

IMPORTANT QUESTIONS CLASS – 11 6=C@C; M

CHAPTER -6 ANATOMY OF FLOWERING PLANTS

Question 1.

What is phellogen? What does it produce?

Answer:

Phellogen is a cork cambium that is developed front hypodermis and epidermal cells near to the cortex. It is produced in the dicot stem during secondary growth for providing protection to the inner tissues.

It produces cork towards the outside and secondary cortex towards the inside.

Question 2.

What features make wood unique as a material?

Answer:

The following features make the wood unique as a material:

1. As it is light in weight, it can be easily transported over long distances.
2. It is a bad conductor of heat, electricity and sound.
3. It is resistant to rust.
4. It can be moulded into various desirable shapes.
5. The fluctuation in temperature does not affect largely and the volume of the wood.
6. Wood pulp is used for the synthesis of various materials like paper, plastics, rayon and transparent films.

Question 3.

List few important anatomical characteristics of the xerophytic leaf.

Answer:

The anatomical characteristics of the xerophytic leaf are:

1. The presence of a thick cuticle on both the epidermis of the leaf offers protection and reduces the rate of transpiration.
2. A multilayered epidermis is present. Its cells are elongated and lignified.
3. Stomata remain sunken in the lower epidermis. This reduces the rate of transpiration.
4. Palisade tissues are richly filled with chloroplast.

5. It also contains crystals of calcium oxalate scattered in the upper palisade tissues of leaf cells.

Question 4.

List the differences between the internal structure of the dicot stem and the Monocot stem.

Answer:

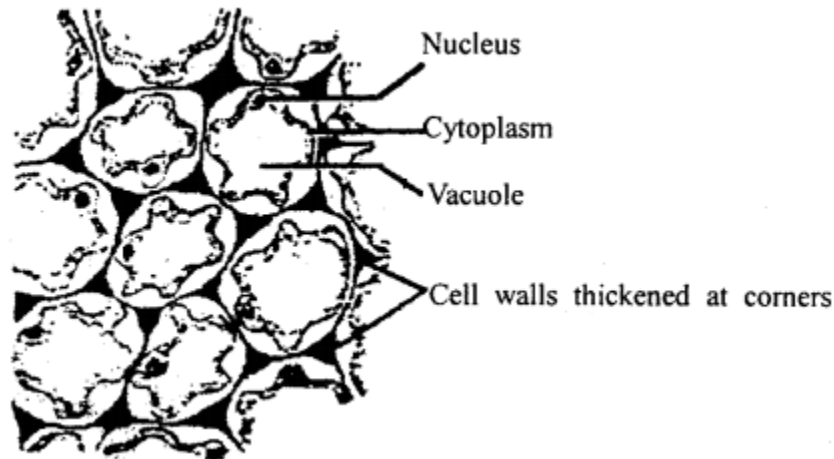
Dicot Stem	Monocot Stem
(i) Multicellular epidermal hairs are present.	(i) Epidermal hairs are generally absent.
(ii) Hypodermis is made up of collenchyma cells.	(ii) Hypodermis is made up of sclerenchyma cells.
(iii) Cortex is distinct and made up of parenchyma cells.	(iii) Cortex is not distinct but instead ground tissue is present.
(iv) Endodermis and pericycle are present.	(iv) Endodermis and pericycle are absent.
(v) A large pith is present.	(v) Pith is absent.
(vi) The prominent medullary ray between vascular bundles are present.	(vi) Medullary rays are absent.
(vii) The definite number of same size vascular bundles are arranged in a concentric ring.	(vii) The vascular bundles are of different size are found scattered in the ground tissue.
(viii) The vascular bundles are conjoint, collateral and open.	(viii) The vascular bundles are conjoint, collateral and closed.
(ix) The sheath around the vascular bundle is absent.	(ix) Bundle sheath made up of sclerenchyma cells is present around the vascular bundle.
(x) Lysigenous cavity is absent.	(x) Lysigenous cavity is present in mature vascular bundles.
(xi) Secondary growth is present.	(xi) Secondary growth is absent.
(xii) Phloem parenchyma is present.	(xii) Phloem parenchyma is absent.

Question 5.

What are the characters of collenchyma tissues? Give its functions also.

