Candidate's Name: .....

Signature: .....

Random No.					Personal No.		

(Do not write your School/Centre Name or Number anywhere on this booklet.)

P530/3
BIOLOGY
(Practical)
Paper 3
Nov./Dec. 2023
3¼ hours

UGANDA NATIONAL EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

BIOLOGY
(PRACTICAL)

Paper 3

3 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of **three** *questions.*

Answer **all** *the questions.*

Write the answers in the spaces provided. **No** *additional sheets of paper should be inserted in this booklet.*

You are **not** *allowed to start working within the first* **15 minutes.** *You are advised to use this time to* **read** *through the paper and ensure that you have all the apparatus, chemicals and specimens you require.*

For Examiners' Use Only		
Question	**Marks**	**Examiner's Signature & No**
1		
2		
3		
Total		

Turn Over

1. You are provided with a freshly killed specimen **X**.

(a) (i) Giving **three** reasons, state the class to which it belongs. (*04 marks*)

Class . .....

Reasons

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(ii) Open the mouth of specimen **X** and examine the teeth. What special teeth adaptations do you observe? (*04 marks*)

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(iii) View the head of specimen **X** from the dorsal side and state how the features are suitable for environmental perception.

(05 marks)

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(b) (i) Dissect specimen **X** to open the abdominal cavity. Carefully disentangle the alimentary canal without causing much bleeding. Ligature the hepatic portal vein to prevent much bleeding. Stretch out the full length of the alimentary canal from the cardiac end of the stomach to the posterior end of the colon.

Measure the length of each portion of the alimentary canal as indicated in table **1**, record your results in the table and complete the table.

Table 1 *(06 marks)*

Portion (along outer part)	**Length (mm)**	**Percentage length of each section**
stomach		
duodenum		
ileum		
caecum & appendix		
colon		
full length		

(ii) What is the significance of the observed differences in the length and shape of the different portions of the alimentary canal?

Stomach *(2 ½ marks)*

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Duodenum *(02 marks)*

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Ileum *(02 marks)*

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Caecum and appendix *(02 marks)*

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Colon *(1 ½ marks)*

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(c) Proceed with the dissection by removing the unnecessary structures in order to display the major blood vessels of the left side of the abdominal cavity.

Draw and label the major blood vessels displayed. *(12 marks)*

2. You are provided with solutions; **P**, **Q**, **R** and specimen **S**. Solutions **P** and **R** provide different pH media.

(a) (i) Label four beakers; A_1, A_2, A_3 and A_4, and prepare their corresponding solutions as shown in table **2**.

Table 2

Solution (cm^3)	Volume of solution **Q** (cm^3)	Volume of water added (cm^3)
A_1	7	7
A_2	4	8
A_3	5	30
A_4	1	11

(ii) Cut a cube from specimen **S** measuring 3 cm × 3 cm × 3 cm. Chop the cube into smaller pieces and crush them into a paste using a mortar. Add 10 cm^3 of distilled water and decant the extract of specimen **S** in a petri dish and label it extract **S**.

(iii) Obtain six test tubes and label them as A_1, A_2, A_3, A_4, A_5 and A_6. Pour 10 cm^3 of the solutions A_1, A_2, A_3 and A_4 into the corresponding test tubes.

(iv) Pour 10 cm^3 of solution A_3 into each of the test tubes A_5 and A_6. Add five drops of solution **P** to the content of A_5 and five drops of solution **R** to the content of A_6.

(v) Cut six pieces of filter paper each measuring 0.5 cm × 0.5 cm. Dip the filter papers into extract **S** and leave them to stay in the extract for **five** minutes.

(vi) Pick one filter paper from extract **S** and gently dip it into the solution in test tube A_1, and start the stop clock immediately.

(vii) Record your observations and time taken for the paper to rise to the surface in table **3**.

(viii) Repeat procedure (vi) - (vii) using solutions in test tubes; A_2, A_3, A_4, A_5 and A_6.

Table 3 *(11 marks)*

Test Tube	Content	Observations	Time taken for paper to return to surface (seconds)
A_1	Solution A_1 + filter paper		
A_2	Solution A_2 + filter paper		
A_3	Solution A_3 + filter paper		
A_4	Solution A_4 + filter paper		
A_5	Solution A_3 +P + filter paper		
A_6	Solution A_3 +R + filter paper		

(b) Explain the results in the following test tubes.

(i) A_1 *(03 marks)*

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(ii) A_3 *(03 marks)*

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(iii) A_4 *(03 marks)*

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(iv) A_5 *(03 marks)*

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(v) A_6 *(03 marks)*

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(c) (i) Explain the significance of the reactions in the experiment to multicellular organisms. *(05 marks)*

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(ii) How were errors minimised during the experiment? *(03 marks)*

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3. You are provided with specimens; **E**, **F** and **G**.

(a) Mount a small portion of specimen **E** in a drop of water and observe under low power of a light microscope.

(i) Giving **two** reasons, state the division to which specimen **E** belongs. *(03 marks)*

Division .....

Reasons .....

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(ii) From your observations, state how the features of specimen **E** ensures its survival in the habitat. *(04 marks)*

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(b) (i) Using a hand lens, examine the upper surface of the pinna of specimen **G**. Describe the role of the observable structures in the survival of the organism. *(04 marks)*

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(ii) Cut a thin transverse section of the rachis of specimen **G**. Observe under low power of a light microscope. Draw and label the tissue plan observed. *(07 marks)*

(c) Use a hand lens to examine specimen **F**.

(i) Describe the structure of specimen **F**. (*04 marks*)

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(ii) Explain the ecological significance of specimen **F**. (*03 marks*)

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END