

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

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

**P530/3**  
**BIOLOGY**  
**(Practical)**  
**PAPER 3**  
**3¼ hours**

## **WAKISSHA**

**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		

1.

72 MINUTES (40 marks)

You are provided with specimen K. Examine the external features of the specimen.

- a) Give **three** external features used to classify the specimen in to the class to which the specimen belongs: (1½ marks)

1. ....
2. ....
3. ....

- b) Place the specimen with its ventral side uppermost. Cut off part of the limbs posterior to the femur.

- i) Draw and label the anterior half of the trunk region of the specimen. (9½ marks)

- ii) How are any **two** parts labeled in (b) (i) adapted for survival of the specimen in its habitat? (2 marks)

1. ....
2. ....

- c) Remove the head of the specimen with its accessory structures. Using a hand lens observe the following on the head from Ventral views.

- i) Segmentation of the head plus the compound eyes,
- ii) Visible mouth parts and
- iii) Attachment of 1<sup>st</sup> segment at base of the left antenna.

Draw left half of the head to show parts observed in (i), (ii) and (iii) above.

**Do not label.**

(9 marks)

- d) Dissect the specimen to display structures responsible for locomotion plus those used for transport of materials in the body of the specimen anterior to the 5<sup>th</sup> abdominal segment.  
Draw and label with dorsal cuticle displaced to left of the specimen. (18 marks)



2. 65 MINUTES (30 marks)

You are provided with coloured solution X and solution P and Q prepared from the same nutrient.

- a) Carry out the instructions below:-
- Add four drops of solution X to 1 cm<sup>3</sup> of solution P in a tube and shake the contents of the tube.
  - Obtain a little of the coloured mixture using a dropper and insert the tip of the dropper half way into 8 cm<sup>3</sup> of solution Q.  
Gently release one drop of the coloured solution. Observe the movement of the drop.
- b) From your observations in (a) (ii) above state the solution with lower concentration of the nutrient. Explain your answer. (2½ marks)

.....

.....

.....

.....

- c) i) Label five petri dishes 1-5 and prepare 20 cm<sup>3</sup> of the other solutions by mixing solution P and Q as follows:  
Record the volume of solution Q used to add to volume of P to make 20cm solution in the table 1 below.

**Table 1:**

Petri dish	1	2	3	4	5
Solution P in cm <sup>3</sup>	20	16	12	8	2
Solution Q in cm <sup>3</sup>					

(2½ marks)

- ii) Using a scalpel/razor blade, split plant materials R longitudinally to obtain six strips (each of width 2mm and length 6cm).  
Describe the shape of the strips immediately they are cut from R. (1 mark)

.....  
.....  
.....

- iii) Explain the shape of the strips as described in (b) (ii) above. (2 marks)

.....  
.....  
.....  
.....

- iv) Transfer one strip into each of the solutions in the petri dishes labeled 1- 5.  
Put the 6<sup>th</sup> strip in a small beaker containing 20cm<sup>3</sup> of original solution P provided and immerse the beaker in water (bath) maintained at temperature 40°C. Leave the strips in petri dishes 1 – 5 and that in beaker all to stand for 50 minutes..

**NB:** For strips in solution 1 and P measure the distance between the ends of the strips every 10 minutes for 50minutes.

Record the distance in **Table 2** Below.

(5 marks)

Time in Minutes	10	20	30	40	50
Distance (D) in mm 1					
Strip in solution P					

- d) (i) After 50 minutes measure and record in millimeters the distance between the end of the strips in the petri dishes in **Table 3** below: (2 marks)

**Table 3:**

Strip from solution	1	2	3	4	5
Distance (D) in mm					



- (ii) Explain the results in:-  
**Table 2.**

(2 marks)

