1) Some fungi like Mushrooms are consumed as food.

(2) The unicellular yeast is used in bakery and breweries, as it brings about fermentation.

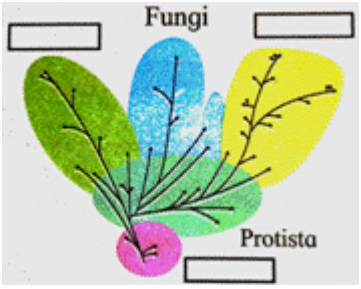
(3) For antibiotic production, Penicillin, a fungus, is used.

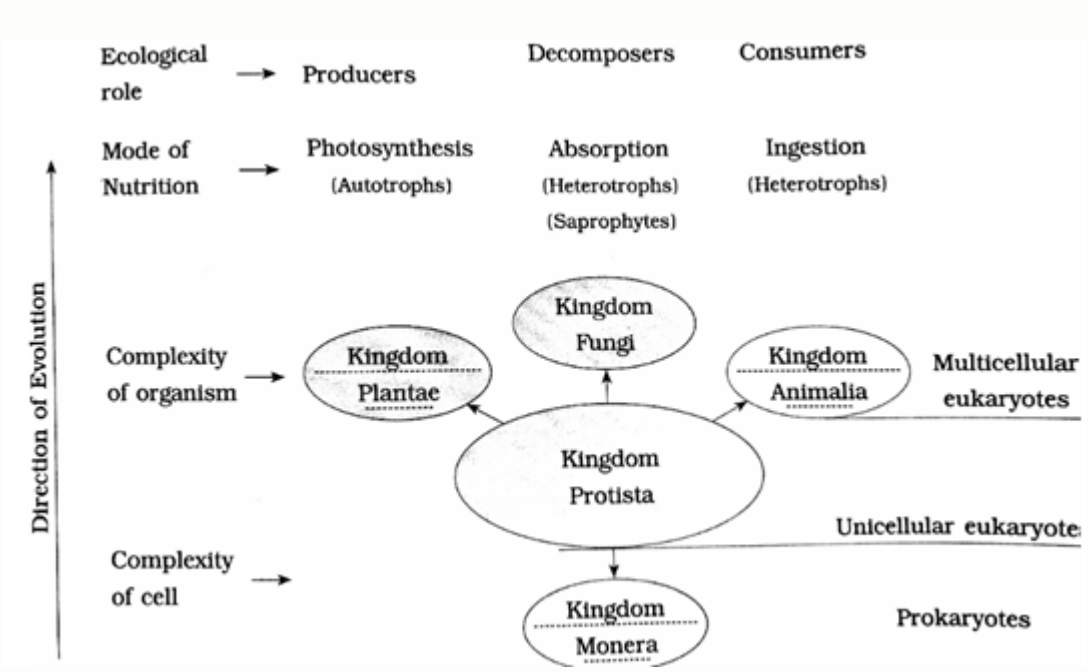
(4) Morels and truffles are varieties of sac fungi which are consumed as delicacies.

(5) Neurospora is useful in genetic and biochemical assays.

(6) Fungi can be also be used as decomposers.

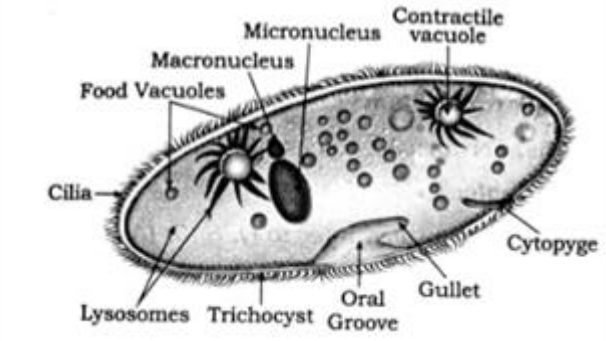
4. Complete tree diagram in detail:



