231/3
BIOLOGY
PAPER3 (PRACTICAL)
MARKING SCHEME

1. a) (i) leaf
   (ii) P – stoma; rej stomata.
   Q – palisade cells/layer/mesophylls
   R – Spongy layer/cell/mesophylls
   S – vascular bundle/xylem/phloem
   T – Intercellular/air spaces
   U – Upper epidermis.

b. (i) Site for photosynthesis.
   (ii) Adaptation
   - Numerous chloroplasts (which contain chlorophyll) for photosynthesis.
   - Closely packed/vertical arrangement for maximum absorption of light.
   - Positioned on the upper surface to absorb maximum light.

c. - Light
   - Temperature

d. Length = 1cm accept ± 0.1

$$\text{Actual length} = \frac{\text{length of image}}{\text{Magnification}} = \frac{10{,}000}{5{,}000}$$

= 2 um → 2 micrometers .rej.if no units

2.

a) i) M :- Lumbar vertebra;
Rej.Lumbar alone/lumbar bone/lumbar vertebrae.
N: - Cervical vertebra;
Rej.Cervical bone/cervical alone/cervical vertebrae.
ii) J: - Neural spine;
K: - Neural canal;
L: - Vertebraterial canal;

b. i)

M	N
Broad /wide/large neural spine	Narrow/small neural spine;
Vertebraterial canal absent	Vertebraterial canal present;
Narrow neural canal	Wider neural canal
Large transverse processes	Small/shorter transverse precesses
Undivided/unwinged transverse processes	Divided/winged transverse processes
Metapophysis and anapophysis are present	Metapophysis and anapophysis absent.

ii) M:-abdomen/abdominal region;
N:- neck region

c. Branched /winged/divided transverse processes to increase the surface area for muscles attachment;
Neural canal for passage of spinal cord;
Neural spine to increase the surface area for muscle attachment;
Vertebraterial canals for passage of blood vessels and nerves;
Neural arch and Centrum for protection of the spinal cord;

3 a)

Food substance	procedure	observation	conclusion
starch	Put solution K in a test tube add iodine solution	Blue black	Presence of starch
	Put solution L in a test tube add iodine solution	No colour change/colour of iodine/brown	Absence of starch
Reducing sugars	Put solution K in a test tube and equal volume of benedicts solution; heat to boil	No colour change; colour of benedicts solution remains	Absence of reducing sugars
	Put solution L in a test tube Add benedict's solution; heat to boil.	Colour changes to green,yellow,orange , brown	Presence of reducing sugars.

12/2 = 6marks

b.i)

Test with	procedure	observation	conclusion
Iodine solution	Put contents of visking tubing in a test tube add iodine solution	Blue black	Presence of starch
Benedicts solution	Put contents of visking tubing in a test tube add Benedict's solution heat	Colour changes from blue to green, yellow, orange brown	Presence of reducing sugars.

ii)

Test with	procedure	observation	conclusion
Iodine solution	Put contents of the beaker in a test tube add iodine solution	No colour change/colour of iodine/brown.	Absence of starch.
Benedicts solution	Put contents of the beaker in a test tube add Benedict's solution Then heat	Colour changes from blue to green, yellow orange then brown.	Presence of reducing sugars

6 /2= 3 marks

N:B Mark procedure once. But must be correct at all cases.

c. Reducing sugar molecules are small in sizes; able to pass through the semi – permeable membrane into the visking tubing by diffusion.
Starch molecules are too large; to pass through the semi -permeable membrane/visking tubing into the beaker;