Name the stages labelled as 1, 2, 3. 4. 5 and 6.

1 - ……..
2 - ……..
3 - ……..
4 - ……..
5 - ……..
6 - ……..

(i) Which stage of the above diagram is homologous to the stamens of flowering plants?
……..

(ii) Which stage of the above diagram is homologous to carpels of flowering plants?
……..

(iii) Explain how microscopes are produced and dispersed in flowering plants.
……
……

(B) (i) State **two** functions of hair like trichomes.

……

……

(ii) What form the symplastic route of radial transport in plants?

……

(iii) What is the form of intake of sulphur into plants?

……

(iv) Why do land plants carry out internal fertilization?

……

(v) What are known as statoliths that help to detect gravity by vascular plants?

……

2025 AL

Unit 4

Paper 3

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Exhilarating Experience in Biology

1. **Some types of plant cells and their functions are given below.**

Type of cells	Function
A – Sclerenchyma	P – Providing support
B – Collenchyma	Q – Transporting water
C – Tracheids	R – Storage of starch
D – Parenchyma	S – Wound repair

Select the response that indicates all correct combinations of 'cell type - function'.

(1) A – Q, B – S, C – P, D – R
(2) A – P, B – R, C – Q, D – S
(3) A – P, B – P, C – Q, D – R
(4) A – R, B – S, C – P, D – S
(5) A – Q, B – P, C – S, D – R

2. Which of the following statements is correct regarding phloem cells?
(1) Phloem consist only living cells.
(2) Phloem is always present out to the xylem of dicotyledonous stem.
(3) All phloem cells have only primary cell wall.
(4) Companion cells are absent in phloem of monocotyledonous stem.
(5) Conduct nutrients.

3. Which of the following is directly related to primary growth of plants?
(1) Apical meristerm. (2) Intercalary meristem. (3) Interfacicular cambium.
(4) Cork cambium (5) Fascicular cambium.

4. Direction of the leaf is called as leaf orientation. Which of the following incorrect
(1) Leaves may be horizontally oriented.
(2) In low light conditions, horizontal leaves capture sunlight much more effectively than vertical leaves.
(3) horizontal orientation may expose upper leaves to overly intense light
(4) Intense light injures leaves and reducing photosynthesis.
(5) light rays are essentially parallel to the leaf surfaces in dicot leaf to receives too much light, and light penetrates more deeply to the lower leaves.

5. Which statement is false about stomatal mechanism.
(1) This response is triggered by illumination of blue-light receptors in the plasma membrane of guard cells.
(2) During the day time, Light stimulates the guard cells actively accumulate K+ from neighboring epidermal cells, thus lowering their water potential that leads to the inflow of water by osmosis from the surrounding epidermal cells.
(3) The accumulation of K+ in the guard cells requires the energy which is provided by the transfer of electrons during photosynthesis of the chloroplast in guard cells.
(4) Stomatal closing occurs by loss of K+ from guard cells to neighboring epidermal cells.
(5) Abscisic acid (ABA) result K+ influx.

6. Part of the leaf epidermal cells were immersed in distilled water for 30 minutes. All cells became turgid and reach to equilibrium. Which of the following statement is correct regarding these cells?
(1) The water potential and the osmotic potential of the cell sap is having equal opposite values.

(2) The water potential of the cell sap and the pressure potential are having equal values.
(3) The osmotic potential and the pressure potential of the cell sap is having equal opposite values.
(4) The water potential of the cell sap is less than the water potential of distilled water.
(5)Osmotic potential of the cell sap is higher than the pressure potential.

7. Which of the following statements regarding phloem transport according to pressure-flow hypothesis is correct?
(1) Transfer cells secrete sucrose into sieve tubes along a concentration gradient.
(2) Pressure inside the sieve tube is greatest at the sink.
(3) Mass flow takes place from source to sink along a pressure potential gradient.
(4) Phloem transport is a passive process.
(5) Water potential in the sieve tube increases due to phloem loading.

