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

 Actual length = length of image

 Magnification

 = 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 solutionheat | 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 addBenedict’s solutionThen 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;