CBSE Class 11 Biology
Sample Paper-04 (2017-2018)

Time : 3 Hrs.] [MM : 70

General Instructions:

i. All Questions are compulsory.
ii. The question paper is consist of A, B, C, D, E and F Sections. Section 'A' Contain 5 Questions of 1 mark each, Section 'B' is of 5 Questions of 2 marks each, Section 'C' has 12 Questions of 3 marks each, Section 'D' contains 1 Question of 4 marks, Section 'E' contains 1 Question of 5 marks. Section 'F' contains 2 Question of 5 marks each from the content of OTBA.
iii. There is no over all choice. However, an internal choice is given in 1 Question of 2 marks, one question of 3 marks and one question of 5 marks. Students have to attempt only one question from such alternative questions.
iv. Whenever necessary or asked the diagrams should be neat and clean and well labelled.

Section 'A'

1. How re Monographs different from Manuals?
2. Name the enzyme which hydrolysis protein in acidic medium in adult human.
3. Name vegetative propagules present in Agave and water hyacinth.
4. Which two factors affect water potential?
5. L and B islet of Langerhans Secretes two hormones to maintain the glucose balance in blood. Name them.

Section 'B'

6. In angiosperms, sieve tubes are associated with specialized cells of parenchyma. Name these cells and briefly write how do they function.

   OR

   Mention the importance of Trichomes and root hair for a plant.
7. Write two advantages of multicellularity to an organism.

8. What do you understand by secondary structure of protein. Explain.
9. Briefly describe two pathways through which mineral nutrients absorbed by roots are carried to the xylem.
10. Inspiratory muscles and expiratory muscles play very important role in respiratory process. Explain their role.

Section 'C'

11. Define Metamerism? Differentiate between metameric and non metameric segmentation.
12. Where do you fnd Adipose tissues in human body? Describe its structure only through diagram. Give its important function.
13. Draw a neatly labelled diagram of T.S. Dicot stem. (any six correct Labellings).
14. Expand the term 'RuBisCO'. How does it act as carboxylase and oxygenase respectively?
15. Explain the mechanism of carbon dioxide transport from tissues to the lungs by Red Blood cells.
16. Discuss the role of middle ear in hearing.
17. Explain the process of ATP formation during aerobic respiration (In mitochordria) with the help of diagram.
18. Some symbiotic organisms are very good pollution indicators and composed of a chlorophyllous and a non-chlorophyllous members. Name and Describe them.

OR

The leaves in gymnosperms are adopted to withstand xerophytic conditions. Justify.

19. Maize grain is usually called as fruit and not a seed. Why?
20. List out six major proteins and their functions.
21. Write two functions of each of the following-
Golgi Complex, Endoplasmic reticulum, plastids.
22. What is stroke volume? How is it related to cardiac output?

Section 'D'

23. Sumit watched a T.V. programme with showed that fruiter use chemicals in their godown to induce artificial ripening green and unripe fruits purchased from farmers. He was surprised to see that green and unripe fruits are transported to destined places. He asked his biology teachers the reason for it.
    i. Which compound is used to induce artificial ripening of fruits?

ii. Why only green and unripe fruits are transported by farmers?
iii. Mention only two values reflected by fruiter.

Section 'E'

24. What is cell cycle? Explain the events occurring during the cell cycle of a somatic cell.

OR

a. Write a note on significance of meiosis.
b. Differentiate between anaphase I of meiosis and Anaphase of mitosis.
c. What do you understand by Synapsis? In which stage of Prophase-I you observe it.

25. Explain the counter current mechanism in Vasa Reeta. Also mention its significance.

OR

Explain the important steps of sliding filament theory of muscle contraction.

26. What is Glycolysis? Explain different steps of Glycolysis. What are products of light reaction? Name first stable product of C_3 plants. Explain different steps of Calvin cycle.

ANSWER

Section 'A'

1. Monographs contain information on any one taxon and Manuals provide information for identification of name of species in an area.
2. Pepsin.
3. Agave - Bulbic
4. Concentration of solute, external pressure.
5. α - cell : Glucgon
   β - cell : Injulin.

Section 'B'

6. Companion Cells.
   Sieve tubes lacks nuclei.Their functions are controlled by the nucleus of companion cells. They help in the translocation of the food material.

OR

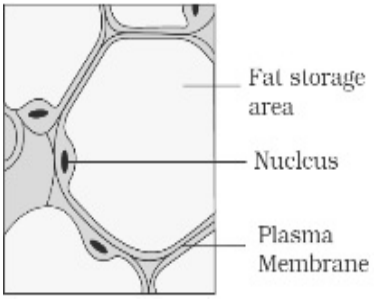
Trichomes are multicellular epidermal hairs on the stem, seeds and fruits. They help in

protection dispersal of seeds and fruits and reduction of water loss.
Root hair helps in absorbing water and mineral from soil.