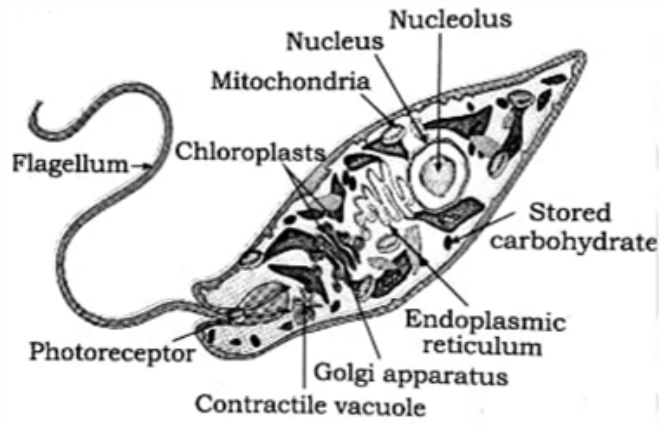


5. Draw neat labelled diagrams

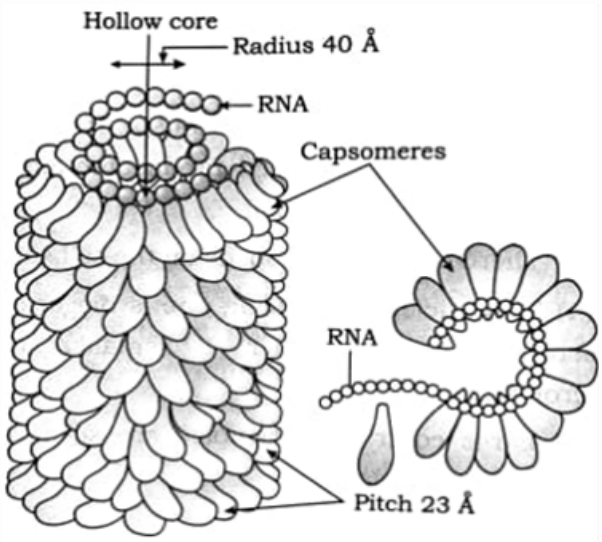
A. Paramoecium



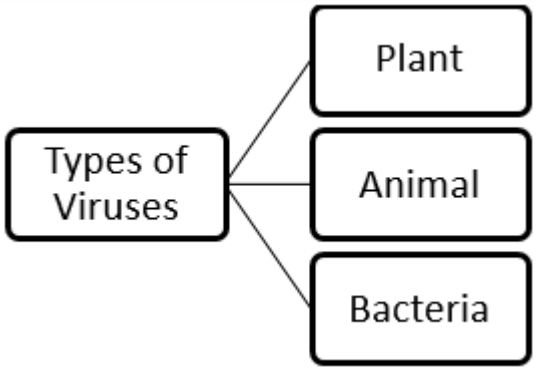
B. Euglena



C.TMV

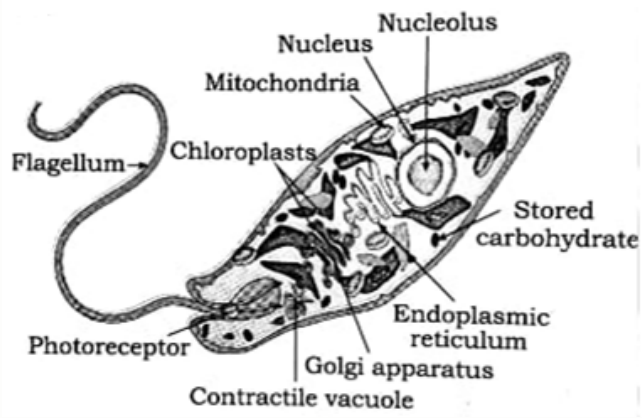


6. Complete the chart and Explain in your word:



Viruses are of three types. Those that infect plant cells are called plant viruses. They have single stranded RNA. Those that infect animal cells are animal viruses. They have either single or double stranded RNA or double stranded DNA. Bacterial viruses infect bacterial cells and they have doublestranded DNA. These are commonly known as bacteriophage.

7. Identify the following diagrams, label them and write detail information about them.



Euglena

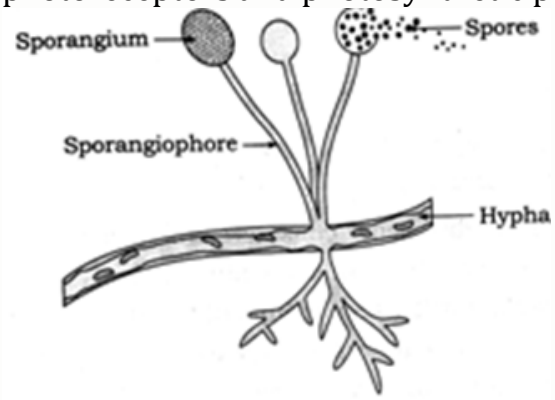
(1) The given organism is Euglena,

(2) It is flagellated Protist. It belongs to the group Euglenoids.

(3) Euglenoids are heterotrophic flagellates, but also show autotrophic mode.

(4) It has two flagella one is short and the other is long.

(5) It can perform photosynthesis in the presence of light due to the presence of photoreceptors and photosynthetic pigments.



