MODEL PAPER – I
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.

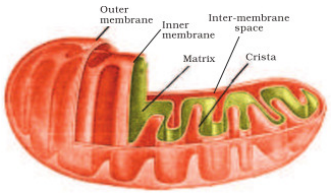
PART – A

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

1. Herbarium is defined as a collection of plants that have been dried, pressed and preserved on sheets. These sheets are arranged in accordance with any accepted system of classification.
2. The arrangement of ovules within the ovary on a fertile tissue.
3. Apical meristem found at stem tip and root tip divide to increase length of plant organs, therefore it is called primary meristem.
4. Tonoplast.
5. Division of cytoplasm resulting in formation of daughter cells.
6. A solution whose solute concentration is more than that of cell sap is known as hypertonic solution.
7. Hydroponics is technique of growing plants to maturity in a defined nutrient solution and in the complete absence of soil.
8. It is a chronic disorder in which alveolar walls are damaged due to which respectively surface is decreased.
9. 'O' group
10. Nephrons

PART – B

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

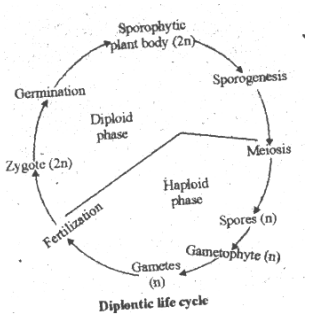
11. Viroids are infectious free RNA molecules. Potato spindle tuber disease.
12. a) Comprise of primitive multicelluar animals and have cellular level of organisation.
    b) Posses water canal system for food capture, respiration and removal of wastes
    c) Body is supported by a skeleton made up of special sponging fibres or silica or calcium cabonate
    d) Asexual reproduction by fragmentation and sexual reproduction by formation of gametes. Both the gametes are produced in the same organism.
13. Simple epithelium is composed of a single layer of cells and functions as a lining for body cavities, ducts and tubes. Compound epithelium consists of two or more cell layers and has protective function.
14. 

15. Growth can be defined as an irreversible, permanent increase in size of an organ or its parts or even of an individual cell.
    Phases of growth are:
    (a) Meristematic phase.
    (b) Elongation phase
    (c) Maturation phase
16. a) Physical solution in blood plasma (as carbonic acid) 7%
    b) As bicarbonates 70%
    c) As carbamino haemoglobin = 23%
17. Animals which excrete ammonia as nitrogenous waste products are called ammonotelic animals.
    Ex : bony fishes, aquatic invertebrates
18. Actin and Myosin

PART – C

III. Answer any FIVE of the following: **5 x 3 = 15**

19. Naming of living organisms by scientific name universally by using two names namely Generic name and species name.
    (1) Scientific names are generally written in Latin or derived from Latin irrespective of their origin
    (2) The scientific names are written in italics or underlined.
20. Pigments vary in different classes of algae, theses is the basis for classification
    a) Class : Chlorophyceae: - Chlorophyll a, b
    b) Class : Phaeophyceae – Chlorophyll a, c fucoxanthin
    c) Class : Rhodophyceae – Chlorophyll a, d, phycoery thrin
21.



Diplontic life cycle

- The dominant phase in the life cycle is the independent sporophytic plant
- Meiosis occurs in the spore mother cells during spore formation and the gametophyte is short – lived and is dependent on the sporophyte
  Ex : Fucus (brown alga), gymnosperms and angiosperms.

22. a) Gap 1 phase
    b) Synthetic phase
    c) Gap 2 phase
23. a) Initiate rooting in stem cuttings
    b) Auxins promote flowering ex: in pineapples
    c) The auxin produced at shoot tip inhibits the growth of lateral buds
24. a) **Digestion in the mouth**: The salivary amylase or ptyalin converts starch and glycogen into maltose units.

$$\text{Starch or Glycogen + Water} \xrightarrow[pH\ 6.8\ to\ 7.2]{\text{Salivary amylase}} \text{Maltose units}$$

    b) **Digestion in intestine**: Pancreatic juice : Carbohydrase secreted by pancreas is called pancreatic amylase. It converts starch and glycogen into maltose units

$$\text{Starch or Glycogen} \xrightarrow[pH\ 7.1-8.2]{\textit{Pancreatic amylase}} \text{Maltose units}$$

    Intestinal Juice : It consists of three types of Carbohydrase.
    Maltase : Maltase catalyses hydrolysis of maltose (disaccharide) into glucose units (monosaccharides).

$$\textbf{Maltase :} \xrightarrow[pH\ 7.1\ to\ 8.2]{\textit{Maltase}} \text{Glucose + Glucose}$$

    Sucrose : Sucrase catalyses the splitting of sucrose (disaccharide) into glucose, and fructose units (monosaccharides)

$$\text{Sucrose} \xrightarrow[pH\ 7.1\ to\ 8.2]{\textit{Sucrase}} \text{Glucose + Fructose}$$

    Lactase : Lactase acts on milk sugar lactose (disaccharide), and splits lactose into galactose, and glucose units (monosaccharides).

