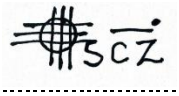
Candidate's Name: ***PROPOSED MARKING GUIDE***

School: ***SCZ SALONGO 2020*** **Signature:** 

553/2

BIOLOGY

(Practical)

Paper 2

Oct. / Nov. 2020

2 hours

RESOURCE EXAMINATIONS SET NUMBER ONE

Uganda Certificate of Education

BIOLOGY GUIDE

(PRACTICAL)

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***	
Total	***60***	.....

1. You are provided with specimen **M** and solution **X.**

(a) Carry out the following tests to establish the food nutrients in **X**. (*04 marks*)

Tests	**Observations**	**Deductions**
(i) To $1cm^3$ of **X** in a test tube, add 2 drops of iodine solution.	***Colourless solution turns into yellow/brown solution;*** ✓ ***Acc; orange***	***Starch absent;*** ✓
(ii) To $1cm^3$ of **X** in a test tube add $1cm^3$ of Benedict's solution and boil.	***Colourless solution turned to blue solution to green solution to yellow precipitate to orange precipitate. ;*** ✓ ***Acc ;Brown***	***Reducing sugars present;*** ✓ ***Rej: Simple sugars***

(b) Label 3 test tubes as **A1**, **B1** and **C1**. Pour $5cm^3$ of distilled water in test tube **A1**, and $5cm^3$ of solution **X** in each of the test tubes **B1** and **C1**.

Using a cork borer, cut out three cylinders from specimen **M**, each measuring 3cm long. Put one cylinder in each of the test tubes **A1** and **C1**. Cut up the third cylinder into 5 smaller pieces then add them to test tube **B1**. Leave the set- up for 15 minutes.

Label three other test tubes as **A2**, **B2** and **C2** and add $4cm^3$ of distilled water to each of them. After 15 minutes, Remove the strip in **A1**, dip it in distilled water and immediately remove it and transfer it to test tubes **A2**. Remove the strips in **B1**, dip them in distilled water and immediately remove them and transfer them to test tubes **B2**. Remove the strip in **C1**, dip it in distilled water and immediately remove it and transfer it to test tubes **C2**. Leave the set up for 15 minutes.

After 15 minutes, remove the cylinders from the test tubes leaving the solutions. Carry out tests in table 2 on solution in test tubes **A2**, **B2** and **C2**.

(***07 marks***)

Table 2

Tests	**Observation**	**Deduction**
(i) Take 1cm^3 of the solution from test tube **A2** and put it into another test tube, add 1cm^3 of Benedict's solution and boil.	*Colourless solution turned to blue solution which persisted on boiling. ;* ✓ *Acc Green solution*	*Reducing sugars absent;* ✓ *Acc; Little reducing sugars present.* *Rej; Simple sugars*
(ii) Repeat test (i) using the solution in test tube **B2**.	*Colourless solution turned to blue solution to green solution or to yellow precipitate. ;* ✓ *Acc Orange*	*Little/moderate/much reducing sugars present;* ✓ *Rej; simple sugars*
(iii) Repeat test (i) using the solution in test tube **C2**.	*Colourless solution turned to blue solution which persisted on boiling. ;* ✓ *Acc; green solution / yellow precipitate*	*Reducing sugars absent* *Acc; Little/moderate reducing sugars present. ;* ✓ *Rej; Simple sugars.*

(c) Name the biological process investigated in (b). (*01 mark*)

N/A

(d) Explain the results in test (ii) and (iii).

Test (ii) (*03 marks*)

Cutting the cylinders into small pieces increased/provided/exposed a large surface ; ✓*area for absorption/diffusion ;* ✓*of solution X/reducing sugars into smaller pieces in test tube B1 and diffusion out in test tube B2. ;* ✓

Rej; all explanations if observations do not show trend.

