

Inter (Part-I) 2018

Biology	Group-I	PAPER: I
Time: 20 Minutes	(OBJECTIVE TYPE)	Marks: 17

Note: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1- In mollusca, a blue respiratory pigment is present called:

- (a) Haemoglobin (b) Haemoerythrin
(c) Prothombin (d) Haemocyanin ✓

2- Mesosomes are internal extensions of:

- (a) Cell wall (b) Cell membrane ✓
(c) Golgi complex (d) Endoplasmic reticulum

3- Oxygen released during photosynthesis comes from:

- (a) Water ✓ (b) CO₂
(c) Glucose (d) Chlorophyll

4- Covalent bond between two monosaccharides is called:

- (a) Glycosidic bond ✓ (b) Peptide bond
(c) Hydrogen bond (d) Ester bond

5- Passive immunity is developed by injecting:

- (a) Vaccine (b) Serum
(c) Antiserum ✓ (d) Antibiotics

6- Parasitic fungi directly absorb nutrients from living host by:

- (a) Haustoria ✓ (b) Roots
(c) Rhizoids (d) Gametangia

7- De Duve discovered cell organelle:

- (a) Mitochondria (b) Lysosome ✓
(c) Plastids (d) Golgi complex

- 8- A group of similar cells that perform similar function is called:
 (a) Organ (b) Tissue ✓
 (c) System (d) Organelle
- 9- **Cartilaginous fishes contain scales:**
 (a) Placoid ✓ (b) Cycloid
 (c) Ganoid (d) Ctenoid
- 10- **During photorespiration, glycine is converted into serine in:**
 (a) Mitochondria ✓ (b) Golgi complex
 (c) Chloroplast (d) Ribosome
- 11- **In psilopsida, sporangia are produced at:**
 (a) Tips of branches ✓ (b) In the axils of branches
 (c) Margins of leaves (d) Axils of leaves
- 12- **Which one is not a viral disease:**
 (a) Cow pox (b) Mumps
 (c) Tetanus ✓ (d) Measles
- 13- **The total transpiration through cuticle is:**
 (a) 5 – 7% ✓ (b) 1 – 7%
 (c) 2 – 4% (d) 2 – 5%
- 14- **Amoeba moves and obtains food by means of:**
 (a) Flagella (b) Pseudopodia ✓
 (c) Flexing (d) Cilia
- 15- **Optimum pH for action of pancreatic lipase is:**
 (a) 3.00 (b) 5.00
 (c) 7.00 (d) 9.00 ✓
- 16- **Calvin cycle is also known as:**
 (a) C₃ pathway ✓ (b) C₂ pathway
 (c) C₄ pathway (d) C₅ pathway
- 17- **Organisms that live upon or within another organism are called:**
 (a) Predators (b) Pests
 (c) Parasites ✓ (d) Hosts

Inter (Part-I) 2018

Biology	Group-I	PAPER: I
Time: 2.40 Hours	(SUBJECTIVE TYPE)	Marks: 68

SECTION-I

2. Write short answers to any EIGHT (8) questions: 16

(i) Differentiate between anatomy and morphology.

Ans Anatomy:

The study of internal gross structure is called anatomy. It is the branch of biology.

Morphology:

It is the branch of biology. The study of formation and structure of living things is called morphology.

(ii) Define ecosystem with an example.

Ans A community together with its non-living surroundings is called ecosystem.

(iii) Differentiate between procariotique and eucariotique.

Ans The prokaryotes have only a limited number and type of organelles in their cytoplasm.

Eukaryotes are rich in number and include both membranous and double membranous organelles.

(iv) Differentiate between substrate and active site of enzymes.

Ans Substrate	Active site of enzyme
Every enzyme by virtue of its specificity recognizes and react with a special chemical substances called substrate.	Enzymes are composed of hundreds of amino acids joined together and coiled upon each other to form a structure. The catalytic activity is restricted to a small portion of the enzyme known as active site of enzyme.

and no true jaws. Abdomen may be segmented or un-segmented with or without appendages. Respiration is by gills or special structures called book lungs, excretion is by the Malpighian tubules. Eyes simple, sexes are separate. They are oviparous (lay eggs). No true metamorphosis e.g., scorpions, spiders, mites and ticks.

(ix) **Differentiate between gastropods and cephalopods.**

Ans **Gastropods:**

These are asymmetrical and their body is covered with usually coiled one piece shell. The animal can withdraw itself into the shell. Both aquatic and terrestrial species are included in this class.

Cephalopods:

The members of this class are bilaterally symmetrical with dorso-ventrally flattened body. All species are aquatic. The shell is much reduced and internal.