Answer:

Collenchyma tissue: Collenchyma tissue cells are living isodiametric without any intercellular spaces. The corner walls are thickened by Pectinisation. They appear cylindrical in vertical section and oval or polygonal in cross-section. The nucleus in each cell lies at a corner position.



Collenchyma

They are found in the dicot stem below the epidermis and on the outer region of the leaf, midribs and pedicels. On the basis of thickening, they are of three types:

1. Lamellar,
2. Angular,
3. Lacunate

Functions: Collenchyma tissue provides mechanical function as well as the function of photosynthesis.

Question 6.

Draw a well-labelled diagram showing the L.S. of phloem of an angiosperm with its components

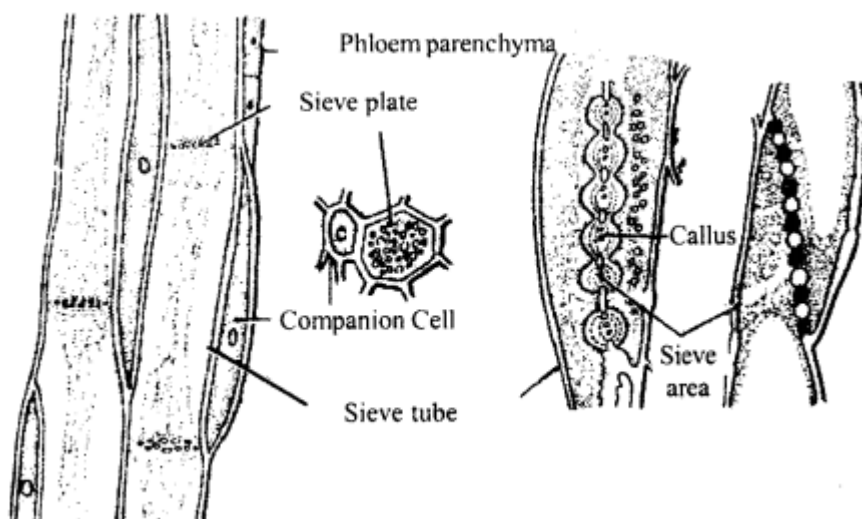
Answer:

Phloem is a food conducting tissue and it consists of:

1. Sieve, elements
2. Companion cells
3. Phloem fibres and
4. Phloem parenchyma.

1. Sieve elements: These occur as a single cell in pteridophytes and gymnosperms and longitudinal file of cells in angiosperms. The morphological specialization of sieve plates is the development of sieve area on their walls bearing sieve plates. The sieve plate bears a large number of perforations.

The protoplasmic strands maintain continuity through these perforations within the adjoining sieve tubes. In a mature sieve element there occurs a thin layer of parietal cytoplasm and a large central vacuole. The most important features of sieve elements are that they lack a nucleus at maturity.



Structure of phloem (L.S)

2. Companion cells: These are thin-walled, living parenchyma narrow cells, which are closely associated with sieve tube elements. They appear rounded or polygonal with dense granular cytoplasm, « prominent nucleus and numerous small vacuoles. The companion cells lack starch.

The nuclei of the companion cells serve as the nucleus of sieve tubes as they lack them. The companion cells mainly occur in angiosperms, accompanying the sieve tube elements.

3. Phloem fibres: They form a prominent part of both the primary and secondary phloem. They are elongated cells with lignified walls having simple pits. They provide support and help in the transport of food material. They are used for making cords and ropes etc.

4. Phloem parenchyma: These are the living parenchyma cells associated with sieve tube cells. They are elongated with sieve tube cells. They are elongated, pointed in shape and store the starch, fat and other organic substances. The tannings and resins are also found in these cells, They are elongated like the sieve elements.

The sieve element is a living component, which lacks a nucleus at maturity.

Question 7.

Describe briefly the various types of vascular bundles.

Answer:

These are of the following types:

1. Radial The bundles in which xylem and phloem are arranged on different radii and form the separate bundles are called radial vascular bundles as in all roots.
2. Conjoint The xylem and phloem are situated at the same radius and form a vascular bundle together.

These are divided into three types:

(a) Collateral: These are the bundles where xylem and phloem are arranged on some radius, xylem is located internally and phloem externally. These may be open when there is a patch of cambium in between the xylem and phloem e.g. Helianthus or closed when there is no cambium at all as seen in monocot stems

(b) Bicollateral: In this vascular bundle, the phloem is found in two groups one outside the xylem elements and the other inner to them. These are always open and found in pumpkin.

