St. Peter's Senior Secondary School - Naalya

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S.6 BIOLOGY

AUTOTROPHIC NUTRITION; Section A

1. In an investigation to study the effect of light intensity on the physiology of spirogyra, its amount of Phosphoglyceric acid (PGA), Ribulose bi-phosphate (RuBP) and sucrose were measured at different intervals of time in the presence of light. At the 30th minute, light was removed completely. The results obtained are shown in the table below. Study it and answer the questions that follow:

Time (minutes)	Amount of metabolites		
	PGA	RuBP	Sucrose
0	40	30	10
10	40	30	46
20	40	30	54
30	40	30	60

40	50	20	46
50	58	10	30
60	60	06	16
70	60	06	06

a) Plot the results on a suitable graph.

b) Compare the changes in the amount of PGA and RuBP with time.

c) Explain the changes in the amount of the following with time:

   i) PGA

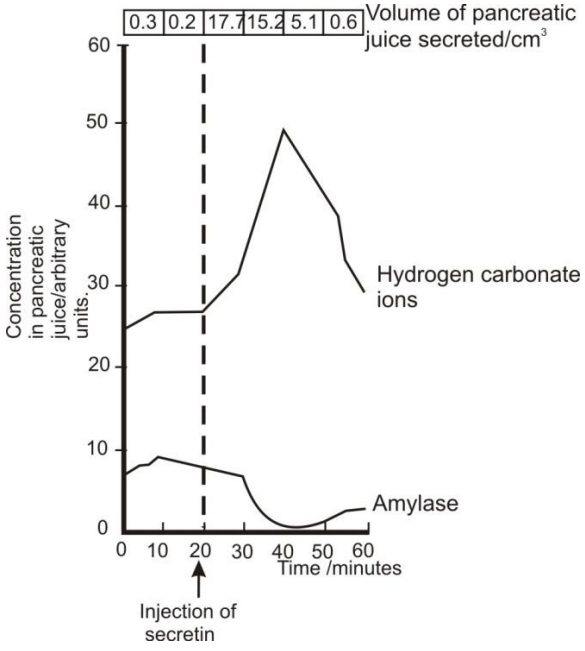
   ii) RuBP

   iii) Sucrose

d) Give the various ways in which C_3 plants differ from C_4 plants.

HETEROTROPHIC NUTRITION

2. The graph shows how an injection of secretin affects the secretion of pancreatic juice by the pancreas.



a) i) Use the graph to describe the effect of secretin on the pancreas.

ii) Explain why the concentration of amylase in the pancreatic juice decreased shortly after the injection of secretin.

b) What other digestive secretion is stimulated by secretin.

c) Certain types of ulcers are thought of to be made worse by the production of too much acid from the stomach. Doctors have used a number of different methods to treat these ulcers. Suggest how the following treatments might reduce the amount of acid secreted by the stomach.

i) Cutting the vagus nerve to the stomach.

ii) Giving the patient atropine, which blocks the action of acetylcholine

d) Giving examples, explain how organisms are able to utilize cellulose in their diet.

e) In what ways are saprophytes important to man?

SECTION B:

3. (a) Describe how structure is related to function in a voluntary muscle tissue.

(b) Contrast the structures of an involuntary muscle and that of a skeletal muscle.

4.(a) Describe the two possible routes through which electrons flow during the light reactions of photosynthesis.

5. (a) What is the significance of small size to seeds which require a stimulus of light for germination

(b) Describe the relative changes in dry mass of the endosperm and embryo during germination of sorghum.

(c) Suggest three suitable conditions under which seeds for planting should be stored.

6. (a) What is alternation of generation with reference to plants?

(b) Make a sketch diagram of the life cycle of a moss to show where mitosis, meiosis and fertilization have occurred. On your sketch show which stages are haploid and diploid.

(c)(i) Distinguish sexual reproduction from asexual reproduction.

(ii) Describe how plants are produced using vegetative propagation.

(iii) Explain why animals are more difficult to clone than plants.

7. (a) (i)What is meant by imprinting and how does this differ from other forms of learning?

(ii) How may a 'learning set' be formed and why is it useful?

(b)(i) What role does the hypothalamus play in motivation?

(ii) Explain the connection between the photoperiod, hormones and reproductive behavior in some birds and mammals.

(iii). Name three types of endogenous rhythm and give an example of each.

8. a) Describe the fluid mosaic model of the plasma membrane.

b) How is the structure of the plasma membrane suited to transport materials across it?

c) Using diagrams, give an account of the structure and function of the endoplasmic reticulum and Golgi apparatus.

9. a) Describe the process of glycolysis in a cell.

b) Outline the major steps in which fats may be used as energy sources.

c) Distinguish between aerobic and anaerobic respiration.

10. Give an account of the distribution and functions of the membranes of cells.

11. a) Explain the term 'saprotroph'.

b) Compare and contrast saprophytes with parasites.

c) In what ways are saprophytes important to humans?

d) Describe how the flow of the pancreatic secretion is controlled.

12. a) What is meant by a receptor?

b) Describe the general features common to all receptors.

c) Using the mammalian ear as an example, show how a receptor organ functions.

13. a) Describe how the loop of Henle operates as a counter-current multiplier.

b) Explain how different animals have solved their osmotic challenges.

14. a) What are the adaptations of the plasmodia to its parasitic mode of life

b) Describe the life cycle of plasmodia.

c) Why is malaria still such an unrelenting disease in sub-Saharan Africa?

15. (a) Define 'organic evolution'

(b) (i) Name six evidences used to support the theory of evolution.

(ii) Briefly explain how each of the evidences you have named in (b) (i) above is used to support the theory of evolution.

16. (a) Briefly describe how protein molecules are formed from poly peptide chains after protein synthesis.

(b) Explain how

(i) temperature affects enzyme activity

(ii) inhibitors alter the rate of enzyme catalysed reactions

17. (a) State three ways in which water has similar functions in both plants and animals.

(b) Explain the ways in which desert mammals minimize water loss through the following:

(i) structural means

(ii) physiological means

(iii) behavioral means

18. (a) How are gas exchange surfaces adapted to their function in terrestrial mammals?

(b) Give an account of the gas exchange mechanisms in a bony fish such as Tilapia. How do these mechanisms differ from those of terrestrial mammals?

(a) What are carbohydrates?

(b) Account for the fact that carbohydrates form a wide variety of polysaccharides.

END