Chapter 2: Systematics of Living Organisms

EXERCISE [PAGES 17 - 18]

Exercise | Q 1. A. | Page 17
Choose the correct option:
Which of the following shows single stranded RNA and lacks protein coat?

1. Bacteriophage
2. Plant virus
3. **Viroid**
4. Animal virus

SOLUTION

Viroid

Exercise | Q 1. B. | Page 17
Choose the correct option:
Causative agent of red tide is _____.

1. **Dinoflagellate**
2. Euglenoid
3. Chrysophyte
4. Lichen

SOLUTION

Causative agent of red tide is **Dinoflagellate**.

Exercise | Q 1. C. | Page 17
Choose the correct option:
Select odd one out for Heterotrophic bacteria.

1. Nitrogen fixing bacteria
2. Lactobacilli
3. **Methanogens**
4. Cyanobacteria

SOLUTION

Methanogens

Exercise | Q 1. D. | Page 17
Choose the correct option:
Paramoecium : Ciliated Protist Plasmodium : _____

1. Amoeboid protozoan
2. Ciliophora
3. Flagellate protozoan
4. **Sporozoan**

SOLUTION

Paramoecium : Ciliated Protist Plasmodium : **Sporozoan**

Exercise | Q 2. A. | Page 17

Answer the following:

What are the salient features of monera?

SOLUTION

Salient features of Kingdom Monera:

i. **Size**: The organisms included in this kingdom are microscopic, unicellular, and prokaryotic.

ii. **Occurrence**: These are omnipresent. They are found in all types of environment which are not generally inhabited by other living beings.

iii. **Nucleus**: These organisms do not have a well-defined nucleus. DNA exists as a simple double-stranded circular single chromosome called a nucleoid. Apart from the nucleoid they often show the presence of extrachromosomal DNA which is a small circular called plasmids.

iv. **Cell wall**: Cell wall is made up of peptidoglycan (also called murein) which is a polymer of sugars and amino acids.

v. **Membrane-bound cell organelles**: Membrane-bound cell organelles like mitochondria, chloroplast, endoplasmic reticulum are absent. Ribosomes are present, which are smaller in size (the 70S) than in eukaryotic cells.

vi. **Nutrition**: The majority are heterotrophic, parasitic, or saprophytic in nutrition. Few are autotrophic that can be either photoautotrophs or chemoautotrophs.

vii. **Reproduction**: The mode of reproduction is asexual or with the help of binary fission or budding. Very rarely, sexual reproduction occurs by the conjugation method.

viii. **Examples**: Archaebacteria: e.g. Methanobacillus, Thiobacillus, etc. Eubacteria: e.g. Chlorobium, Chromatium, and Cyanobacteria e.g. Nostoc, Azotobacter, etc.

Exercise | Q 2. B. | Page 17

Answer the following:

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

SOLUTION

Bacillus is rod shaped bacteria while coccus is spherical bacteria.

Exercise | Q 2. C. | Page 17

Answer the following:
Why is binomial nomenclature important?

SOLUTION

1. The binomials are simple, meaningful, and precise.
2. They are standard since they do not change from place to place.
3. These names avoid confusion and uncertainty created by local or vernacular names.
4. The organisms are known by the same name throughout the world.
5. Binomials are easy to understand and remember.
6. It indicates phylogeny (evolutionary history) of organisms.
7. It helps to understand the inter-relationship between organisms.

Exercise | Q 3. A. | Page 17
Write short notes:
Useful and harmful bacteria

SOLUTION

A. **Useful bacteria:**
Most of the bacteria act as a decomposer. They breakdown large molecules into simple molecules or minerals.

Examples of some useful bacteria:
Lactobacillus: It helps in curdling of milk.
Azotobacter: It helps to fix nitrogen for plants.
Streptomyces: It is used in antibiotic production such as streptomycin.
Methanogens: These are used for the production of methane (biogas) gas from dung. Pseudomonas spp. and Alcanovorax borkumensis: These bacteria have the ability to destroy the pyridines and other chemicals. Hence, used to clear the oil spills.

B. **Harmful bacteria**:
This includes disease causing bacteria. They cause various diseases like typhoid, cholera, tuberculosis, tetanus, etc.

