

M.S.

NAME..... ADM NO..... CLASS.....

ALLIANCE HIGH SCHOOL

Kenya Certificate of Secondary Education (K.C.S.E.)

FORM FOUR TRIALS

231/3

BIOLOGY

Paper 3 (PRACTICAL)

SEPTEMBER 2022

Time: 1 3/4 Hours

INSTRUCTIONS TO THE CANDIDATES

- Sign and write your Name and Index Number in the spaces provided above.
- Answer all the questions in the spaces provided.
- You are required to spend the first 15 minutes of the 1 3/4 hours allowed for this paper reading the whole paper carefully before commencing your work
- Additional pages must NOT be inserted.
- Candidates may be penalized for recording irrelevant and incorrect spelling especially of technical terms.

For Examiner's Use Only

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1	13	
2	16	
3	11	
TOTAL	40	

This paper consists of 8 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

1. You are provided with specimen labeled M. Crush it using pestle and mortar, add some distilled water to get fine solution. Label four clean test tubes: A, B, C, and D. Put about 4ml of the solution into each of the four test tubes.

a) To solution in test tube A, add some few drops of iodine. Shake the solution to mix well. Pour some little solution onto a white tile.

(i) Record your observation. (1mk)

Solution turns blue/black in colour.

(ii) Account for your observations in a) (i) above (1mk)

This indicates presence of starch in the solution.

b) Into solution in test tube B, add about 2ml of Benedict's solution. Place it in a boiling water bath.

(i) After about 3 minutes, record your observation (1mk)

Blue color persists.

(ii) What is your conclusion from observation in b) i) above? (1mk)

Reducing sugar absent.

c) For the remaining test tubes: -

To test tube C, add about 3ml of solution labeled K. To test tube D, add about 3ml of solution K and about 2ml of solution labeled L. Place both test tubes C and D in a water bath. Maintain the water bath at 37 °C. Allow it to stand in the water bath for 30 minutes. After 30 minutes, remove the test tubes. Add about 2ml of Benedict's solution to each test tube and shake well. Place the two test tubes in a boiling water bath. After about 5 minutes record your observations in the table below. (4mks)

Test tube	Observation	Conclusion
C	Color changes from blue to yellow to orange and then brown.	Reducing sugar present.
D	Blue color persists.	Reducing sugar absent.

The starch solution was not hydrolysed, hence absence of reducing sugars after 30 minutes; solution L prevented the hydrolysis by killing it (denatured it)

d) Account for your observations in the test tubes C and D. (2mks)

C. Starch solution was converted/hydrolysed to reducing sugars; the 30 minutes allowed hydrolysis of starch by solution K

e) i) Why was set up placed at 37°C? (1mk)

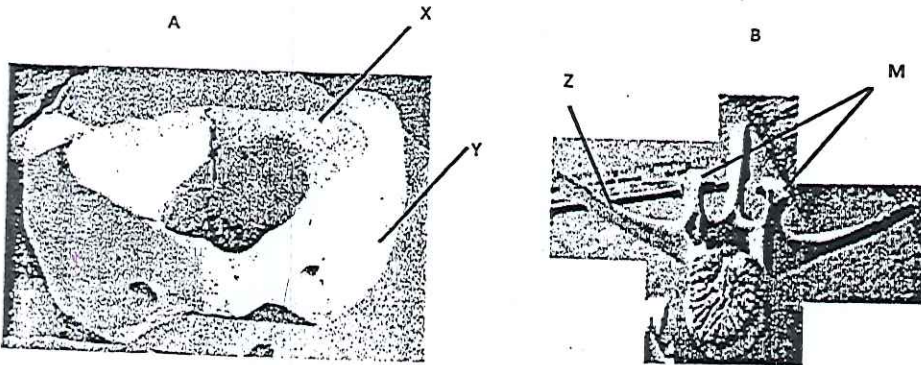
It is the optimum temperature for enzyme action

(ii) Suggest identity of solutions K and L (2mks)

K Amylase or amylidase  
L Hydrochloric acid; as enzyme inhibitor

2. The photographs below are of the same mammalian vertebra showing two views of the same bone.

Examine them carefully.



