

P530/2
BIOLOGY
PAPER 2
2½ hours
Apr 2023

Uganda Advanced Certificate of Education

BIOLOGY DEPARTMENT - 2023

SET SEVEN

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.

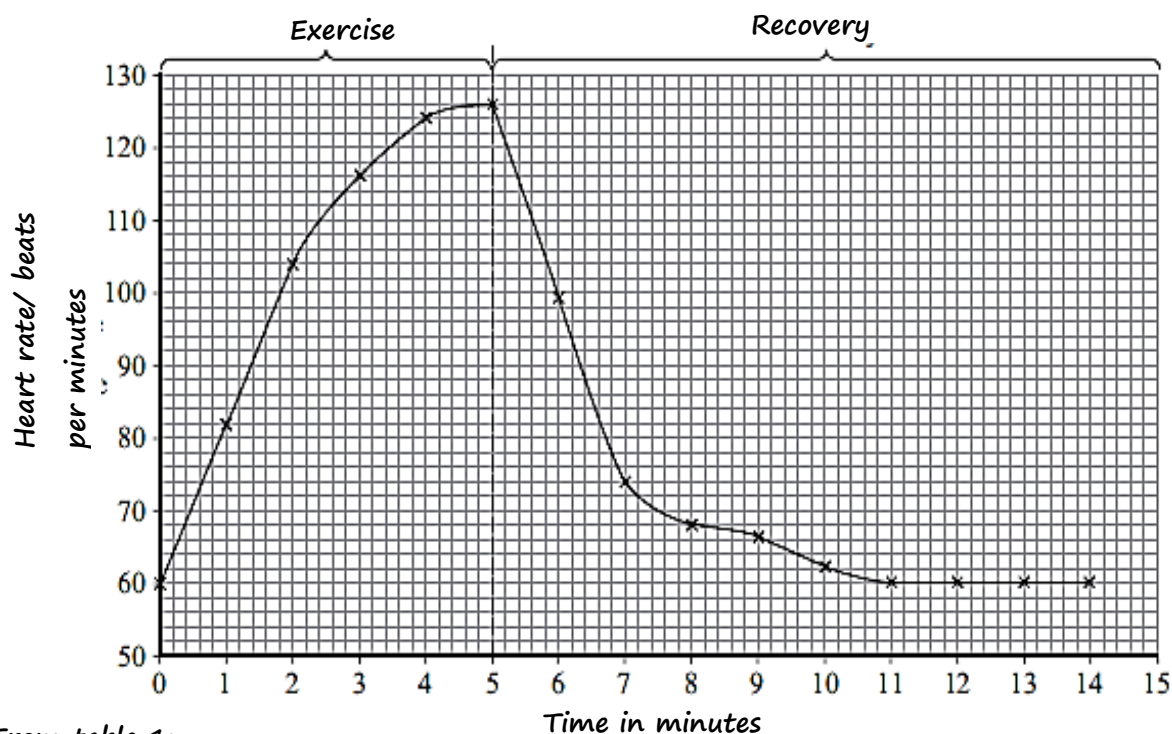
1. (A): The table shows the concentrations of dissolved substances in the urine of a healthy person and the urine of a person with one type of kidney disease.

Table 1.

Substance	Concentration in grams per dm ³	
	Urine of healthy person	Urine of person with kidney disease
Protein	0	6
Glucose	0	0
Amino acids	0	0
Urea	21	21
Mineral ions	19	19

(B): A student pedalled an exercise cycle at a constant speed for 5 minutes. The student's heart rate was recorded at one-minute intervals during the exercise and also during recovery. The student's heart was found to have a stroke volume of 60cm³/beat. The results are shown in the graph below.

Graph 1.



From table 1:

- Account for the absence of glucose in urine for a healthy person. (04marks)
- Compare the concentrations of dissolved substances for the two people. (05marks)

- c) Suggest an explanation for the difference in composition of urine between a healthy person and the person with the kidney disease. (03marks)
- d) Person with kidney disease could be treated either by using a dialysis machine or by having a kidney transplant operation. What are the advantages and disadvantages of having a kidney transplant rather than dialysis? (04marks)

From graph 1.

- e) Calculate the volume of blood ejected from the heart;
 (i) Between 0th minute and 1st minute. (03marks)
 (ii) Between 3rd and 4th minute. (03marks)
- f) Suggest reasons for the changes in heart rate between 0 and 14 minutes. (10marks)
- g) Explain five factors that alter the rate of heart beat in mammals, other than level of exercise/ activity. (08marks)

SECTION B: (60 Marks)

Attempt only 3 questions from this section.

2. (a) Explain the significance phosphate ions incorporated into plants. (08marks)
 (b) Outline the evidences for the role of xylem in translocation of mineral ions. (07marks)
 (c) Describe the methods exposed by insectivorous plants in obtaining essential elements from their nutrient deficient habitats. (06marks)
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) Convergent evolution and divergent evolution. (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

