

**P530/3 Inst. Sch.
BIOLOGY
PRACTICAL
INSTRUCTIONS
Nov./Dec. 2024**



UGANDA NATIONAL EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

BIOLOGY PRACTICAL INSTRUCTIONS

P530/3 Inst. Sch.

November/December 2024

CONFIDENTIAL

This information is given only to facilitate the preparation of the examination.

Great care should be taken so that the information given below does not reach the candidates either directly or indirectly.

INSTRUCTIONS FOR PREPARING SPECIMENS AND APPARATUS

The teacher responsible for preparing specimens **must** ensure that candidates are provided with correct specimens and other materials as specified in these instructions.

Specimens and solutions which have been assigned **codes** should be presented to the candidates using those **codes only** and not any other identity.

The head teacher **must** ensure that the teacher responsible for preparing the specimens hands in his/her trial results for the physiology/biochemistry question, properly sealed in a separate envelope and **firmly** fastened (attached) to the candidates' scripts envelope(s).

Each candidate should be provided with the following:

A freshly killed rat, labelled **X**.

15 maize seedlings germinated for 24 hours, labelled **C**.

15 maize seedlings germinated for 72 hours, labelled **B**.

15 maize seedlings germinated for 48 hours, labelled **A**.

15 maize seedlings germinated for 12 hours, labelled **E**.

15 maize seedlings germinated for 108 hours, labelled **D**.

(Each of the maize seed lots are first soaked in water for 12 hours then planted on moist cotton wool. Begin counting the germination time when the seeds are planted on the cotton wool.)

10 cm³ of 1 % amylase solution, labelled **F**.

30 cm³ of distilled water, labelled **G**.

8 cm³ of 6 % hydrogen peroxide solution, labelled **Q**.

A complete mature plant of *Bidens pilosa* (black jack) but not yet flowering, labelled **U**.

A complete mature plant of *Commelina benghalensis* (wandering jew) but not yet flowering, labelled **V**.

An onion bulb, labelled **W**.

An Irish potato tuber, labelled **Y**.

A light microscope, glass slides and cover slips.

2 droppers and razor blade/scarpel.

Dissecting kit, board, pins and cotton wool.

A thermometer and glass rod.

A plastic mug/beaker and labelling tape.

8 test tubes of the same make and size.

5 boiling tubes.

5 ml and 20 ml or 25 ml measuring cylinders.

5 petri dishes.

A thread (20 cm long).

A cork borer (5 mm diameter).

A mortar and a pestle.

A stop clock.

Access to:

Reagents for carrying out food tests.

Distilled water.

Source of heat.

Filter papers and printing paper.

This form MUST be completed and returned in a separate envelope firmly attached to the scripts envelope(s).

UGANDA ADVANCED CERTIFICATE OF EDUCATION

November/December 2024

REPORT ON BIOLOGY PRACTICAL P530/3

Section I

Any information which the teacher responsible for preparing the specimens and the apparatus thinks may be useful to the examiners should be given on this sheet. The teacher must try out the physiology/biochemistry question and submit his/her results in the space provided below to guide the examiners about the specimens, apparatus and concentrations of the chemicals used.

N.B: Teachers who **do not** submit their results will be held responsible for their candidates' performance.

Results:

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Section II

The invigilator in consultation with the teacher responsible for preparing the specimens should give details of any difficulties experienced by particular candidates, giving their names and personal numbers. These should include:

- (a) Candidates who were unable to use specimens.

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- (b) Insufficiency of specimens or shared specimens.

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- (c) Substituted specimens.

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- (d) Any other information.

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Other cases of hardship e.g. illness, disability, etc., should be reported directly to UNEB in the normal way.

A plan of work benches, giving details by personal numbers of the places occupied by the candidates for each session, must be enclosed with the scripts.

DO NOT STAMP ANYWHERE ON THIS DOCUMENT

Name of the invigilator Signature

Signature of the teacher responsible for preparing specimens

Signature of the head teacher

Random number

Candidate's Name:

Signature:

Random No.				Personal No.			

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

P530/3
BIOLOGY
Paper 3
(Practical)
Nov./Dec. 2024
3½ hours



UGANDA NATIONAL EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

BIOLOGY

**Paper 3
(Practical)**

3 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of three questions.

All questions are compulsory.