Test (iii) (*02 marks*)

Traces/moderate reducing sugars because a whole cylinder provided/exposed a small surface area; ✓ for diffusion/absorption; ✓ of solution x/ reducing sugars into a whole cylinder in test tube c1 and diffusion into test tube c2. ; ✓

(e) Explain the purpose of

(i) Cutting up one cylinder of **M** into smaller pieces before adding to test tube **B1**. (*02 marks*)

Increased the surface; ✓ for faster absorption/diffusion of reducing sugars into smaller pieces. ; ✓

(ii) Dipping the pieces of **M** from test tubes **A1**, **B1** and **C1** into distilled water before transferring them to test tubes **A2**, **B2** and **C2** respectively. (*02 marks*)

To wash; ✓ away reducing sugars/solution X on the surface of the cylinders which would affect the results. ; ✓

2. Specimen F is a flower. Examine the specimen using a hand lens.

(a) (i) State the mode of pollination of the specimen. **(***1mark)*

Insect pollination/insect pollinated; ✓

Accept: by insect/flower attracts insect which pollinates it;

Reject: insect pollinated flower

(ii) Give four reasons to support your answer in (a) (i) *(4 marks)*

- ***Brightly coloured petals; ✓ to attract pollinators; ✓***
- ***Large/broad petals; ✓ to provide large surface area for easy landing of pollinating agent/* accept-insect if used; ✓**
- ***Pollen guides/nectar guides to lead the insect to nectar/ nectaries /nectar glands; ✓***
- ***The keel has a suture/ line of weakness; w; ✓ hich easily opens to expose the stigma/anther head foe easy pollination/ or to allow the stigma/ anther head to come out for pollination; ✓***
- ***Scented to; ✓ attract insect; ✓***

Accept: characteristics of insect pollinated flowers alone without function

Points are tied to (a) (i)

Any first four 1mark@ =4marks

(b) Describe the structure of each of the following parts of the specimen F stating their numbers in each case:

(i) Petals *(3 marks)*

- ***They are five in number;***✓
- ***The keel is boat shaped;***✓
- ***The standard is the largest;***✓
- ***Has two wings which are smaller accept small;***✓
- ***They are brightly coloured;***✓
- ***They are wide /broad;***✓
- ***All petals are veined/ they have veins;***✓
- ***Two petals fuse to form the keel;***✓
- ***The wing and standard are free;***✓
- ***The standard has nectar guides/honey guides;***✓
- ***Two petals are smooth;***✓
- ***Divided into standard, wing and keel and are smooth;***✓

Any three including the number =3marks

(ii) Stamens *(3 marks)*

- ***They are ten stamens;***✓
- ***Nine are fused at the base/lower part of filament to form the staminal tube;***✓
- ***One stamen is free;***✓
- ***Stamens have curved filaments;***✓
- ***Nine stamens have short filaments ;✓Accept nine stamens are short***
- ***One stamen has long filament Ac;*** ✓***cept one stamen is long***
  Accept: stamens are of different length
- ***Anther head is bilobed / anther head is rounded;*** ✓
- ***Anther head is brightly coloured;*** ✓

Any three including the number =3marks

(iii) Carpel(s) *(3 marks)*

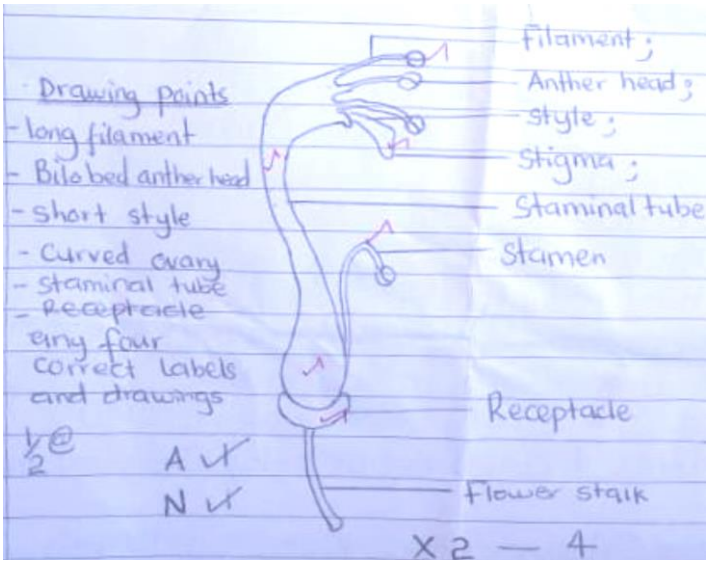
- ***Has one carpel;*** ✓
- ***Has hairy stigma;*** ✓
- ***Has long/elongated ovary;*** ✓
- ***Has curved ovary;*** ✓
- ***Has a flat stigma;*** ✓

