



Class XI

Session 2022 – 23

Subject :- BIOLOGY

Chapter : - 6 Anatomy of flowering plant

Competency based questions

I Source based Questions

The epidermal tissue system forms the outer-most covering of the whole plant body and comprises epidermal cells, stomata and the epidermal appendages – the trichomes and hairs. The epidermis is the outermost layer of the primary plant body. It is made up of elongated, compactly arranged cells, which form a continuous layer. Epidermis is usually singlelayered. Epidermal cells are parenchymatous with a small amount of cytoplasm lining the cell wall and a large vacuole. The outside of the epidermis is often covered with a waxy thick layer called the cuticle which prevents the loss of water. Cuticle is absent in roots. Stomata are structures present in the epidermis of leaves. Stomata regulate the process of transpiration and gaseous exchange. Each stoma is composed of two beanshaped cells known as guard cells which enclose stomatal pore. In grasses, the guard cells are dumb-bell shaped. The outer walls of guard cells (away from the stomatal pore) are thin and the inner walls (towards the stomatal pore) are highly thickened. The guard cells possess chloroplasts and regulate the opening and closing of stomata. Sometimes, a few epidermal cells, in the vicinity of the guard cells become specialised in their shape and size and are known as subsidiary cells. The stomatal aperture, guard cells and the surrounding subsidiary cells are together called stomatal apparatus.

1. Stomata are responsible for -
 - a. Exchange of gases
 - b. Transpiration
 - c. None of the above
 - d. Both of them
2. Hairs in the stems are also known as _____
3. Mention one difference between root hairs and stem hairs (other than their region of origin)
4. What are the components of the stomatal apparatus?
5. Characteristics of epidermal cell
 - a. Large vacuole is present, cytoplasm lines the cell wall and cell wall is lined with cuticle.
 - b. Dense cytoplasm with numerous small vacuoles and the cell wall is highly elastic.
 - c. Dense cytoplasm with numerous vacuoles where the cell wall is rigid due to the deposition of lignin.
 - d. None of the above.

II Multiple choice questions

1. **Casparian strips are found in**
 - (a) Epidermis
 - (b) Endodermis

- (c) Exodermis
- (d) Pericycle
- 2. Where in epiphytes are velamen cells located?**
 - (a) Below the endodermis
 - (b) Below the epidermis
 - (c) Just outside the cortex
 - (d) Just outside the exodermis
- 3. The age of the tree can be determined by**
 - (a) Measuring its diameter
 - (b) Counting the number of annual rings
 - (c) Counting the number of leaves
 - (d) Finding out the number of branches
- 4. Which of the following has a perforated cell wall?**
 - (a) Vessel
 - (b) Fibre
 - (c) Tracheid
 - (d) Sclereid
- 5. Lateral roots originate in**
 - a. Cortex
 - b. Endodermal cells
 - c. Pericycle
 - d. Cork cambium

III Case based question

As the stem continues to increase in girth due to the activity of vascular cambium, the outer cortical and epidermis layers get broken and need to be replaced to provide new protective cell layers. Hence, sooner or later, another meristematic tissue called cork cambium or phellogen develops, usually in the cortex region. Phellogen is a couple of layers thick. It is made of narrow, thin-walled and nearly rectangular cells. Phellogen cuts off cells on both sides. The outer cells differentiate into cork or phellem while the inner cells differentiate into secondary cortex or phelloderm. The cork is impervious to water due to suberin deposition in the cell wall. The cells of secondary cortex are parenchymatous. Phellogen, phellem, and phelloderm are collectively known as periderm. Due to activity of the cork cambium, pressure builds up on the remaining layers peripheral to the phellogen and ultimately these layers die. bark is the tissues exterior to the vascular cambium, including the secondary phloem. Bark formed early in the season is called the early or soft bark and towards the end of the season – late or hard bark

At certain regions, the phellogen cuts off closely arranged parenchymatous cells on the outer side instead of cork cells. These parenchymatous cells soon rupture the epidermis, forming a lensshaped openings called lenticels. Lenticels permit the exchange of gases between the outer atmosphere and the internal tissue of the stem. These occur in most woody trees

1. Phellogen, phellem and phelloderm are together considered as
 - a. Pericycle
 - b. Periderm

- c. Phellogen
- d. Phellem

2. Assertion (A): - Lenticles are responsible for the exchange of gases between the internal tissues of the stem and the atmosphere.
Reason (R): -The phellogen produces parenchymatous cells on the outer side which ruptures the epidermis and produces the lenticels.
- (a) Both A and R are true and R is the correct explanation of A.
 - (b) Both A and R are true but R is not the correct explanation of A.
 - (c) A is true but R is false.
 - (d) Both A and R are false.
3. Name the tissues which are formed when the phellogen divides.
4. Name the tissues constituting the bark.
5. Differentiate between soft and hard bark.