PROPOSED UCE BIOLOGY PRACTICAL 553/2@2019 Marking guide.

Candidates name.....

Random number						Personal no		

Signature.....

(Do not write your school/centre name/number anywhere on this booklet.)

553/2

BIOLOGY

PRACTICAL

Oct/Nov. 2019

2HOURS

UGANDA NATIONAL EXAMINATIONS BOARD

Uganda Certificate of Education

BIOLOGY PRACTICAL GUIDE

Paper 2

2 hours

INSTRUCTIONS TO CANDIDATES:

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

Answer **all** *questions,*

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 writings are to be inserted in this booklet.*

Work on additional sheets will **not** *be marked.*

For Examiners Use Only		
Question	Marks	Examiners signature & No.
1	**20**	
2	**20**	
3	**20**	

1. You are provided with solution **X** and two pieces of visking tubings.

(a) Carry out tests in Table**1** and record your observations and deductions in the table.

Table 1 **(***6marks)*

Tests	Observations	Deductions
(i) To 1cm^3 of X in a test tube, add two drops of iodine solution.	**Turbid;✓/colourless solution;✓/white suspension turns to black;✓/dark blue/blue-black /purple solution.** *Accept:* • *cloudy/milky solution as turbid solution* • *blue-black solution as final colour*	**Starch present;✓** **(2marks)**
(ii) To 1cm3 of X in a test tube, add 1cm3 of Benedict's solution and boil.	**Turbid;✓/colourless;✓solution/white suspension turns to blue;✓solution;✓and remains blue solution/blue solution persists;✓/maintained**	**Reducing sugars absent;✓** **(3 marks)**
(iii) To 1 cm^3 of X in a test tube, add 1cm3 of sodium hydroxide solution followed by 4 drops of copper(II) sulphate solution	**Turbid;✓solution;✓/colourless solution/white suspension to/ remains colourless;✓solution then to blue;✓precipitate;✓** *Accept:* • *blue solution as final colour*	**Proteins absent;✓** **(3marks)**

(b) (i) Label two tubes 1 and 2.

(ii) To test tube 1, add 6cm^3 of solution of X.

(iii) To test tube 2, add 6cm^3 of iodine solution.

(iv) Tie one of end of the visking tubings securely with a piece of thread.

(v) Pour 1cm^{3}of solution inside the first visking tubing and tie

(vi) Pour 1cm^3 of solution X in the second visking tubing and tie its open end.

(vii) Wash the outside of each visking tubing separately with clean water.

(viii) Immerse the visking tubing containing iodine solution into the solution in test tube 1.

(ix) Immerse the visking tubing containing solution X into solution in test tube 2.

Leave the set up to stand for 5minutes. After 5 minutes, remove the visking tubings from the test tubes. Observe the solutions in the test tubes and content of visking tubing from each set up and state your observations.

Test tube 1 and its visking tubing ***(3marks)***

X/starch/turbid solution in test tube turns to black;✓/purple solution/black specks/blue-black solution.

Yellow solution in the visking tubing turns to pale yellow/colourless solution;✓

Accept:

- *Brown solution turns to yellow solution/ remains brown solution.*
- *Pale yellow solution turns to colourless solution/remains pale yellow solution*
- *Colour of iodine solution is retained/ persisted.*

Test tube 2 and its visking tubing ***(3marks)***

Yellow solution in test tube turns to pale yellow solution/remains yellow solution; ✓

X / starch/turbid solution in visking tube turns to black/blue/purple solution/black specks/blue-black;✓

Accept:

- *Brown solution in test tube turns to yellow/ remains brown solution.*
- *Pale yellow solution in test tube turns to colourless/ remains pale yellow.*

(c) (i) State the substance that moved in both cases. (***1marks)***

Iodine;✓ /iodine solution/iodine molecules/iodine particles.

(ii) Explain why the substance you have stated in c (i) moved. ***(2marks)***

Iodine molecules are small;✓ and able to pass through;✓ / diffuse through the visking tubing from the region of high concentration to their region of low concentration.

Accept: tiny/ minute instead of small

(d) (i) Name the process demonstrated in the above experiment in living organisms. ***(1mark)***

Diffusion;✓ *Reject: wrong spellings*

(ii) What do visking tubings represent in living things? ***(1mark)***

Cell membrane;✓ /plasma membrane/tonoplast/epithelia/organelle membrane

Accept: any semi permeable membrane in living organisms

Reject: semi/selectively permeable membrane

(e) Sate any three conditions that may affect the process demonstrated in the experiment. ***(3marks)***

- **Diffusion distance/ thickness of the membrane medium/ thickness of diffusion surface;✓**
- **Temperature;✓**
- **Concentration/ diffusion gradient;✓**
- **Size of diffusing molecules/particles;✓**
- **Size/number of pores in the diffusion surface;✓**
- **Density of diffusing particles**
- **Physical state of diffusing molecules/particles**
- **Concentration of diffusing molecules**