(x) **What is regeneration? Give its importance.**

Ans Regeneration, the ability to reform lost organs is common among echinoderms, starfish, sea cucumber, sea lily, brittle star and sea-urchin exhibit this characteristics.

(xi) **What is meant by parasexuality? Give its importance.**

Ans Despite absence of sexual reproduction, imperfect fungi show special kind of genetic recombination, called parasexuality in which portions of chromosomes of two nuclei lying in the same hypha are exchanged.

(xii) **Differentiate between conidiphores hyphae and coenocytic hyphae.**

Ans **Conidiphores hypha:**

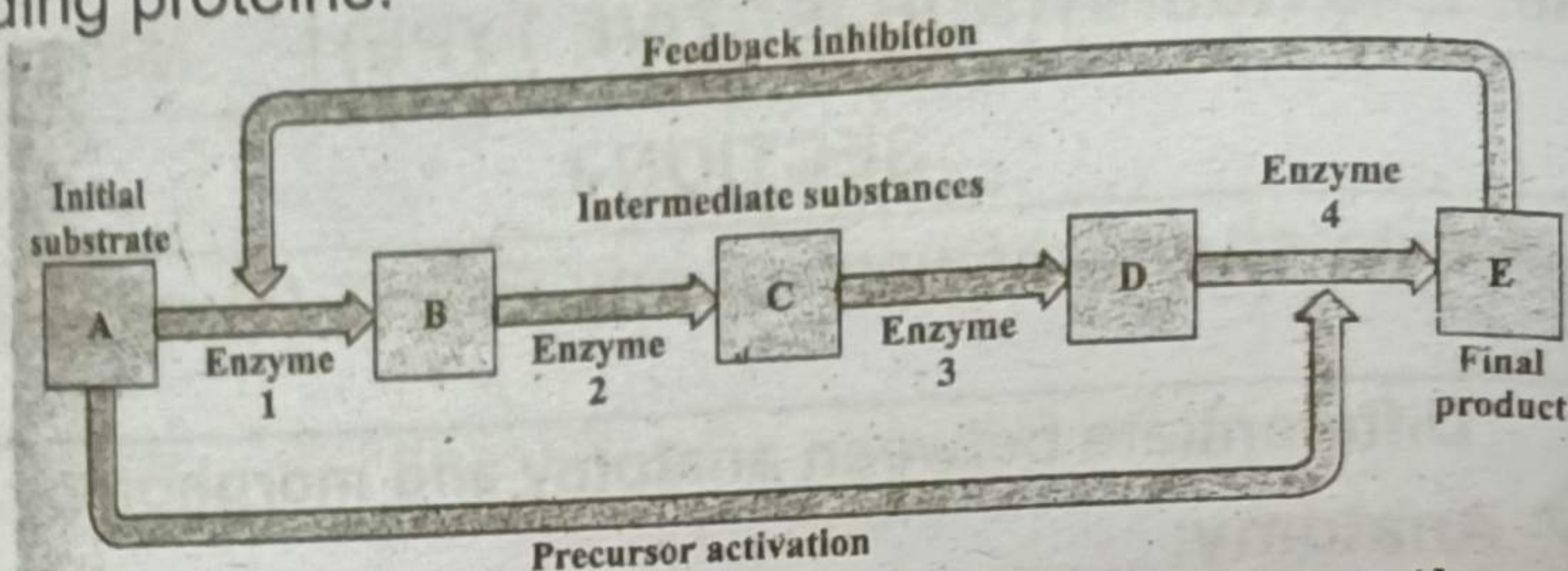
Conidia are non-motile, asexual spores which are cut off at the end of modified hyphae called conidiphores hypha.

Coenocytic hypha:

Such hyphae in which cytoplasm moves effectively, disturbing the materials throughout are called coenocytic hyphae.

(v) Define feedback inhibition of enzymes with diagram.

Ans A type of metabolic pathway control to regulates the rate at which cells synthesize amino acids and use them in building proteins.



(vi) What is induce fit model of enzyme action, who proposed it?

Ans On the basis of new evidences, Koshland (1959) proposed its modified form. This is known as "Induced Fit Model". He argued that when a substrate combines with an enzyme, it induces changes in the enzyme substrate. The change in structure enable the enzyme to perform its catalytic activity more effectively.

(vii) Differentiate between oligochaeta and polychaeta.

Ans **Oligochaeta:**

These animals have internal and external segmentation. Organs of locomotion are setae. Head region not prominent or distinct. They are hermaphrodite (bisexual).

