P530 3 Inst. Sch.
Biology Practical
Instructions
PAPER 3
July/August 2023

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Advanced Certificate of Education

BIOLOGY

Paper 3

PRACTICAL INSTRUCTIONS

CONFIDENTIAL:

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

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

INSTRUCTIONS FOR SPECIMENS AND APPARATUS.

The teacher responsible for preparing specimens and apparatus 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 candidates using those **codes only** and not any other identity.

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

Each candidate must be provided with:

- Specimen **D** – medium sized freshly killed toad frog
- Dissection requirements
- $30cm^3$ of each extract A, B and C (Extract prepared from Soya been seedlings germinated for the following durations –A- 72 hours, B-24 hours and C-144 hours. Select 20 healthy seedlings from each lot and remove the testa before preparing the extract) Grind each seed set and then transfer into a beaker and add $200cm^3$ of distilled water then leave to stand for 40 minutes. Filter to make the corresponding extract. Keep the residue.
- Spatulaful of residue **B** and **C** in separate labelled glass slides.
- Microscope
- 50 black and 50 white bean seeds of uniform size, soaked for 12 hours before the practical and dried thoroughly.
- 500ml beaker
- **Three** petri dishes
- **Two** khaki envelopes (medium sized – 24 x 16 cm) or A5 size
- **Five** test tubes and **two** boiling tubes
- A small conical flask
- Thermometer
- Stop clock
- Solution **S** is $20cm^3$ of urine from a cow or bull
- Litmus Solution
- (Dilute ethanoic/acetic acid approximately 0.1M labelled DILUTE ACID) shared between 5 to 10 candidates.
- 10ml measuring cylinder
- Two clean droppers
- Reagents – 2M NaOH solution, 2M HCL, Iodine solution and 4% $CuSO_4$ solution.

END

Name..... Centre /Index No .....

School ..... Signature .....

P530/3
BIOLOGY
(Practical)
PAPER 3
July/August 2023
$3^{1}/_{4}$ hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Advanced Certificate of Education

BIOLOGY PRACTICAL

Paper 3

3 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

- *This paper consists of* **three** *questions.*
- *Answer* **all** *questions.*
- *Answers must be written in the spaces provided.*
- *Additional sheets of paper must* **not** *be inserted in this booklet.*

FOR EXAMINER'S USE ONLY		
Question	**Marks**	**Examiner's signature**
1		
2		
3		
Total		

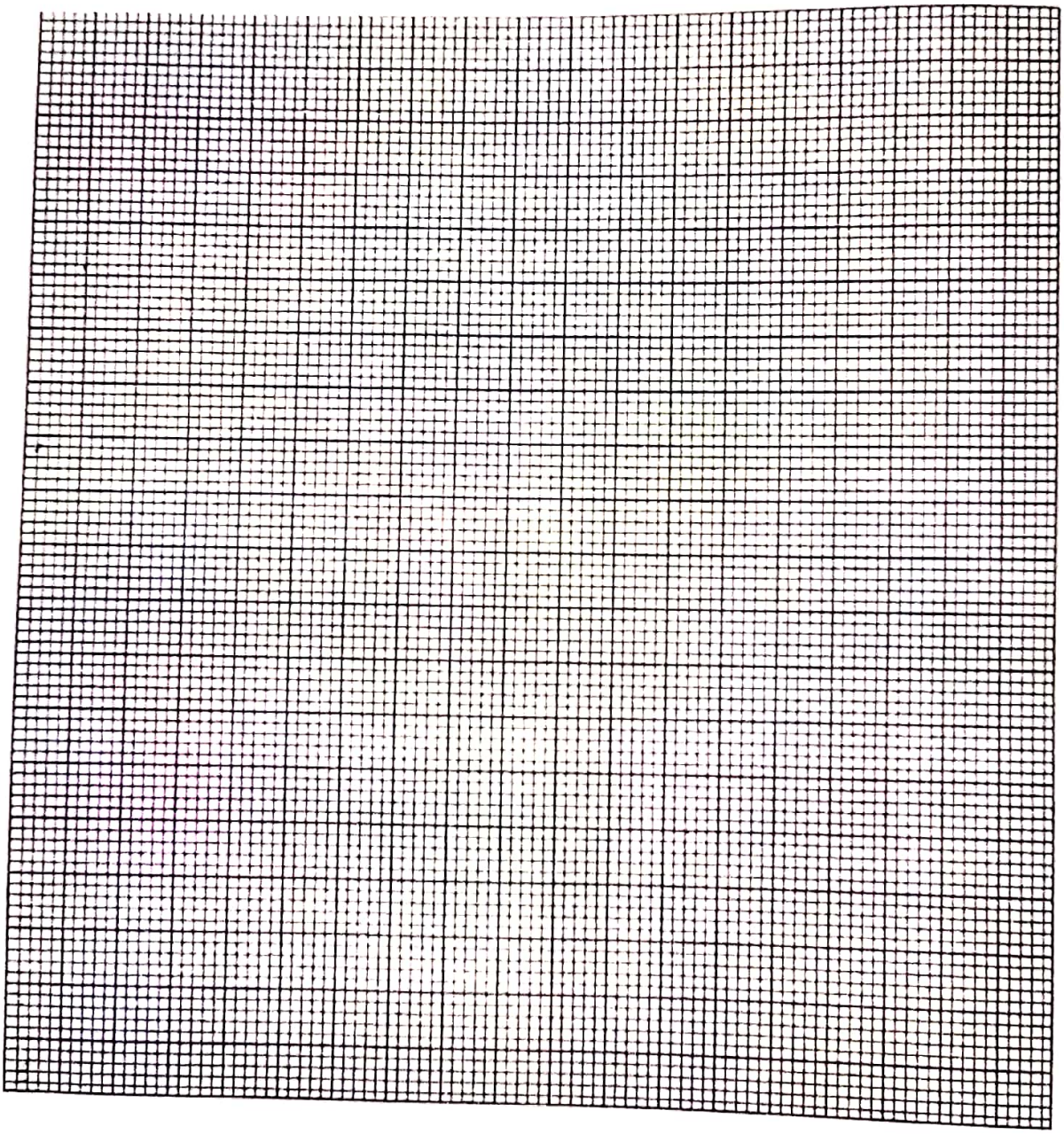
Turn Over

Question 1 **75 MINUTES (40 marks)**

You are provided with specimen **D** which is freshly killed.

