



1- Write briefly and draw about the following: (24 degrees)

- The structure of *Volvox*.
- Different shapes and arrangements of Bacteria.
- Scalariform conjugation of *Spirogyra*.
- The structure of *Rhizopus*.

Next questions, write your answer only in the answer sheet

2- Choose the correct answer: (8 degrees)

- Albugo* is a fungus.
 - Parasitic
 - Saprophytic
- Sexual reproduction in *Fucus* is..... type.
 - Isogamous
 - Oogamous
- Fungi are organisms.
 - Autotrophic
 - Heterotrophic
- Bacterial cells have, which used for attachment.
 - Flagella
 - Pilli
- In viruses, the nucleic acid enclosed in
 - Capsid
 - Cell wall
- Protista are organisms.
 - Eucaryotic
 - Procaryotic
- Heterocysts are the sites of Nitrogen fixation in
 - Nostoc*
 - Agaricus*
- is the most economically important unicellular fungi.
 - Mushroom
 - Yeast

3- Complete the missing words: (8 degrees)

- Bacteria reproduce asexually by
- Spirogyra* chloroplast hasshape.
- Viruses exhibit characters of bothand
- The chemical constituent of bacterial cell wall is
- In *Volvox*, the cells are responsible for asexual reproduction.
- Yeast multiply vegetatively by
- The cell wall of Diatoms are consists of two parts,.....and.....
- The mycelium of *Aspergillus* is, while in *Rhizopus* is

4- Put a mark of right or wrong: (8 degrees)

- Viruses are obligate parasites. ()
- Fungi defined as a non-vascular organisms. ()
- A monotrichous bacterial cell possesses a group of flagella. ()
- Penicillium* has unbranched conidiophore. ()
- The bacterial capsule protects the cell against dehydration. ()
- Algae defined as a non-chlorophyllous organisms. ()
- Viruses contain only a single kind of nucleic acids. ()
- Chlamydomonas* has two unequal flagella at its anterior end. ()

1- Write briefly and draw about the following: (24 degrees)

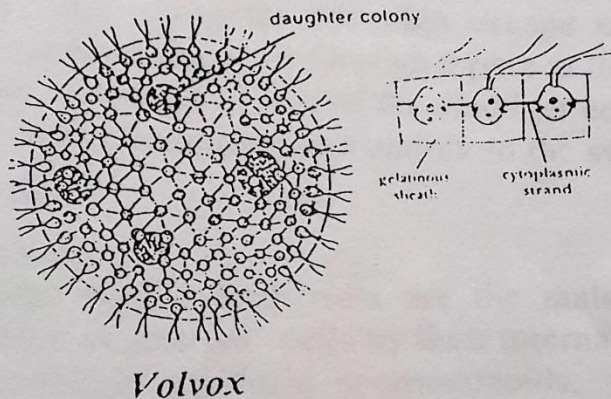
A-The structure of *Volvox*.

Volvox

Volvox represents the highly advanced/coenobial development among colonial members of chlorophyta. The colony forms a hollow sphere, its cells arranged peripherally and connected together by protoplasmic strands. The number of cells is so great that it could be easily seen by the naked eye as the head of small pin on glass slide in some cases. The cells constituting the colony range from 500 to 60,000 cells, these cells are of *sphaerella* type. *Volvox* shows division of labor between 4 types of cells

1-Somatic or vegetative cells

These are small cells, constitute the bulk of the colony. These cells are responsible for vegetative functions.



Volvox

2-Gonidial cells

The number of cells is limited of about 50 cells. These cells are specialized for asexual reproduction and can be distinguished from the early stages of coenobial development by their larger size. They can divide later to give a number of small somatic cells arranged in the form of daughter colonies. The resulting daughter colonies are embedded in between the somatic cells of the parent coenobia in early stages, but they gradually increase in size and followed by liberation of these daughter coenobia outside after rupturing of the parental coenobial wall.

3-Antheridial cells

The male sex organs.

4-Oogonial cells

→ The Female Sex Organs.

The female and male sexual organs are found in smaller number and are responsible for undergoing sexual reproduction.

B-Different shapes and arrangements of Bacteria.