Examples of some harmful bacteria:
Salmonella typhi: It is a causative organism of typhoid.
Vibrio cholerae: It causes cholera. Mycobacterium
tuberculosis: It causes tuberculosis. Clostridium
tetani: It causes tetanus.
Clostridium spp.: It causes food poisoning.
Many forms of mycoplasma are pathogenic.
Agrobacterium, Erwinia, etc are the pathogenic bacteria causing plant diseases.

Animals and pets also suffer from bacterial infections caused by Brucella, Pasteurella, etc.

Exercise | Q 3. B. | Page 17

Write short notes:

Five Kingdom system

SOLUTION

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 the 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.

Exercise | Q 3. C. | Page 17

Write short notes:

Useful Fungi

SOLUTION

Useful Fungi:

A. Role of fungi in medicine:

a. Antibiotic penicillin is obtained from Penicillium.
b. Drugs like cyclosporine, immunosuppressant drugs, precursors of steroid hormones, etc are isolated from fungi.

B. Role of fungi in industries:

a. Yeast is used in bread making. It causes the dough to rise and make the bread light and spongy. It is also used in breweries or winemaking industries. Sugars present in grapes are fermented by using yeast. This results in the production of alcohol which is used for making wine.
b. Lichen is a symbiotic association of algae and fungi are used in the preparation of litmus paper which is used as an acid-base indicator.

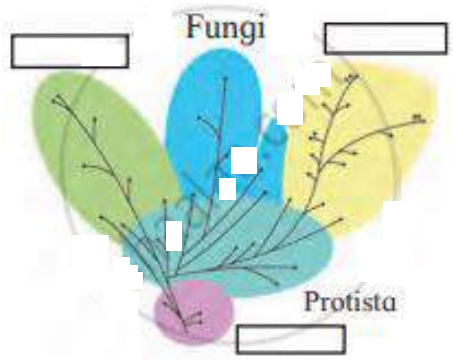
C. Role of fungi in food:

a. Fungi like mushrooms are consumed as food. These are rich sources of protein.
b. Fungi genus Penicillium helps in the ripening of cheese.

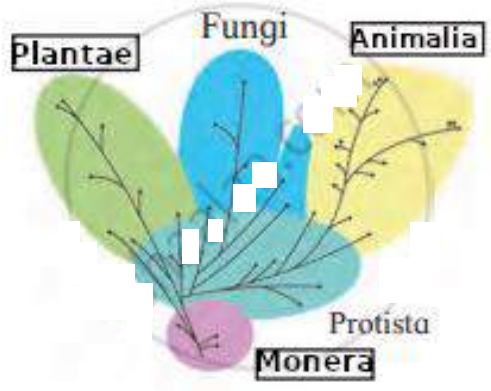
D. Role of fungi as biocontrol agents:

a. Fungi help to control the growth of weeds.
b. Pathogenic fungi like Fusarium sp., Phytophthora palmivora, Alternaria crassa, etc act as mycoherbicides.

Exercise | Q 4 | Page 17
Complete tree diagram in detail:

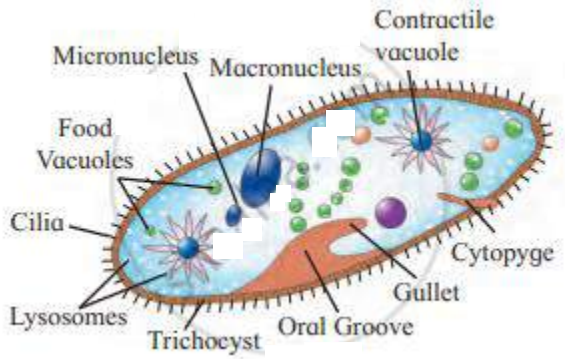


SOLUTION



Exercise | Q 5. A. | Page 17
Draw neat labelled diagrams:
Paramoecium

SOLUTION



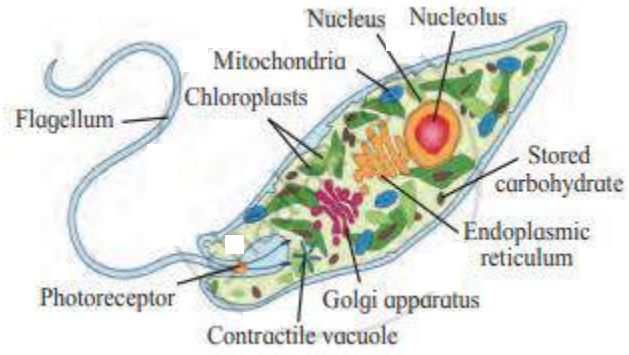
1. The organism shown is Paramoecium.
2. It belongs to Kingdom Protista. It is an animal-like Protista. Cilia are used for locomotion thus also called a ciliate protozoan.
3. There ts a gullet that opens on the cell surface.
4. Two nuclei are present, one ts bigger called macronucleus and the other is smaller called micronucleus.
5. Large contractile vacuoles are seen which help in osmoregulation.

