P530/2

BIOLOGY

PAPER 2

2½ hours

May-June 2023

Uganda Advanced Certificate of Education

BIOLOGY DEPARTMENT - 2023

SET TWELVE

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	

SECTION A: (40 Marks)

Compulsory.

1. **Figure 1** below shows the changes in proportion of amount of sodium ions, glucose and water filtered into the renal capsule, that remain in the filtrate as it passes from the initial point of the proximal convoluted tubule to the end of the collecting duct in the kidney.

   Table 1 below shows the changes in the concentration of the substances in the filtrate along the same nephron in presence and absence of the antidiuretic hormone.

   Use the information in Figure 1 and Table 1 carefully to answer questions that follow.

   Figure 1

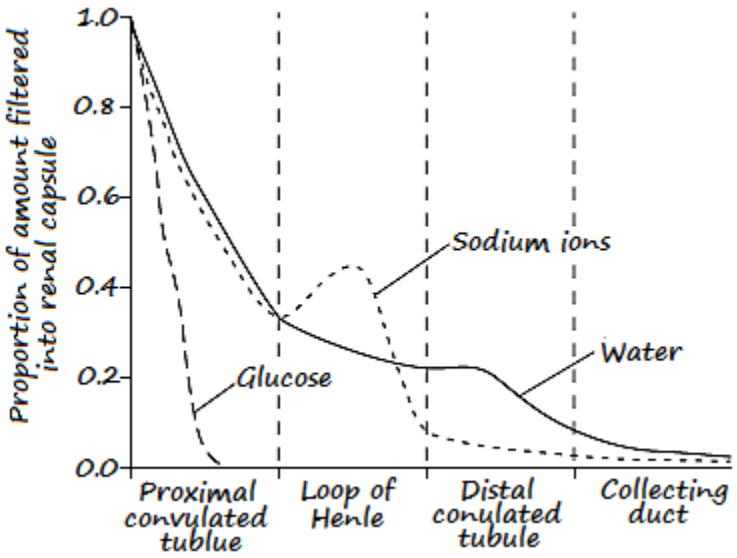

   Table 1:

Region of nephron	Concentration of substances in filtrate/ arbitrary units	
	ADH present	ADH absent
First convoluted tubule	300	300
Bend of loop of Henle	1000	1000
Start of second convoluted tubule	150	150
Middle of second convoluted tubule	250	90
Start of collecting duct	300	50
End of collecting duct	1000	50

   Using figure 1

a) Describe the changes in proportion of substances in filtrate along the nephron **(07marks)**

b) Account for the above changes in (a). **(12marks)**

c) Provide a detailed outline of how the filtrate is successfully formed and delivered into the renal capsule. **(06marks)**

From the Table 1,

d) Compare the concentrations of the substances in the filtrate at the different regions of the nephron in presence and absence of ADH. **(06marks)**

e) Give explanation(s) to the above the comparisons. **(10marks)**

SECTION B: (60 Marks)

Attempt only 3 questions from this section.

2. (a) Compare the compact bone tissue of mammals and the sclerenchyma tissue of plants. **(07marks)**

   (b) Explain the similarities in (2) (a) above. **(05marks)**

   (c) Describe how support is achieved in plants. **(08marks)**

3. (a) Describe how a triglyceride results from a fatty acids? **(05marks)**

   (b) Explain the relationship between the structure of cellulose and its functions. **(08marks)**

   (b) How does the structural diversity of proteins enable the plasma membrane function? **(07marks)**

4. (a) Explain how animals and plants have successfully co-operated in evolution? **(09marks)**

   (b) Describe the ways in which plants have negatively responded to each other. **(06marks)**

   (c) Account for the evolutionary significance of predation. **(05marks)**

5. (a) With suitable examples in each case, describe the photoperiodic categories of flowering plants. **(15marks)**

   (b) Outline the differences between short-day and long-day plants. **(05marks)**

6. (a) Explain the role of the placenta during foetal development. **(10marks)**

   (b) Summarise the changes that occur in the circulation of human foetus at, or soon after, birth. **(10marks)**

END