

Model Paper - II

BIOLOGY

I PUC

Time: 3 Hrs

Max. Marks: 70

General Instructions:

- i) All parts are compulsory.
- ii) Answers without relevant diagram / figure/ wherever necessary will not carry any marks.

PART – A

I. Answer the following questions in one word or one sentence each: 10 x 1 = 10

1. Any classification group, category or rank is called a taxon.
2. Upper epidermis of monocot leaf.
3. If the flower can be divided into two similar halves along any vertical plane, it is known as actinomorphic symmetry
4. It is the loss of chlorophyll leading to yellowing of leaves
5. Solute potential is the amount by which water potential is reduced due to the addition of solute particles
6. Goblet cells
7. Virchow
8. Melatonin
9. Chitin
10. It is a condition in which food is not properly digested leading to a feeling of fullness.

PART – B

II. Answer any FIVE of the following questions in 3 to 5 sentences each: 5 x 2 = 10

11. a) Class : Psilopsida
b) Class : Lycopsida
c) Class : Sphenopsida
d) Class : Pteropsida
12. a) slime moulds are saprophytic protists
b) The body moves along decaying twigs and leaves enquiring organic matter
c) During favorable conditions, they form an aggregation called **plasmodium** which may grow and spread over several feet.
d) During unfavourable conditions, the plasmodium differentiates and forms fruiting bodies bearing spores
13. a) Solanaceae b) Fabaceae
14. a) The cells are arranged compactly, without intercellular spaces
b) Epithelial cells always rest on the basement membrane composed of fine fibers and non living protein polysaccharide material
c) The cells are arranged in the form of a continuous layer or sheet. Such a sheet may cover the external surface of an organ or internal cavity
d) The cells may be grouped as tubes or follicles to produce glands
e) Epithelial tissues are avascular
15. Pigments, Alkaloids (Morphine, codeine) Terpenoids and Essential oils

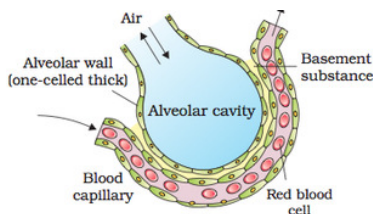
16. a) It is present in limbs, neck, abdomen etc.
b) The fibres are elongated and cylindrical with blunt ends. They are parallel to one another and form bundles
c) Each fibre is covered by a tough membrane called sarcolemma
d) Each fibre contains many nuclei (multinucleated) and they are peripherally scattered below the sarcolemma
e) The cytoplasm is called sarcoplasm and it shows a characteristic dark and light bands in regular alternation
f) The fibres show rapid contractions and controlled by will, hence are called voluntary muscles. They suffer fatigue
17. Actin and myosin
18. If cambium is present between xylem and phloem which posses the ability to form secondary xylem and phloem tissues, it is regarded as open vascular bundle where as if cambium is absent and do not have the capacity to forms secondary tissues is known as closed vascular bundle.

PART – C

III. Answer any FIVE of the following:

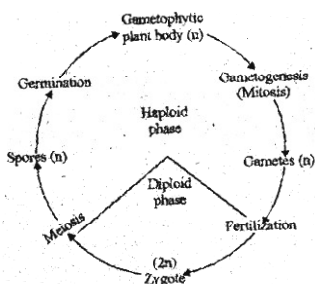
5 x 3 = 15

19.



20. a) Hypogynous flower: A flower possessing a superior ovary
b) Phyllotaxy: The mode of arrangement of leaves on the stem axis is known as phyllotaxy
c) Veination: The mode of arrangement of veins and vein lets is called venation
21. a) Vomiting : It is the ejection of stomach contents through the mouth
b) Diarrhoea : The abnormal frequency of bowel movement and increased liquidity of the faecal discharges is known as diarrhoea.
22. 1) **Lag phase**: This is the initial stage where the growth rate is very slow. But it gradually increases with the time
2) **Log phase**: In this phase, the rate of growth is very rapid. The plant shows high rate of growth, and reaches maximum height. Hence this phase is called exponential phase or grand period of growth
3) **Steady phase or stationary phase**: this is the last phase in which plants shows no growth. Therefore the growth curve becomes almost horizontal.
23. 1) Form blooms in polluted water bodies
2) Some of these organism can fix atmospheric nitrogen. In specialised cells called heterocyst's
3) Form symbiotic association with higher plants where they are responsible for biological Nitrogen fixation.

24.