$$\text{Lactose} \xrightarrow[\text{pH7.1to8.2}]{\text{Lactase}} \text{Glucose + Galactose}$$

25. a) Amoeboid move ment – exhibited by macrophages and leucocytes
    b) Ciliary movement – by ciliated epithelium lining Fallopian tube
    c) Muscular movement – by jaws, limbs etc.
26. **a) Uremia :** Malfunctioning of kidneys can lead to accumulation of urea in blood, a condition called uremia.

    b) Ultrafiltration: Blood is filtered so finely through endothelium of blood vessels epithelium of Bowman's capsule and a basement membrane that almost all the constituents of plasma except the proteins pass onto the lumen of Bowman's capsule, therefore it is called ultra fillration

    c) The process of release of urine from urinary bladder is called micturition.

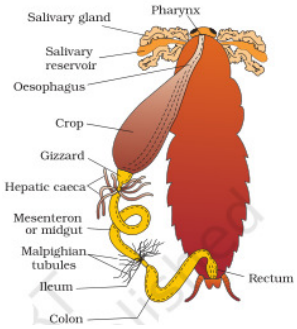
PART – D

IV. Answer any FOUR of the following: **5 x 5 =25**

27. 1) They are non-vascular plants, exhibiting amphibious habitat. .
    2) Gametophytic phase of the life cycle is represented by multicellular, haploid thallus, is called gametophyte.
    3) Gametophytic plant body bearing male' and female sex organs, represents the dominant phase of life cycle unlike in higher plants.
    4) Gametophyte is autotrophic and independent in nature.
    5) The .gametophyte produces sex organs, the antheridia and the 'archegonia which multicellular
    Antheridia may be embedded within the thallus or may be specifically located at the of the gametophyte. It produces biciliate curved antherozoids
    Archegonia is a flask like structure It bears a basal bulbous venter and a narrow, hallow structure at it tip is summit called neck. Within the venter, the female gamete or egg is situated along with a venter canal cell. The neck shows neck cells, neck canal cells and cover
    6) Fertilisation takes place in the presence of water, leading to formation of a zygote which later develops into multicellular embryo. Hence, the group is treated under embryophyta.
    7) Sexual reproduction is always of oogamous type.
    8) Embryo develops into a diploid sporophyte consisting. of foot, seta and capsule, which depend on gametophyte.
    9) Diploid sporophyte reproduced by formation of haploid spores (meiosis occurs during formation). The spore germinates and produces gametophyte
    10) In their life cycle, such distinct heteromorphic alternation of generations is shown by members.
28.

Chondrichthyes	Osteichthyes
• Skeleton is made up of cartilage • Exclusively marine • They posses placoid scales • Mouth and nostrils are situated on ventral side of the body • Passes 5 pairs of gill slits • Tail is heterocercal • Devoid of air bladders • Males usually possess a pair of claspers ex : Sclidon (Shark) Narcine (Electric ray) Trygon (Sting ray).	• Skeleton is made up of bones • Both marine and frest water forms are seen • Possess cycloid or ctenoid ascales • Mouth and nostril are terminal in their position. • Possess 4 pairs of gill slits which are covered by operculum • Tail is homocercal • Possess air bladders • Claspers are absent Ex : Anguilla (Fresh water Eel) Clarias (Cat fish) Hippocampus (Sea horse)

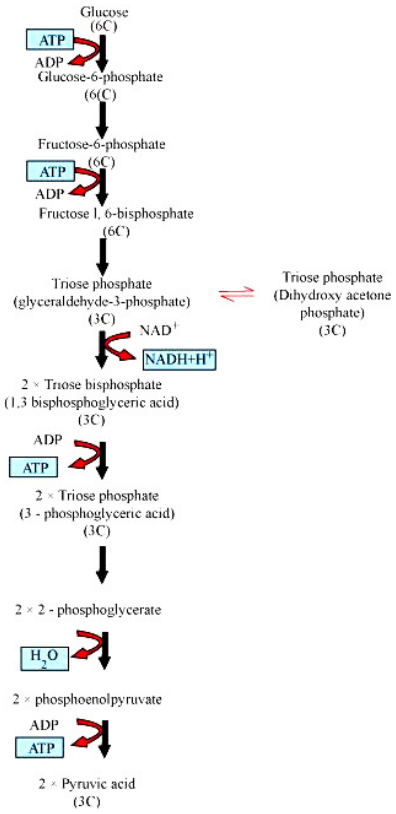
29.



30. (i) Cell envelop consists of a tightly bound three layered structure i.e., the outermost glycocalyx followed by the cellwall and then the plasma membrane
(ii) A special membranous structure is the mesosome which is formed by the extensions of plasma membrane into the cell
(iii) Fluid matrix filling the cell is the cytoplasm
(iv) There is no well defined nucleus. The genetic material is basically naked. Many bacteria have small circular DNA outside the genomic DNA called plasmid.
(v) No organelles except for ribosome's are present.
(vi) Reserve food material is present in the form of inclusion bodies

31. Oxidoreductases – Act on many chemical grouping to add or remove hydrogen atoms.
Transferases – Transfer functional groups between donor and acceptor molecules. Kinases are specialised transferases that regulate metabolism by transferring phosphate from ATP to other molecules
Hydrolases – Add water across a bond, hydrolyzing it
Lyases – Add water, ammonia or carbon dioxide across double bonds, or remove these elements to produce double bonds.
Isomerases – Carry out many kinds of isomerization : L to D isomerizations. Mutase reactions (shifts of chemical groups) and others
Ligases – Catalyze reactions in which two chemical groups are joined (or ligated) with the use of energy from ATP

32.



