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

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

P530/3
BIOLOGY
(Practical)
PAPER 3
$3^{1}/_{4}$ 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		

Turn Over

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 1st 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 5th 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:-

i) Add four drops of solution **X** to 1 cm^3 of solution **P** in a tube and shake the contents of the tube.

ii) Obtain a little of the coloured mixture using a dropper and insert the tip of the dropper half way into 8 cm^3 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)

.....

.....

.....

.....

Turn Over

c) i) Label five petri dishes 1-5 and prepare 20 cm^3 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^3	20	16	12	8	2
Solution **Q** in cm^3					

(2½ marks)

ii) Using a scalpel/raze 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 trips 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 6th strip in a small beaker containing 20cm^3 of original solution P provided and immerse the beaker in water (bath) maintained at temperature 40^{0}C. Leave the strips in petri dished 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)

.....

.....

.....

.....

.....

.....

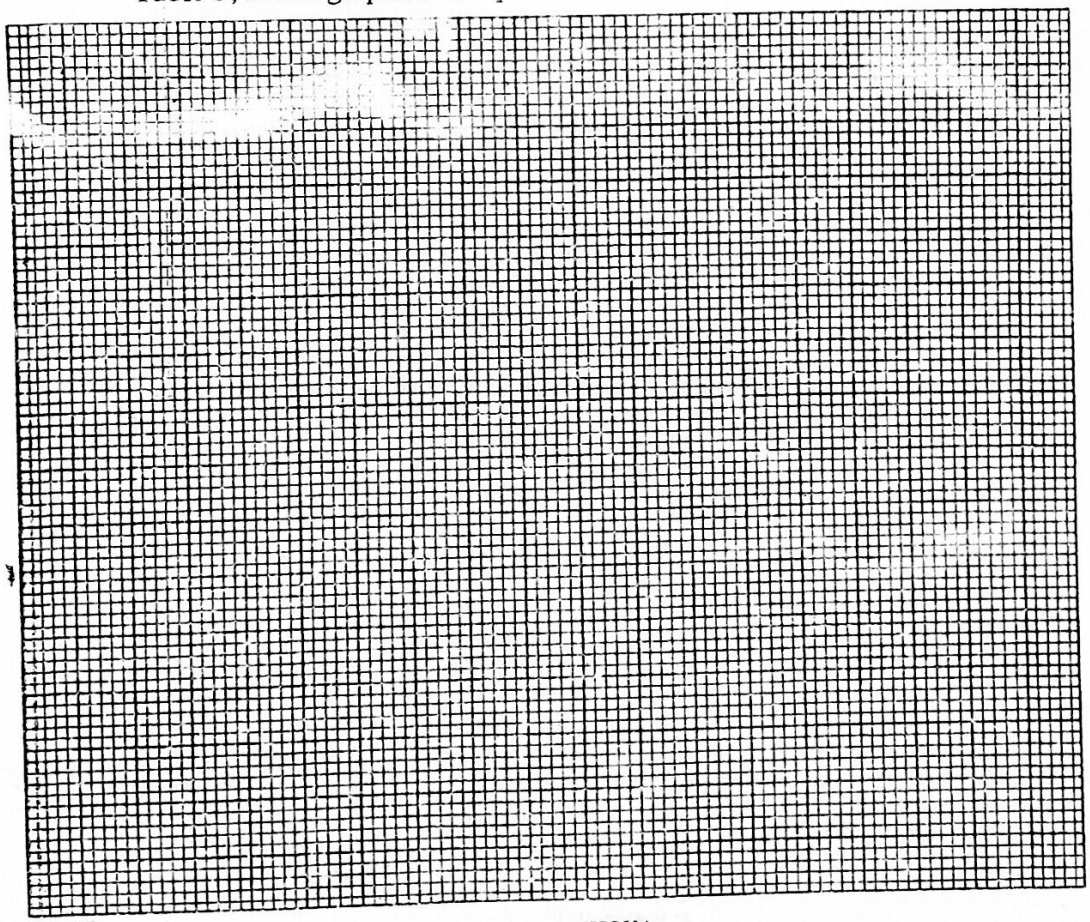
(iii) From the result in **Table 3,** state the solution with nutrient concentration nearest to that in cell sap of plant material **R**. Give reason for your answer. (2 marks)

.....

.....

.....

(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
- 10m*l* measuring cylinders
- Razor blade
- **R**-10cm length young fleshy pawpaw leaf stalk
- Label/ sticky paper
- Ruler
- Thermometer
- 50m*l* 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