8. Which one of the following statements regarding nutrition of plants is incorrect?
(1) Deficiency of nitrogen causes chlorosis.
(2) Magnesium is necessary for formation of chlorophyll.
(3) Calcium helps in maintaining osmotic balance of cells.
(4) Sulphur is a component of amino acids. (5) Phosphorous results purpling of veins

9. Which one of the following statements regarding a comparison of life cycles of *Nephrolepis* and *Selaginella* is incorrect?
(1) *Nephrolepis* produces sori but *Selaginella* does not.
(2) *Nephrolepis* produces one type of gametophyte but *Selaginella* produces two types of gametophytes
(3) Gametophytes of *Nephrolepis* are photosynthetic but gametophytes of *Selaginella* are not photosynthetic
(4) Sperms of *Nephrolepis* are multiflagellate while those of *Selaginella* are biflagellate.
(5) Gametophytes of *Nephrolepis* produce many antheridia while gametophytes of *Selaginella* produce only a one antheridium.

10. Pollination is said to occur when a pollen grain
(1) Matures and has three nuclei (2) Lands on stigma (3) Releases sperm nuclei
(4) Release its sperm nuclei and fertilizes the egg polar nuclei
(5) When he anther dehisces releasing the pollen.

11. Which one of the following statement/s is/ are correct?
(1) Flowers, fruits and companion cells are three features typical of angiosperms.
(2) There is only one ovule in an ovary
(3) Gametophytes of gymnosperms and angiosperms have neither antheridia nor archegonia.
(4) In angiosperms pollen chamber is a cavity in the ovule in which pollen grains are found.
(5) A seed is composed of tissues belonging to two sporophytic generations and one gametophytic generation of flowering plants.

12. Find correct statement
(1) Water deficit stimulates increased synthesis and release of abscisic acid (ABA), which acts on guard cell membrane, closing stomata to reduce transpiration.
(2) In grasses the leaves roll in to a tube-like shape which reduces the surface area to reduce transpiration. Some plants shed their leaves during seasonal drought.
(3) They increase the proportion of unsaturated fatty acids which keeps the membranes more fluid at low temperature.
(4) Water in the cell wall and intercellular spaces freezes before freezing the solute-rich water in the cytosol.
(5) Before the onset of winter, the cell of frost-tolerant plants increases cytoplasmic levels of specific solutes such as sugars that help to reduce the loss of water from the cell preventing dehydration.

13. Incorrect statement regarding plant stress responses
(1) When cell membrane cools below a critical temperature it looses its fluidity
(2) Many plants can respond to moderate soil salinity by storing inorganic solutes that are well tolerated at high concentrations
(3) Plants may wilt when water loss by transpiration exceeds water absorption.
(4) Amount and quality of wax and cuticle that cover the epidermal cells is a preexisting structural and chemical defense mechanisms;
(5) Morphological changes in the cell wall is induced structural and chemical defense mechanisms;

13. Which of the following statements regarding plant meristems is correct?
(1) Lateral meristem and apical meristem are involved in secondary growth.
(2) Shoot apical meristem produces new cells both inward and outward.
(3) Regrowth of broken leaves of monocots occurs due to the action of lateral meristem located at their bases.
(4) Lateral meristem contributes to the formation of periderm.
(5) Meristems are always active.

14. Select the correct statement regarding water loss in plants.
(1) Guttation occurs throughout the day.
(2) Transpiration rate is high when relative humidity is high.
(3) About 50% of water in plants is lost due to stomatal transpiration.
(4) Water loss decreases due to increase in turgor in guard cells.
(5) Root pressure is needed for guttation.

15. Deficiency of which of the following elements cause chlorosis, poor growth and death of leaf tips in plants respectively?
(1) Mg, C and B (2) S, O and Ni (3) N, H and Cl
(4) Mo, Ca and Fe (5) P, B and Ni

16. The eight nuclei in mature embryo sac of angiosperms are contained within
(1) two antipodal cells, two central cells, two synergids and egg.
(2) three antipodal cells, central cell, two synergids and egg.
(3) two antipodal cells, three central cells, synergid and egg.
(4) three antipodal cells, central cell, three synergids and egg.
(5) three antipodal cells, two central cells, two synergids and egg.

17. Which of the following plant hormones stimulate seed germination?
A – Cytokinins
B – Abscisic acid
C – Auxins
D – Gibberellins
(1) A and B (2) A and C (3) A and D
(4) B and C (5) B and D

Structured Essay

1. (A) (i) The diagram given below indicates different stages of the life cycle of *Cycus* plant.