Polychaeta:

These have a distinct head region with eyes and structure known as palps and tentacles. Sexes are usually separate. The organs of locomotion are parapodia.

(viii) What is meant by arachnida? give its two features.

Ans **Arachinda:**

Body has the anterior segments that are fused to form a combined cephalothorax, with a pair of appendages called chelicerae with claws, two pairs as pedipalps and four pairs of legs. There are no antennae

3. Write short answers to any EIGHT (8) questions: 16
- (i) Write down four postulates of germ theory of diseases by Robert Koch.

Ans Following are the four postulates of germ theory of diseases by Robert Koch:

1. A specific organism can always be found in association with a given disease.
2. The organism can be isolated and grown in pure culture in the laboratory.
3. The pure culture will produce the disease when inoculated into susceptible animal.
4. It is possible to recover the organism in pure culture from experimentally infected animal.

- (ii) Write four important features of algae.

Ans Following are the four important features of algae:

1. They are major producers of the aquatic ecosystem.
2. They play basic role in food chains and provide food and oxygen to other organisms.
3. Some algae such as kelps are source of food.
4. Many chemical substances are obtained from marine algae like Algin, Agar, carrageenan and antiseptics.

- (iii) What are diatoms? Write their importance.

Ans The cell wall of each diatom consists of two shells that overlap where they fit together, much like a petri dish. Silica is deposited in the shell, and this glass-like material is laid down in intricate patterns.

Importance:

Diatoms are the major producers in the aquatic (marine and freshwater) ecosystems because of their extremely large numbers. Diatoms are very important in aquatic food chains.

- (iv) What are the red tides? How they are formed?

Ans Dinoflagellates are known to have occasional population explosions or blooms. These blooms frequently colour the water orange, red or brown and are known as red tides.

(v) What are the apicomplexans?

Ans Apicomplexans are a large group of parasitic protozoa, some of which cause serious diseases such as malaria in humans.

(vi) What are the fronds?

Ans The class Filicineae contains seedless plants with foliar sporangia. The leaves are called fronds.

(vii) Write botanical name of two plants belong to family Solanaceae.

Ans Botanical name of two plants belong to family Solanaceae is given below:

1. *Solanum tuberosum* (Potato).
2. *Nicotiano tabacum* (Tobacco).

(viii) Write photolysis of water in photosynthesis.

Ans This hole is filled by the electrons which are extracted, by an enzyme, from water. This reaction splits a water molecule into two hydrogen ions and an oxygen atom, which immediately combines with another oxygen atom to form O_2 . This water splitting step of photosynthesis that release oxygen is called photolysis. The oxygen produced during photolysis is the main source of replenishment of atmospheric oxygen.

(ix) What is Z-scheme of phosphorylation?

Ans The path of electrons through the two photosystems during non-cyclic photophosphorylation is known as Z-scheme from its shape.

(x) Write the role of human pancreas in digestion.

Ans The pancreas is a vital digestive organ because it produces a variety of enzymes that break down all of the major food groups. These enzymes are secreted into the duodenum along with a high concentration of bicarbonate. Bicarbonate makes the pancreatic secretions alkaline in nature. This flow of alkaline fluid into the smaller intestine helps to neutralize the acidic chyme that comes from the

stomach. Neutralizing the acidic chyme provides a better environment for activation of the pancreatic enzymes.

(xi) **What are the piles?**

Ans Piles or haemorrhoids are masses of dilated, tortuous veins in the anorectal mucosa. These masses may sometimes start bleeding during bowel movements. Situation may aggravate when the patient suffers from constipation. The urge to defecate is depressed and it becomes difficult to expel the faeces.

(xii) **Differentiate between obligate parasite and facultative parasite.**

Ans

Obligate parasite

1. They can grow only on living host and cannot be grown on available defined growth culture medium.
2. They do not normally kill their host.

Facultative parasite

1. These can grow parasitically on their host as well as in artificial growth medium and saprophytically.
2. They frequently kill their host.

4. Write short answers to any SIX (6) questions: 12

(i) **Give functions of smooth endoplasmic reticulum.**

Ans Smooth endoplasmic reticulum helps in metabolism of different types of molecules. It helps to detoxify the harmful drugs. In muscle cells and nerve cells, smooth endoplasmic reticulum is responsible for transmission of impulses. Smooth endoplasmic reticulum plays an important role in the transport of materials from one part of cell to the other.

(ii) **What is nucleolus? Give its function.**

Ans Nucleolus is darkly stained body within the nucleus and is without any membranous boundary. There may be one or more nucleoli in the nucleus.