Size, Shape and Measurements of Bacterial Cell

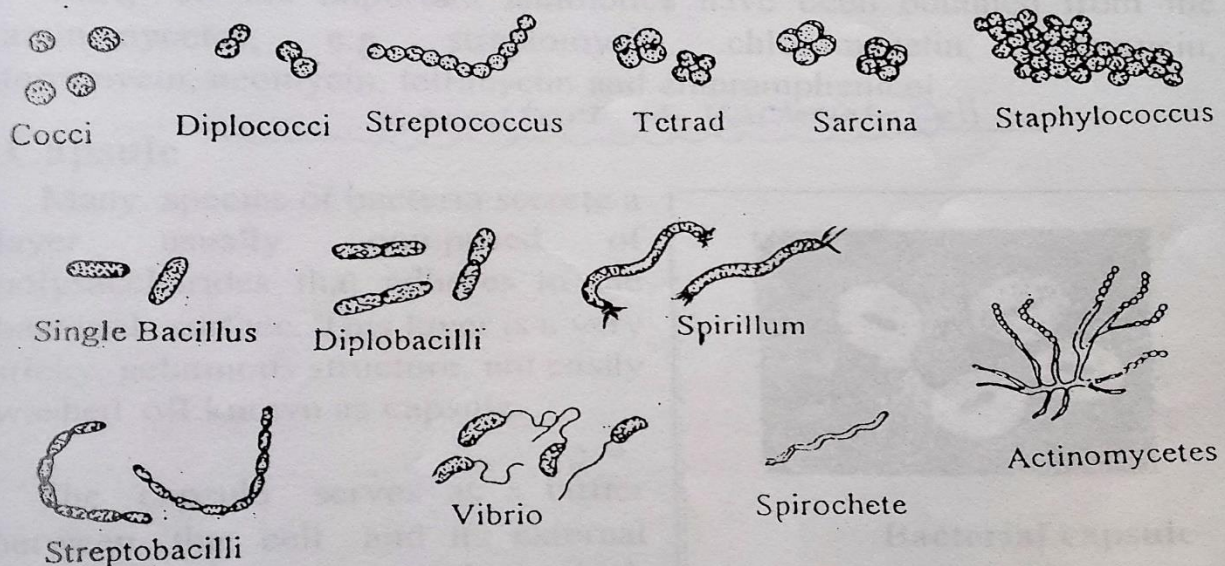
There are a great many sizes and shapes among bacteria. Most bacteria range from 0.2 – 2.0 μm in diameter and from 2 – 8 μm in length. They have four basic shapes; spherical **coccus** (plural, **cocci**, a term derived from the Greek kokkos, meaning berries), rod shaped bacillus (plural, **bacilli**, meaning little staff), and spiral.

Cocci. Cocci are approximately 0.5 μm in diameter. They are usually rounded but can be oval, elongated, or flattened on one side. When cocci divide to reproduce, the cells can remain attached to one another. Cocci that remain in pairs after dividing are called **diplococci**; e.g. gonorrhea and pneumonia. Those that divide and remain attached in chainlike patterns are called **streptococci**. Certain streptococci are involved in strep throat and tooth decay, but many are harmless enough to be used for the production of dairy products such as yoghurt. Those that divide in two planes and remain in groups of four are known as **tetrads**. Those that divide in three planes and remain attached in cubelike groups of eight are called **sarcinae**, an example of this type is *Micrococcus* sp., a common inhabitant of the skin. Those that divide in multiple planes and form grapelike clusters or broad sheets are called **staphylococci**, from staphyle, the Greek word for grape. A well known example, *Staphylococcus aureus*, is a wide spread of food poisoning as well as numerous skin infections, which is known as ‘staph’ infection. These group characteristics are frequently helpful in the identification of certain cocci.

Bacilli. In various species of bacteria, a bacillus may be as 20 μm or as 0.5 μm . Certain rods such as those that cause typhoid fever are slender; others such as the agents of anthrax are rectangular with square ends; still others such as diphtheria are club shaped. Most rods occur singly, but some may be arranged in pairs called, **diplobacilli**, but some form long chains called **streptobacilli**. The streptobacilli that causes rat bite fever is belonging to this type. Other forms called *Lactobacilli* are very

important in food industries, due to their ability to ferment sugars with the production of considerable amount of lactic acid, make it possible to use them in the production of dairy products.