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		

1. You are provided with specimen X which is freshly killed.
- (a) Examine the head of specimen X and describe the structure and location of the following:
- (i) Vibrissae (whiskers). (03 marks)

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(ii) Eyes. (1½ marks)

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(iii) Pinnae. (03 marks)

- (b) How significant is the location of the following structures in the life of specimen X?
- (i) Vibrissae. (02 marks)

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(ii) Eyes.

(1½ marks)

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- (c) Dissect the abdominal cavity of specimen X to expose the structures in the viscera. Displace the liver lobes anteriorly to expose the underlying structures without displacing the stomach. Cut the rectum at the base, pull it upwards and pin it to the right side of the specimen. Locate the duodenum, caecum and ileum. Displace the duodenum and caecum to the right side of the specimen and the ileum to the left side of the specimen. Draw and label the displayed structures of the alimentary canal of the abdominal cavity up to the pinned rectum including the mesenteric structures attached to the small intestine.

(17 marks)

- (d) With the stomach displaced to the right side of the specimen, draw and label the organs lying between the anteriorly displaced liver lobes and the posterior end of the duodenum. Include the blood vessels that supply the structures displayed. *(12 marks)*

2. You are provided with seedlings/seeds of five different lots labelled A, B, C, D and E, which have been grown for different lengths of time. You are required to investigate the effect of growth activities on the chemical components of the seed/seedlings using the following procedures:
- (a) (i) Label 5 petri dishes A, B, C, D and E.
(ii) Obtain 10 seedlings/seeds from each lot and place them in the respective petri dishes labelled A, B, C, D and E.

- (iii) Using a clean mortar and pestle, thoroughly pound the seedlings from petri dish A. Add 15 cm³ of distilled water, stir well and decant into a clean boiling tube and label it extract A₁. Pour the residue into the plastic mug / beaker provided.
- (iv) Repeat the procedures (a)(i) – (iii) using the remaining seed/seedling lots to make corresponding extracts B₁, C₁, D₁ and E₁.
- (b) (i) Carry out tests in table 1 to determine the food nutrients in extracts C₁ and D₁. Record your test procedures, observations and deductions in the table.

Table 1 (14 marks)

Test procedure		Observations	Deductions
<u>Iodine test</u>	C ₁		
	D ₁		
<u>Benedict's test</u>	C ₁		
	D ₁		
<u>Biuret test</u>	C ₁		
	D ₁		

- (ii) Basing on your results in table 1, name the extract which was obtained from the seedling that had grown for a longer time. (01 mark)

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- (iii) Explain your observations in table 1. (02 marks)