V. Answer any Three of the following: 2 x 5 =10

33. Macronutrients are those elements, which are generally present in large amounts in the plant tissues, i.e in excess of 10m mole kg $^{-1}$ of dry matter. Eg Carbon, hydrogen, oxygen, nitrogen, phosphorus, sulphur, potassium and magnesium.

The role of four macronutrients:

1) **Nitrogen:** It is absorbed NO_3^-, NO_2^- and NH_4^+ ions

Functions:

It is a major constituent of amino acids, proteins, nucleic acids, vitamins, etc

2) **Sulphur:** It is obtained as sulphate ions.

Functions:

(i) It is the constituent of amino acids, methionine and cystine

(ii) It also forms part- of ferredoxin, and vitamins like thiamine; biotin, and coenzyme-A

3) **Phosphorus:** It is absorbed by plants in the form of phosphate ions.

Functions:

(i) It is a constituent of nucleotides, and nucleic acids.

(ii) It is present in cell membranes as phospholipids.

(iii) It is involved hi phosphorylation reactions, and energy metabolism a $\rightarrow$ A T P

4) **Potassium:** it is taken in as potassium (K^+). It is more abundant in meristematic tissues like buds, root-tips, and young leaves.

Functions:

(i) It determines the anion-cation balance in cells

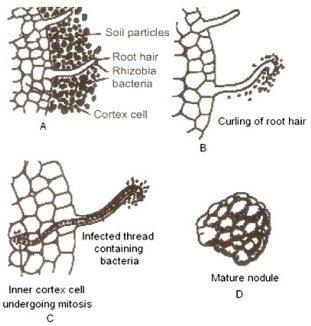
(ii) It controls the opening and closing of stomata

(iii) It maintains turgidity(osmotic balance) in cells

(iv) It is also involved in protein synthesis

34. 1) When the root hair of a leguminous plant comes in contact with Rhizobium, it becomes curled or deformed due to the chemical secreted by the bacterium.

2) The rhizobia enter these deformed root hair and proliferate within the root hair.



Root Nodule Formation in a leguminous plant

1) The plant responds by forming an infection thread, that grows inwards to deliver the bacteria to the tissues

2) It is believed that the cytokinin produced by the bacteria, and the auxin produced by the plant cells stimulate cell division, and enlargement to form a nodule.

3) The nodule establishes contact with the vascular tissues of the host for absorption of nutrients

4) The formation of root nodules, and nitrogen fixation occur under the control of nod genes of legumes, and the nod, nif, and fix genes of bacteria

35. a)

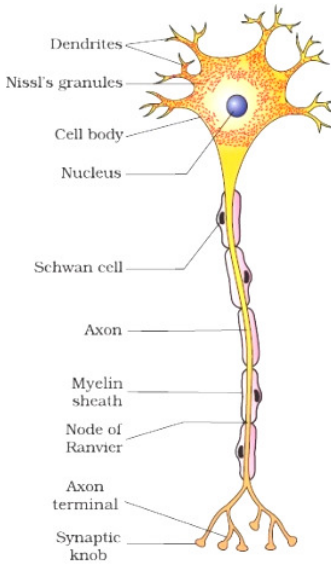
Aerobic C.R	Anaerobic C.R
1) Occurs in the presence of molecular oxygen	1) Occurs in the absence of oxygen
2) Centered in mitochondria and cytoplasm	2) Centered in cytoplasm
3) Glucose is completely oxidised into CO_2 and H_2O	3) Glucose in incompletely oxidised into C_2H_5OH and CO_2
4) Generates 38 ATPs per glucose	Generates only 2 ATPs per glucose
5) Occurs in a great majority of organisms called anaerobes	5) Occurs in only a few of organisms called aerobes

b) It is defined as the ratio of volume of CO_1 evolved to the volume of O_2 utilized

$$RQ = \frac{\text{Volume of } CO_2 \text{ released}}{\text{Volume of } O_2 \text{utilised}}$$

RQ value of fats = 0.71

36.



37. a) Growth hormone (G.H) – regulates body growth

b) Prolactin – regulates growth of mammary glands and formation of milk in them

c) Thyroid stimulating hormone (TSH) – synthesis and secretion of thyroid hormone from the thyroid gland

d) Adrenocorticotrophic hormone (ACTH) – stimulates secretion of steroid hormones called gluco corticoids

e) Luteinizing hormone (LH) – stimulate gonidal activity.

f) Follicle stimulating hormone (FSH) – stimulate gonidal activity.