Name: MARKING GUIDE ..... Centre/Index No: BATWALA ALLAN2 / 0779220446

P530/3
BIOLOGY
PRACTICAL
Paper 3
AUGUST, 2019
3¼hours

JINJA JOINT EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

MOCK EXAMINATIONS – AUGUST, 2019

BIOLOGY

PRACTICAL

Paper 3

$3\frac{1}{4}$ hours

INSTRUCTIONS TO CANDIDATES

Answer **ALL** *questions.*

Answers must be written in the spaces provided.
Additional papers must not be inserted

For Examiner's Use Only

QUESTION	MARKS
1	39
2	35
3	26
TOTAL	100

1. You are provided with specimen K (Toad) which is freshly killed.

(a) Open the mouth fully using forceps and examine its roof. How are structures within it adapted for the survival of the organism? (3 marks)

- Nostrils which are narrow/small openings for breathing when submerged in water; ✓
- Vomerine and maxillary teeth which provide grooved/rough surface for grip of food; ✓
- Eye ball swellings whose movement aids pushing food into oesophagus/ swallowing of food; ✓
- Eustachian tube openings for hearing/balancing pressure of water currents during swimming;

Ignore for vomerine

Any 3. 03

Deny: If no description of structure

(b) (i) P in the specimen ventral side up. Dissect to open the skin. Draw and label body trunk muscles. (6 marks)

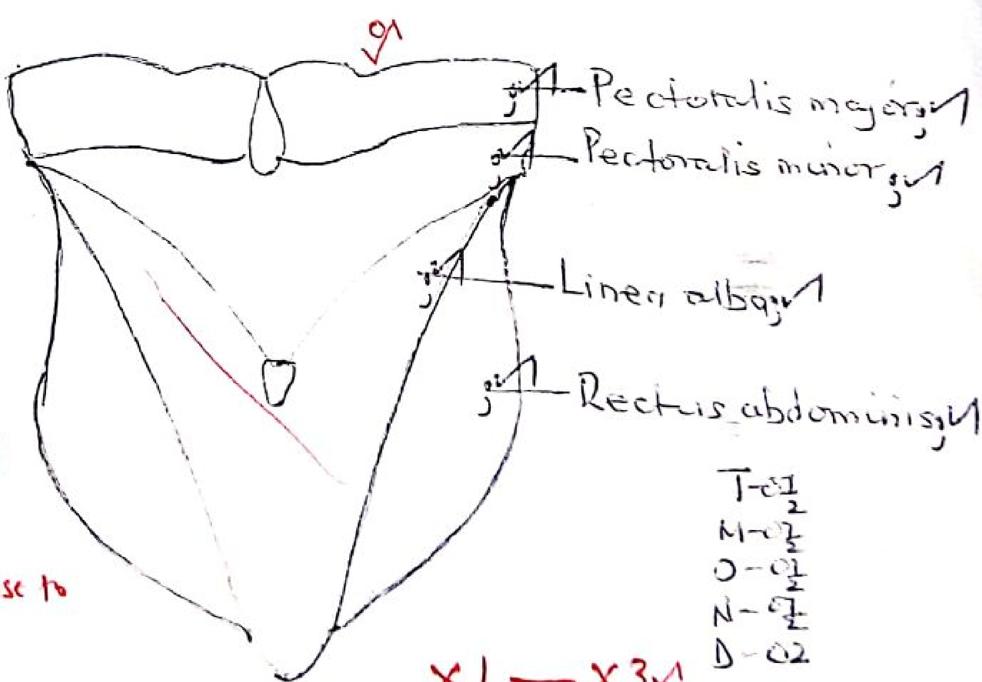
Drawing showing ventral body trunk muscles of specimen K; ✓

T – only award when drawing appears of specimen K (toad)'s ventral body trunk

NA: If any other muscles drawn & labelled

If other muscles are drawn but not labelled Deny D marks but award L marks

IL – Drawing not near/close to the muscles.



X1 — X3 ✓

T – 01/2
M – 01/2
O – 01/2
N – 01/2
D – 02
L – 02
06

(ii) Describe the pattern of blood vessel arrangement on the inner surface skin and relate to significance. (3 marks)

Dense capillary network which ramifies the entire inner surface that join to form smaller vessels; that further join to form major vessels on either side of the skin; whose blood carries away oxygen; O3 creating a steep diffusion gradient; for effective gaseous exchange;

Acc. runs over/covers @ ½ mk.

