

P530/2
BIOLOGY
(Theory)
Paper 2
June-July
2 ½ hours

UGANDA ADVANCED CERTIFICATE OF EDUCATION

BIOLOGY

(THEORY)

Paper 2

2 Hours 30 minutes

INSTRUCTIONS TO CANDIDATES

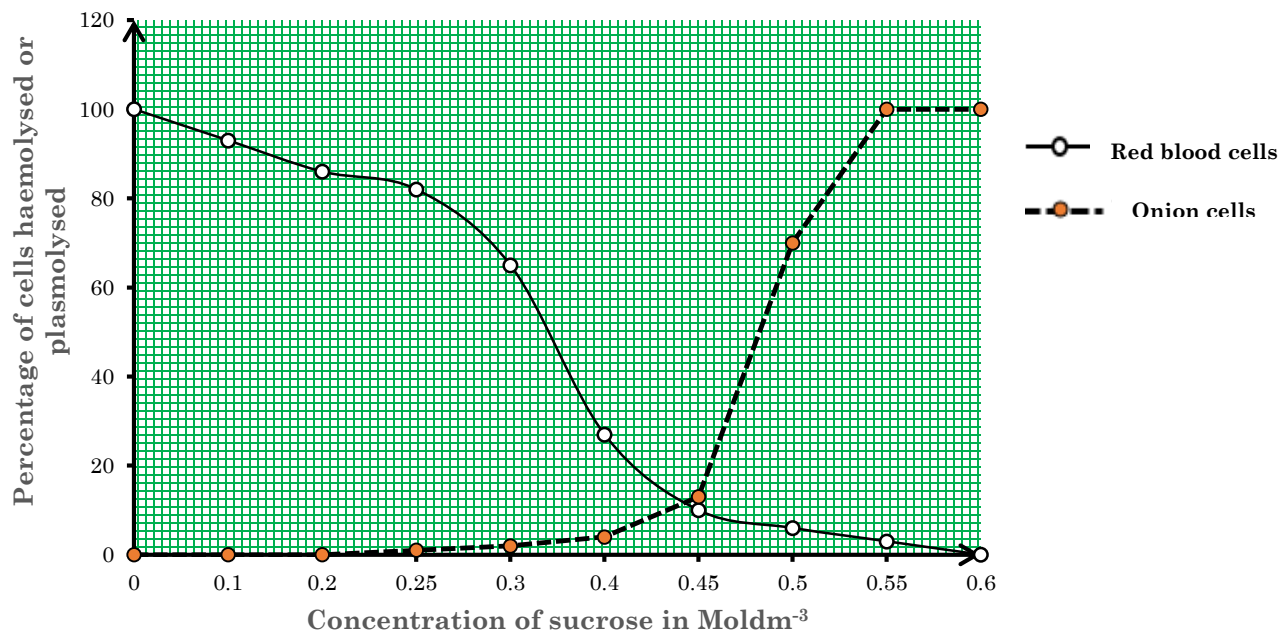
*This paper consists of **six** questions*

*Answer question **one** in section **A** plus **three** others from section **B***

Candidates are advised to read the questions to read carefully, organize their answers and present them precisely and logically, illustrating with well labeled diagrams where necessary.

SECTION A (40 MARKS)

1. A graph in the figure below shows percentage of haemolysed red blood cells and plasmolysed onion epidermal cells at different sucrose concentrations. Study it carefully and answer the questions that follow.



- (a) Describe the variation in the percentage of plasmolysed onion epidermal cells with increasing concentration of sucrose solution. **(05 marks)**
- (b) Compare the percentage of red blood cells haemolysed and the percentage of plasmolysed onion cells. **(07 marks)**
- (c) (i) From your graph, determine the concentration of the onion epidermal cells to be used to determine their solute potential. **(01 mark)**
 (ii) Explain how you arrived at your answer in (b) (i). **(10 marks)**
- (d) Give an explanation of each of the following;
 - (i) Red blood cells placed in a 0.00M sucrose solution swell and burst while plant cells do not. **(06 marks)**
 - (ii) Red blood cells haemolyse over a range of sucrose solution concentration rather than at one particular sucrose concentration. **(02 marks)**
 - (iii) The dishes containing the red blood cells or onion epidermal tissue are covered during the experiment. **(03 marks)**
 - (iv) The solutions are kept at a constant temperature of 20°C during the experiment. **(01 mark)**
- (e) Explain the significance of the biological process exhibited by the red blood cells and onion cells to living organisms. **(05 marks)**

SECTION B (60 MARKS)

*Attempt any **three** questions from this section.*

2. Describe the;
 - (a) structure of a skeletal muscle. (08 marks)
 - (b) sliding filament mechanism of skeletal muscle contraction. (12 marks)
3. (a) Distinguish between the **Fluid mosaic** and **Danielli-Davson** model of the cell membrane. (05marks)
- (b) What is the significance of possessing membrane bound organelles in eukaryotic cells? (05marks)
- (c) How is the structure of the plasma membrane suited to transport materials across it? (10 marks)
4. (a) Briefly describe the structure of a DNA molecule. (06 marks)
- (b) Describe the series of events that lead to formation of a mRNA in a cell. (10 marks)
- (c) Structurally distinguish DNA from RNA. (04 marks)
5. (a) Structurally distinguish a **chordate** from an **arthropod**. (05 marks)
- (b) With reference to body plan of chordates, explain the meaning of the term *triploblastic coelomate*. (07 marks)
- (c) Explain the main advantages of possessing
 - (i) Metameric segmentation. (02 marks)
 - (ii) Coelom. (06 marks)
6. (a) Outline **four** characteristics of epithelial tissues. (04 marks)
- (b) Describe the adaptations of each of the following epithelial tissues for their functions, giving **two** examples of sites where each of them is found.
 - (i) Stratified tissue. (08 marks)
 - (ii) Pseudo-stratified tissue. (05 marks)
 - (iii) Pavement tissue. (03 marks)

END

LAB/2023