Functions:

1. The ribosomal RNA is synthesized and stored in nucleolus.

2. Ribosomes are formed in the nucleolus and then exported to the cytoplasm through nucleus pores.

(iii) Define heat of vaporization. Give heat of vaporization of water.

Ans Water absorbs much heat as it changes from liquid to gas. Heat of vaporization is expressed as calories absorbed per gram vaporized. The specific heat of vaporization of water is 574 Kcal/kg, which plays an important role in the regulation of heat produced by oxidation. It also provides cooling effect to plants when water is transpired, or to animals when water is perspired. Evaporation of only two ml out of one liter of water, lowers the temperature of the remaining 998 ml by 1°C .

(iv) What is imbibition?

Ans Imbibition is the force in ascent of sap. Water molecules move along the cell walls of xylem vessels due to imbibition. The cell wall components, especially cellulose, pectin and lignin can take up water and increase in volume but the components do not dissolve in water, this is called imbibition.

(v) What is honey dew? Give its composition.

Ans The composition of materials flowing in phloem has been studied by using aphids -- the insects which are phloem feeders. These insects insert their stylets into stem or leaf and extend them to puncture a sieve tube. The pressure in the sieve tube cell forces sap through aphid's digestive tract and, out its posterior end as droplets called "honey dew". The composition of honey dew has revealed that it contains 10-25% dry matter 90% or more of which is sucrose. Nitrogenous compounds are about 1%.

(vi) Give percentage of CO_2 in arterial and venous blood.

Ans It has been found that arterial blood contains about 50 ml of CO_2 per 100 ml of blood whereas venous blood

has 54 ml of CO_2 per 100 ml of blood. In this way, each 100 ml of blood takes up just 4 ml of CO_2 as it passes through the tissues and gives off 4 ml of CO_2 per 100 ml of blood as it passes through the lungs.

(vii) What are the important factors which affect the capacity of haemoglobin to combine with oxygen?

Ans The pH of blood also influences the degree to which oxygen binds to haemoglobin. As the pH of the blood declines, the amount of oxygen bound to haemoglobin also declines. This occurs because decreased pH results from an increase in hydrogen ions, and the hydrogen ions combine with the protein part of the haemoglobin molecules, causing a decrease in the ability of haemoglobin to bind oxygen. Conversely, an increase in blood pH results in an increased ability of haemoglobin to bind oxygen.

(viii) Write different ways of respiration in frog.

Ans Here are such types of respiration in frog:

1. Cutaneous respiration
2. Pulmonary respiration

(ix) What is larynx or voice box?

Ans The larynx or voice box is a complex cartilaginous structure surrounding the upper end of the trachea. One of the cartilages, the epiglottis has a muscularly controlled, hinge-like action and serves as a lid which automatically covers the opening of the larynx during the act of swallowing, so as to prevent the entry of food or liquid into the larynx.

SECTION-II

NOTE: Attempt any Three (3) questions.

Q.5.(a) Write a note on population and community level of biological organization.

Ans **Population:**

A population is a group of living organisms of the same species located in the same place at the same time.

Examples are the number of rats in a field of rice, the number of students in your biology class, or human population in a city.

Population is a higher level of biological organization than organism (whole) because here a group of organisms of the same species is involved. This level of organization has its own attributes which come into being by living together of a group of organisms of the same species.

Some of these attributes are gene frequency, gene flow, age distribution, population density, population pressure, etc. All these are new parameters, which have appeared due to population of an organism. You will study them in detail in population ecology.

Community:

Populations of different species (plants and animals) living in the same habitat form a community. Communities are dynamic collections of organisms, in which one population may increase and others may decrease due to fluctuation in abiotic factors. Some communities are complex and well-interrelated, other communities may be simple. In a simple community, any change can have drastic and long-lasting effects.

The foregoing account makes it clear that an organism can be studied at different levels of organization. It can be studied at subatomic, atomic, molecular, macromolecular, organelle, cell, tissue, organ and organ system level. We can also look at it as an individual, as a part of population of similar individuals, as a part of a community that includes other populations and a part of community of an ecosystem which includes abiotic factors as well as living organisms.

The organisms, interaction can take many shapes. It may be predation, parasitism, commensalism, mutualism and competition.

(b) Discuss two main types of immunity.

(4)

Ans Immunity:

The capacity to recognize the intrusion or any material foreign to the body and to mobilize cells and cell products to help remove the particular sort of foreign material with greater speed and effectiveness is called immunity.

There are two types of immunity:

(i) Active Immunity:

The use of vaccines, which stimulate the production of antibodies in the body, and making a person immune against the disease or infection, is called active immunity.

But this active immunity has been achieved by artificially introducing antigens in the body, so it is called artificially induced active immunity.