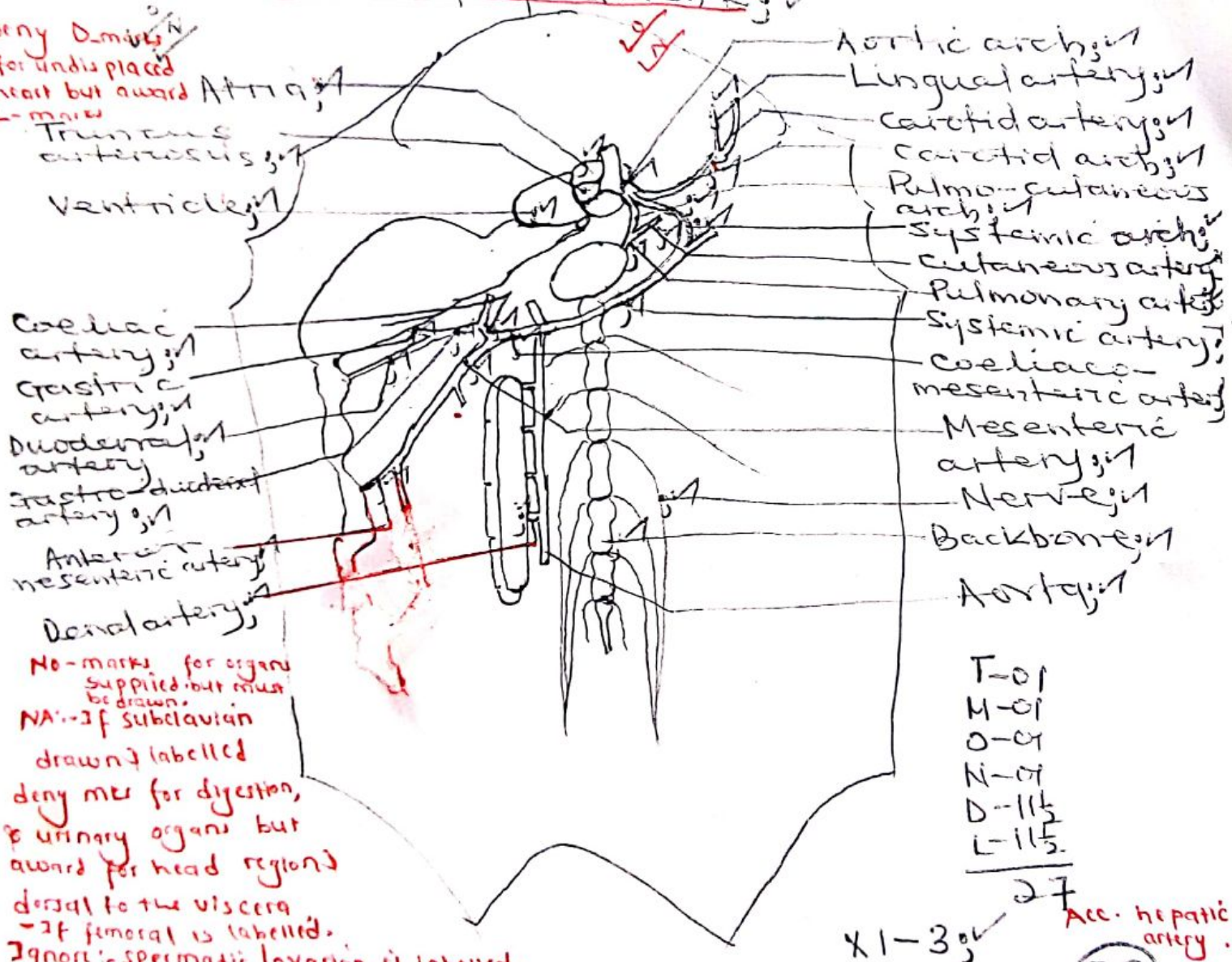
(c) Further dissect the specimen to expose alimentary canal

(i) vessels carrying blood to the left head region, structures responsible for digestion and oxygenation of blood and urinary organs from a displaced heart to the right.

(ii) structures dorsal to the viscera.

Draw and label your dissection. (27 marks)

Drawing showing vessels carrying blood to the left head region, structures responsible for digestion and oxygenation of blood and urinary organs from a displaced heart to the right including structures dorsal to the viscera of specimen K;



No-marks for organs supplied but must be drawn.

NA:- If subclavian drawn / labelled deny mks for digestion, & urinary organs but award for head regions dorsal to the viscera

- If femoral is labelled.

Ignore:- spermatic / ovarian if labelled.

- splenic

Deny D-marks If aorta is not to the right

* If kidneys not turned deny urinary organ marks.

IR- If veins / venous system is drawn.

- If alimentary canal is displaced to the left.

39

Day 1 germinating G-nuts seed
Day 5 germinating G-nuts seed.

