MARKING SCHEME

231/3

BIOLOGY FORM 4

END OF TERM 2, 2022 EXAMINATION

INSTRUCTIONS TO CANDIDATES

1. *Write your Name, Admission Number, and Class/Form in the spaces provided above.*

*2. This paper contains **THREE Sections.** Answer **ALL** the questions in the spaces provided **IN THIS PAPER**.*

*3. **ALL** the answers must be clear and precise.*

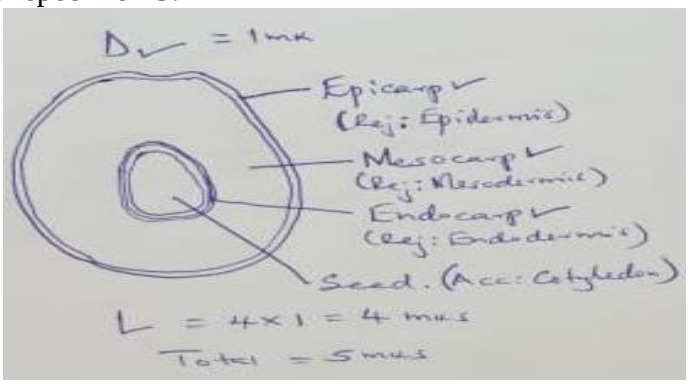
4. Answer all the questions using correct English.

FOR EXAMINER'S USE ONLY

SECTION	MAX. SCORE	CANDIDATE'S SCORE
1	13	
2	11	
3	16	
TOTAL	**40**	

This paper consists of 5 printed pages. Candidates should check the question paper to ascertain that all pages are printed as indicated and no questions are missing.

1. You are provided with specimens labeled **S** and **T**. Using the appropriate apparatus and reagents provided, use the specimens to answer the questions below.
   a. Carefully, cut a **longitudinal section** of specimen **S**. Draw and label a plain diagram of the cut surface of specimen **S**.



NOTE: **For to score the diagram mark; (1x1=1 mark)**

- *Epicarp and endocarp MUST have a double line otherwise penalize*
- *Mesocarp MUST be bigger than epicarp and endocarp, with endocarp thinnest (proportionality)*
- *The seeded MUST be indicated within the endocarp*
- *Drawing is free-hand (not traced using circular objects or using a compass*)
  For labels; **(diagram; 1x4=4 marks)**
- *ARROWS should not be used for labeling*
- *Outline of ALL structures MUST be solid/continuous*
- *Any structure should be labeled ONCE, otherwise back-mark and reject both answers.*

Encourage indication of magnification but DO NOT penalize.

(These rules apply to ALL the Biological drawings)

   b. State **three** differences between specimen **S** and **T**.

Specimen **S**	Specimen **T**
Epicarp, mesocarp, and endocarp separate	**Mesocarp fused to epicarp and endocarp (OWTTE)**
Pericarp is thick	**Pericarp is thin**
Fleshy fruit	**Dry fruit**

1x3=3 marks

   c. Give **three** functions of the major chemical component in specimen **T**.

- **Broken down to release energy in living organisms (e.g. glucose)**
- **Complex carbohydrates are used to provide mechanical support (e.g. chitin and cellulose)**
- **Are the stored food in cells (e.g. starch in plants and glycogen in animals)**
- **Excess carbohydrates are converted to fat used for insulation against heat loss.**

1x3=3 marks

d. Which branch of biology deals with the study of the specimens above?

Botany **1x1=1 mark**

e. In which kingdom do the specimen above belong? (

Plantae Rej: **plantae** **1x1=1 mark**

2. Below are photographs of skulls of different mammals, **W** and **X**. Study them carefully and use them to answer the questions that follow.

W **X**

a. State the diet of the mammals from which the photographs above were obtained and give a reason in each case.

b.

	Diet	Reason
W	Vegetation/grass/plant (material)	Has diastema/lack canines; Has horny pad/lack upper incisors; • *Technical terms well spelled.* • *Must mention **UPPER** incisors (in case the answer is on incisors)*
X	Flesh/Meat *Rej; Fresh*	Has (large/long/curved) sharp pointed/pointed canines Has carnassial teeth

NB: For BOTH **W** and **X,** mark the **first reason** **1x4=4 marks**

c. In a natural set-up, the mammals from which the photographs of skulls **W** and **X** were obtained have a **biotic** interrelationship.

i. Identify the biotic interrelationship of such mammals.

Predation

ii. What are the adaptations of the animal with the skull labeled **X** for efficiency in the named biotic interrelationship in (b) (i) above?