When a person is exposed to an infection (antigen) -- becomes ill, and in most cases survives, then this immunity, developed against that disease is called naturally induced immunity or auto immune response.

(ii) Passive immunity:

In contrast to active immunity, in which case antigens are introduced to stimulate the production of antibodies, by artificial or natural method; antibodies are injected in the form of antisera, to make a person immune against a disease, this is called passive immunity.

In body, antigen -- antibody complexes are formed which are taken up by phagocytes and destroyed. The patient is spared the complications (or possibly death) caused by the infection or venom.

Passive immunity response is immediate, but not long-lasting. Because no time is taken for the production of sufficient level of antibodies (as antibodies are being injected) and after the level of antibodies is reduced or they are used up -- No more antibodies production is there.

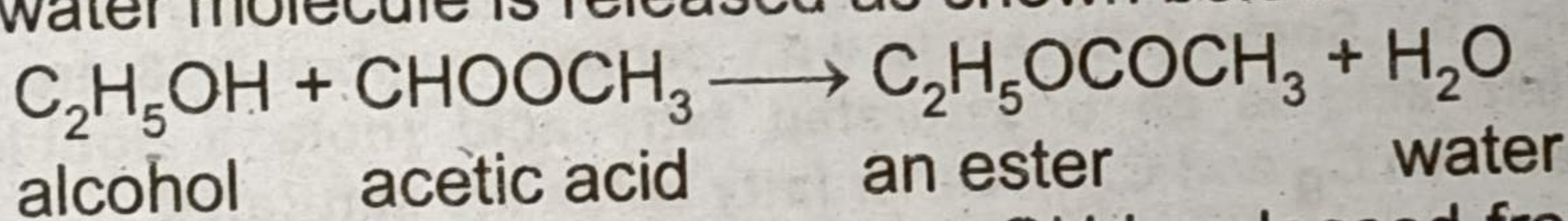
The method of passive immunization is used to combat active infections of tetanus, infectious hepatitis, rabies, snake-bite venom, etc. In the case of snake-bite venom, passive immunity is produced by the antitoxins – so, the serum is called antivenom serum.

Q.6.(a) Give an account of acylglycerols.

(4)

Ans **Acylglycerols:**

Acylglycerols are composed of glycerol and fatty acids, see (Fig. (a)). The most widely spread acyl glycerol is triacyl glycerol, also called triglycerides or neutral lipids. Chemically, acylglycerols can be defined as esters of fatty acids and alcohol. An ester is the compound produced as the result of a chemical reaction of an alcohol with an acid and a water molecule is released as shown below:



As indicated by dotted squares, OH is released from alcohol and H from an acid, H and OH combine and form a water molecule. Fatty acids are one of the most important components of triglycerides.

