Anatomy of Flowering Plants

Assertion Reason Questions

Given below are two statements labelled as Assertion (A) and Reason (R). Select the most appropriate answer from the options given below:

(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true and R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

1. Assertion (A): Phloem is also known as food tissue, as it transports food from root to stem and leaves.
Reason (R): Xylem is also known as water tissue, as it transports water from root to stem and leaves.

Ans. (d) A is false but R is true.
Explanation: Phloem is food tissue; it transports plant food which is synthesised by leaves to other parts of the plant. Xylem is a water tissue because it conducts water and provides water to stem and leaves which is collected from roots.

2. Assertion (A): Gymnosperms lack vessels in their xylem.
Reason (R): Tracheids are living cells with protoplasm.

Ans. (c) A is true but R is false.
Explanation: Seed-producing plants, gymn- osperms do not contain vessels in their xylem. Their xylem consists of xylem fibres, xylem parenchyma and tracheids but not vessels which are present in angiosperms. Tracheids are long and elongated and appear as tubes having thick walls which taper at the end. Their walls are lignified and non-living. The walls of tracheids lack protoplasm.

3. Assertion (A): The companion cells help in maintaining the pressure gradient in the sieve tubes.
Reason (R): The companion cells are specialised collenchymatous cells.

Ans. (c) A is true but R is false.

Explanation: Companion cells are essential parenchymatous cells that are closely connected to sieve tube elements. Pit fields exist between the shared longitudinal walls of the sieve tube elements and companion cells, which connect them. The partner cells aid in maintaining the sieve tubes' pressure gradient.

4. Assertion (A): Casparian strips runs along the endodermis radial and tangential walls.
Reason (R): Casparian strips prevent plasmolysis of endodermal cells.

Ans. (a) Both A and R are true and R is the correct explanation of A.
Explanation: The endodermal cells possess a band of thickening which runs along their radial and tangential walls. It is made up of lignin and suberin. It prevents plasmolysis of endodermal cells.

5. Assertion (A): Xylem is exarch in stem and endarch in roots.
Reason (R): Exarch of xylem facilitates inflow of water from cortex and endarch favours ascent of sap.

Ans. (d) A is false but R is true.
Explanation: In stem, the xylem is endarch, i.e. protoxylem lies at the tip of the metaxylem. It helps in lateral conduction of the sap whereas in roots, the xylem is exarch, i.e. protoxylem lies in contact with the pericycle and metaxylem is present towards the pith (centre). It helps in conduction of water and minerals to the shoot from the cortex.

6. Assertion (A): Palm is a monocotyle- donous plant but shows secondary growth.
Reason (R): Presence of parenchy- matous cells in the ground tissues.

Ans. (a) Both A and R are true and R is the correct explanation of A.
Explanation: Palm is a monocotyledonous plant. It shows enlargement of parenchymatous cells that are present in the ground tissues causing an increase in the girth of the stem.

7. The cambium is most active in the spring and early summer when most tree growth is taking place. During this time of the year, the bark of a tree is very loose and can be easily knocked off the tree. Inside the vascular, cambium is the largest portion of the trunk known as the xylem.

Assertion (A): Cambium is present in monocot stem.
Reason (R): The vascular bundles are in the form of atactostele.

Ans. (d) A is false but R is true.
Explanation: Cambium is absent in most of the monocots and the whole procambium is consumed in the formation of vascular tissues. The vascular strands are in the form of atactostele where a large number of vascular bundles lie scattered throughout the ground tissue.