P530/2

BIOLOGY

PAPER 2

2½ hours

March 2023

Uganda Advanced Certificate of Education

BIOLOGY DEPARTMENT – 2023

SET ONE

PAPER 2

THEORY

2 hours 30 minutes.

INSTRUCTIONS TO CANDIDATES:

- ✓ Answer question one in section **A** plus three others from section **B**.
- ✓ Candidates are advised to read the questions carefully, organize their answers and present them precisely and logically, illustrating with well labeled diagrams where ever necessary.
- ✓ Write on the answer sheet, your name, index number and the questions attempted in their order as shown in the table.

QUESTION	MARKS
TOTAL	

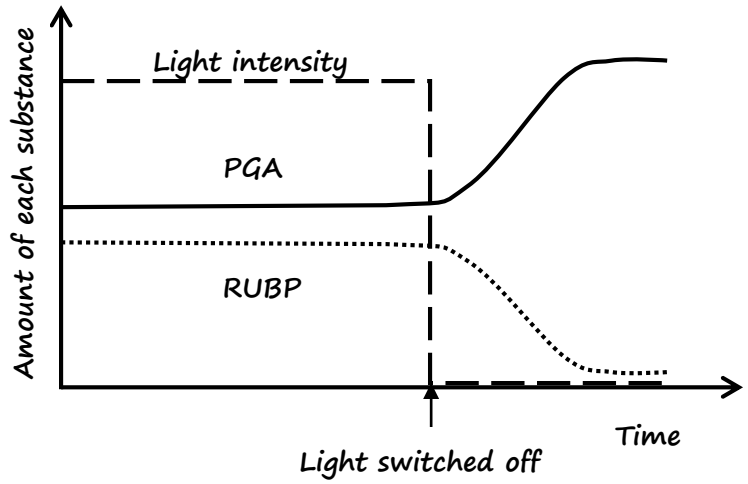
©Jusan

SECTION A: (40 Marks)

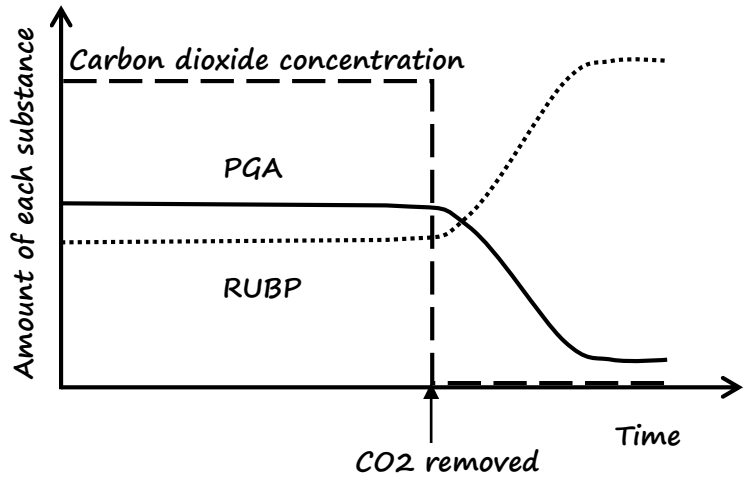
Compulsory.

1. Experiments were carried out on cultures of a unicellular green protist to investigate the effect in the formation of phosphoglyceric acid (PGA) and ribulose bisphosphate (RUBP) of (A) switching the light off, i.e. suddenly putting the organisms in darkness, and (B) depriving the organisms of carbon dioxide. The results are summarized in the figures below.

A



B



a) Describe the effect of switching off light and removing carbon dioxide on the quantity of substances formed with time in Graph A and B respectively. **(06marks)**

b) Suggest explanations for the variation in the amount of PGA and RUBP in;

   i. Graph A. **(09marks)**

   ii. Graph B. **(05marks)**

c) Sucrose is one of the substances observed to be formed during the investigation.

i. Sketch a graph to show the effect of switching off light on the amount of sucrose formed. **(03marks)**

ii. Account for the shape of the graph in (i) above. **(06marks)**

d) Predict the levels of PGA and RUBP if experiments were continued for longer. **(03marks)**

e) Explain the following observations.

i. Although photosynthesis generates ATP, plants also generate ATP by respiration. **(02marks)**

ii. At high temperatures, the photosynthetic rate in higher in C4 plants than in C3 plants. **(03marks)**

iii. Photosynthetic rate in C4 is not enhanced by atmospheric carbon dioxide, yet in C3 plants it is. **(03marks)**

SECTION B: (60 Marks)

Attempt only 3 questions from this section.

2. (a) Relate the structure of the non-lipid components of the cell membrane to movement of molecules across it. **(08marks)**

   (b) Describe the functions and interactions of the following organelles. (Nucleus, endoplasmic reticulum, lysosomes, Golgi complex, mitochondrion). **(12marks)**

3. (a) Explain the sequence of events that may lead to eutrophication of a previously non polluted water body. **(10marks)**

   (b) Outline any five parameters that can be measured to assess the quality of water in a lake. **(05marks)**

   (c) Suggest reasons why it is important to measure BOD at standard temperature of 20°C and water sample kept in darkness. **(05marks)**

4. (a) Describe how carbon dioxide from respiring tissues is transported to the lung capillaries in man. **(10marks)**

   (b) Explain the effect of increased levels of carbon dioxide on blood pressure in man. **(10marks)**

5. (a) Describe how xerophytes have overcome their osmoregulatory challenges. **(10marks)**

   (b) Account for the absence of complex excretory systems in plants. **(10marks)**

6. How are the following achieved in humans;

   (a) Reception of visual images at different light intensities. **(10marks)**

   (b) Detection of high pitch and low frequency sound. **(10marks)**

END