Spiral. Bacteria have one or more twists; they are never straight. Bacteria that look like curved rods, that resemble commas under the microscope, and are called vibrios, e.g. the bacterium of cholera is typical to this shape. Others have a helical shape, like a corkscrew, and fairly rigid bodies. Yet another group of spirals is helical and flexible; they are called spirochaetes. Unlike the spirilla, which use whiplike external appendages called flagella to move, spirochaetes moves by



Different arrangements of bacteria

means of an axial filament, which resembles a flagellum but is contained under an external flexible sheath. The bacterium of syphilis is an example of a spirochaete.

Actinomycetes. Actinomycetes are filamentous bacteria, very common inhabitants of soil. Their morphology resembles that of the filamentous fungi. However, the filaments of actinomycetes consist of procaryotic cells with diameter much smaller than those of fungi. They are usually composed of branching threads about one micron in diameter. Some actinomycetes further resemble fungi by forming external asexual spores for reproduction called conidiospores or conidia. When the conidiospores laid on a suitable substrate, it is capable of germinating into new filaments. Knowledge about streptomycetes has advanced considerably because of their practical importance as producers of many effective antibiotics.

Most of the important antibiotics have been obtained from the actinomycetes; e.g. streptomycin, chloromycetin, aureomycin, terramycin, neomycin, tetracyclin and chloramphenicol.

C-Scalariform conjugation of *Spirogyra*.

Reproduction in *Spirogyra*

2-Sexual Reproduction:

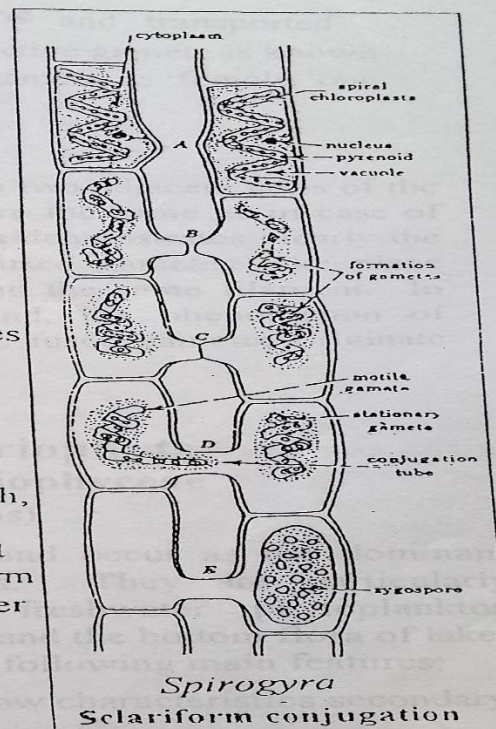
By gametes, a process known as conjugation. There are two types of conjugation, scalariform and lateral.

a) Sclariform Conjugation

Two filaments of the alga approach to each other, the contents of each cell contract forming gamete. In the same time arise from the two filaments opposite to each other two lateral outgrowths or extensions leading at last to the formation of tube called conjugation canal. The conjugation canals of the two filaments are at first

separated from each other by cross transverse septa. After a period, these septa will decay and dissolve to form only one passage binding the two filaments together. The gametes at that time had been

matured and begun to unite through the conjugation canal. Fusion takes place and zygote is formed which a thick wall and zygospore is produced. The green zygospores, which is usually ellipsoidal rarely ovoid becomes darker and is capable now resisting unfavorable conditions. The zygospore remains dormant for some time and during ripening the diploid nucleus divides meiotic division, three of the daughter nuclei dissolved and the fourth, one will germinate to form a new haploid filament. It is to be noted that the gametes are similar in size and form and thus called isogametes, which differ

