

Class: 11
Subject: Biology
Topic: Anatomy of flowering plants
No. of Questions: 20

Q1. Cork cambium forms tissues that form the cork. Do you agree with this statement? Explain.

Sol. No, the statement is misleading. Actually the cork cambium forms two types of tissues. Towards outer side, it forms cork whereas towards inner side it forms secondary cortex. The cells of cork are dead whereas those of secondary cortex are living.

Q2. Indicate the location of cambium in a dicot stem.

Sol. Intrafascicular, between xylem and phloem within each vascular bundle.

Q3. Cut a transverse section of young stem of a plant from your school garden and observe it under the microscope. How would you ascertain whether it is a monocot stem or a dicot stem? Give reasons.

Sol. During examination of a cross section of young stem, if it shows the following details it belongs to dicot stem:

- (a) Internally, the stem is differentiated into epidermis cortex, vascular bundles and pith.
- (b) Hypodermis, if present, is collenchymatous.
- (c) Vascular bundles are arranged in a ring.
- (d) Vascular bundles are open.

During examination if the following details are seen, the young stem belongs to monocots:

- (a) Internally, the stem is not differentiated into cortex and pith.
- (b) Hypodermis, if present, is sclerenchymatous.
- (c) Each vascular bundle is closed and has a bundle sheath.

Q4. Name the three basic tissue systems in the flowering plants. Give the tissue names under each system.

Sol. Three basic tissue systems in flowering plants are:

1. Epidermal tissue system: it consists of :
 - (a) Epidermis
 - (b) Cuticle and wax
 - (c) Stomata
 - (d) Trichomes
2. Ground tissue system : It consists of
 - (a) Cortex
 - (b) Endodermis
 - (c) Pericycle

- (d) Medullary rays
- (e) Pith
- (f) Ground tissue of leaves

Q5. When do you refer to a vascular bundle as a closed bundle?

Sol. A vascular bundle without cambium is called closed.

Q6. Why is cambium considered to be a lateral meristem?

Sol. Cambium is generally located laterally between the xylem and phloem tissues. It produces secondary xylem and secondary phloem which increase the growth in thickness of an organ.

Q7. Which one out of root or stem shows endarch arrangement of xylem? What is meant by endarch arrangement?

Sol. Endarch arrangement of xylem is found in stem. It means the protoxylem is present towards pith and metaxylem towards epidermis.

Q8. Where are companion cells located in flowering plants? What is their function?

Sol. Companion cells are the components of phloem and occur along with the sieve tubes. They assist the sieve tubes in the process of translocation of solutes.

Q9. What is an annual ring?

Sol. The two bands of secondary xylem, i.e., autumn wood and spring wood, produced in one year, is called an annual ring.

Q10. Name a plant organ where endodermis is absent. Give one basic difference between endodermis and epidermis.

Sol. Endodermis is absent in leaves. Cells of endodermis possess casparian strips or bands in their radial and transverse walls whereas epidermal cells do not possess casparian strips.

Q11. Below is a list of plant fibers. From which part of the plant these are obtained

- (a) Coir
- (b) Hemp
- (c) Cotton
- (d) Jute

Sol. (a) mesocarp of fruit (b) bast (c) surface of seed (d) bast.

Q12. What do you mean by leptocentric and hadrocentric vascular bundle? Cite examples.

Sol. A concentric bundle in which the phloem is surrounded by xylem is called leptocentric. It is found in secondary bundles of Dracaena. A concentric bundle in which the xylem is surrounded by phloem is called hadrocentric. It is found in polypodium rhizome.

Q13. What are medullary rays and what are their functions?

Sol. Medullary rays are the radially arranged living cells present in between the xylem and phloem. They are usually one to few layers in thickness and one to several layers in height. They form the radial system responsible for radial conduction of solutes. They maintain connection between pith and cortex.

Q14. Why there is secondary growth in dicots and no such growth in monocots?

Sol. Dicotyledons are characterized by having cambium in their vascular bundles i.e., the vascular bundles is open. The monocotyledons, on the other hand have no cambium in their vascular bundles. Therefore, secondary growth occurs in dicotyledons and not in monocotyledons.

Q16. (a) What are casparian strips and what is their function?

- (b) Define concentric vascular bundle. What are their types?
- (c) What is wood botanically?

Sol. (a) The radial and transverse walls of epidermal cells possess a waxy substance called suberin in the form of bands or strips. These strips were first observed by Caspary (1865-66) and hence, called casparian strips. These strips help endodermis to act as 'water tight' layer outside the vascular strand and stops passive movement of water and minerals. It also prevents the conducting elements being clogged with air.

(b) A vascular bundle, in which one kind of vascular tissue is completely surrounded by the other kind of vascular tissue, is called concentric bundle. The concentric bundles are of two types – (A) Amphivasal and (B) Amphicribal

(c) Wood is defined as the main strengthening and water conducting vascular tissue in stems and roots.

Q16. What will you observe in a transverse section of a trunk to estimate the age of the tree?

Sol. Age of a tree is estimated by counting the annual rings in the transverse section of its trunk. An annual ring consists of two kinds of woods- i.e., spring wood (early wood) and autumn wood (late wood) that appear as alternating concentric rings.

Q17. Grandfather used to prune the tips of hedge plant in his garden. Harish asked him the reason for doing so. Grandfather answered that it induces profuse growth of lateral branches thereby making hedge denser.

Read the above passage and answer the following questions:

- (a) Which plant tissue is removed during trimming of tips of hedge plant?
- (b) How many times of meristems are found in plants?
- (c) Why did Harish ask his grandfather about the reason of his act?

Sol. (a) Apical meristem.

- (a) Three types (apical, intercalary and lateral meristems).
- (b) Harish was curious to know the effect of pruning on the hedge plant.

Q18. Sanjeev went to buy clothes with his father and preferred cotton clothes. Father asked him about the source of cotton fibers. He answered that it is obtained from hair-like structures present on the seeds of cotton.

Read the above passage and answer the following questions:

- (a) Cotton fibers represent which cells? Name two other fiber yielding plants.
- (b) What value is displayed by father?

Sol.

- (a) Elongated epidermal cells; jute and Hemp.
- (b) Father wanted to share scientific knowledge with the younger generation.

Q19. Mother went to the market to buy fruits and bought apples and naashpati (Pyrus). Ravi did not like naashpati as it was very hard in comparison to apples, but his mother insisted that he should eat naashpati also as it contained the calcium for the growth of the body.

Read the above passage and answer the following questions:

- (a) What is the reason for the difference in the softness in apple and naashpati fruits?
- (b) What are sclereids?
- (c) Why did mother want Ravi to eat naashpati?

Sol.

- (a) Abundant presence of sclereids in the naashpati fruit.
- (b) Sclereids are sclerenchymatous cells which are short and possess extremely thick lamellated lignified walls.
- (c) She was concerned about the health of her child as fruits provide necessary minerals and vitamins.

Q20. Maninder went to kerala to visit his friend Nair. In the evening, he went for a walk and saw coconut trees everywhere. Nair told him that this tree is very important for them as they get huge benefits from this plant.

Read the above passage and answer the following questions:

- (a) Which part of this plant is the source of coir fibers? What is the morphological nature of coir fibers?
- (b) Give at least two other benefits of coconut trees.
- (c) How did Maninder derive benefit from his visit to Kerala?

Sol.

- (a) Fruit wall is the source of coir fiber; these fibers are lignified elongated cells.
- (b) Coconut tree provides us coconut water to drink and coconut oil for various uses.
- (c) Maninder maintained his relationship with his friend and also came to know about natural resources of Kerala region.