2. You are provided with solution B_1 and B_2 obtained from some plant seeds at different days of germination and freshly prepared solution C:— starch 1% + Albumen 10%

(a) Carry out tests to establish the nutrient contents in solutions B_1 and B_2 as indicated on Table I. Record your tests, observations and deductions. (25 marks)

Table I

TEST		OBSERVATIONS	DEDUCTIONS
Iodine test To 1cm³ of solution add 1/2/3 drops of Iodine solution	B_1	Turbid solution turns to pale black; specks/traces of black Deny if obs. black.	Traces/Little starch present CE: award for starch present.
	B_2	Turbid solution turns to black specks/particles; Acc. pale brown/yellow if specks in B_2	Very little starch present; Acc. Starch absent
Benedict's test To 1cm³ of solution add 1cm³ of Benedict's solution and boil; Deny if condition is heat. Deny obs. & Ded. if condition is warm	B_1	Turbid solution turns to pale blue solution;	Reducing sugars absent;
	B_2 CE	Turbid solution turns to pale blue to green solution; Acc. ppt/precipitate Rej. abbreviation for precipitate	Little reducing sugars present; moderate reducing sugars max 2
Biuret test To 1cm³ of solution add 1cm³ NaOH solution then add 2/3 drops of $CuSO_4$ solution; Acc. symbol if O_2 accompanies reagent eg $NaOH_{(aq)}$ $CuSO_{4(aq)}$.	B_1	Turbid solution turns to deep purple/violet solution;	Much/Moderate proteins present;
	B_2	Turbid solution turns to pale purple;	Little proteins present;

If volumes not the same Deny 2. Rej. drops of Benedicts if < 5

Rej. soln for solution

marks for Deny much: If much ppte not stated in ob

Emulsion test To 1cm³ of solution add 1cm³ of ethanol; shake; then add 1cm³ of water;	B_1	Turbid solution turns to white emulsion with much precipitate;	Much lipids present;
	B_2	Turbid solution turns to white emulsion with little/moderate precipitate;	Little/Moderate; lipids present;
To 1cm³ of solution add 1cm³ of blue litmus solution and another 1cm³ of solution add 1cm3 of red litmus solution	B_1	Blue litmus solution remains blue; Red litmus solution remains red;	Acc: Neither acids nor alkaline solution present ~~Acids absent~~; Acc. neutral solution
	B_2	Blue litmus solution turns pink/red Red litmus solution turns pink/remains red;	Acids present;

25max

(b) To 2cm³ of solution C add 2cm³ of solution B_2 in a test tube. Incubate the test for 45 minutes. After the time duration, carry out the tests indicated on Table II on solution C and the contents of the incubated test tube to establish the effect of solution B_2 on the nutrient contents of solution C. Record only your observations.

Table II

TEST	OBSERVATIONS	
	Fresh solution C	Incubated mixture
Iodine test Ignore test procedure if in table 1 they are correct.	Turbid solution turns to black/blue-black solution/pale black solution;	Turbid solution turns to black specks/particles;
Biuret test	Turbid solution turns to deep purple solution;	Turbid solution turns to pale purple;

But: Deny everything if test procedures in Table 1 was wrong.

Benedict's test	Turbid solution turns to pale blue solution/purple solution;	Turbid solution turns to pale blue to (pale) green solution;

06

(c)(i) Explain the results of the experiment to the physiology of germination. (4 marks)

Imbibition/water uptake by seeds activates enzymes which catalyse breakdown of starch to reducing sugars; lipids to fatty acids and glycerol for respiration to generate energy to support germination; proteins to amino acids for enzyme synthesis;

max 03

(ii) Explain the difference in the results obtained in the litmus solution test. (1 mark)

In B_1 solution no breakdown of proteins and lipids had taken place hence neutral solutions; while B_2 solution breakdown of proteins to amino acids and lipids to fatty acids to make it acidic;

max 2.

02

(iii) Comment on the suitability of the solutions from seeds as the main diet for an infant, (2 marks)

Its (very) suitable; because of much proteins required for growth during (tissue formation;

02

37

35 max

- Commelina leaf
- Moss with a sporophyte
- onion bulb leaf
- Spirogyra
- Root system of monocot / maize young

3. You are provided with specimens labeled P, Q, R, S and T.

(a) State with a reason the class taxonomic level of each in Table III.

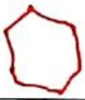
Table III

Specimen	Class	Reason
P	Monocotyledoneae;	Lamina with parallel veins / Leaf sheath; (Rej. venation)
Q	Musci;	Leafy gametophyte with sporophyte;
S	Chlorophyceae;	Filaments with green pigment;
T	Monocotyledoneae;	Numerous slender roots arising from base of stem; (Acc fibrous roots)

Class ½ mk. Reason full mark. 06

(b) Carefully peel off a piece of outermost tissue from P and innermost tissue from R. Place each on solution V and leave to stand for 5 minutes. After time duration, remove each and place on a slide and cover with a cover slip. V – 1M sucrose solution
Examine each under medium power of microscope.