Accept: *concentration alone*

Hint

- *If no/wrong/blank results for (b) then answers for (c), (d) and (e) are null/void*
- *If (d)(i) is wrong/blank, then d(ii) and (e) answers are null and void*
- *If one of the test tube results in (b) is wrong or left blank, then answers for (c) are null and void*

Total marks =20

2. You are provided with specimen R, S and T which are rom the same animal.

(a) (i) identify the specimen *(3marks)*

R –**scapula/shoulder blade;**✓

S-**humerus;** ✓

T-**femur -/ thigh bone;**✓

(ii) State the role of these specimens in the animal from which they were obtained. *(1mark)*

Protection;✓

Articulation with other bones/ formation of joints;✓

Attachment of muscles/ bones;✓

Provision of support;✓

Any one

(b) Give two adaptations of specimen R for its functions. (*2marks)*

Projections/ ridges/ spines to provide surface for attachment of muscles;✓

Hard/ rigid scapula blade for support;✓

Curved/long/ flat scapula blade to increase surface area for muscle attachment;✓

Many/ smooth facets for articulation with other bones;✓

(c) (i) what type of joint is formed between specimens R and S *(1mark)*

Ball and socket joint/ universal joint;✓

(ii) Give reason for your answer. *(1mark)*

S/Humerus has a rounded head that fits into the glennid cavity/socket of R/scapula;✓

(d) (i) What observable features are common to both specimens S and T. *(2mark)*

Head; groove; projections; facets; shaft;✓

(ii) What are the observable differences between specimens **S** and **T**? *(2marks)*

Specimen S	**Specimen T**
Has no neck; ✓	**Has neck**
Has three condyles; ✓	**Has two condyles**
Has a short shaft; ✓	**Has a long shaft**
Has deltoid ridge; ✓	**Has no deltoid ridge**

Has no trochanters;	✓	**Has trochanters**
Has tuberosities;	✓	**Has no tuberosities**
Has central head;	✓	**Has lateral head**
Has trochlea;	✓	**Has no trochlea**

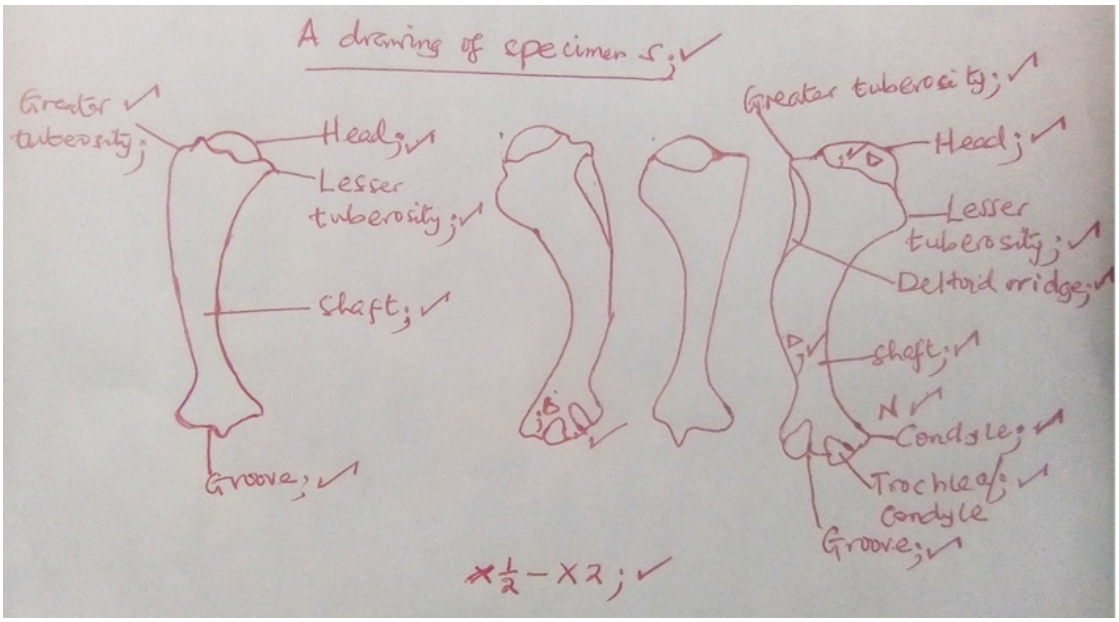
Any two

(e) Describe the movement at the distal end of specimen **T**. ***(2marks)***

T/femur has condyles which articulate with tibia, to allow movement in any plane or direction;✓

Accept, to allow flexing and extension if the limb/ forward and backward movement of the limb.