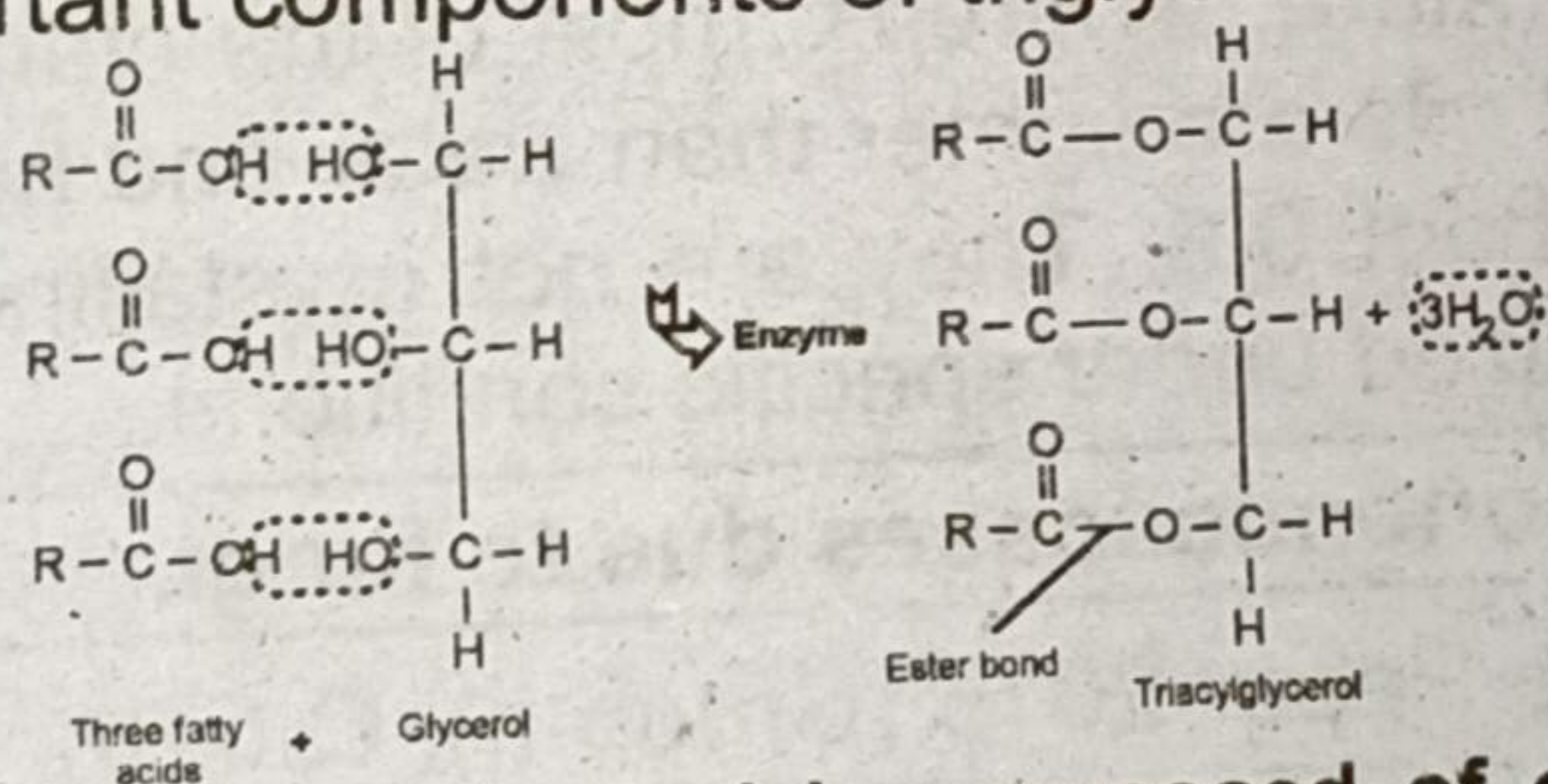


Fig. (a) Triacylglycerol is composed of one glycerol and three fatty acids molecules.

Fatty acids contain even numbers (2–30) of carbon atoms in straight chain attached with hydrogen and having an acidic group COOH (carboxylic group). They may contain to double bond (saturated fatty acids) or up to 6 double bonds (unsaturated fatty acids). In animal, the fatty acids are straight chains (Fig. (b)), while in plants, these may be branched or ringed. Solubility of fatty acids in organic solvents and their melting points increase with increasing

number of carbon atoms in chain. Palmitic acid (C_{16}) is much more soluble in organic solvent than butyric acid (C_4). The melting point of palmitic acid is 63.1°C as against -8°C for butyric acid.

