Name: MARKING SCHEME…….. Centre/Index No. ……/……

Signature: …… ***Hotline: 0776/0754958643***

P530/3

BIOLOGY

PRACTICAL

Paper 3

Jul/Aug 2022

3 hours

Uganda Advanced Certificate of Education

BIOLOGY

PRACTICAL

Paper 3

3 hours

INSTRUCTIONS TO CANDIDATES:

Answer **all** questions

Answers must be written in the spaces provided. Additional sheets of paper must **not** be inserted.

For Examiner's Use only	
Question	**Marks**
1	
2	
3	
Total	

(70 minutes)

1. You are provided with specimen T which is freshly killed.
   Examine the external features of specimen.
   (a) State four features necessary for aquatic existence of the specimen. (04 marks)
      1- *Webbed hind feet/toes for swimming;*
      2- *Buldging/protruding eyes for vision when body under water;*
      3- *Moist skin for gaseous exchange;*
      4- *Streamlined head/body for swimming;*
      5- *Pale colour of skin from underside blends with water; [any 4]*
      6- *Transparent nictitating membrane for protection of eyes/vision under water;*
      7- *Anteriorly located nostrils/ external nares above mouth maintain aerial contact for inlet and out of gases when submerged;*
      8- *Flat eardrums/tympanic membrane/tympanum thus streamlined body for swimming;*

      ACC: Any correct 4 given
      @01MK,04MAX

   (b) Place the specimen on its back.
      (i) Draw the left fore and hind limbs of the specimen without stretching them. Do not label. (06 marks)