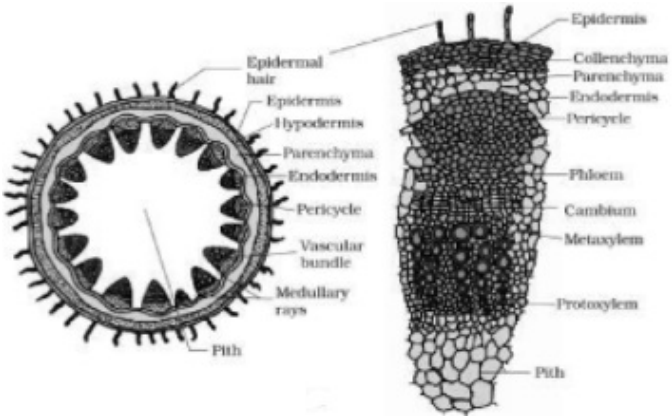
7. Multicellularity results in producing division of Labour amongst its cells and enhance the chances of survival.
8. Polypeptide chain undergoes folding or coiling which is stabilized by hydrogen bonding. Right handed helices are observed eg. fibrous protein in hair, nails.
9. A protoplast pathway- The ions enter the cell wall of Epidermis and move across the cell wall from epidermis to xylem and finally accumulated their Symplast pathway - The ions enter the cytoplasm of Epidermis and move across the cytoplasm of epidermis to cytoplasm of pericycle through plasmodesmata and finally to xylem vessels.
10. The contraction of the external inter costal muscles and diaphragm → Increase in volume of thoracic cavity → Inspiration.
    Relaxation of the inspiratory muscles – Decrease the volume of thoracic cavity – Expiration.

Section 'C'

11. Metamerisation – Segmentation of External and internal body into linear sequence of segments (repetition of atleast some organ).
    Metameric Segmentation : External segmentation correspond to internal segmentation eg. Earthworm.
    Non-metameric Segmentation : External segmentation do not correspond internal segmentation eg. Platyhelminthes.
12. Adipose tissues are located beneath skin. Falls are stored in them.



13. T.S. Dicot stem



14. RuBisCO– Ribulose bisphosphate carboxylase-oxygenase.
    RuBisCo brings about carboxylation during Calvin cycle in photosynthesis under high concentration of Oxygen and Increase in temperature, RuBisCO act as oxygenase and carry out photorespiration.
15. Transport of CO_2 in the blood.

    $$CO_2 + H_2O \rightleftharpoons \underset{Carbonic\ Acid}{H_2CO_3} \rightleftharpoons HCO_3 + H^+$$

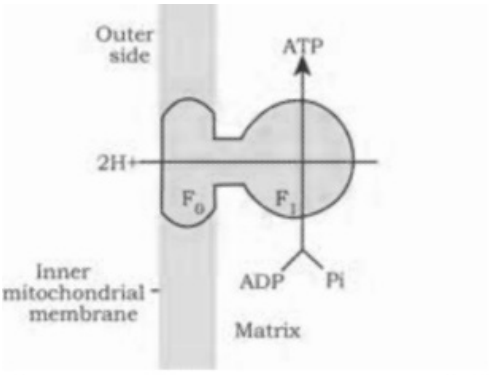
    About 20% of CO_2 is transported by combining with free amino group of Haemoglobin in RBC.
    70% of CO_2 is transported as bicarbonates of sodium ($NaHCO_3$) and potassium ($KHCO_3$).
16. Middle ear
    i. Tympanic membrane – act as resonator that produces vibration of sound.
    ii. Ear Ossicles – Transmit sound waves to internal ear.
    iii. Eustachian tube – help in equalising the pressure of either side of ear drum.
17. 

    Figure Diagramatic presentation of ATP synthesis in mitochondria

    The Synthesis of ATP from ADP and inorganic Phosphate using energy from proton gradient is called oxidative phosphorylation. This takes place in elementary particles present on the inner membrane of crystal of mitochondria. This process in mitochondria

is catalysed by ATP synthetase.
This complex has two major components F_0 and F_1. F_0 acts as channel for proton and F_1 acts as on ATP synthetase.