Mucor

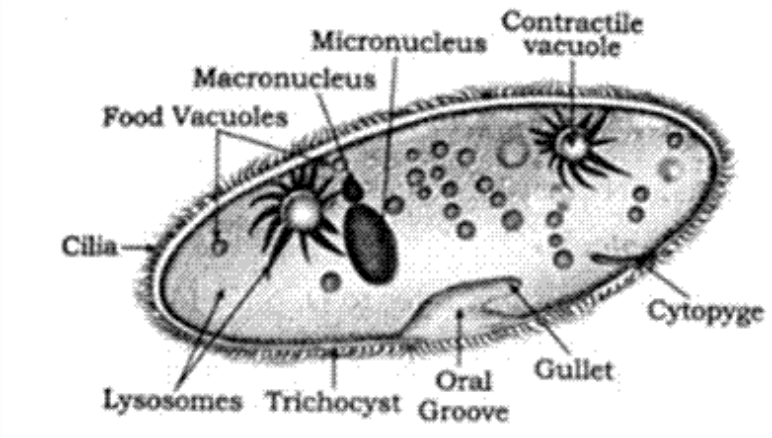
(1) The given diagram is of Mucor, which belongs to Kingdom Fungi and class Phycomycetes

(2) They are decomposers and hence grow in damp, moist habitats on decaying organic matter.

(3) The body consists of hyphae which spread horizontally.

(4) On the hyphae sporangiophore are seen which bear sporangium at their tips.

(5) They liberate spores, which help in asexual reproduction.



Paramoecium

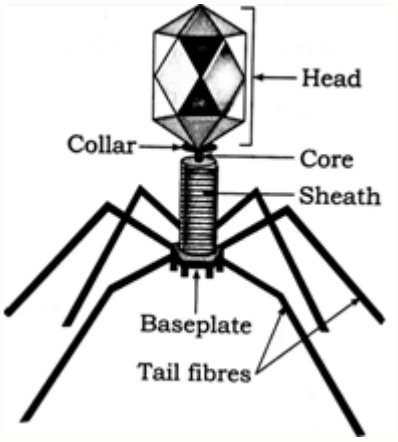
(1) The organism shown is Paramoecium.

(2) It belongs to Kingdom Protista. It is animallike Protists. Cilia are used for locomotion thusalso called ciliate protozoan.

(3) There is gullet that opens on the cell surface.

(4) Two nuclei are present, one is bigger calledmacronucleusandotherissmallercalledmicronucleus.

(5) Large contractile vacuoles are seen which help in osmoregulation.



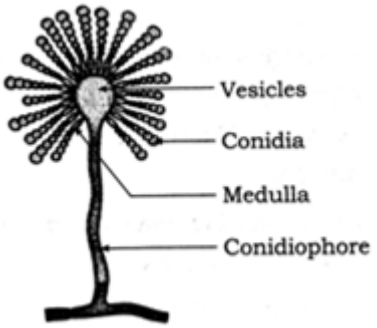
Bacteriophage

(1) This is bacteriophage. It is an acellular organism not included in any kingdom.

(2) This is a virus that infects the bacterial cells.

(3) They have a core of genetic material which is surrounded by capsid which is a protein coat.

(4) The structure consists of head, core and basal plate possessing tail fibres.



Aspergillus

(1) The given diagram is that of Aspergillus.

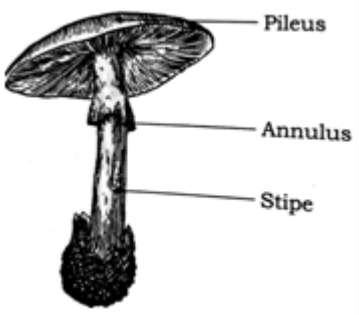
(2) Aspergillus belongs to kingdom Fungi and class Ascomycetes.

(3) Commonly it is known as mould. It grows well in the damp and moist regions.

(4) A majority have been shown to be terricolous, which means that they are largely found in soil/land.

(5) They have become increasingly important in human health, agriculture as well as in biological sciences among others.

(6) They are also called conidial fungi because they reproduce asexually through the production of spores from the fungi hyphae. The spore produced is referred to as conidium.



Agaricus

(1) The given diagram is of mushroom, Agaricus.

(2) The small, white, globular, apical swellings is the fruiting-bodies which arise on the branches of the subterranean mycelial strands.

(3) The dome-shaped upper portion is known as pileus.

(4) The lower hyphae constitute the stalk or stripe.

(5) The margins of the pileus are connected with the stripe with the help of a membrane called inner veil or velum. There is a constriction between stipe and pileus.

(6) Two gill-chamber cavities are present, one on either side of the pileus.

(7) From the roof of these cavities arise many gills or lamellae.

(8) Button stage is a developmental stage of the fruiting body of Agaricus.

8. The scientific name of sunflower is given below. Identify the correctly written name :

A. Helianthus annus

B. Helianthus Annus

Ans. Helianthus annuus, this is the correctly written name.

9. Match the following.
Kingdom - Example (Ans)

(1) Monera - **(b) Cyanobacteria**

(2) Protista - **(d) Spirogyra**

(3) Plantae - **(a) Lichen**

(4) Fungi - **(c) Rhizopus**

10. Complete the following:

A. Plant-like Protista – **Diatoms**

B. **Animal like Protista** - Entamoeba