- **The animal has strong jaws to crush bones**
- **The animal has pointed canines to hold/grasp/tear flesh/prey**
- **The animal has carnassial teeth to cut and crush bones**
- **The animal has strong/muscular limbs for fast movement**
- **The animal has large claws on its forelimbs to hold prey**. **1x3=3 marks**

d. Draw and label the external structure labeled **I** on photograph **W**

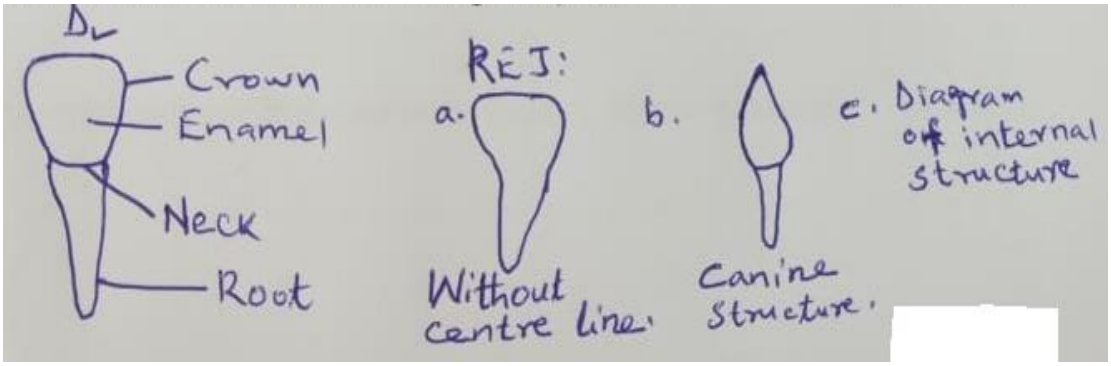
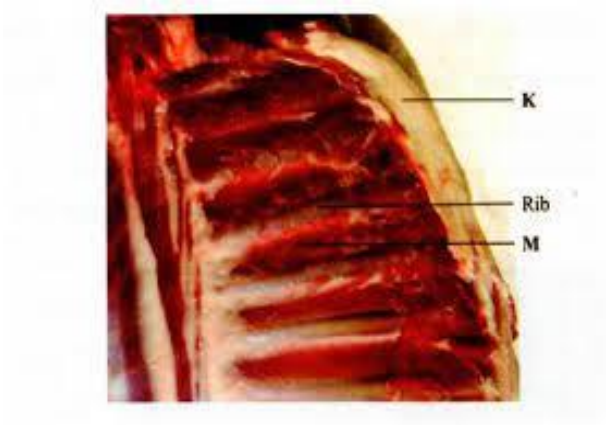


Diagram mark (D√); 1x1=1 mark
Label marks; 2x1=2 marks

3.

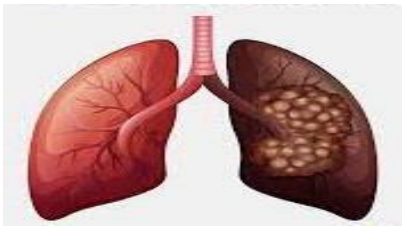
a. The photograph below shows the inner surface of the upper left side of the ribcage.



Explain the role of the part labeled **M** in inhalation.

- **The internal intercostal muscles/M relax; the ribcage moves upwards and outwards; the volume of the ribcage increases while pressure decreases; the air is forced/moves into the lungs;** **1x4=4 marks**

b. Below is a photograph of a respiratory system. Study it to answer the questions that follow.



i. Identify the disease

Lung cancer **1x1=1 mark**

ii. Name a chemical compound formed when burning tobacco that accelerates the disease.

Tar **1x1=1 mark**

iii. Name a plant excretory product used in the therapy of such a disease.

Colchicine **1x1=1 mark**

iv. Give three ways in which the disease can be treated.

- **Surgery to remove the tumor(s)**
- **Radiotherapy to destroy cancerous/malignant/carcinogenic cells**
- **Chemotherapy to destroy cancerous/malignant/carcinogenic cells**
- **Avoid (active/passive) smoking** **3x1=3 marks**

c. You are provided with a specimen labeled **P**. You are also provided with a sharp scalpel, a hand lens, a Petri dish, a glass slide, an iodine solution, and distilled water. Carry out the following procedure and answer the questions that follow.

i. Cut off the petiole about 1.5cm from the end where the leaf attaches to the stem.

ii. Carefully make several thin cross sections through the piece obtained above using a sharp scalpel.

iii. Put the sections obtained in water in a Petri dish.

iv. Mount the thinnest section and stain with iodine.

Using a hand lens, observe and then draw a well-labeled diagram of the section observed.

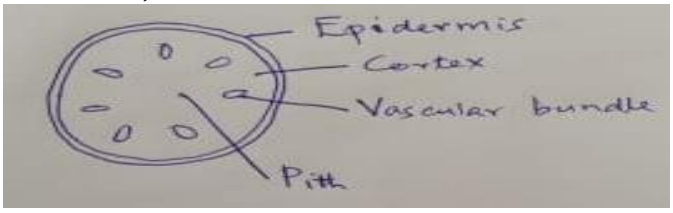


Diagram mark (D√); **1x1=1 mark**

Label marks; **2x1=2 marks**

d. What is the purpose of the following procedures when preparing the sections?

i. Making thin cross sections.

To allow light to pass through (for illumination of parts/cells) **1x1=1 mark**

ii. Using a sharp scalpel when cutting thin sections.

To avoid destroying tissues/cells/organelles/parts (of the sections) **1x1=1 mark**

Rej: To avoid destroying sections

iii. Putting the sections obtained in water.

To keep cells turgid;

To keep cells alive/not kill the cells/to avoid desiccating cells; **1x1=1 mark**

Rej: To keep sections alive (OWTTE) without mentioning tissues, cells, organelles, or parts.