KCSE 2024

BIOLOGY PAPER 3

MARKING SCHEME

1 (i) Solution X is hypotonic to/ less concentrated than **cells**/ cell sap of specimen A/ Petiole; hence water molecules move from solution X to the (cells of) petiole by osmosis; leading to increase in size of the cells/ petiole; The inner cortical cells lack cuticle; hence absorb more water/ absorb water faster than the outer epidermal cells; that are covered by cuticle ; The cortical tissue expands/ increases in size more than the epidermal tissue; leading to curvature of the petiole outwards;

(ii) Hypertonic/ More conc. / Has more solute molecules/ Has less water molecules;

(b)

	Observation	**Conclusion**
Proteins	No **colour** change/ (Green) colour Of solution R persists;	Proteins absent;
Reducing sugars	1. **Colour** changes to green/ Green Colour of solution R persists; 2. Acc. No **colour** change	1. Traces/ little reducing sugar present; 2. Reducing sugar Absent
Vitamin C	DCPIP solution is decolourised/ Becomes colourless;	Vitamin C Present;

Note: rj No change alone
Response 1. are matched
Response 2. are matched

(c) (i)
A Cuticle;
B Upper epidermis/ Upper epidermal cell/ layer;

(ii)

C	**D**
Cylindrical/ regular	Irregular
Closely packed	Loosely packed
Contain chloroplast	Contain fewer chloroplast

Note: Mark first one only

(iii) Allows for free diffusion/ circulation of **respiratory** gases/ water vapour;

1. (a) Caryopsis;

(b) (i) Self dispersal/ Explosive mechanism;

(ii) Presence of lines of weakness/ sutures; Rj weak lines

(3marks)

A DRAWING (1 MK)

Conditions:-

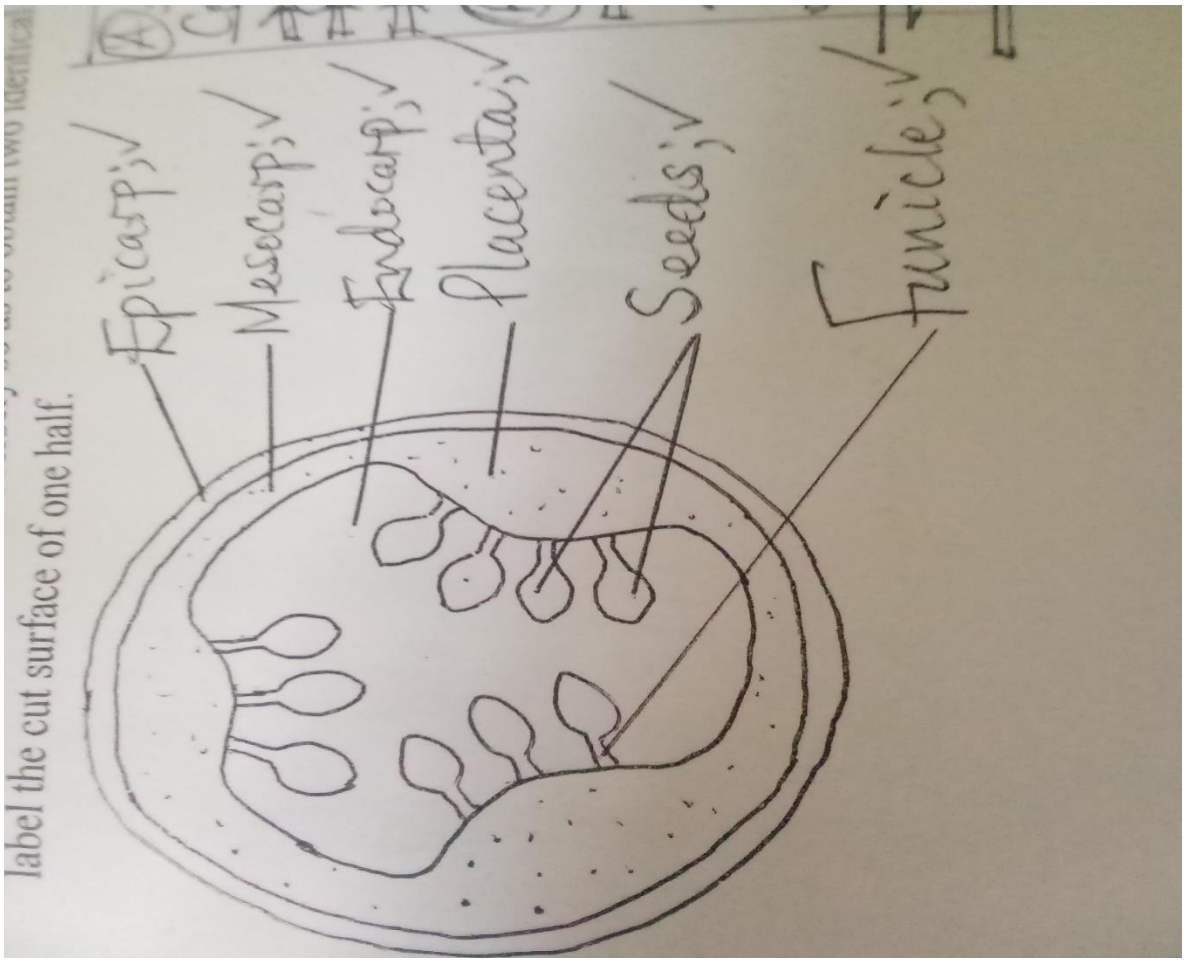
- Continuous outline
- Proportionality
- Accuracy

B LABELLING (2 MKS)

- Each correctly labelled part = ½ mk

∴ 6mks Maximum 2 MKS

TOTAL → 3 MARKS



(d) (i)

P Coleorhiza;
S Plumule;

(ii) Protects S/ plumule from damage by soil particles;

(iii) Q/ Endosperm;

(e) Distance between V and W = 3.5 – 13.7mm

Actual width = $\frac{13.5 \times 1000}{X30,000}$; = 0.45micrometers; OR Actual width = $\frac{13.7 \times 1000}{X30,000}$ = 0.46micrometers

OR Actual width = $\frac{13.6 \times 1000}{X30,000}$; = 0.45micrometers;

2. (a)

F Cortex;
J Cornified layer;
K Granular layer;

(b)

L Secrete sebum which keeps hair and epidermis supple/ waterproof/ contain antiseptic substances/ kill micro-organisms;
M Conduct sweat to the skin surface;

(c)

Coiled to increase surface area for absorption of excess water/ mineral salts/ urea/ lactic acid/ sweat from the surrounding blood vessels/ tissues;
Made up of numerous secretory cells that absorb excess water / mineral salts/ urea/ lactic acid/ sweat;

(d)

F/ Cortex;

(e) (i)

Q/ Fine adjustment knob;

(ii)

To avoid destruction/ distortion/ of the cells/ tissues/ layer;
To obtain thin sections;
Note: Any one

(iii)

Hinge/ Hinge screw;

(iv)

Magnifies the cell;
Increases the resolution/ resolving power of the eye;