- 1) The dominant phase in the life cycle is a free-living gametophyte (haploid)
- 2) The diploid phase is represented only by the single –celled zygote
- 3) The zygote undergoes meiosis (zygotic meiosis) and forms haploid spores which germinates to form the gametophyte. Eg spirogyra, chlamydomonas etc

25. Homopolymers are made up of only one type of monosaccharide. Eg , cellulose, starch
Heteropolymers are made up of different types of monosaccharides. Eg, chitin
26. The first step of anaerobic respiration is glycolysis, in which glucose is incompletely oxidised to 2 pyruvic acid molecules with 2 ATP and 2NADH₂ formed as byproducts. Pyruvic acid formed is used for alcoholic fermentation.
In alcoholic fermentation, the pyruvic acid is first decarboxylated to acetaldehyde liberating CO₂. Later acetaldehyde is reduced to ethyl alcohol by NADH₂ of glycolysis

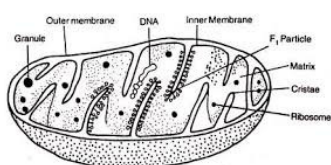
PART – D

IV. Answer any FOUR of the following:

4x 5 =20

27. 1) Birds are homeothermic (warm blooded) animals
2) Body is body shaped and is adapted in such a way as to offer the least resistance while flying
3) Body is differentiated into a head, long neck, a trunk and a short tail
4) Body is covered by feathers, which provide insulation
5) Forelimbs are modified into wings for flight. Wings are provided with feathers, which are bad conductors of heat
6) The hind limbs are shifted forwards to balance the body while walking. They are variously modified for perching, walking, running, swimming etc.
7) Endoskeleton is fully ossified(bony). Bones are tubular and hollow and have air cavities or air sacs (pneumatic bones)
8) Digestive system is complete
9) Respiration takes place with the help of lungs, which are spongy
10) There is a voice box or syrinx near the junction of trachea and bronchi, which is responsible for the production of sound
11) Nervous system is well developed with 12 pairs of cranial nerves
12) Heart is completely four chambered. There is a separation of pure and impure blood, RBC are nucleated
13) Sexes are separated, tests are paired. In female only the left ovary, and oviduct is present.
14) Fertilization is internal
15) Development is direct

28.



It is present in eukaryotes except mammalian RBC, and absent in prokaryotes. Its shape is oval or sausage. Its number per cell depends on the metabolic state of the cell.

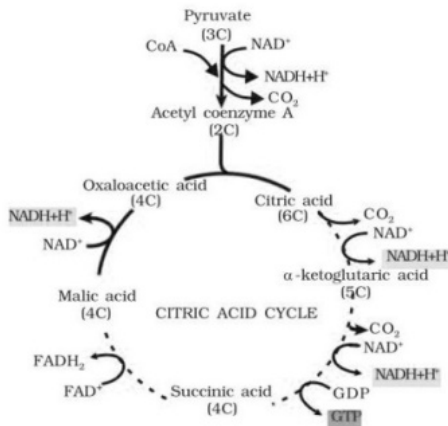
Structure: The mitochondria are bounded by two lipoprotein unit membranes namely outer membrane and inner membrane. In between them, lies perimitochondrial matrix containing water, minerals and enzymes

Outer membrane is smooth and unfolded while the inner membrane is folded and it procures inward finger like process called cristae. Along the inner surface of the inner membrane, there are numerous tiny tadpole like structures called **elementary particles** or **F₁ particles**, **Racker's particles** or **oxysomes**. F₁ particles contains basal piece, stalk and head. Sites of ATPase is between adjacent elementary particles. The inner membrane contains electron transport system. it is made up of chain of co-enzymes in the order of NAD, FAD, cytochrome B, cyt A, cyt A3. The inner space of mitochondria is filled with a dense fluid called mitochondria matrix containing water, proteins, lipids, all enzymes of Kreb's cycle, circular DNA and 70s ribosome's

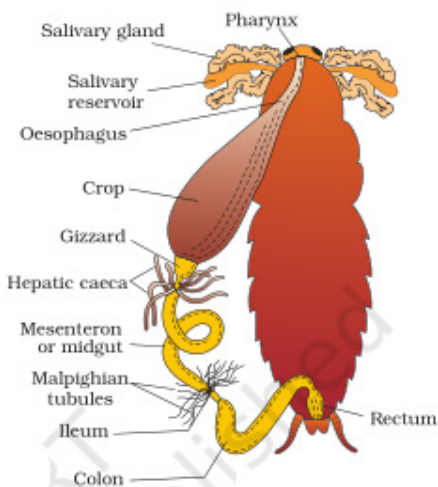
Functions:

- Mitochondria are the centers of aerobic respiration
- They are the sites of synthesis and storage of energy as ATP. Hence, called power house of the cell

29.



30.



31. a) First the substrate binds to the active site of the enzyme fitting into the active site
- b) The binding of the substrate induces the enzyme to alter its shape, fitting more tightly around the substrate.
- c) The active site of the enzyme, now in close proximity of the substrate breaks the chemical bonds of the substrate and the new enzyme-product complex is formed
- d) The enzyme releases the products of the reaction and the free enzyme is ready to bind to another molecule of the substrate and run through the catalytic cycle again.
32. a) Auxins can stimulate cell division, cell elongation and cell maturation
- b) It promotes Apical dominance
- c) It initiates Root formation
- d) Can promote parthenocarpy
- e) Prevent premature fall of flowers, buds, and leaves
- f) 2, 4D, and 2, 4, 5T are used as selective weedicides
- g) Promote phototropic and hydrotropic movements
- h) Promote xylem differentiation

