Candidates Name: ……..

Signature ……Personal No ……

553/2

BIOLOGY

PRACTICAL

Paper 2

July/August

Paper 2

2hours

UGANDA CERTIFICATE OF EDUCATION
BIOLOGY PRACTICAL
2HOURS

INSTRUCTIONS TO CANDIDATES

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

*Answer **ALL** questions*

*Answers **must** be written in the spaces provided*

*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 papers are to be inserted in this booklet

For Examiners' use only		
Question	**Marks**	**Examiners' signature**
1		
2		
3		
Total		

Turn over

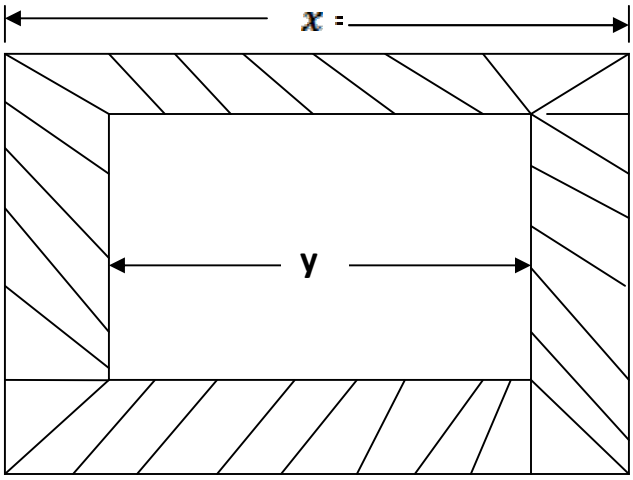
1. You are provided with specimen **G.** Peel it and cut it into two cubes of dimensions 1cm by 1cm by 1cm (*labeled A*) and 2cm by 2cm by 2cm (*labeled B*)

(a) Calculate the surface area, volume and surface area to volume ratio for each one of the cubes **A** and **B**. Record your calculations in Table **1** below. (5marks)

Table 1

Cube	Surface area	Volume	$\frac{\text{Surface area}}{\text{Volume}}$
A			
B			

(b) Immerse the cubes in potassium permanganate solution in a beaker for 20 minutes. After 20 minutes, remove the cubes from the solution and dry them using blotting paper. Cut the cubes into two equal halves. Measure and record the length of cross section **(*x*)** of each specimen, and length **(y)** of the unstained portion in each transverse section. The cubes appear as shown below when cut



Record your results in Table **2** below. (4marks)

Table 2

Cube	Length of cross-section, ***x*(cm)**	Length of unstained portion, **y(cm)**	% penetration $\frac{x-y}{x} \times 100$
A			
B			

(c) (i) Which process is being demonstrated in this experiment? (1mark)

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(ii) Explain the results of percentage penetration for cubes **A** and **B** in Table **2** above

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(d) If the coloured substance represents an important chemical of life to be transported in the body;

(i) What advantage would specimen **A** have over specimen **B**? (1mark)

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(ii) How would specimen **B** overcome its disadvantage? (1mark)

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(e) (i) Apart from surface area, explain three other factors that affect the process demonstrated in the experiment. (3marks)

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(ii) Name two structures in the mammalian body where the process demonstrated occurs. (2marks)

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2. You are provided with specimen **K, L** and **M** which are plant organs. Cut specimen **M** longitudinally.

(a) Giving one reason in each case, identify specimen **K, L** and **M** (4½marks)

(i) Identity of specimen **K**

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Reason

……..

(ii) Identity of specimen **L**

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Reason

……..…

(iii) Identity of specimen **M**

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Reason

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(b) Describe the arrangement of fleshy leaves of specimen **M** (2marks)

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(c) (i) Give two similarities between specimen **K** and **L** (2marks)

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(ii) State any two differences between specimen **L** and **M** (2marks)

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(d) Specimen **K, L** and **M** perform two common functions. Describe how the specimens are structurally adapted to perform their functions (4marks)

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(e) Draw and label the longitudinal section of specimen **M** in the space below. State your magnification (5½marks)

3. You are provided with specimen **P** and Q which are organs from the same animal.

(a) State the phylum and class to which the specimen**s** were obtained. Give a reason for your answer. (2 marks)

Phylum ……

Reason ……

……..……

(b) (i) Describe the structure of each specimen. (6 marks)

Specimen P

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Specimen Q

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(ii) From your description, suggest the habitat of the animal from which the specimens were obtained. (1 mk)

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(c) Describe how each specimen is adopted to its function. (6 marks)

Specimen P

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Specimen Q

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(d) In the space below draw the lateral view of specimen Q. Do not label. (5marks)

END

Confidential for resource paper

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- Each candidate should be provided with:
- $40cm^3$ of potassium permanganate solution.
- Small beaker (50ml or 100ml)
- Medium size fresh irish potato tuber labeled G
- Small size irish potato tuber with sprouting buds, labeled **L**
- Rhizome of cana lily labeled **K**
- Bulb of onion , with foliage leaves, labeled **M**
- Small size Tilapia fish labeled **P**
- Hand lens
- Knife labels