      A drawing showing the (unstretched) left fore limb of specimen T

T-0.5

D-0.5MAX

N-0.5

M-0.5

P-0.5

S-0.5

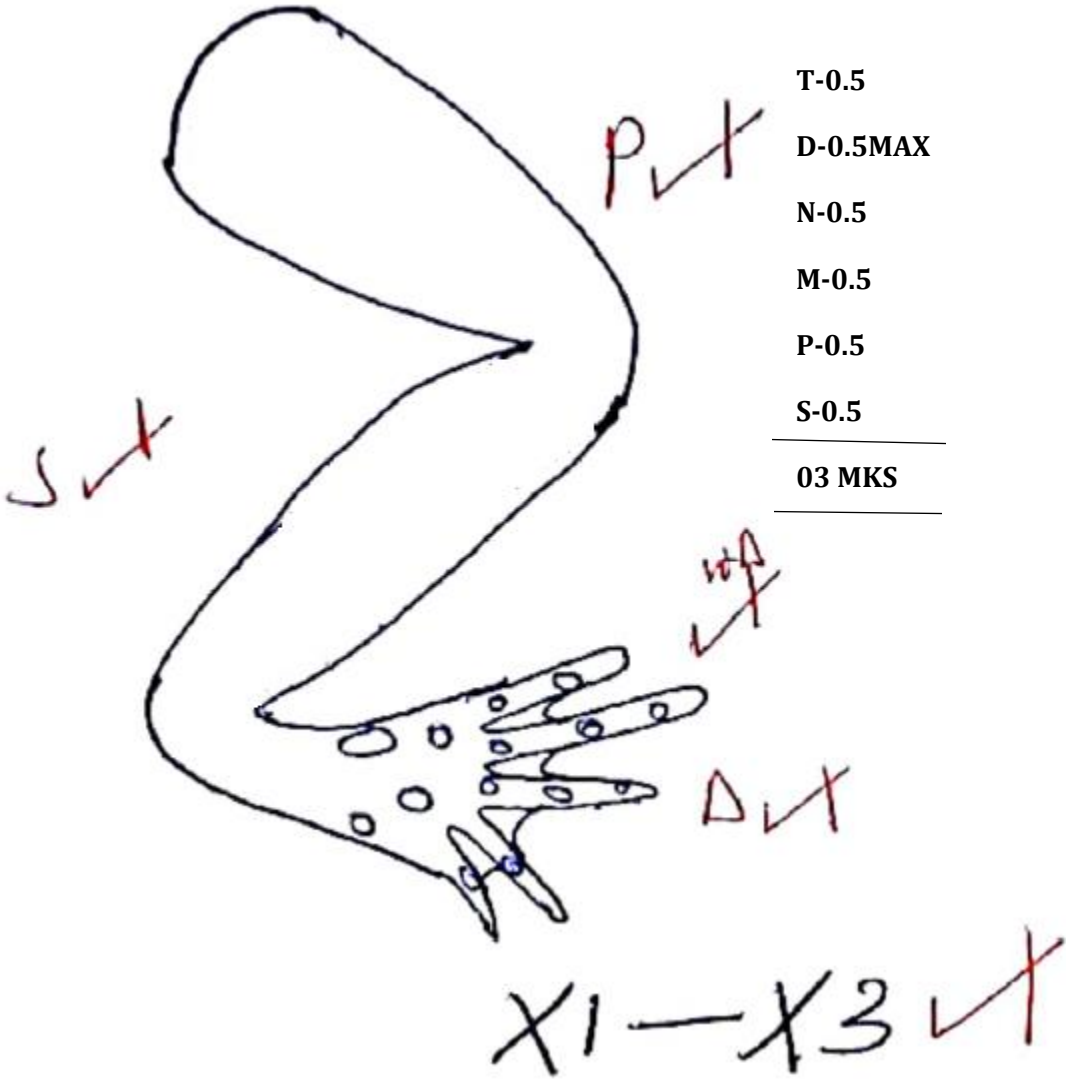
03 MKS

P-positioning

S-V-shape

D- 4 digits

A drawing showing the (unstretched) left hind limb of specimen T



T-0.5

D-0.5MAX

N-0.5

M-0.5

P-0.5

S-0.5

03 MKS

Commentary

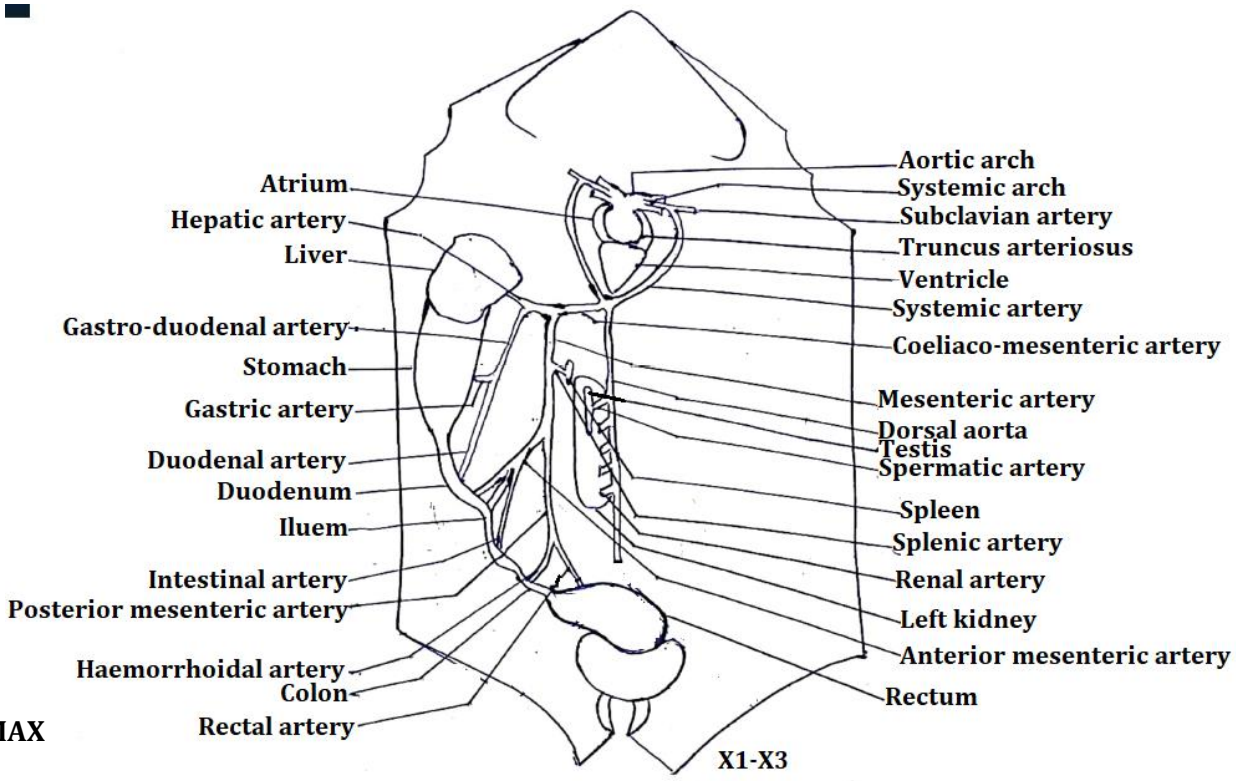
- ***Award a mark for P-only if left positionings are shown as drawn above.***
- ***S-Z-shape***
- ***D-5 digits with webs in-between.***
- ***NA: If different positionings shown unlike those in the drawings above.***
- ***Deny all marks in case of NA.***
- ***ACCEPT: With or without digital and foot pads***