(i) Distinguish between features of P and R.



(3 marks)

R	P
Smooth surface	Hairy surface;
Lacks stomata	Has stomata;
Rectangular cells – Regularly shaped	Hexagonal cells; – Irregularly shaped

Rej hairy if L appears hairly. 03

(ii) How are the features of P adapted for the survival of a plant. (3 marks)

- Hairy surface to trap moist air to reduce water loss;
- Has stomata for gaseous exchange;
- Thick cell wall for protection against water loss / infection;

Acc. dessication

03

(iii) What is the physiological relevance of the state of stomata to a plant. (1 mark)

closed stomata to reduce excessive water loss during high temperature/sunny days ✓

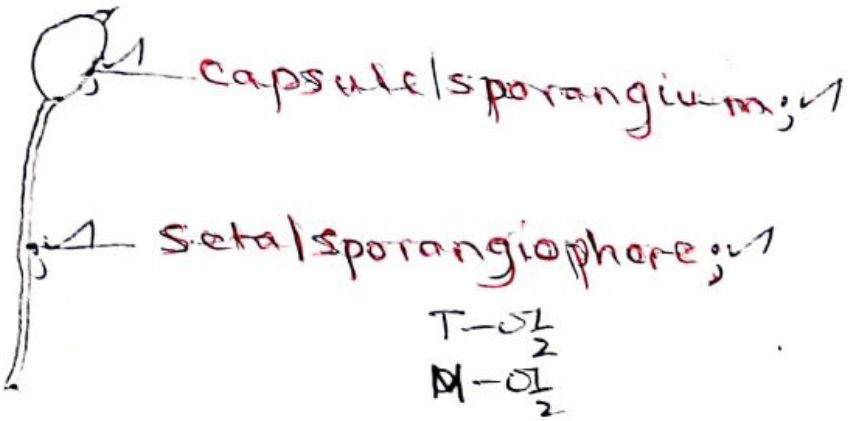
01

(c) Using a hand lens, examine specimen Q

(i) Draw and label the dependent unit of Q. (3 marks)

Drawing showing dependent unit of specimen Q viewed (under hand lens); ✓1

NA: If whole plant is drawn.



T – 01/2
M – 01/2
D – 01
L – 01
03

X10 – 40; ✓1

(ii) How is the unit in (c) (i) above adapted for the plant survival in habitat? (2 marks)

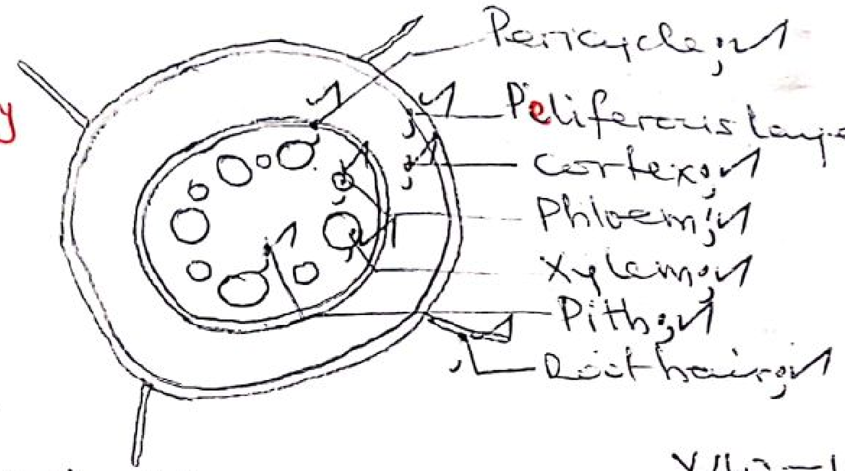
- Swollen capsule to store large quantity of spores; ✓
- Long slender seta to hold capsule high to ease dispersal of spores; ✓

02

(d)(i) Obtain a thin transverse section from one unit in specimen T close to base. Place it on a slide and stain using acidified phloroglucinal stain. Observe under low power of microscope. Draw and label. (6 marks)

Drawing showing a transverse section from one unit of specimen T close to base viewed under lower power of microscope ✓

IR - Anything away from this



T - 0½
M - 0½

T - 0½
M - 0½
D - 03
L - 03
07

NB: ignore detail of cells

X40 - 100; ✓ other

(ii) Identify tissue stained red and giving a reason, state the significance to life of organism from where it was obtained. (2 marks)

xylem/sclerenchyma; lignified; ✓
to provide mechanical support; ✓ 02

(26)

End