Solutions

S1. Ans.(d)

In grasses, certain adaxial epidermal cells along the veins modify themselves into large, empty, colourless cells. These are called bulliform cells. When the bulliform cells in the leaves have absorbed water and are turgid, the leaf surface is exposed. When they are flaccid due to water stress, they make the leaves curl inwards to minimise water loss.

S2. Ans.(d)

Guard cells of stomata have thin outer wall and highly thickened inner walls.

S3. Ans.(c)

Collenchyma is also living tissue.

Gymnosperm lack xylem vessels but presence of xylem vessels is the characteristic of angiosperm.

S4. Ans.(a)

Endarch and exarch are the terms often used for describing the position of primary xylem in the plant body.

S5. Ans.(b)

In winter, the cambium is less active and forms fewer xylary elements that have narrow vessels, and this wood is called autumn wood or late wood.

S6. Ans.(c)

Lenticels are lens shaped opening permitting exchange of gases between the outer atmosphere and internal tissue of the stem.

Bark that is formed early in the season is called early or soft bark. Towards the end of the season late or hard bark is formed.

S7. Ans.(a)

Radial vascular bundles are present in roots. Monocot roots have polyarch and exarch condition of xylem.

S8. Ans.(a)

Explanation The correct sequence of tissues in the stelar region of the stem showing secondary growth from pith towards cortex is:

Primary Xylem → Secondary Xylem Secondary Phloem → Primary Phloem

S9. Ans.(b)

Lateral meristems are the meristems that add to the width or girth in a process known as secondary growth. They are responsible for the secondary growth in plants and are found parallel to the sides of the plants.

S10. Ans.(d)

During secondary growth in dicot stem, the cells of medullary rays lie between the vascular bundles become dedifferentiated and give rise to new cambium called interfascicular cambium.

S11. Ans.(a)

Initiation of lateral roots and vascular cambium during secondary growth takes place in pericycle cells of dicot roots. Epiblema, endodermis and cortex do not dedifferentiate.

S12. Ans.(b)

The girdling experiment shows that phloem is the tissue responsible for translocation of food; and that transport takes place in one direction i.e. towards the root.

S13. Ans.(Bonus)

All the statements are correct.

S14. Ans.(a)

In old trees, the greater part of secondary xylem is dark brown due to deposition of organic compounds like tannins, resins, oils, gums, aromatic substances and essential oils in the central or innermost layers of the stem. These substances make it hard, durable and resistant to the attacks. of micro-organisms and insects.

S15. Ans.(b)

The large cells around the vascular bundles of C. plants form bundle sheath. These cells have large number of chloroplasts to perform calvin cycle.

S16. Ans.(b)

Spring wood is also called early wood. It is lighter in colour and has a lower density. The vessels are produced with the wider lumens to transport more water to meet the requirement by increased transpiring surface in spring season.

The spring and autumn wood appear as alternate concentric rings of light and dark colour forming annual rings.

S17. Ans.(b)

Interfascicular cambium is form by cells of medullary rays.

S18. Ans.(b)

Due to the deposition of organic compounds such as tannins, resins, oils, gums, aromatic chemicals, and essential oils, the middle or innermost part of secondary xylem in old trees is dark brown. The heartwood region consists of dead elements with strongly lignified walls. Sapwood refers to the lighter-colored peripheral area (outermost) of the secondary xylem.

S19. Ans.(d)

A sclerenchymatous hypodermis, a large number of distributed vascular bundles, each surrounded by a sclerenchymatous bundle sheath, and a vast, visible parenchymatous ground tissue characterise the monocotyledonous stem. The vascular bundles are joined and closed together.

S20. Ans.(c)

Certain adaxial epidermal cells along veins in grasses transform into huge, empty, colourless cells. Bulliform cells are what they're termed.

S21. Ans.(d)

Cells on both sides are cut off by cork cambium or phellogen. Inner cells differentiate into secondary cortex or phelloderm, whereas exterior cells differentiate into cork or phellem. On the inside, it produces secondary cortex.

S22. Ans.(b)

Water stress causes bulliform cells to become flaccid. This causes the leaves to curl inward, reducing water loss.

S23. Ans.(d)

Gymnosperm phloem is devoid of both sieve tubes and companion cells. Albuminous cells and sieve cells are seen in gymosperms.