(a) (i) Identify the vertebrae (2mks)

(a) Atlas

(b) Lumbar

(ii) Name part X Articulating facet (1mk)

(iii) State the function of part X (1mk)

For articulation with the axis

(b) State the functional difference between a tendon and a ligament (1mk)

Ligament - Holds bones together at a joint  
Tendon - Attaches skeletal muscles to bones

(c) Name the views of the vertebrae above? (2mks)

A - Posterior/Dorsal

B - Anterior/Ventral

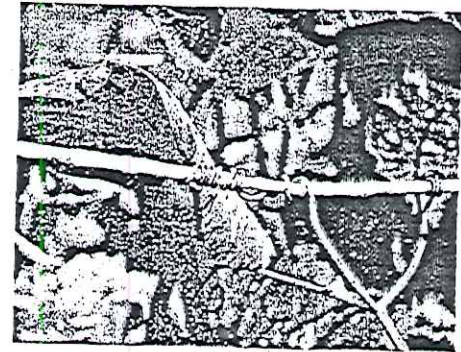
(d) State a common role of the parts labeled Y and Z. (1mk)

Form surface for muscle attachment

(e) What are the differences between bones A and B? (2mks)

A - Lacks vertebral foramen, lacks vertebral arch, small neural spine, lacks metapophysis and anapophysis  
B - Lacks vertebral foramen, lacks vertebral arch, large neural spine, has metapophysis and anapophysis

f) The photographs below illustrate a response in plants. Study it carefully and answer the questions that follow.



(i) Identify the type of response illustrated above. (1mk)

Thigmotropism / Haptotropism

(ii) Explain how the structure above is formed. (3mks)

Contact causes lateral migration of auxin to the accumulated on the outer part which is not in contact. This causes faster elongation of cells in the inner part than the outer part. This makes the stem to keep curling around the support object.

(iii) Besides the structure above, name other two support structures in plants. 2mks

- Xylem tissues
- Turgid parenchyma
- Collenchyma

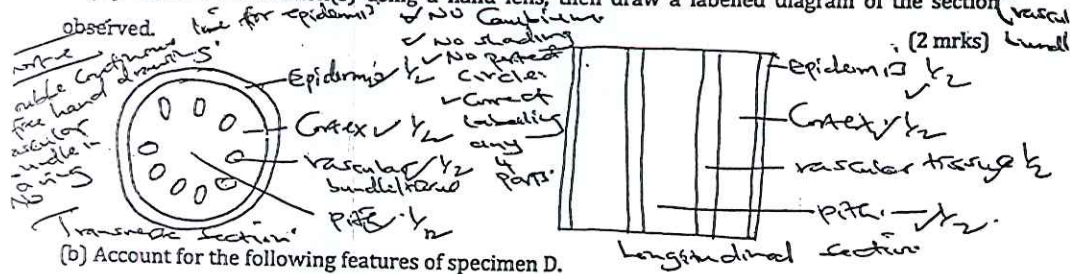
3. You are provided with specimen D.

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

(ii) Carefully make several thin cross sections through the piece obtained in (a)(i) above, using a sharp razor blade or scalpel.

(iii) Put the sections obtained in water on a Petri dish. (iv) Mount the thinnest section(s) on a glass slide, add a drop of iodine solution provided.

(v) Observe the section(s) using a hand lens, then draw a labelled diagram of the section observed.



(b) Account for the following features of specimen D. (2 mks)

(i) Extensive network of veins (1 mark)

- Enhance absorption/transportation of water/minerals
- transport of organic and inorganic substances and mineral salts
- Enhance transport/evaporation of water

(ii) Tough leaf blade (1 mark)

- Enhance support
- Prevent leaf from folding
- Thick upper cortex to minimize water loss
- Keep leaf open to allow maximum reception of light for photosynthesis

(iii) Strong and extended petiole (1 mark)

To provide support and firmly attach to stem strongly

(c) State with reason, the class of plants from which the specimen was obtained. (1 mark)

Class

Dicotyledonae

Re: wrong spelling (1 mark)

Reasons: Tied to class

- Presence of pith
- Net venation / reticulate
- Broad leaf / lamina / leaf blade
- Presence of said leaf petiole / stalk

(d) Explain why the following procedures were necessary during the preparation of the sections for observation. (1 mark)

(i) Putting the sections in water on a Petri dish. (1 mark)

- Maintains shape of cells/sections/tissues
- Keep cells turgid / alive / cells not to dry / cells intact
- Prevents dehydration / destruction of cells/sections

(ii) Using a sharp scalpel/razor blade. (1 mark)

Avoiding damaging cells during cutting/detachment of cells/tissues

(iii) Adding iodine solution to the section. (1 mark)

Enhance clarity / proper visibility / contrast the parts

(iv) Cutting very thin sections. (1 mark)

- Allow light to pass through
- For easy diffusion of iodine solution to stain