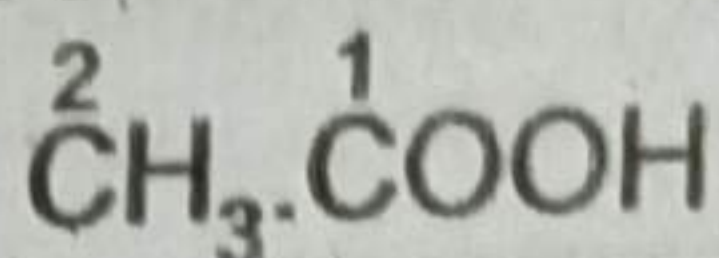
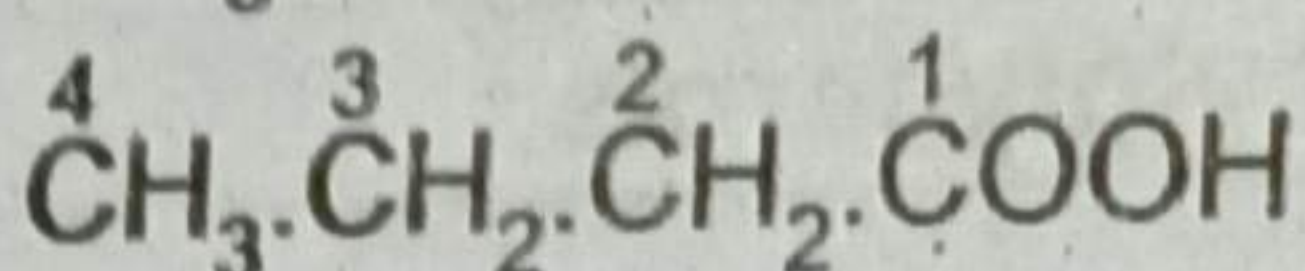
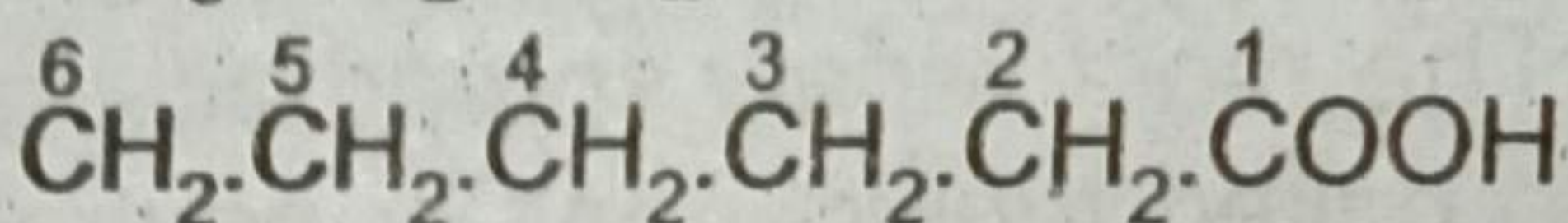
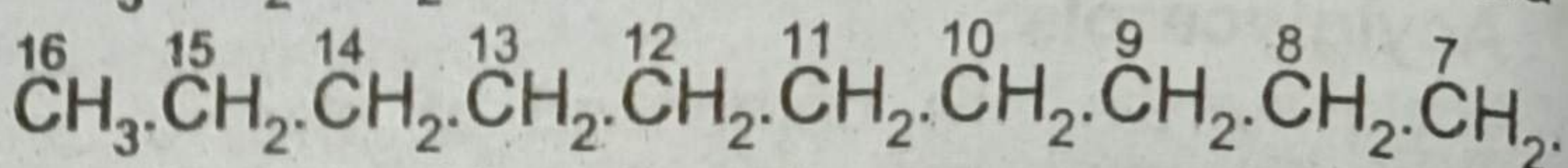
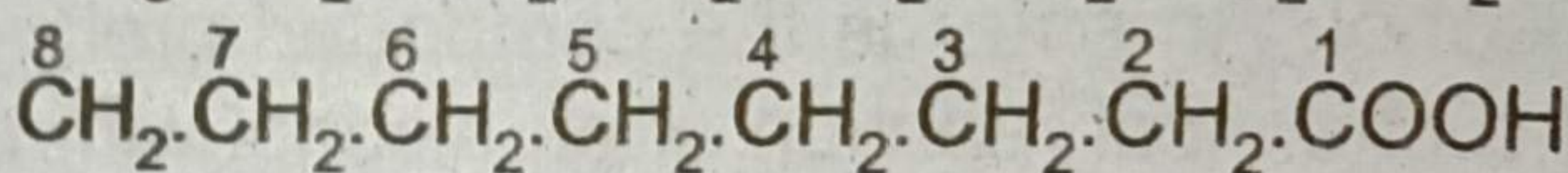
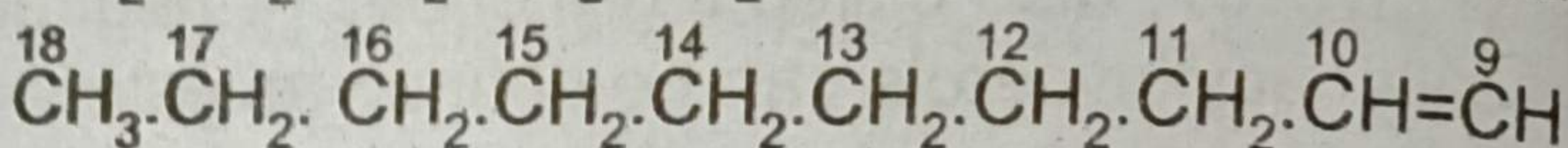
Acetic Acid (C_2)Butyric Acid (C_4)Palmitic Acid (C_{16})Oleic Acid (C_{18})

Fig. (b): Some fatty acids with carbon number 2-18 are shown. Oleic acid is an unsaturated fatty acid (note a double bond between C_9 and C_{10}). Other fatty acids are saturated.

Fats containing unsaturated fatty acids are usually liquid at room temperature and are said to be oils. Fats containing saturated fatty acids are solids. Animal fats are solid at room temperature, whereas, most of the plant fats are liquids. Fats and oils are lighter than water and have a specific gravity of about 0.8. They are not crystalline but some can be crystallized under specific conditions.

(b) Write down economic losses due to fungi. (4)

Ans For Answer see Paper 2015 (Group-II), Q.5.(b).