(f) Draw and label specimen S. State the magnification of your drawing. ***(6marks)***



T-01

D-02

L-1½

M-01

N- ½

Total ;06

Rej:

All drawing marks if head is not superior from shaft

3. You are provided with specimens L, M, N and O which are Parts of different plants.

(a) State three observable characteristics of each of the specimens **L**, **M**, **N** and **O**. ***(6marks)***

(i) **L** thick/succulent/fleshy lamina;✓network veins;✓smooth lamina;✓ notched/crenate/serrated margin;✓ bulbils/plantlets/growing plant;✓solid petiole;✓ smooth petiole;✓short petiole/petiole expanded at the base;✓grooved petiole;✓rounded/blunt apex;✓

Any three- ½marks@

(ii) **M** thin lamina;✓network/reticulate veins;✓broad lamina;✓ smooth lamina;✓grooved lamina;✓solid petiole;✓long/short petiole;✓smooth petiole;✓entire margin;✓pointed apex;✓ ***Any three- ½marks@***

(iii) **N** lamina divided into leaflets;✓ broad lamina;✓smooth/rough lamina;✓ thin lamina;✓network/reticulate veins;✓divided margin;✓acute apex;✓long petiole;✓solid petiole;✓petiole expanded at the base;✓smooth petiole;✓veined petiole;✓ ***Any three- ½marks@***

(iv) **O** thin lamina;✓narrow lamina;✓ lamina big at the base;✓ linear/reticulate leaf shape;✓ smooth/rough lamina;✓ parallel veins;✓ sharp margin;✓ long petiole;✓ sheathed petiole;✓ veined petiole;✓ smooth petiole;✓petiole hairy at the top;✓ sharp apex ***Any three- ½marks@***

(b) Use the characteristics stated in (a) above to construct a dichotomous key to identify specimens L, M, N and O. ***(3marks)***

1 (a)specimen with parallel veins.....0;✓
(b)specimenwith network veins.....2;✓

2 (a)specimenwith lamina divided into leaflets.....N;✓
(b)specimenwith lamina undivided.....3;✓

3 (a)specimen with lamina thick/succulent/fleshy L ;✓
(b)specimenwith lamina thin.....M;✓

Accept

Any other correct version;

Simple/ compound leaf

Reject

(b) if (a) is wrong;

couplets where features used are not reflected in (a)

(c) Give four adaptations of specimen O to its functions. ***(4marks)***

(i) **Green pigment/ chlorophyll/ green to trap sunlight for photosynthesis;✓**

(ii) **Veins to transport water/ mineral salts/ food;✓**

(iii) **Thin lamina to reduce diffusion distance for faster exchange of gases;✓**

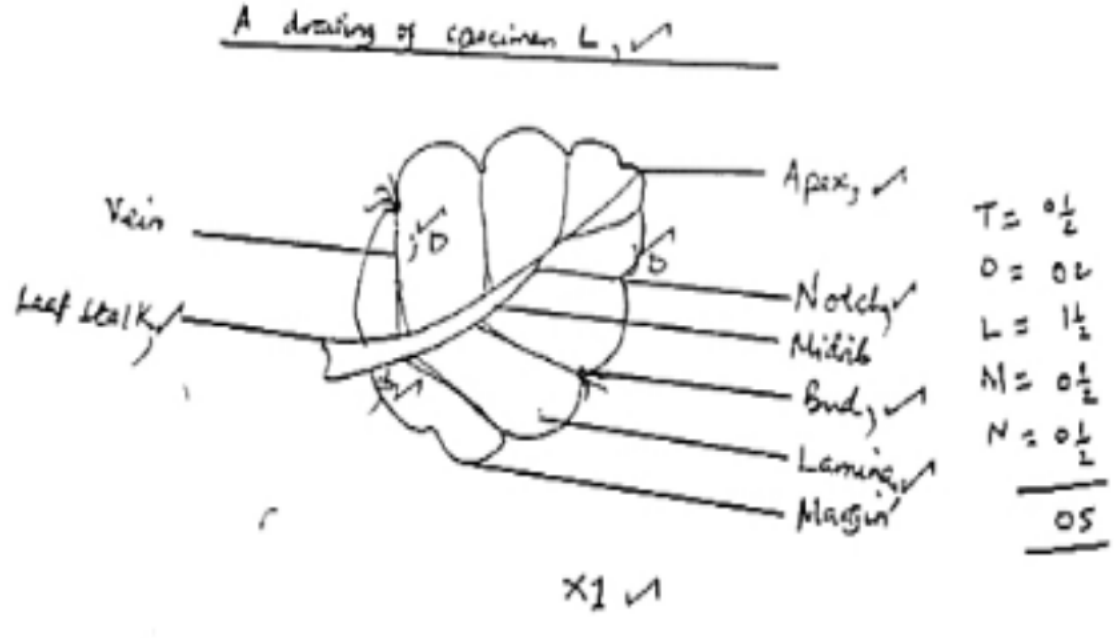
(iv) **Long lamina to increase surface area for trapping sunlight/ exchange of gases;✓**

(d) State two adaptations of specimen L to perform its modified functions. ***(2marks)***

(i) **Thick/ fleshy/ succulent lamina for storage of water /food;✓**

(ii) **Buds/ plantlets/ young plants in margin for reproduction/ vegetative propagation/ asexual reproduction;✓**

(e) Draw and label specimen L. state the magnification of your drawing. ***(5marks)***



Drawing marks

Grooved petiole;

Leaf shape-ovate;

Continuous notched margin;

TOTAL-20MARKS

END