

P530/2
BIOLOGY
(Theory)
Paper 2
July/Aug. 2023
2 ½ hours



TORORO ARCHDIOCESE EXAMINATIONS BOARD
Uganda Advanced Certificate of Education

BIOLOGY
(THEORY)

Paper 2

2 hours 30 minutes

INSTRUCTION TO CANDIDATES:

This paper consists of six questions.

*Answer question **one** in section A plus **three** others in 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 necessary.

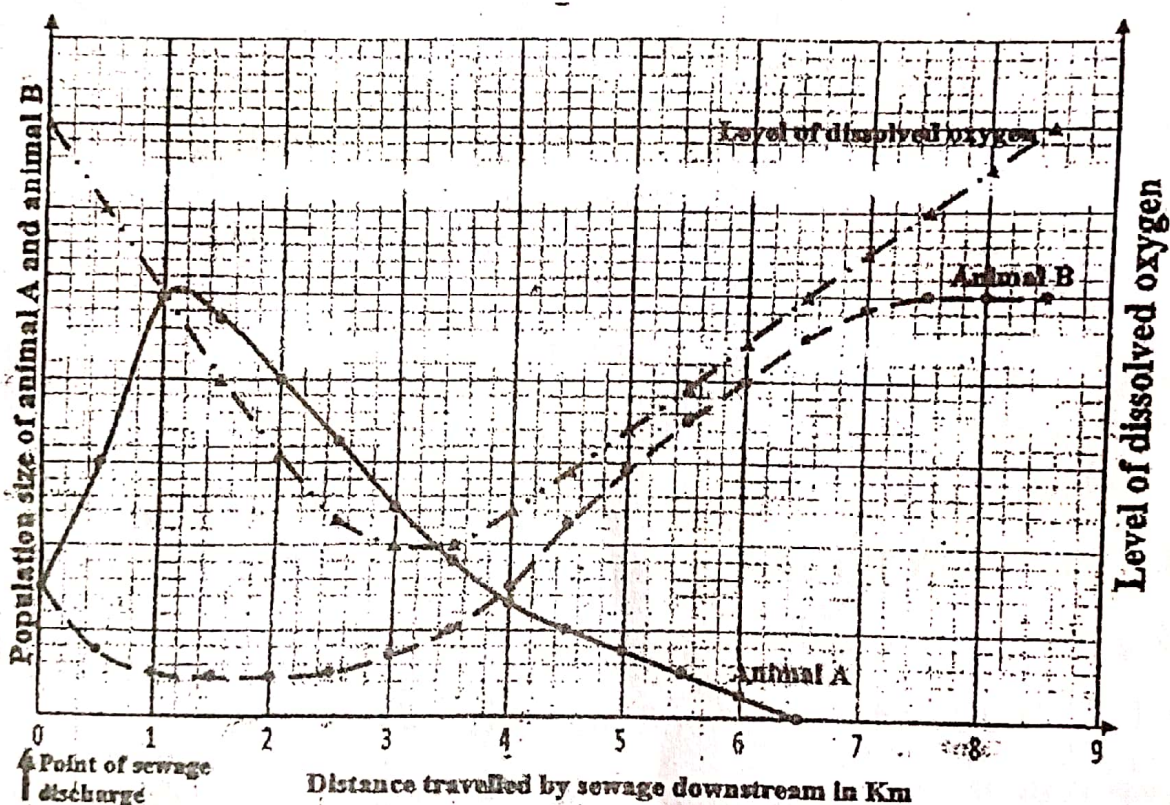
Turn Over

SECTION A (40 MARKS)

1. An ecological study was carried out on the consequences of discharging sewage into a river flowing through a town into a rural area.

The population size of two animal species A and B plus the amount of dissolved oxygen into the water was measured at every kilometer, along the distance travelled by sewage downstream from the point of sewage discharge. The results are shown in figure 1 below.

Figure 1



- (a) Compare the population size of animal A and animal B in this study. (06 marks)
- (b)
 - (i) State the relationship between the population size of animal A and animal B shown by the graph. (03 marks)
 - (ii) Explain the relationship stated in (b) (i) above. (17 marks)
- (c)
 - (i) What is the effect of distance travelled downstream on the level of dissolved oxygen? (02 marks)
 - (ii) Explain the effect stated in (c) (i) above? (06 marks)
- (d) Explain the physiological adaptations of animal A that makes it survive near the point of sewage discharge over animal B. (06 marks)

SECTION B (60 MARKS)

Answer three questions from this section.

2. (a) Distinguish between photophosphorylation and photorespiration. (04 marks)
(b) Describe the role of proteins in flowering of plants. (10 marks)
(c) How does day length affect plant distribution? (06 marks)
3. (a) What is meant by pressure potential? (03 marks)
(b) What is the effect of lowering solute potential on the following?
(i) Water potential of the plant tissue. (03 marks)
(ii) Mechanical support in herbaceous plants. (05 marks)
(iii) Pressure potential of the plant tissue. (05 marks)
(c) Compare osmosis and active transport. (04 marks)
4. (a) Explain how the counter current system operates in each of the following;
(i) Fish gills. (04 marks)
(ii) Kidney. (07 marks)
(iii) Human legs. (04 marks)
(b) How do marine teleosts manage their osmoregulatory problems? (05 marks)
5. (a) (i) State the Bohr's effect. (02 marks)
(ii) What is the physiological significance of the Bohr's effect? (06 marks)
(b) Describe how carbon dioxide is expelled as gaseous carbon dioxide by the lungs. (08 marks)
(c) Explain the physiological advantage of increasing the body temperature on the dissociation of haemoglobin in the mammalian blood. (04 marks)
6. (a) Describe the fluid mosaic model of the cell membrane. (07 marks)
(b) How is the structure of each of the following suited for transport of materials?
(i) Plasma membrane. (08 marks)
(ii) Xylem vessels. (05 marks)

END