

BIOLOGY QUESTIONS S6MCB&PCB

SECTION A: Attempt all questions

1. a) Water enters plants cells by the process of osmosis. Explain why the cells don't burst during this process.

b) Why is cell membrane described as a bilayer?

c) How does the membrane structure help to keep solutions apart?

2. a) What is the function of mitochondria?

b) Explain why muscles have a high number of cristae per mitochondrion.

3. Suggest the cellular process that would be taking place in the following cells.

a) A cell in which the membrane contained many microvilli.

b) A cell with many rough endoplasmic reticulum.

c) A cell with a large number of Golgi bodies.

d) A cell with much smooth endoplasmic reticulum.

4. The diagram below represents a flower.



a) Give the letter of the structure which:

i) Becomes the fruit wall.

ii) Becomes the testa.

iii) Produces pollen grains.

b) Explain two ways shown in the diagram in which this flower is adapted for insect pollination.

5. Draw a well labelled diagram to show that there is an equal chance of parents producing a baby boy or girl. Use the symbols X and Y for the chromosomes.

6. a) Describe the functions of centromere during mitosis.

b) List three similarities between mitosis and meiosis.

7. A) Give two similarities between transcription and DNA replication.

b) If the diploid number of chromosomes for a species is 46, how many chromosomes are present in: i) spermatogonium.

ii) a primary oocyte.

iii) a secondary oocyte.

8. Explain the main difference between the lock and key and the induced fit models of enzyme action.

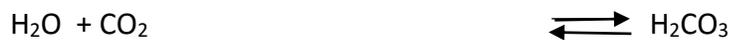
9. a) Name the gaseous exchange surface in:

- i) Humans
- ii) Plants
- iii) Fishes

b) Explain how efficient gas exchange is achieved in plants.

10. The following equations summarize three reversible reactions that occur in mammalian blood:

Equation 1



Equation 2



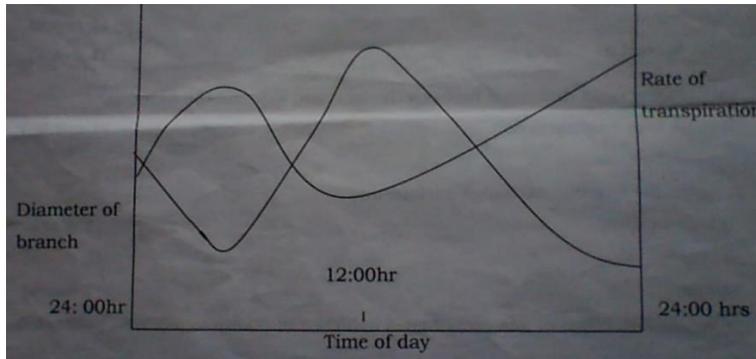
Equation 3



- a) Which of these reactions involves the enzyme carbonic anhydrase?
- b) What is the function of hydrogen carbonate ions produced in equation 2?
- c) What effect do the reactions left to right in equation 1 and 2 above on the oxygen dissociation curve of hemoglobin?
- d) In which component of the blood do all the above reactions take place?

11. Land plants have most stomata on the lower leaf surface. Floating aquatic plants have many stomata on the upper surface of their leaves. Suggest some advantages of this arrangement.

12. The graph below shows the relationship between the rate of transpiration and the diameter of a branch.



- a) Explain the graph.
- b) Explain why carbohydrates are transported as sugars and not as starch?

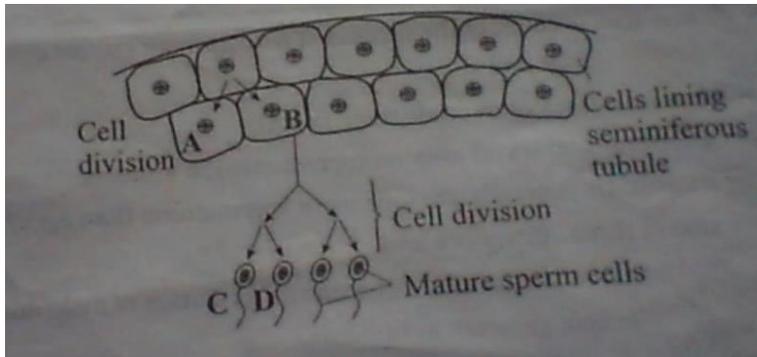
13. State one function of each the following compounds in an organism.

- a) Phospholipid.
- b) Collagen.
- c) Cellulose.
- d) Globular protein.

14. a) What does the term oxidative phosphorylation mean?

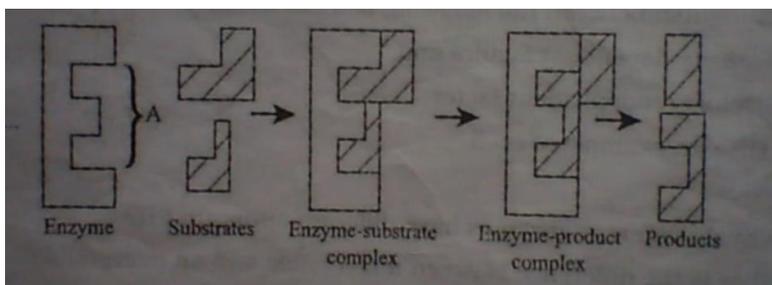
b) Describe the function of the electron transport chain. Where is it located in mitochondria.

15. The diagram below shows the process of sperm formation in a mammalian testis.



- Explain why cell A and B are genetically identical.
- Describe two ways in which cell division leads to cells C and D being genetically different.

16. The diagram below illustrates one model of enzyme action.



- Name the part of the enzyme labelled A.
- Explain how this model can account for enzyme specificity.
- With reference to the model, explain the effect of a competitive inhibitor on an enzyme-catalyzed reaction.

SECTION B: ATTEMPT ALL QUESTIONS

17. a) List four similarities between DNA and RNA.
- b) Explain why the genetic code must be triplet and not doublet.
- c) What is the significance of protein synthesis?
18. a) State two functions of mitosis.
- b) Write a brief account of the process of mitosis in animal cell.
19. a) i) What does "asexual reproduction" means?
- ii) Give two examples of asexual reproduction in animals.
- b) Why do animals generally produce more spermatozoa than eggs?
- c) Describe: i) three differences between the formation of male and female gametes in human.
- ii) three similarities between the formation of male and female gametes in human.
20. a) Explain the following ecological terms.
- i) Ecological succession.
- ii) Climax vegetation.
- iii) Biodiversity.
- b) Distinguish between the following pairs of terms as used in ecology.
- i) Density dependent factors.
- ii) Density independent factors.
21. a) Why do different enzymes have different optimum pH?
- b) What is the difference between a reversible and an irreversible enzyme inhibitor?
- c) Explain the term cofactor and give two examples of cofactors.

GOOD WORK.

TEACHER: VIA M.