(a) (i) Mop any water from the skin and place the animal ventral side up in the space provided with the limbs stretched out. Draw an outline of the specimen and use it to calculate the total skin surface area in cm^2. Show your working.

(04 marks)



(ii) Measure 250 ml of water in the large beaker provided. Using a blunt pin, completely immerse specimen D into the water and record the new volume of water in the beaker. (01 marks)

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(iii) From your result above, calculate the surface area to volume ratio of specimen D. (01 mark)

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(iv) Suggest the adaptive significance of such a ratio in the life of the specimen. (02 marks)

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b) Dissect the specimen to display contents in the abdomen.
List the visceral abdominal structures seen. (04 marks)

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(c) Dissect the specimen further to display blood vessels that:-

(i) Drain structures listed in (b) above and

(ii) Carry blood from heart to left side of the chest and head of the specimen.
Draw and label with the heart in dorsal view. (28 marks)

Question 2 **60 MINUTES (30 marks)**

You are provided with extracts **A, B** and **C** prepared from three lots of soya seedlings at different stages of development plus the residues obtained during preparation of extracts **B** and **C.**

(a) Examine extracts **B** and **C** plus nature of their residues.

(i) Describe the appearance of the extracts and nature of residue in:- (03 marks)

B

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C

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(ii) Account for the difference between extracts and residues from **B** and **C.** (02 marks)

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(b) Using the reagents provided, compare the amount of starch and proteins in the extracts. Record your tests and observations only in the table below:- (10 marks)

TEST	OBSERAVTIONS
1. Iodine test	A –
	B –
	C –
2. Biuret test	A –
	B –
	C –

(i) From your observations, arrange the extracts starting with that prepared from youngest to oldest seedlings. (01 marks)

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(ii) Explain how you have arrived at the order in (b) (i) above. (05 marks)

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(c) You are required to investigate the effect of extracts B and C on substrate S.

(i) To 5 cm^3 of solution S in each boiling tube labelled B and C, add the same quantity of the respective extracts. Incubate tubes B and C at temperature range 35 - 40^0C for 90 minutes.

(ii) After this period, transfer the contents of tube B into a small conical flask and add 1 cm^3 of litmus solution (Take note of the color change). Then using a dropper and counting the number of drops, add the dilute acid drop wise into the contents of the flask. (Shake the flask on adding each drop). Continue adding the acid till there is a color change. Record the number of drops added. (02 marks)

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(iii) Repeat the above procedure using content of tube C and record number of drops added. (02 marks)

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(d) Explain the:-

(i) changes in color of solutions in the flask. (02 marks)

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(ii) difference in number of drops of acid added in B and C (03 marks)

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Turn Over

Question 3 **(30 marks)**

You are provided with seeds of two contrasting colours representing factors for inheritance in plants. Label the envelopes provided **A** and **B.**
In the envelopes put seeds of contrasting colours as indicated in Rounds X, Y and Z in table of instructions. Rounds Y and Z represent crosses of subsequent generations carried out.

(a) (i) Table of instructions

	Envelope A	Envelope B
Round X	20 white seeds (W) 20 black seeds (B)	20 black seeds (B) 20 white seeds (W)
Round Y	20 white seeds (W) 12 black seeds (B)	12 black seeds (B) 20 white seeds (W)
Round Z	20 white seeds (W) 06 black seeds (B)	06 black seeds (B) 20 white seeds (W)

(i) Starting with round X, shake the seeds in each envelope thoroughly, without hesitation and looking into the envelope, pick one seed from each envelope to make a pair. Place the envelopes back carefully taking care not to spill the seeds out. Transfer the pair of seeds picked into petri dishes labelled WW, WB and BB, corresponding to the colours of the pairs picked. Continue picking seeds from both envelopes till the envelopes are empty. Count the number of pairs of seeds in each petridish and record in the table below:-

(ii) Repeat the procedure in a) (ii) above to obtain results for rounds **Y** and **Z.**

Table of Results: **(09 marks)**

Rounds	**X**			**Y**			**Z**		
No. of pairs	WW	WB	BB	WW	WB	BB	WW	WB	BB
ratio									

(b) From your results in round X, suggest giving reasons what the following represent in genetics:-

(i) black and white color of seeds. (02 marks)

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(ii) envelopes A and B. (02 marks)

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(iii) procedure of picking seeds. (02 marks)

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(iv) procedure of pairing seeds. (02 marks)

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(c) Explain why the envelopes were shaken thoroughly before seeds are picked. (02 marks)

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(d) Suggest and explain the genetic principles exhibited by the results obtained in:-

(i) Round X- (03 marks)

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(ii) Round Y and Z- (04 marks)

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(e) (ii) With evidence deduce the type of selection taking place. (02 marks)

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(ii) With explanations predict, what will happen if the crosses were continued in further subsequent generations. (02 marks)

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END