Exercise | Q 5. B. | Page 17

Draw a neat labelled diagram:

Euglena

SOLUTION

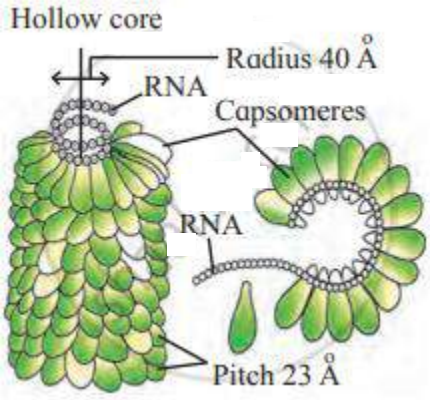


1. The gtven organism is Euglena.
2. It is a flagellated Protista. It belongs to the group Euglenoids.
3. Euglenoids are heterotrophic flagellates, but also show autotrophic mode.
4. It has two flagella one is short and the other is long.
5. It can perform photosynthesis in the presence of light due to the presence of photoreceptors and photosynthetic pigments.

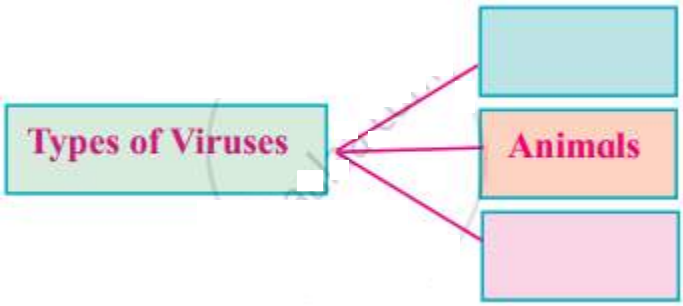
Exercise | Q 5. C. | Page 17

Draw a neat labelled diagram:
TMV

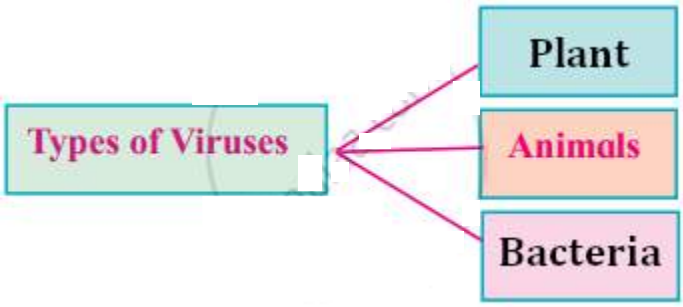
SOLUTION



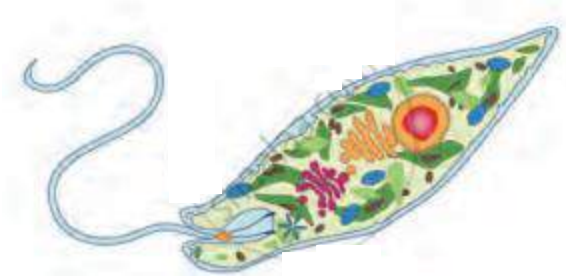
Exercise | Q 6 | Page 17
Complete chart and explain in your word:



SOLUTION

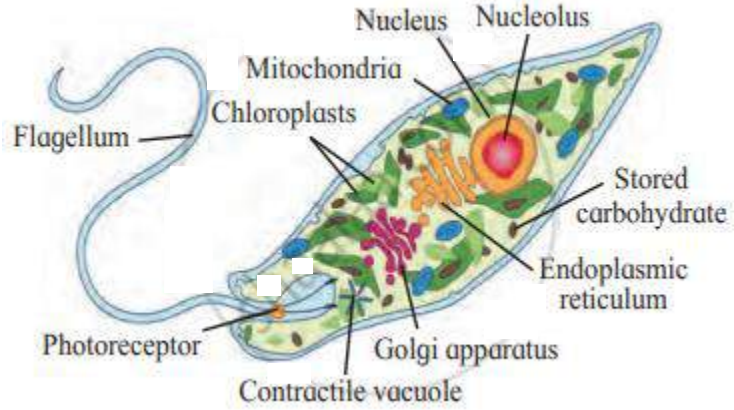


Exercise | Q 7. A. | Page 17
Identify the following diagram, label it and write detail information in your words:



SOLUTION

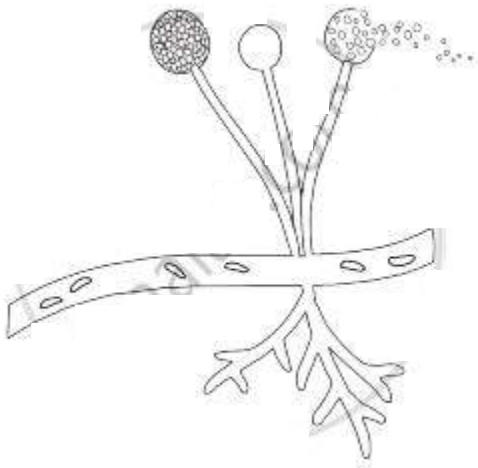
Euglena:



1. The given organism is Euglena.
2. It is a flagellated Protista. 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.

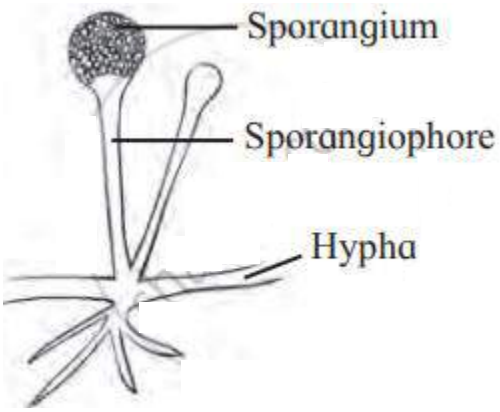
Exercise | Q 7. B. | Page 17

Identify the following diagram, label it and write detail information in your words:



SOLUTION

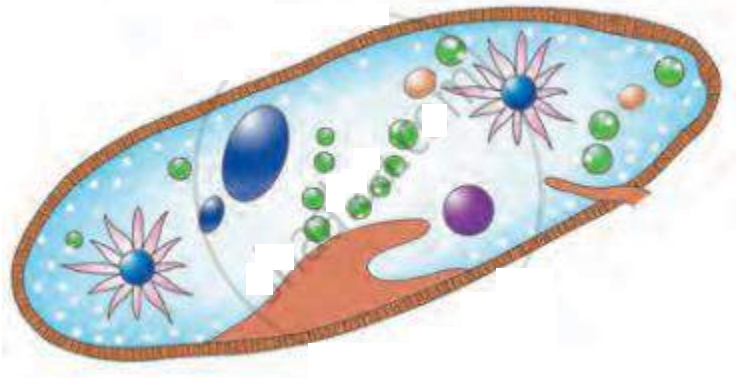
Mucor:



1. The given diagram is of Mucor, which belongs to the 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 is seen which bear sporangium at their tips.
5. They liberate spores, which help in asexual reproduction.

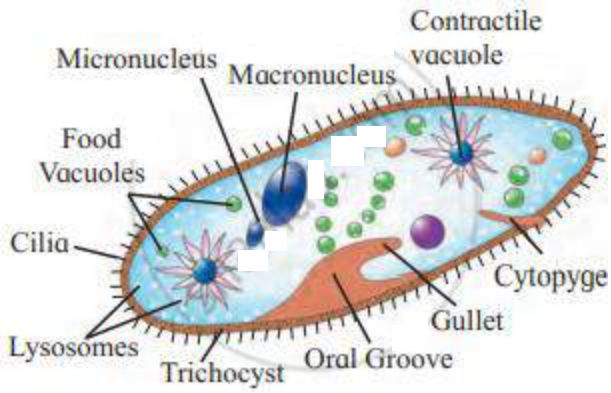
Exercise | Q 7. C. | Page 18

Identify the following diagram, label it and write detail information in your words:



SOLUTION

Paramoecium:



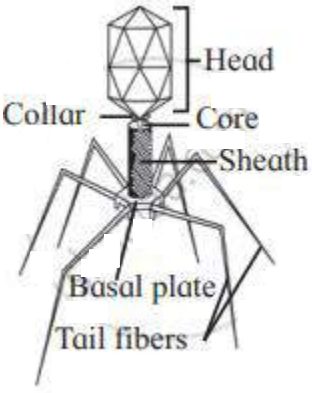
1. The organism shown is Paramoecium.
2. It belongs to Kingdom Protista. It is an animal-like Protista. Cilia are used for locomotion thus also called a ciliate protozoan.
3. There is a gullet that opens on the cell surface.
4. Two nuclei are present, one is bigger called macronucleus and the other is smaller called micronucleus.
5. Large contractile vacuoles are seen which help in osmoregulation.