Q.7.(a) Define cell membrane. Explain its functions. (4)

Ans **Cell Membrane:**

Just beneath the cell wall is the cell membrane or plasma membrane. It is very thin, flexible and completely surrounds the cytoplasm. Plasma membrane is very delicate in nature, any damage to it results in death of the organism. Bacterial membranes differ from eukaryotic membranes in lacking sterols such as cholesterol.

Cell membrane regulates the transport of proteins, nutrients, sugar and electrons or other metabolites. The plasma membranes of bacteria also contain enzymes for respiratory metabolism.

(b) Write a note on digestion in amoeba. (4)

Ans For Answer see Paper 2015 (Group-I), Q.7.(b).

Q.8.(a) Write a note on smallpox and polio. (4)

Ans **Smallpox:**

Smallpox, which is caused by pox viruses (the DNA enveloped virus) is an ancient disease that is known to have occurred as epidemic in China as early as the twelfth century B.C. Until the early twentieth century, smallpox was a common disease throughout the world. In smallpox, raised fluid-filled vesicles are formed on the body which become pustules later on and form pitted scars, the pocks. By 1950s, immunization and other control measures had largely decreased the danger. But it is still present in the Third World countries, where many people are affected. In 1980, it was declared by World Health Organization that smallpox has been eradicated from the world.

Polio:

Poliomyelites, caused by polio virus, is found all over the world. It occurs mostly in childhood. The age at which primary infection occurs varies with social and economic factors. The polio-viruses are the smallest known viruses and contain RNA in spherical capsid.

(b) Sketch Krebs Cycle. (No description) (4)

Ans For Answer see Paper 2016 (Group-II), Q.8.(b).

Q.9.(a) Describe structure and reproduction in Nostoc. (4)

Ans Nostoc is common as terrestrial and subaerial cyanobacterium. It is widely distributed in alkaline soils

and on moist rocks and cliffs. Nostoc forms a jelly-like mass in which numerous filaments are embedded.

Structure:

Trichomes are unbranched and appear beaded. Individual cells are mostly spherical but sometimes barrel shaped or cylindrical.

All cells in trichome are mostly similar in structure but at intervals are found slightly large, round, light yellowish thick-walled cells called as heterocysts. Trichome mostly breaks near heterocyst and forms hormogonia and thus help in fragmentation.

Reproduction:

There is no sexual reproduction, but it reproduces asexually by formation of hormogonia. Hormogonia are formed when filament break at different points into smaller pieces. This is due to death and decay of an ordinary cell or the heterocyst may serve as a breaking point. Reproduction can also be due to akinete formation. Akinetes are thick walled, enlarged vegetative cells which accumulate food and become resting cells. On arrival of favourable conditions, they form normal vegetative cell.

(b) Discuss evolution of leaf.

(4)

Ans Evolution of Leaf:

Early vascular land plants did not have true leaves or roots. They were small in size, with dichotomously branched erect smooth aerial parts and equally strong subterranean anchoring and absorptive rhizome.

Cooksonia had the same structural layout *i.e.*, naked stem without leaves. Such plants started to form leaves as small scale-like outgrowths. These outgrowths were not supplied with vascular tissues, therefore, they were not regarded as true leaves. Lycopods were the first plants that formed the true leaves and roots.

However, in lycopods (e.g., *Lycopodium*), the leaves are small in size. Each leaf has a single undivided vein (vascular supply). Such a leaf is called microphyll.

Large leaves having divided veins and veinlets with an expanded leaf blade or lamina are known as megaphylls. Megaphylls are characteristic for ferns and seed plants. It is suggested that evolution of megaphylls started from a dichotomous branching system in some primitive psilopsids, approximately 350 million years ago. It is assumed that evolution of a megaphyll included series of successive evolutionary steps which are as follows:

(i) Overtopping:

The dichotomously branched aerial portion of the stem showed unequal branching. Some branches remained short, while others grew and expanded at a much faster pace. All these branches grew in different planes. Such an unequal development of various branches is called overtopping.

(ii) Planation:

Next important step was the arrangement of unequal dichotomies in one plane. This process is termed as planation.

(iii) Fusion/Webbing:

Overtopping and planation was followed by a process known as fusion or webbing. The space between the overtopped dichotomous branches was occupied by a sheet of parenchyma cells which connected these branches forming a flat lamina or leaf blade type of structure, having many dichotomously branched veins.

During the course of evolution, fusion of the vascular strands resulted in net or reticulate venation pattern. The process of evolution of leaf was very slow and gradual, which completed in more than 15-20 million years.