

P530/2  
BIOLOGY  
PAPER 2  
2½ hours  
Apr-May 2023

Uganda Advanced Certificate of Education

BIOLOGY DEPARTMENT - 2023

SET EIGHT

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.

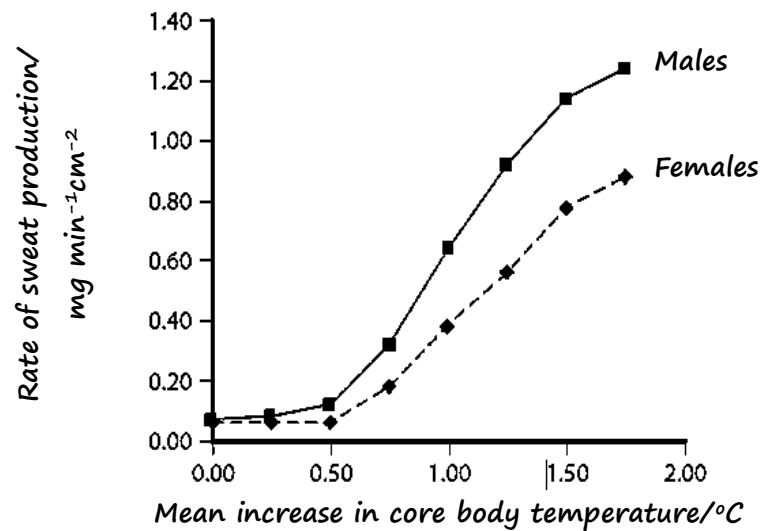
QUESTION	MARKS
TOTAL	

# SECTION A: (40 Marks)

## Compulsory.

- Graph A below shows the effect of a mean increase in the body temperature on the rate of sweat production by males and females during a marathon. Female marathon runners were identified to have smaller bodies than males.

Graph A:



Graph B shows effect of exercise intensity on stroke volume for marathon runners. During the race, runner's exercise intensity increased from 0 to 100%. The table 1 below shows the effect on the runner's heart rate.

Graph B:

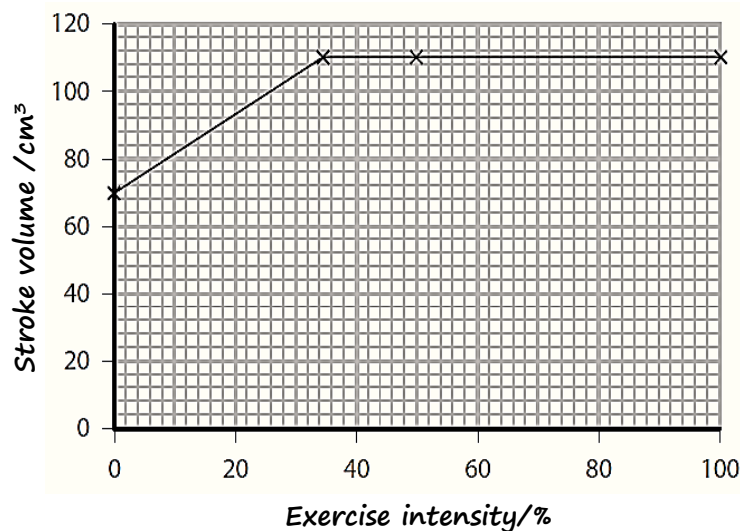


Table 1:

Exercise intensity, %	Heart rate/ bpm
0	55
100	160

**Using Graph A.**

- a) Compare the effect of mean increase in core body temperature on the rate of sweat production in the males and females. (05marks)
- b) Explain the effect of mean increase in core body temperature on rate of sweat production among the male runners. (10marks)
- c) Account for the observed difference in the rate of sweat production between male and females runners. (04marks)

**Using Graph B and Table 1.**

- d) (i) Distinguish stroke volume from heart rate (02marks)  
(ii) Calculate the change in cardiac output from rest to 30% exercise intensity. (03marks)
- e) Explain the relationship in heart rate, stroke volume and cardiac output at varying exercise intensity. (10marks)
- f) Other than those in Graphs A, B and Table 1; explain other three factors that affect the heart rate. (06marks)

**SECTION B: (60 Marks)**

**Attempt only 3 questions from this section.**

- 2. (a) Explain the significance phosphate ions incorporated into plants. (06marks)  
(b) Outline the evidences for the role of xylem in translocation of mineral ions. (07marks)  
(c) Describe the mechanism of stomatal opening based on the active potassium pump theory. (08marks)
- 3. (a) Describe how a whole set of codons required for formation of a polypeptide are assembled from DNA? (10marks)  
(b) How are the codons assembled provide a basis for formation of the polypeptide (10marks)
- 4. (a) Describe briefly the range of defenses of a mammal against infection (12marks)  
(b) Explain the different modifications of the columnar epithelium to perform their roles in the body of animals. (08marks)
- 5. (a) Distinguish between the following as applied to evolution.  
(i) Natural selection and speciation. (05marks)  
(ii) Analogous structures and homologous structures (05marks)  
(b) Account for the different pre-zygotic mechanisms that isolate organisms of different organism. (10marks)
- 6. (a) With suitable examples in each case, describe the photoperiodic categories of flowering plants. (14marks)  
(b) Outline the differences in the effects of red light and far-red light plants. (06marks)

**END**