(ii) Account for the difference in the shape of the two limbs as drawn in (b) (i) above.[01 mk]

- *Fore limb is V-shaped because it has fewer limbs; while hind limb is Z-shaped because it has many joints;* ***@0.5MK, 01MK***

(c) Dissect the specimen to display the heart and blood vessels supplying blood to the left forelimb and abdominal structures.
Draw and label your dissection. (32 marks)

A drawing showing the heart and blood vessels supplying blood to the left forelimb and abdominal structures of specimen T



T-01

D-13.5MAX

L-13.5MAX

O-01

N-01

M-01

LFT-01

32 MKS

Commentary

- **ACC: Genital/testial artery instead of spermatic artery**
- **Deny all marks incase of NA**

NA:

- ✓ ***If treated branches off aorta separate from coeliaco-mesenteric artery.***
- ✓ ***If the heart is displaced anteriorly***

Question 2

(a)

TESTS	Soln	OBSERVATIONS	DEDUCTIONS
Iodine test.	E	• Turbid solution turned to black solution	• Much starch present. 01½
Acc: Pale brown solution/ yellow solution.	F	• Turbid solution turned to pale blue solution Acc: Black specks suspended in a pale brown solution.	• Little starch present. 01½ MAX Acc: Starch absent.
Benedict's test	E	• Turbid solution turned to pale blue solution then to green solution, yellow precipitate on boiling.	• Moderate reducing sugar present 02½ Acc: Little reducing sugar present.
	F	• Turbid solution turned to pale blue solution then to green solution, yellow precipitate, orange precipitate and finally brown precipitate on boiling.	Much reducing sugar present. 02 MKS

Biuret's test.	E	Turbid solution turned to pale purple solution/Blue ppt	Little protein present, 0½
	F	Turbid solution turned to blue precipitate.	Little protein present. 0½

(b) (i) • As the fruit ripens, the amount of starch decreases; amount of reducing sugars increases; and the amount of proteins remain the same; 02mks