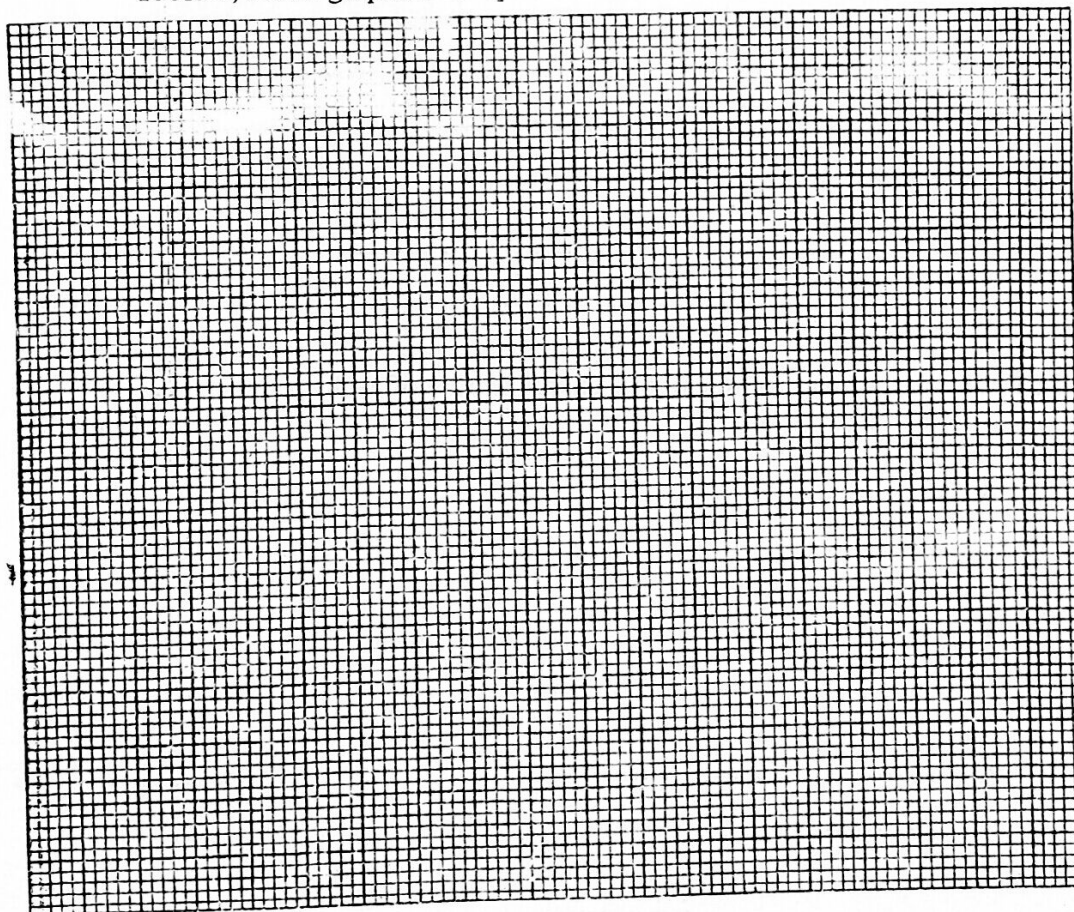
**Table 3:** where value of (D) is below 50 mm.

(5 marks)

- (iii) From the result in **Table 3**, state the solution with nutrient concentration nearest to that in cell sap of plant material **R**. Give reason for your answer. (2 marks)

- (iv) Using the volume of solution **P** in **Table 1** and distances recorded in **Table 3**; Plot a graph in the space below.

(8 marks)



3.

(30 marks)

You are provided with specimens X, Y and Z.

- a) Examine specimens X and its flora parts under low power magnification.  
Describe the structure of:

i) Inflorescence of the specimen (4 marks)

.....  
.....

ii) Visible parts of floret from periphery of the specimen. (4 marks)

.....  
.....  
.....  
.....  
.....

- b) Remove a complete floret from each specimen and observe using a hand lens.

i) Give two ways each floret is structurally unique from the others. (6mks)

X

1. ....  
2. ....

Y

1. ....  
2. ....

Z

1. ....  
2. ....

ii) What is the adaptive role of one unique feature of each specimen is as recorded in (b) (i) above. (3 marks)

X .....

Y .....

Z .....

- c) Cut three transverse sections of the ovary of specimen Y and transfer into 5 drops of the stain provided for 10 minutes. Mop any excess stain before observing under low power magnification. **Draw, but don't label.** (4 ½ marks)

- d) Remove another complete floret from specimen Z. Split it longitudinally in to halves. Examine one half from inner view under low power magnification. **Draw and Label.** (8½ marks)

**END**

**Each candidate must be provided with**

**No. 1**

- Specimen **K**- fresh killed cockroach
- Hand lens
- Dissection board + kit

**No. 2**

- 10ml solution    **X**- concentrated DCPIP solution
- 100ml solution    **P** - 0.1M sucrose solution
- 100ml solution    **Q** - 0.8M sucrose solution
  - 3 droppers
  - 6 petri dishes
  - 2 Test tubes
- 10ml measuring cylinders
- Razor blade
- R-10cm length young fleshy pawpaw leaf stalk
- Label/ sticky paper
- Ruler
- Thermometer
- 50ml beaker
- Stop clock

**No. 3**

Freshly obtained inflorescences of:

- **X**- Mature *Tridax* (with clear forked stigma)
- **Y**- Mature *Cassia*
- **Z**- Mature *Lantana camara*
- Microscope
- Methyl blue stain

**END**