P530/2
BIOLOGY
(Theory)
Paper 2
July/ Aug: 2022
2 ½ hours

MMM JOINT MOCK EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

BIOLOGY
(THEORY)
Paper 2

2 hours 30 minutes

INSTRCUCTIONS TO CANDIDATES:

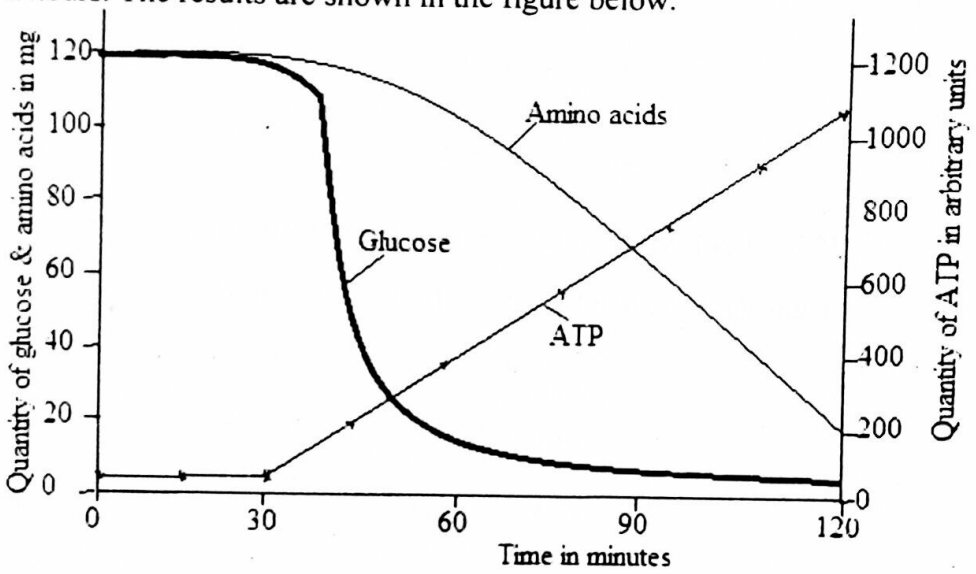
This paper consists of **six** *questions.*

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, illustration with well labeled diagrams where necessary.

SECTION A (40 MARKS)

1. An experiment was carried out using mitochondria isolated from muscle cells of a mammal. The mitochondria were placed in a buffer solution into which similar quantities of glucose and amino acids had been added. The variation in the quantity of glucose, amino acids and ATP liberated were monitored for a period of 2 hours. The results are shown in the figure below.



(a) Explain the variation in the quantity of:
- (i) Glucose; *(08 marks)*
- (ii) Amino acids *(06 marks)*
- (iii) ATP *(05 marks)*

(b) Explain why:
- (i) the experiment was carried out using a buffer solution. *(03 marks)*
- (ii) quantity of glucose and amino acids were maintained at the beginning of the experiment. *(02 marks)*
- (iii) the amount of glucose or amino acids does not reduce to zero. . *(02 marks)*

(c) Calculate the rate of depletion of each substance. *(03 marks)*

(d) Giving reasons, predict the likely changes if the experiment was allowed to run for another two hours. *(06 marks)*

(e) (i) Suggest why the quantity of ATP does not begin from zero. *(02 marks)*

(ii) How is the mitochondrion modified to suit to its functions? *(03 marks)*

SECTION B (60 MARKS)

2 (a) Explain how the environment may influence the process of natural selection. *(10 marks)*

(b) Explain how the following may have similar effects to natural selection in nature:
(ii) founder effect;

(ii) genetic drift;

(iii) predator-prey interaction. *(10 marks)*

3 (a) Describe the adaptation of blood in terrestrial animals living in the following environmental conditions:
(i) Extreme oxygen tensions. *(08 marks)*

(ii) High altitude. *(04 marks)*

(b) Describe how carbon dioxide from the respiratory tissue is transported to the alveolus. *(08 marks)*

4 (a) Discuss reasons why animals have to move from one place to another. *(08 marks)*

(b) Describe how propulsion is achieved in:
(i) an earthworm. *(05 marks)*

(ii) a plantigrade bipod. *(05 marks)*

5 (a) Describe the features common to all nerve impulses. *(08 marks)*

(b) Explain how action potential and repolarization is achieved across membrane of a motor neuron. *(12 marks)*

6 (a) What is the importance of a larval stage in the life cycle of an organism? *(06 marks)*

(b) Describe the hormonal control of ecdysis and metamorphosis in insects. *(14 marks)*

END