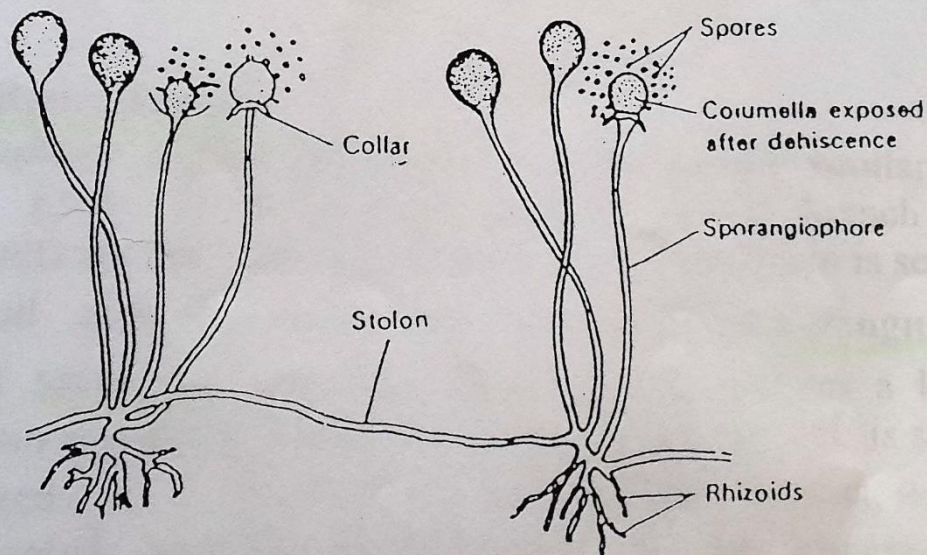


only in behaviour. One of them is active and transported from one filament to the other, the active gamete is known as the male gamete and the passive gamete as female one. The process called isogamous.

D-The structure of *Rhizopus*.

Rhizopus

The mycelium at first grows chiefly within the substratum which may be composed of various kinds of organic matter. After that, aerial hyphae develop so that the surface of the substratum become covered with a mass of hyphae. *Rhizopus* grows luxuriantly on bread and sweet potatoes, which can be utilized as media for the growth of laboratory cultures. The aerial mycelium produces **rhizoides** formed especially at points where it contacts a hard surface. The rhizoids adhere to the substratum and anchor the fungus securely and absorb nutrients. A hypha that connects two groups of rhizoids is called a stolon. The stolon grows out of the parent mycelium and strikes rhizoides at the tip into the substratum.



Vegetative growth in *Rhizopus*

2- Choose the correct answer: (8 degrees)

- 1- *Albugo* is a fungus.
a) **Parasitic** b) **Saprophytic**
- 2- Sexual reproduction in *Fucus* is..... type.
a) **Isogamous** b) **Oogamous**
- 3- Fungi are organisms.
a) **Autotrophic** b) **Heterotrophic**
- 4- Bacterial cells have, which used for attachment.
a) **Flagella** b) **Pilli**
- 5- In viruses, the nucleic acid enclosed in
a) **Capsid** b) **Cell wall**
- 6- Protista are organisms.
a) **Eucaryotic** b) **Procaryotic**
- 7- Heterocysts are the sites of Nitrogen fixation in
a) **Nostoc** b) **Agaricus**
- 8- is the most economically important unicellular fungi.
a) **Mushroom** b) **Yeast**

3- Complete the missing words: (8 degrees)

- 1- Bacteria reproduce asexually by **Binary fission**
- 2- *Spirogyra* chloroplast has **Spiral** shape.
- 3- Viruses exhibit characters of both **Living** and **Nonliving things**
- 4- The chemical constituent of bacterial cell wall is **Peptidoglycan**.
- 5- In *Volvox*, the **Gonidial** cells are responsible for asexual reproduction.
- 6- Yeast multiply vegetatively by **Budding**.
- 7- The cell wall of Diatoms consists of two parts **epitheca** and **hypotheca**
- 8- The mycelium of *Aspergillus* is septate, while in *Rhizopus* is **nonseptate**

4- Put a mark of right or wrong: (8 degrees)

- 1- Viruses are obligate parasites. (**Right**)
- 2- Fungi defined as a non-vascular organisms. (**Right**)
- 3- A monotrichous bacterial cell possesses a group of flagella. (**Wrong**)
- 4- *Penicillium* has unbranched conidiophore. (**Wrong**)
- 5- The bacterial capsule protects the cell against dehydration. (**Right**)
- 6- Algae defined as a non-chlorophyllous organisms. (**Wrong**)
- 7- Viruses contain only a single kind of nucleic acids. (**Right**)
- 8- *Chlamydomonas* has two unequal flagella at its anterior end. (**Wrong**)

Best wishes