- ***Has curved style/hairy/expanded/short***; ✓
- ***Has a single lobe stigma***; ✓
- ***Smooth style***; ✓

Any three including the number =3marks

(c) Remove all the sepals and petals from specimen F. Draw and label the remaining parts of the specimen. *(6marks)*

A drawing of specimen F without sepals and petals; ✓
Or. A drawing of specimen F with sepals and petals removed



NB: wrong specimen, unwanted part drawn and labelled.

Reject: unwanted part drawn not labelled, give marks for label only

M- ½

T- ½

N- ½

D- 02

L- 02

A- ½
=6Marks

3. You are provided with specimens **X, Y** and **Z** which are from the same animal.

(a) Examine the specimens and state four structural features which are common to all.

Have; Neural canal ; ✓***Neural spine, Facets***; ✓, ***Neural arches***; ✓, ***Centrum***; ✓, ***transverse processes***; ✓.

(b) Identify the specimens giving to reasons in each case. (*06 marks*)

Specimen X is Cervical vertebra; ✓; ***ACC; Cervical bone/atlas vertebra/axis vertebra. REJ; Cervical vertebrae***

Reasons; Has vertebraterial canals; ✓, ***Divided/branched transverse processes***. ; ✓

Specimen Y; Thoracic vertebra; ✓. ***REJ; Thoracic vertebrae or thoracic alone***.

Reasons: Long neural spine; ✓, *Has demi facets/extra facets on transverse process/facets on centrum*; ✓:

Specimen Z; Lumbar vertebra; ✓. ***REJ; Lumbar vertebrae***

Reasons; Long transverse processes; ✓; *Broad/wide neural canal*; ✓; *Long metapophysis,* ; ✓*has hypophysis/extra process*; ✓.

(c) Using observable features, give **four** functions of the specimens to the animal. (*04 marks*)

Facets for articulation with other vertebra/bones; ✓; ***REJ feature without correct function.***

Neural canal for passage of spinal cord; ✓.

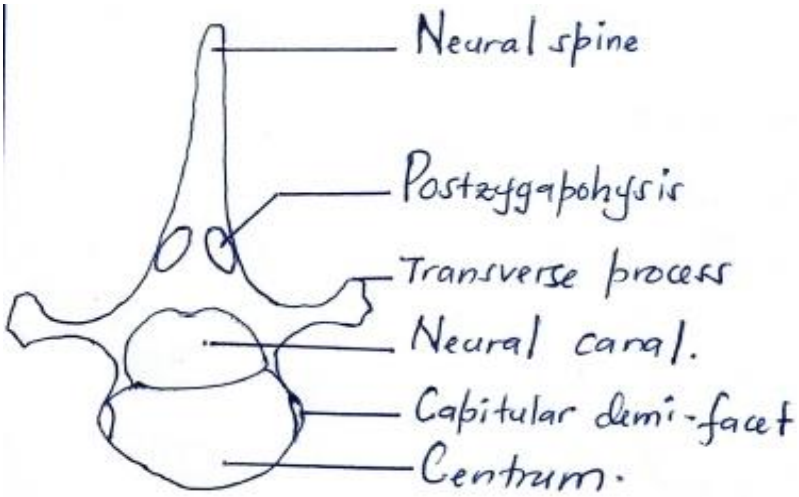
Centrum for support. ; ✓

Neural spine/transverse process for attachment of muscles. ; ✓

(d) Examine the posterior view of specimen **Y**. Draw and label in the space provided. (*06 marks*)

Drawing of posterior view of specimen Y; ✓

Drawing points; well-drawn neural spine, transverse process, neural canal and centrum.



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Specimen M is mature Irish potato tuber.

Solution X is 2% Glucose solution.

Specimen F, is Crotalaria bean flower.

Specimen X, is cervical vertebra bone.

Specimen Y, is Thoracic vertebra bone.

Specimen Z, is Lumbar vertebra bone.

(X, Y and Z are all from the same dog)