18. Lichens are symbistic association between algal components (phycobiont) and fungal components (mycobiont). Algae provides food. Fungi provides shelter and absorb nutrients and water for alga. They are good pollution indicator as they do not grow in polluted area.
19. Maize grain is a single seeded fruit in which the seed covering on testa is fused with pericarp or fruit wall. A micropyle is not found but base of style is present.
20. Collagen – Intercellular group substance
    Trypsin – Enzyme, Insulin-Hormone
    Antibody – Fights infectious agents
    Receptor – Sensory perception
    GLUT-4 – Enable glucose transport.
21. Golgi Complex:
    i. Perform packaging of Material
    ii. Site for formation of glycoprotein and glycolipids.
    iii. Endoplasmic reticulum – Synthesis of protein and lipids.
    Plastid : Storage of protein, site of photosynthesis.
22. During are cardiac cycle or one heart beat the volume of blood pumped by the heart is called stroke volume. This is normally 70 ml.
    The amount of blood pumped by heart per minute is called cardiac out put. This is 5 L approximately.

Section 'D'

23. a. Ethophen release Ethylene which causes ripening of fruits.
    b. Mature fruit will get spoiled during Transportation.
    c. Scientific knowledge and scientific temper.

Section 'E'

24. Cell cycle – Sequence of events by which a cell duplicate its genome, synthesis the other constituents of the cell and eventually divides into two daughter cell.
    Phases – refer to diagram

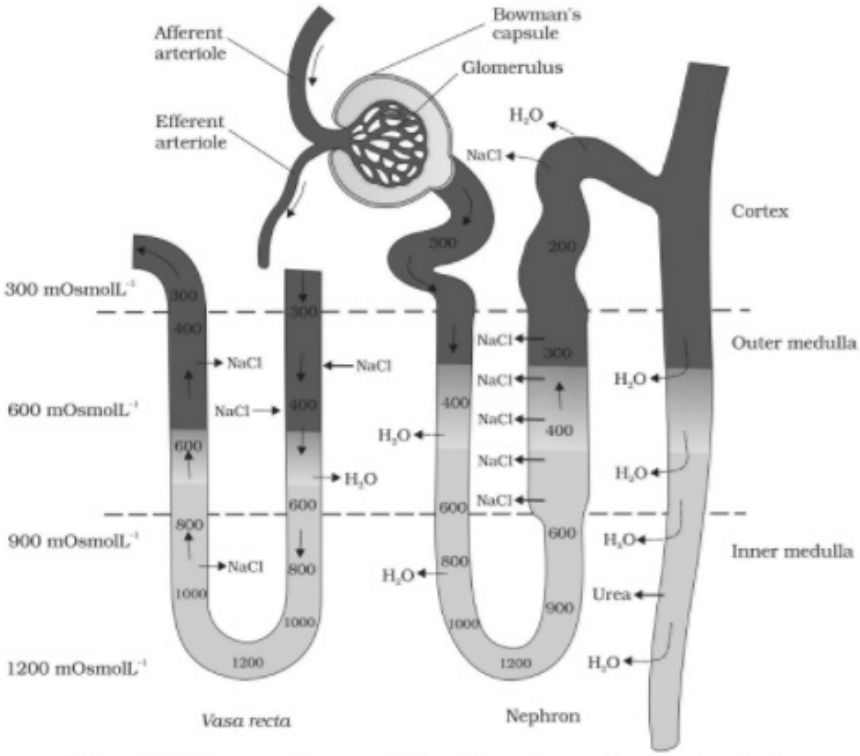


Figure 19.6 Diagrammatic representation of a nephron and *vasa recta* showing counter current mechanisms

Phases of cell cycle – Interphase

– M-Phase (Mitosis)

A. Interphase :

   G_1 – Cell metabolically active and g row continuously but does not replicate DNA.

   S Phase – DNA replication occur.

   G_2 Phase – Proteins are synthesized in preparation for mitosis while cell growth continues.

B. M-Phase (Mitosis) - stats with nuclear division (kalgokinesis) and then cytokinesis.

OR

a. Formation of genetic, Genetic variabling, maintainance of chromosomal number.

b. Anaphase of mitosis : Centromeres spl and chromatids seperate; chromatials moves to opposite poles due to shortening of Spindle fibres.

   Anaphase I of meiosis : Homologous chromosanus seperate while chromatids remain associated at their centromeres.

c. Pairing of homologus chromosomls. Synopsis is observed during zygetene stage.

25. The mechanism of concentration of the filtrate is said to be counter current because outflow (in ascending limb) runs parallel to and in opposite direction of inflow (in descending limb).

    - NaCl is transported by the ascending limb of (Henles loop) which is exchanged

with descending limb of Vasa-recta.