Exercise | Q 7. D. | Page 18

Identify the following diagram, label it and write detail information in your words:

SOLUTION

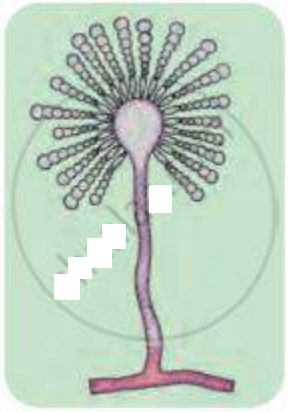
Bacteriophage:



1. This ts bacteriophage. It is an acellular organism not included in any kingdom.
2. This is a virus that infects bacterial cells.
3. They have a core of genetic material which is surrounded by a capsid which is a protein coat.
4. The structure consists of a head. core and basal plate possessing tail fibers.

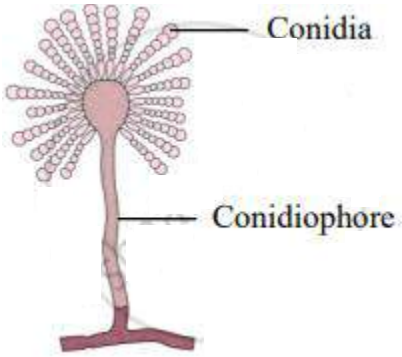
Exercise | Q 7. E. | Page 18

Identify the following diagram, label it and write detail information in your words:



SOLUTION

Aspergillus:



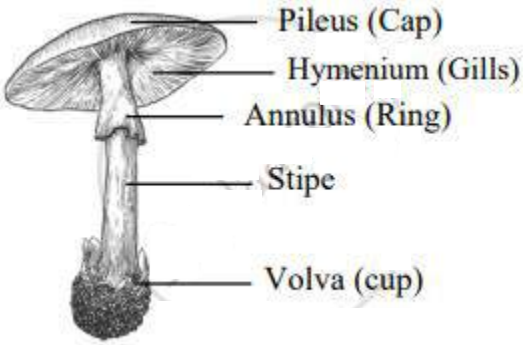
1. It belongs to class ascomycetes of the kingdom Fungi.
2. It is multicellular.
3. The hyphae are branched and septate.
4. Aspergillus grows well in soil, decaying vegetation, hay, dung, on plants, etc.
5. Asexual reproduction takes place by spores called conidia which are produced at the tip of hyphae called conidiophores.

Exercise | Q 7. F. | Page 18

Identify the following diagram, label it and write detail information in your words:

SOLUTION

Agaricus:



1. It belongs to class basidiomycetes of the kingdom Fungi.
2. It has branched septate hyphae.
3. It grows in soil, on rotten wood, etc.
4. It is edible and rich in proteins.
5. Vegetative reproduction takes place by fragmentation.

Exercise | Q 8 | Page 18

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

1. **Helianthus annuus L.**
2. Helianthus Annuus l.

SOLUTION

The correctly written scientific name of sunflower is Helianthus annuus L.

Exercise | Q 9 | Page 18

Match the following:

Kingdom	Example

i. Monera	a. Riccia
ii. Protista	b. Cyanobacteria
iii. Plantae	c. Rhizopus
iv. Fungi	d. Diatoms

SOLUTION

Kingdom	Example
i. Monera	a. Cyanobacteria
ii. Protista	b. Diatoms
iii. Plantae	c. Riccta
iv. Fungi	d. Rhizopus

Exercise | Q 10. A. | Page 18

Complete the following:
Plant-like Protista - _____

SOLUTION

Plant-like Protista - **Diatoms**

Exercise | Q 10. B. | Page 18
Complete the following:
_____ - Entamoeba

SOLUTION

Animal like Protista - Entamoeba