Candidate's Name: .....

Signature: .....

Random No.						Personal No.		

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

553/3
BIOLOGY
PRACTICAL
Paper 3
Oct. / Nov. 2022
2 hours

UGANDA NATIONAL EXAMINATIONS BOARD

Uganda Certificate of Education

BIOLOGY PRACTICAL

Paper 3

2 hours

INSTRUCTIONS TO CANDIDATES:

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

Answer **all** *questions.*

Drawings should be made in the spaces provided.

Use **sharp pencils** *for your drawings.*

Coloured pencils or crayons should **not** *be used.*

No *additional sheets of writing paper are to be inserted in this booklet.*

Work on additional sheets will **not** *be marked.*

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

Turn Over

1. You are provided with specimen **S** and solutions **X** and **Y**, which are of different concentrations.

(a) (i) Label **three** test tubes T_1, T_2 and T_3. To each of the test tubes, add a mixture of solution **X** and solution **Y** as indicated in table **1**.

Table 1

Test tube	Volume of **X** (cm^3)	Volume of **Y** (cm^3)
T_1	0.0	10.0
T_2	5.0	5.0
T_3	10.0	0.0

(ii) Using a 5 mm cork borer, obtain **three** potato cylinders from specimen **S** and trim each cylinder to a uniform length of 3.0 cm.

(iii) Place **one** potato cylinder in each of the test tubes T_1, T_2 and T_3 and ensure it is completely immersed in the solution. Keep the cylinders in the solutions for 25 minutes. (*You may continue doing other work.*)

(iv) After 25 minutes, remove the potato cylinders from solutions and measure the final length of each of the cylinders. Record your results in table **2** and determine the changes in length of each potato cylinder.

Table 2 *(03 marks)*

Test tube	Initial length (cm)	Final length (cm)	Change in length (cm) - (Final length - Initial length)
T_1	3.0		
T_2	3.0		
T_3	3.0		

(b) (i) Explain the change in length of the potato cylinder in the test tube T_1. *(04 marks)*

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(ii) Why is the change in length of the potato cylinder in test tube T_2 different from that in T_3? (*04 marks*).

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(c) (i) Feel the potato cylinder from T_1 between your fingers, try bending without breaking it. Repeat the procedure for the potato cylinder in T_3. Describe your observations.

Potato cylinder from T_1 (*02 marks*)

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Potato cylinder from T_3 (*02 marks*)

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(ii) What is the significance of the observations in (c)(i) to the plant?

Potato cylinder from T_1 (*02 marks*)

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Potato cylinder from T_3 (*02 marks*)

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(d) How can the observed changes in the potato cylinder in test tube T_1 be reversed to its original state? (*01 mark*)

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2. You are provided with specimens **P**, **Q** and **R** which are plant organs.

(a) Cut longitudinally through each of the specimens **Q** and **R**.

(i) Observe the cut surfaces and state the type of fruit to which specimens **Q** and **R** belong.

Specimen **Q** ..... (*01 mark*)

Specimen **R** ..... (*01 mark*)

(ii) Describe the observable structures in one half of each of the specimens **Q** and **R**.

Specimen **Q** (*03 marks*)

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Specimen **R** *(02 marks)*

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(iii) What are the advantages of the type of dispersal of specimen **Q** over that of **R**? *(03 marks)*

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(b) Using observable features, explain how specimen **P** is dispersed. *(03 marks)*

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(c) (i) Put one half of specimen **R** on a table, measure and record the length of the fruit from the stalk up to the scar. *(01 mark)*

Length ..... cm

(ii) Draw and label **one** half of specimen **R**. State the magnification of your drawing. *(06 marks)*

3. You are provided with specimens **T** and **U** obtained from a mammal.

(a) Observe and feel the working surface of each of the specimens with your fingers.

(i) Describe what you observed and felt.

Specimen **T**

(02 marks)

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Specimen **U** *(02 marks)*

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(ii) From your observations, identify the specimens **T** and **U**.

T ..... *(01 mark)*

U ..... *(01 mark)*

(b) Outline **four** structural differences between specimens **T** and **U**.
(04 marks)

	T	**U**
(i)		
(ii)		
(iii)		
(iv)		

(c) (i) State the function of each specimen to the mammal. *(02 marks)*

T

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U

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(ii) Explain **two** adaptations of specimen **U** to its function. *(04 marks)*

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(d) (i) Identify the longest portion of specimen **T** and then measure it. Record your results. *(½ mark)*

Length ..... cm

(ii) Draw and label specimen **T**. State your magnification. *(3½ marks)*

END

Each candidate should be provided with:

1 large sized fresh Irish potato tuber, labelled **S**.

30 cm^3 of distilled water, labelled **X**.

30 cm^3 of solution **Y**.
(*Solution* **Y** *is prepared by dissolving 273* g *of commercial sucrose in distilled water to make 1 litre of solution.*)

1 *Tridax* fruit, labelled **P**.

1 bean pod, labelled **Q**.

1 *Solanum sp* fruit (the edible type; garden egg/ bitter garden egg fruit), labelled **R**.

(*Each of the fruits* **P**, **Q** *and* **R** *should have a stalk.*)

1 incisor tooth, labelled **T**.

1 premolar tooth, labelled **U**.

(**T** *and* **U** *should be obtained from the same mammal.*)

1 cork borer of size 5 mm.

1 knife/scalpel.

4 test tubes.

1 stop clock.

Access to:

- Heat Source.
- Reagents for food tests.