- NaCl is returned to the interstitium by ascending portion by vasa recta.
- Osmalality increase from 300 mosmol/2 in context to about 1200 mosoml/L in inner medulla.
- Small amount of urea enter, the thin segment of ascending limb of Henle's loop which is transported back to interstitium by the collecting tubule.
  This mechanism helps to maintain a concentration gradient in the medullary tubule interstitium.

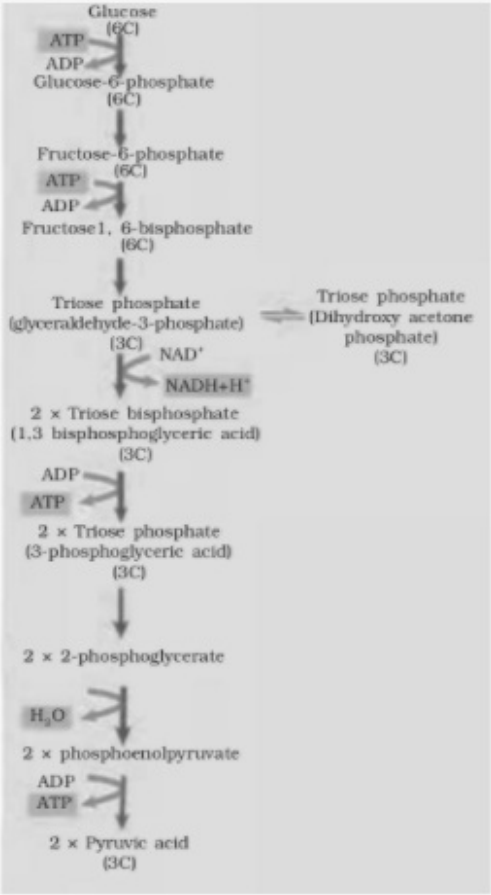


Figure Steps of glycolysis

OR

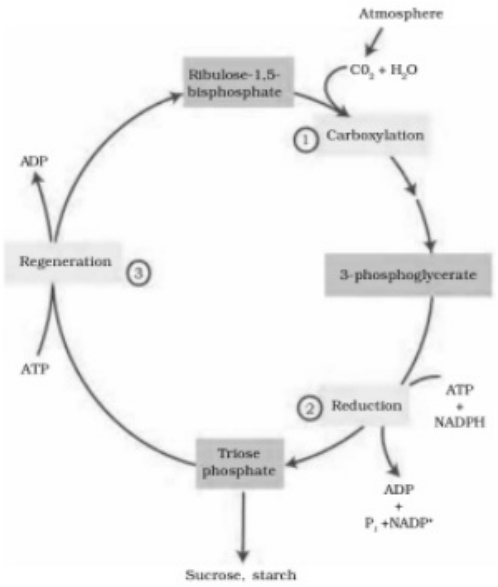
- Central Nervous system initiate muscle contraction via motor Neuron.
- Motor Neuron – stimulate Muscle fibre → secrete neurotransmitter → generate action potential in sarcolemma → Release of Ca^{2+} in sarcoplasm → Ca^{2+} binds with troponin → Unmask active site → Myosin head binds to actin at active site and form cross bridge using ATP. → Pulls the actin flament towards the centre of 'A' band → Z lines also pulled thereby shortening of sarcomere i.e. contraction. I band get reduced, where the 'A' band retain the length.

During relaxation :

Cross bridge between Actin and myosin break → Ca^{2+} pumped back into Sarcoplasmic cisternae → Actin flament slide out of 'A' band and length of I band increase.

26. Glycolysis : Breakdown of one molecule of glucose into 2 molecules of pyurvuvic acid. Glycolysis take place in Cytoplasm.

For schematic presentation



OR

ATP and NADPH, the product of light reaction are used in synthesis of food.

The first CO_2 fixation product in C_3 Plants is 3-phosphoglyceric acid. The CO_2 acceptor is RuBP. Cyclic pathway is called Calvin cycle.

It has three stages.

i. Carboxylation : CO_2 + RuBP → 2 molecule of PGA.

ii. Reduction : Carbohydrate i formed at the expense of ATP and NADPH. It involves 2 ATP for phosphorylation and 2 $NADPH_2$ for reduction per CO_2 molecule fixed.

iii. Regeneration : RuBP is formed again.

6 turns of Calvin cycle and 18 ATP molecules are required to synthesize one molecule of glucose.

6 CO_2 + 6 RuBP + 18 ATP + 12 NADPH - $C_6H_{12}O_6$ + 6 RuBP + 18ADP + 18 pi + 12 NADP.