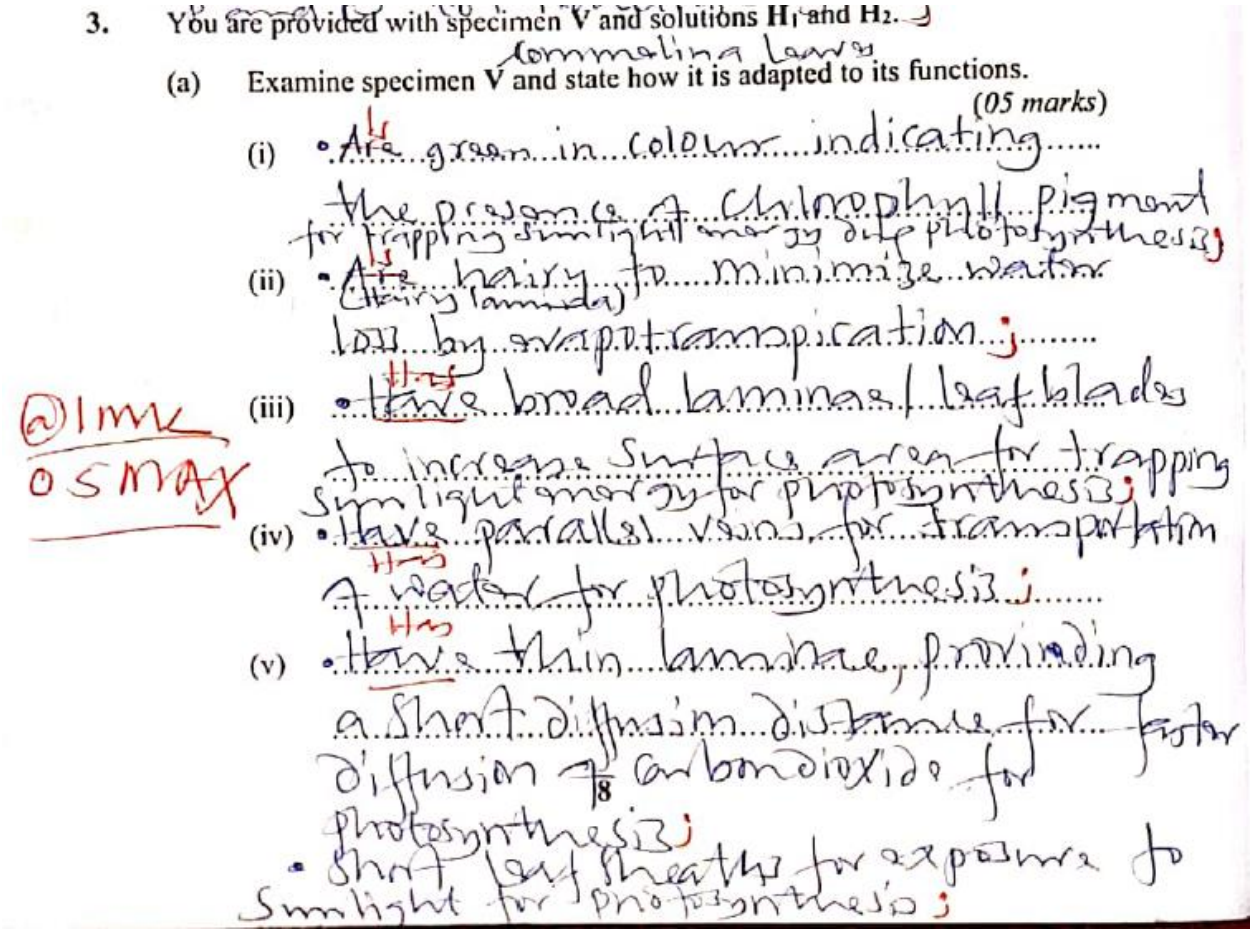
(ii) • N_1 and N_2 are not suitable for main diet for a young child because there are little proteins required for the growth of the child ✓ 02

(c) (i)

TESTS	OBSERVATIONS	DEDUCTIONS
Iodine test. • To 1 cm³ of extract in a test tube, added 2/3 drops of Iodine solution	Turbid solution turned to black solution.	• Much starch present. 02½
Benedict's test • To 1 cm³ of extract solution in a test tube, added 1 cm³ of Benedict's solution and boiled for 1 minute.	Turbid solution turned to pale blue solution that persisted on boiling. OR Turbid solution turned to pale blue solution then to green solution on boiling.	• Reducing sugar absent. 03½ max OR Traces of reducing sugar present.
Biuret's test		