(c) Concentric: The bundle in which either Phloem surrounds the xylem completely is known as concentric.

This exists in two forms.

1. Amphicribal: The xylem lies at the centre and is surrounded by a ring of phloem, e.g., fern.
2. Amphivasal: The phloem lies at the centre and is surrounded by the xylem e.g. Dracaena.

Question 8.

Describe briefly the internal structure of the monocot root with the help of a labelled diagram.

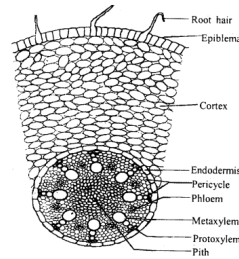
Answer:

A transverse section of the monocot root shows the following issues.

1. It is composed of a single layer of compactly arranged thin-walled cells without intercellular spaces and cuticle. It bears many unicellular root hair.
2. Cortex: It is present beneath the epidermis. It consists of 15-20 layers of parenchymatous cells with large intercellular spaces.

3. Endodermis: It is the innermost layer of the cortex. Its cells are barrel-shaped with Casparian strips on their anticlinal walls. The passage cells are seen just opposite the protoxylem ends.
4. Pericycle: It consists of a single layer of thin-walled parenchymatous cells.
5. Vascular bundle: The vascular bundles are radial and the xylem is exarch. The xylem and phloem bundles are always more than six.
6. Pith: It occupies the central portion of the stele and is made up of parenchymatous cells.
7. Conjunctive tissue: It consists of parenchymatous cells and is found between the xylem and phloem strands.

T.S. of a typical monocot root



Question 9.

Define the following.

(i) Radial vascular bundles

Answer:

Radial vascular bundles: The bundles in which xylem and phloem are arranged in different radii alternating with each other and form the separate bundles are called radial vascular bundles as in all roots.

(ii) Collateral vascular bundles

Answer:

Collateral vascular bundles: These are the bundles where xylem and phloem are arranged not at the same radius.

Xylem is located internally and phloem externally. These may be open when there is a patch of cambium in between the xylem and phloem e.g. Helianthus or closed when there is no cambium at all as seen in the monocot stem.

(iii) Exarch xylem

Answer:

Exarch xylem: It is the condition where protoxylem is located towards the periphery of axis and metaxylem inwards e.g. root.

(iv) Endarch xylem

Answer:

Endarch xylem: It is the condition where metaxylem is located towards the periphery of axis

and protoxylem inwards e.g. stem.

(v) Stele

Answer:

Stele: All the tissues that lie internal to Endodermis are collectively called stele. The outermost layer of stele is known as the pericycle.

Question 10.

Distinguish between:

(i) Phellum and Pheiloderm

Answer:

Phellum: It is a dead tissue that is formed by the activity of cork cambium in the outer region of the cortex during secondary growth. It is protective in function.

Pheiloderm: It is a living tissue that is formed by the activity of cork cambium in the inner side of the cortex. It regains during secondary growth. It performs the function of storage.

(ii) Open bundle and closed bundle

Answer:

Open Bundle: Avascular bundle containing cambium between xylem and phloem is called an open bundle e.g. dicot stem.

Closed Bundle: Avascular bundle lacking cambium between xylem and phloem is called a closed bundle e.g. monocot stem.

(iii) Fascicular cambium and inter fascicular cambium

Answer:

Fascicular cambium: It is a strip of cambium found between the xylem and phloem of each vascular bundle of dicot stem.

Interfascicular cambium: It is a strip of cambium that is formed from the cells of medullary rays adjoining with the fascicular cambium. It occurs during secondary growth.

(iv) Conjoint vascular bundles and Radial vascular bundles

Answer:

Conjoint vascular bundles: Xylem and phloem lie in the same bundles. They lie on different radii alternating with each other e.g. Dicot and monocot root.

Radial vascular bundles: Xylem and phloem lie in separate bundles. They lie on different radii alternating with each other e.g. Dicot and monocot root.

(v) Periderm and Bark

Answer:

Periderm: It includes three tissue consisting of phellogen, phellem and phelloderm and is formed at the peripheral region of the axis.

Bark: It includes all the tissue external to the secondary xylem formed during secondary growth. These are cambium, secondary phloem.