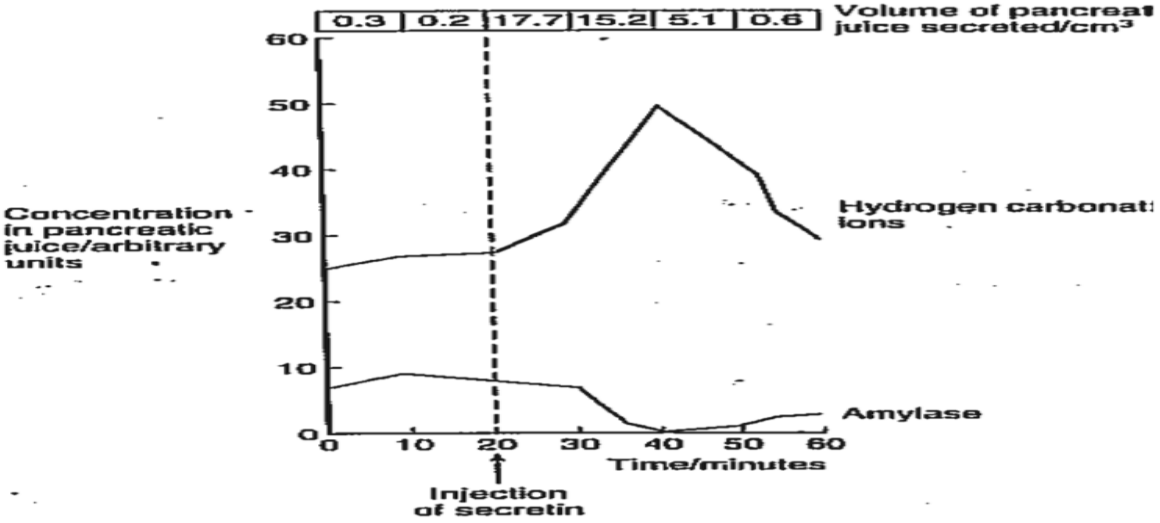
S.6 BIOLOGY TEST SERIES 4 - 2023

TOPICS: Nutrition in plants and animals
TIME : 2 Hours and 30 minutes
INSTRUCTIONS: Attempt all questions in section A and 3 questions in section B. Any additional (s) will not be marked. You are advised to read the questions carefully, organize your answers and present them precisely and logically. Illustrate your answers with clear labeled diagrams where necessary

SECTION : A

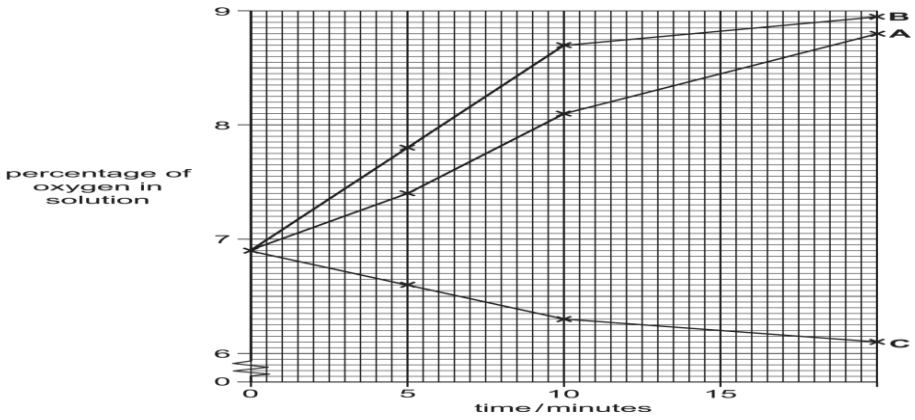
1 (a) In an investigation carried out to study the effect of secretin injection on the functioning of the pancreas. The results that were obtained are shown in the graph below. Study them and answer the questions about them.



(i). Explain the results obtained injection on secretin into the body. (10 marks)
(ii) State three enzymes found in the pancreatic juice and give the use of each. (03 marks)

(b) The following experiment was carried out to investigate the effect of light intensity on the rate of photosynthesis of a water plant, Elodea.

- Elodea was cut into three pieces, each 10 cm long.
- Each piece of Elodea was placed in a glass tube, containing 0.5% sodium hydrogen carbonate solution, which was then sealed with a stopper.
- Tube **A** was placed 10 cm away from a lamp.
- Tube **B** was placed 5 cm away from a lamp.
- Tube **C** was placed in a dark room.
- An oxygen sensor was used to measure the percentage of oxygen in the solutions at the start of the experiment and again at 5, 10 and 20 minutes. The results are shown in Figure below.



(i) Describe the changes in the percentage of oxygen in solution for tubes A and C (04 marks)

(ii) State why sodium hydrogen carbonate solution was used. (01 mark)
(iii) Calculate the mean rate of oxygen production for tube **A** for the 20 minutes of the experiment. (03 marks)
(iv) Compare the results for tubes **B** and **C**. (04 marks)
(v) Explain the results for tube **C**. (04 marks)
(vi) Suggest what factor, which may have an effect on the rate of photosynthesis, that was **not** taken into account in this experiment. (01 mark)

(c) The light compensation point for three woodland species is shown in the table below. The average light compensation point for plants in this woodland is 1150 lux.

Species	Light compensation point (lux)
A	2000
B	350
C	900

State and explain which of these three species:
(i) normally grows in bright sunlight (05 marks)
(ii) has leaves with the highest chlorophyll content. (05 marks)

SECTION : B

2(a) With an example, describe the different heterotrophic forms of obtaining food nutrients in organisms (10 marks)

(b) Explain the different feeding mechanisms used by animals while obtaining their food from the environment. Give an example in each mechanism (10 marks)

3.(a) Explain the effect of light intensity and temperature on the rate of photosynthesis.

(b) Explain photophosphorylation in terms of chemiosmosis.

(c) Explain the reactions involving the use of light energy that occur in the thylakoids of the chloroplast.

4.(a) Explain how the secretion of the following digestive juices is controlled

(i) Saliva (04 marks)
(ii) Gastric juice (06 marks)

(b) Describe how the end products of digestion are absorbed into the blood stream. (07 marks)

(c) State three ways how the ileum is suited to perform its functions. (03 marks)

5. (a) Explain how the photosystems increase the light harvesting ability of a chloroplast? (06 marks)

(b) Explain the relationship between the action spectrum and the absorption spectrum of photosynthetic pigments in green plants. (04 marks)

(c) Explain the concept of limiting factors in photosynthesis, with reference to light intensity, temperature and concentration of carbon dioxide

6. (a) How does altitude affect distribution of C_3 and C_4 plants? (04 marks)
(b) Describe the steps involved in the formation of the products in the photosynthesis.(12 marks)
(c) Explain what makes C_4 plants more photosynthetically efficient than C_3 plants.(04 marks)

END