

NEET Important Questions with Solutions from Anatomy of Flowering Plants

Q.1. When protoxylem faces pericycle, it is called

- A) Endarch
- B) Mesarch
- C) Exarch
- D) Polyarch

Answer: Exarch

Solution: Complex tissues are of two types xylem and phloem. Xylem helps in the conduction of water and minerals from roots to another region of the plant body. Protoxylem and metaxylem are arranged differently in various types of plants. In exarch arrangement, the protoxylem is towards the peripheral region, and metaxylem is present near the centre.

Q.2. Which of the following structures of a plant is responsible for transpiration?

- A) Xylem
- B) Root
- C) Stomata
- D) Phloem

Answer: Stomata

Solution: Stomata is the tiny pore present in almost all the leaves of land plants. The main function of the stomata is the gaseous exchange (transpiration). This process is completed by the opening and closing of guard cells of stomata. The guard cells may be bean-shaped or dumb-bell shaped

Q.3. Which wood conduct sap -

- A) Heart wood
- B) Sap wood
- C) Wood with lots of fibres and tyloses
- D) All of the above

Answer: Sap wood

Solution: The peripheral region of the secondary xylem is called as sapwood. It is lighter in colour and involved in the conduction of water and minerals from root to leaf.

The major portion of secondary xylem is dark brown due to deposition of organic compounds such as tannins, resins, oils, gums, aromatic substances and essential oils in the innermost layers of the stem. These substances make it hard, durable and resistant to the attacks of microorganisms and insects. This region is called heartwood and comprises dead elements with highly lignified walls. The heartwood provides mechanical support to the stem.

Q.4. Pith is produced by

- A) Ground meristem
- B) Procambium



- C) Periblem
- D) Dermatogen

Answer: Ground meristem

Solution: Pith is generally located in the centre of the stem. It is composed of a large number of soft, spongy, rounded, parenchymatous cells with large intercellular spaces, which store and transport nutrients throughout the plant. It is surrounded by a ring of xylem. It is produced by the ground meristem.

The ground tissue is constituted by all tissues except epidermis and vascular bundles. The ground tissue consists of simple permanent tissues such as sclerenchyma, parenchyma and collenchyma. Parenchymatous cells are usually present in cortex, pericycle, pith and medullary rays, in the primary stems and roots.

- Q.5. A timber merchant told his customer that log of wood which he was purchasing comes from a 20 years old tree, he told so by inspecting the-
- A) Diameter of log
 - B) Thickness of the heart wood
 - C) Number of cork layers
 - D) Annual rings

Answer: Annual rings

Solution: The age of the plant can be estimated by counting the number of annual rings.

The activity of cambium is not uniform in those plants which grow in the regions where favourable climatic conditions (spring or rainy season) alternate regularly with unfavourable climatic conditions (cold water or dry, hot summer). In temperate weather, the cambium becomes prominently active during spring and forms a greater number of vessels with wider cavities; while in winter its activity becomes lesser and forms narrower and smaller vessels. The wood formed during the spring season is known as spring wood and the wood formed during the dry summer or cold winter is called autumn wood or late wood. Both autumn and spring wood constitute a growth or annual ring. The annual ring is formed when the early wood alternates with late wood. Thus, in one year, only one growth ring is formed. Thus, by counting the number of annual rings in the main stem at the base, we can determine the age of a tree. This branch of science is known as dendrochronology. Age is determined by an instrument increment borer. Growth rings are distinct or sharply demarcated in the plants of temperate regions whereas in tropical climate (near the equator) they are not distinct or sharply demarcated in the trees.

- Q.6. Select true statements:
- (a) Lenticels are absent in woody climbers and leaves
 - (b) Lenticels occur in most woody trees
 - (c) The spring wood is lighter in colour and has a lower density
 - (d) The sap wood also called as duramen
- A) a, b and c are correct
 - B) a and b are correct
 - C) b and d are correct
 - D) a and c are correct

Answer: a, b and c are correct



Solution: Lenticels are the openings or breaks in the cork tissue which look like raised spots on the surface of the stem and permit the exchange of gases between the outer atmosphere and the internal tissue of the cells of the stem. These occur in most of the woody trees except the climbers. Lenticels consists of a pore formed due to the rupture in the epidermal layer.

In spring season, the cambium is very active and produces a large number of xylary elements having vessels with wider cavities. The wood is called spring wood or early wood. The spring wood is lighter in colour and has a lower density.

The peripheral region of the secondary xylem is called as sapwood. It is lighter in colour and involved in the conduction of water and minerals from root to leaf. The heartwood is known as duramen.

Q.7. Water conduction in stem of tree takes place mainly by-

- A) Duramen
- B) Sapwood
- C) Primary xylem
- D) All of the above

Answer: Sapwood

Solution: The peripheral region of the secondary xylem is called as sapwood. It is lighter in colour and involved in the conduction of water and minerals from root to leaf.

The major portion of secondary xylem is dark brown due to deposition of organic compounds such as tannins, resins, oils, gums, aromatic substances and essential oils in the innermost layers of the stem. These substances make it hard, durable and resistant to the attacks of microorganisms and insects. This region is called heartwood and comprises dead elements with highly lignified walls. The heartwood provides mechanical support to the stem.