V. Answer any Three of the following:

33. The accepted mechanism used for the translocation of sugars from source to sink is called the pressure flow hypothesis. The glucose prepared by photosynthesis is converted to sucrose and is then moved in the form of sucrose solution into companion cells and into sieve tube cells by active transport. This loading creates hypertonic condition in the phloem and water in the adjacent xylem moves into the phloem by osmosis. As osmotic pressure builds up the phloem sap will move to areas of lower pressure. Again by transport sucrose is transported out of phloem sap into the cells where it is used to convert into energy, starch or cellulose
34. a) The mechanism of blood clotting is explained by various theories out of these 'Best and Taylors' theory is one. According to this theory four factors are responsible for blood clotting.
- 1) **Prothrombin:** produced by the liver and present in plasma
 - 2) **Thromboplastin:** An enzyme released from damaged tissues, present in the body tissues
 - 3) **Calcium ions:** Present in the plasma of the blood
 - 4) **Fibrinogen:** Produced by the liver and present in plasma

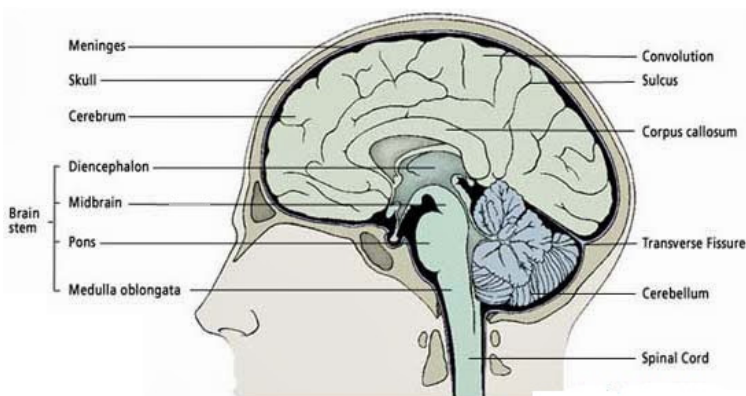
Chemical events leading to the formation of blood clot as suggested by 'Best and Taylor's' theory can be represented as follows

Prothrombin $\rightarrow$ Thrombin (Active)

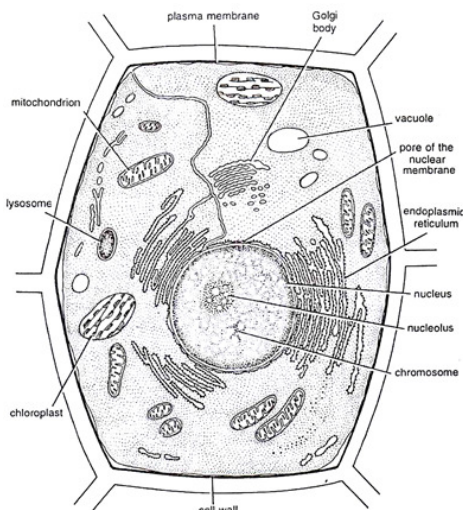
Fibrinogen (soluble) $\xrightarrow{\text{Thrombin}}$ fibrin (insoluble)

The reaction shown above indicates that the inactive Prothrombin is converted into active thrombin by the catalytic activity of enzyme Thromboplastin in the presence of Ca^{2+} . The activated thrombin reacts with soluble fibrinogen, resulting in the formation of insoluble fibrin. The fibrin threads form a mesh like network in which the blood components get entangled and results in blood clot and thus prevents bleeding.

35.



36.



37. a) Simple epithelium: Simple epithelium is further classified into

- i) Squamous epithelium
- ii) Columnar epithelium
- iii) Cuboidal epithelium
- iv) Ciliated epithelium
- v) Glandular epithelium

i) Squamous epithelium:

- 1) It occurs in the skin of vertebrates, alveoli of lungs, the mouth cavity, etc.
- 2) The cells are nearly hexagonal, flat and plate like.
- 3) A spherical or oval nucleus is found at the cell centre
- 4) The cells are closely fitted without intercellular space. Hence look like a mosaic pavement.

Because of this squamous epithelium is also called **pavement epithelium**

ii) Columnar epithelium

- 1) It occurs in the mucosa layer of stomach and intestine
- 2) The cells are elongated and pillar like. The lower ends are narrow and upper ends are broad
- 3) The nucleus is oval and basal and cytoplasm is granular
- 4) Cells are lodged over a basement membrane. Intercellular spaces are present at the basal region of the cells
- 5) The free surface of the cells may be smooth or branched to form microvilli

iii) Cuboidal epithelium

- 1) Cuboidal epithelium occurs in organs like thyroid, kidney, etc
- 2) The cells are cuboidal in shape with central spherical nucleus
- 3) These cells are lodged over basement membrane without intercellular spaces

iv) Ciliated epithelium

- 1) It occurs in the trachea of the lungs and the urinogenital ducts(oviduct, ureter)
- 2) The cells are elongated and pillar like
- 3) The lower end of the cell is attached to basement membrane and the upper end is free. The upper border bears hair like cilia