S24. Ans.(d)

The cyclical activity of cambium produces annual rings. Climate conditions in temperate zones are rarely consistent throughout the year. The climatic conditions in the tropics, on the other hand, are consistent throughout the year. As a result, in temperate plants, cambium is more active in the spring and less active in the autumn.

S25. Ans.(b)

In the stem and root of a vascular plant, vascular cambium is found between the xylem and phloem. It is the source of both secondary xylem (inwards, towards pith) and secondary phloem (outwards, away from pith) growth (outwards).

S26. Ans.(d)

The casparian strip is a band of cell wall material deposited in the endodermis' radial and transverse walls. Suberin and lignin make up this substance.

S27. Ans.(a)

Monocots have either no secondary growth or abnormal secondary development, as seen in grass.

In monocots, this occurs due to the lack of cambium between the xylem and the phloem.

S28. Ans.(a)

Guard cells in broad-leaved plants are kidney- shaped, whereas those on grasses' leaf blades, such as wheat and bamboo, are dumb-bell shaped.

S29. Ans.(c)

Both sides of the cell are cut off by phellogen. The cork (phellem) differentiates from the outer cells, whereas the secondary cortex develops from the inner cells (phelloderm). Secondary cortical cells are parenchymatous. Phellem is made up of cells that have died.

S30. Ans.(c)

The vascular cambium produces secondary xylem and secondary phloem during secondary growth.

Cork cambium produces phelloderm.

S31. Ans.(c)

Heartwood is the non-functional middle section of the secondary xylem of old trees that is hard, lifeless, dark brown in colour, and heavily lignified.

Deposition of organic molecules is responsible for the dark colour (tannins, resins, oils, gums, aromatic substances, essential oils, etc). These ingredients make it tough, long-lasting, and resistant to bacteria and insects. The stem is supported mechanically by the heartwood, which does not conduct water.

S32. Ans.(c)

Sieve tube elements are long, tube-like structures that are coupled with companion cells and are oriented longitudinally. The sieve plates are formed by perforating their end walls. A developed sieve element has a big vacuole and peripheral cytoplasm but no nucleus. The nucleus of companion cells controls the actions of sieve tubes.

S33. Ans.(d)

Tracheids and vessels are the principal water transportation elements in flowering plants. Vessel is a long cylindrical tube-like structure composed of multiple vessel parts, each with lignified walls and a huge central chamber.

S34. Ans.(a)

Tyloses are balloon-shaped structures that extend from xylem parenchyma cells into vessels.

S35. Ans.(c)

Between the epidermis and the stele is the cortex. The stele is made up of all tissues on the inner side of the endodermis, such as the pericycle, vascular bundles, and pith.

S36. Ans.(b)

In the area of the guard cells, a few epidermal cells become specialised in their shape and size and are known as subsidiary cells. Stomatal apparatus refers to the stomatal orifice, guard cells, and auxiliary cells that surround it.

S37. Ans.(d)

The vascular bundles of monocotyledonous plants are devoid of cambium.

S38. Ans.(a)

The vascular bundles of monocotylednous plants are devoid of cambium. As a result, they are referred to as closed since they do not generate additional tissues. The monocot stem, not the root, has scatter vascular bundles.

S39. Ans.(b)

The correct order from the outer to the inner side of the dicot stem is phellem-secondary cortex- secondary phloem-wood.

S40. Ans.(d)

The stem of a dicot is endarch, while the root of a dicot is exarch. Protoxylem distinguished them anatomically.

S41. Ans.(c)

Tracheids are imperforate, while the rest of the trachea is perforated.

S42. Ans.(c)

The exchange of gases between the outer atmosphere and the inside tissue of the stem is enabled through lenticels, which are lens-shaped openings. Most woody trees have these.

S43. Ans.(b)

The intrafasicular cambium is the cambium present between primary xylem and primary phloem in dicot stems. Adjacent to these are the cells of medullary rays.

The interfascicular cambium is formed when the intrafascicular cambium becomes meristematic.

Xylem parenchyma is a live, thin-walled organ with cellulose-based cell walls.

Endodermis is the innermost layer of the cortex in dicot roots.

The pericycle is a layer of thin-walled parenchymatous cells that is next to the endodermis.

S44. Ans.(d)

The number of annual rings equals the number of years.