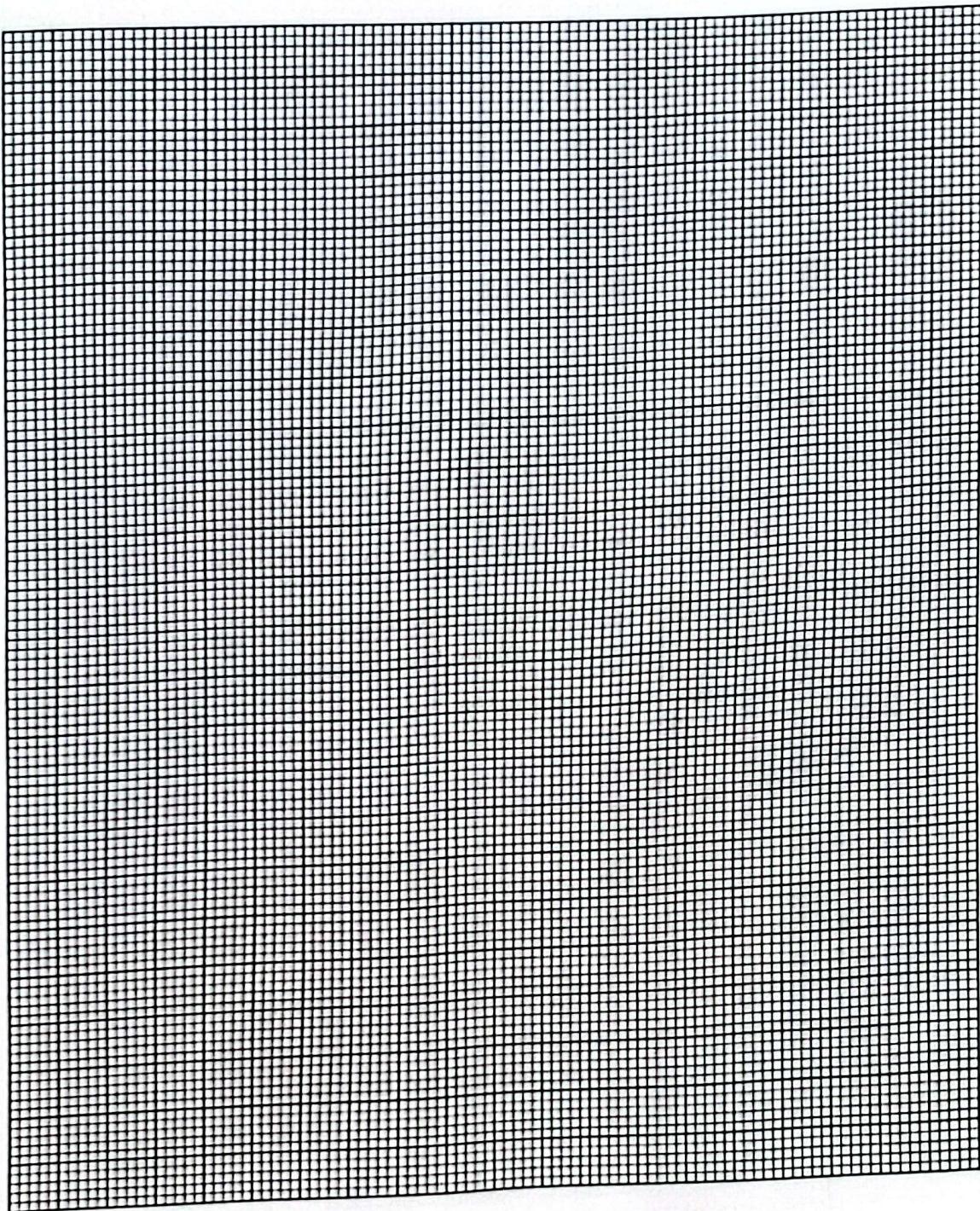
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- (c) (i) Obtain five clean test tubes of the same size, label them **A₂**, **B₂**, **C₂**, **D₂** and **E₂** and place them in a test tube rack.
- (ii) To each of the labelled test tubes **A₂**, **B₂**, **C₂**, **D₂** and **E₂**, measure and pour 1 cm³ of solution **Q**.
- (iii) Add 1 cm³ of **A₁** into the test tube **A₂** and immediately start the stop clock.
- (iv) After 30 seconds, using a ruler, measure in centimetres the height of the contents in the test tube **A₂**.
- (v) Record your measurement in table 2.
- (vi) Repeat procedures (c)(iii) – (v) using extracts **B₁**, **C₁**, **D₁**, **E₁** and the corresponding contents of test tube **B₂**, **C₂**, **D₂** and **E₂**.

Table 2 (05 marks)

Extract	Height of contents after 30 seconds (cm)
A₁	
B₁	
C₁	
D₁	
E₁	

(d) (i) Represent your results in table 2 on a suitable graph. (08 marks)



(ii) Explain the results plotted in (d)(i). (04 marks)

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3. You are provided with specimens V, W, Y and U.

(a) Examine specimens V, W, Y and U.

(i) Identify **two** distinctive features of the leaves and roots of each of the specimens and record your observations in table 3.

Table 3 (07 marks)

Specimen	Distinctive Features Observed	
	Leaves	Roots
V
W
Y
U

- (ii) Using the features in table 3, construct a dichotomous key for the identification of specimens V, W, Y and U. (03 marks)

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- (b) Explain the significance of any two common observable features unique to both specimens W and Y. (02 marks)

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(ii)
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- (c) (i) Peel off the lower epidermis of a fleshy leaf of specimen W. Place it on a glass slide, add 1 – 2 drops of distilled water and cover with the cover slip. Observe under low power of a light microscope and describe the appearance of the observed structures within the field of view. (03 marks)

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- (ii) Obtain a thin transverse section at the fourth internode towards the apex of specimen U. Place it on a glass slide, add 1 – 2 drops of iodine solution and cover it with a cover slip. Allow it to stand for 3 minutes and observe under low or medium power of a light microscope.

Draw and label the observed structures.

(08 marks)

- (iii) State how any **three** observed structures in (c)(ii) are suitable for their functions.

(03 marks)

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END

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