

NAME: Signature

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P530/2

BIOLOGY

PAPER 2/ 2023

RENA COLLEGE MAYUGE

TOPICAL TESTS EXAMINATIONS

TOPICS: Respiration, transport and gaseous exchange.

UGANDA ADVANCED CERTIFICATE OF EDUCATION

BIOLOGY (THEORY) 2023 S.6 Paper 2

2 HOURS 30 MINUTES

INSTRUCTIONS

- ✓ *This paper consists of sections A and B ,Answer all questions in both sections*
- ✓ *Answer all questions in section A and choose ONLY THREE in section B*
- ✓ *All answers MUST be written in the booklets provided and Present neat graphical work*
- ✓ *Attach your question paper on the answer booklets*

FOR EXAMINERS' USE ONLY		
Section	marks	comments
A (40 MARKS)		
B (60 MARKS)	NO:	
	NO:	
	NO:	
Totals (100 MARKS)		

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SECTION A

1. The figure below shows the pressure changes in the buccal and opercular cavities of a teleost fish that were obtained using a hypodermic tubing connected to a pressure recorder.

The table below summarizes the features of gill lamellae of three species A, B and C of teleost fish.

Species of fish	Thickness of lamellae in μm	Distance between lamellae in μm	Distance between blood and surrounding water in μm
A	20	30	6
B	12	35	3
C	7	20	1

Use the information in the figure and table to answer the questions that follow.

- a) Compare the pressure changes in the buccal cavity and opercular cavity. (8marks)
- b) Explain the pressure changes in the first 0.4 seconds in the;
- i) Buccal cavity (8marks)
- ii) Opercular cavity (8marks)
- c) What is the physiological significance of the observed differences between pressure in the buccal cavity and opercular cavity? (5marks)
- d) From the table, explain how the thickness of lamellae is related to the extent of cavity in these fishes. (6marks)
- e) Suggest reasons why the gill lamellae would not provide an efficient respiratory surface on land. (2marks)
- f) Give adaptations of gills as gaseous exchange surfaces in bony fishes. (3marks)

SECTION B

2. a.) How are plant roots adapted to absorption of water from soil? (04 mark)
- b.). Explain the mechanism of stomatal opening and closure according to;
- (i) Starch-sugar inter-conversion theory (07 marks)
- (ii) Photosynthetic theory (05 marks)
- c.) How are the phloem tissues adapted to their functions (04 marks)

3. a) Describe the structure of guard cells in a plant leaf. (6marks)
b) Explain how stomatal opening occurs according to;
i) Starch \rightleftharpoons sugar interconversions (8marks)
ii) Photosynthetic theory (6marks)

4. a) Explain the lack of vascular system in specific organisms. [10½mks]
b) How is blood flow maintained in mammals? [7mks]
c) State the advantage of a double circulatory system over a single circulatory system. [2½mks]

5. a) What is meant by oxidative decarboxylation? (04 marks)
b) Explain the chemiosmosis theory of energy formation. (07 marks)
c) Describe the respiratory metabolism of glycerol in the cytoplasm of the cell. (09 marks)

6. a) Describe the structure of an **antibody**. (05 marks)
b) How might birth of a rhesus positive child by a rhesus negative mother affect the subsequent rhesus positive children? Explain your answer. (05 marks)
c) Describe how active immunity to a viral infection can be acquired naturally. (10 marks)

END