	Biuret's test. • To 1 cm³ of diluted solution in a test tube, added 1 cm³ of dilute sodium hydroxide solution followed by 3 drops of copper (II) Sulphate solution and shaken.	• Turbid solution turned to violet/ deep purple solution. OR • Turbid solution turned to pale purple solution.	present. • Much protein present. OR Moderate protein present. 03 MAX
(ii)	• Young children / children / babies Reason: • Because it contains much proteins required for growth of children. ✓ 02		

Question 3



3. You are provided with specimen V and solutions H_1 and H_2.

(a) Examine specimen V and state how it is adapted to its functions. *(05 marks)*

(i) • Are green in colour indicating the presence of chlorophyll pigment for trapping sunlight energy for photosynthesis;

(ii) • Are hairy to minimize water loss by evapotranspiration;

(iii) • Have broad laminas/leaf blades to increase surface area for trapping sunlight energy for photosynthesis;

(iv) • Have parallel veins for transportation of water for photosynthesis;

(v) • Have thin laminae, providing a short diffusion distance for faster diffusion of carbondioxide for photosynthesis;
• Short leaf sheaths for exposure to sunlight for photosynthesis;

@1mk
05MAX

(b).

D.W. water

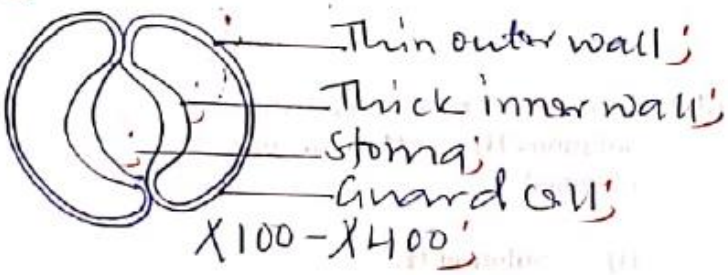
Label two petri dishes as H_1 and H_2 and pour into each the corresponding solutions H_1 and H_2. 5% salt soln

Transfer two strips of specimen **V** into solution H_1 in the petri dish. Transfer the remaining two strips of specimen **V** into solution H_2 in the petri dish. Leave the set-up to stand for at least 5 minutes.
After 5 minutes;

(i) remove one strip from solution H_1 and mount it in a drop of solution H_1 on a microscope slide. Observe under medium power of a microscope.

Draw and label any **two** adjacent cells. *(6½ marks)*

A drawing showing two adjacent cells of strip from solution H_1 of specimen V as observed under medium power of a microscope;



X100 – X400;

T – 0½
D/L – 0½
M – 0½
N – 0½
N/C – 0½
A – 0½
0/6½

(ii) remove one strip from solution H_2 and mount it in a drop of

2(ii) remove one strip from solution H_2 and mount it in a drop of solution H_2 on a microscope slide. Observe under medium power of a microscope. Describe the appearance of cell parts.
(03 marks)

- outer wall is thin and convex shaped;
- Inner wall is thick and concave shaped;
- stoma closed by a thick crescent shaped inner walls; @1mk, 03 mks
- End walls are joined;

(c) Explain the effect of each of the solutions H_1 and H_2 on the cells of specimen V. *(05 marks)*

(i) Solution H_1.

Stoma widely open; because H_1 was hypotonic to cell sap of cell thus absorbed water by osmosis; became turgid and opened widely;

(ii) Solution H_2.

Stoma closed; because H_2 was hypertonic to cell sap of guard cell; thus lost water by osmosis, became flaccid and closed; @½mk, 05 mks

(d) From your observations, what is the significance of the effect of solutions H_1 and H_2 to the plant from which specimen V was obtained? (*03 marks*)

(i) **Solution H_1.**

·Stoma widely open; favours carbondioxide absorption for photosynthesis; encourages water loss thus cooling of the plant hence preventing overheating;

(ii) **Solution H_2.**

·Stoma closed; minimizes water loss; thus water conservation on hot days;

⑦ ½mk, 3m

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END