Q.8. Secondary growth is the production of

- A) New tissues from intercalary meristem
- B) New conduction cells
- C) New tissues from lateral meristem
- D) New ground cells

Answer: New tissues from lateral meristem

Solution: The primary growth refers to the growth of the roots and stems in length with the help of apical meristem. The most dicotyledonous and gymnospermic plants exhibit growth which results in increase in girth. This increase is called the secondary growth. The tissues involved in secondary growth are the two lateral meristems: vascular cambium and cork cambium.

Q.9. Vascular cambium forms :-

- A) Secondary xylem & Secondary phloem
- B) Primary xylem & Primary Phloem
- C) Only Secondary phloem
- D) Only Primary xylem

Answer: Secondary xylem & Secondary phloem



Solution: The cells of cambium present between primary xylem and primary phloem is the intrafascicular cambium. The meristematic cells of medullary rays, adjoining these intrafascicular cambium forms the interfascicular cambium. This leads to the formation of a continuous ring of cambium. This cambial ring cut off new cells, both towards the inner and the outer sides. The cells cut off towards pith, mature into secondary xylem and the cells cut off towards periphery mature into secondary phloem.

The cambium is generally more active on the inner side than on the outer which results in more production of secondary xylem as compared to secondary phloem.

Q.10. In monocots, vascular bundles are of closed type, what does it denote?

- A) Xylem is surrounded by phloem
- B) Cambium is absent in vascular bundle
- C) The pores of vessel elements and sieve elements are closed.
- D) No connection in between two successive internodes.

Answer: Cambium is absent in vascular bundle

Solution: The vascular tissues include complex tissues, i.e., the phloem and the xylem. The xylem and phloem together forms the vascular bundle.

In the monocots, the cambium is absent in between the vascular bundles. Hence, monocots do not form secondary tissues, and the type of vascular bundle is referred to as closed.

Q.11. A tissue is a group of cells having a

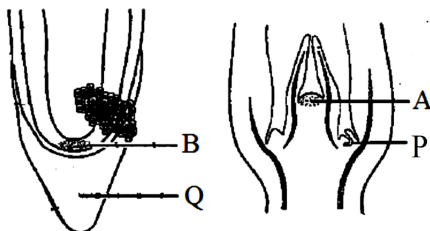
- A) Common origin and dissimilar in function.
- B) Dissimilar origin and common in function.
- C) Dissimilar origin and common in function
- D) Common origin and usually performing a common function.

Answer: Common origin and usually performing a common function.

Solution: A tissue can be defined as a group of cells having a common origin and usually performing a common function.

A plant consists of different kinds of tissues which are classified into two main groups, namely, meristematic and permanent tissues. This classification is done on the basis whether the cells being formed are capable of dividing or not.

Q.12. On the basis of the given diagram, find out the correct option:-

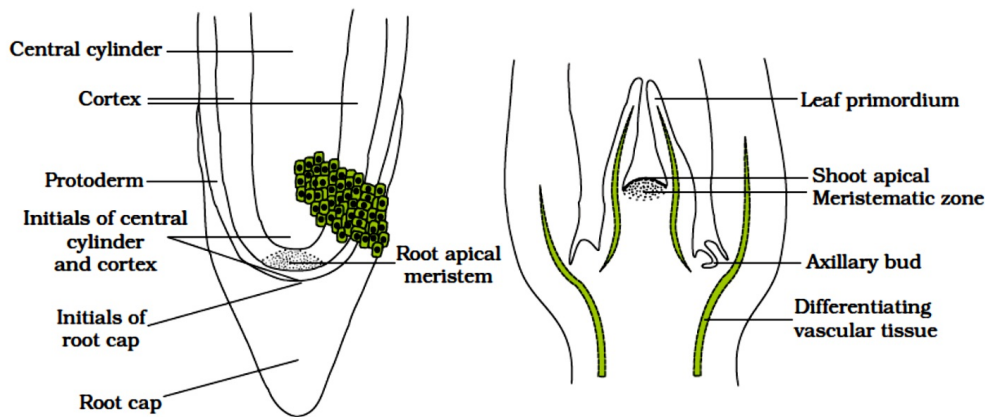


- A) A-shoot apical meristem, P-leaf primordium, B-Root apical meristem, Q-Protoderm
- B) A-Root apical meristem, P-Axillary bud, B-Shoot apical meristem, Q-Protoderm
- C) A-Shoot apical meristem, P-Axillary bud, B-Root apical meristem, Q-Root cap
- D) A-Shoot apical meristem, P-leaf primordium, B-Root apical meristem, Q-Lateral meristem

Answer: A-Shoot apical meristem, P-Axillary bud, B-Root apical meristem, Q-Root cap



Solution: Root apical and shoot apical meristem are a meristematic region that is responsible for the growing root and shoot. The root cap lies below the root apical meristem and protect growing root and root apical meristem from damage.



Q.13. The radial vascular bundle occurs in _____ A _____ and the conjoint vascular bundle occurs in _____ B _____.

- A) A - stem, B - root
- B) A - root, B- stem
- C) A - stem, B - stem
- D) A - root, B - root

Answer: A - root, B- stem

Solution: The xylem and phloem within a vascular bundle are arranged in an alternate manner on different radii, the arrangement is called radial such as in roots. In conjoint type of vascular bundles, the xylem and phloem are situated at the same radius of vascular bundles. Such vascular bundles are common in stems and leaves.

Q.14. Which meristem helps in increasing girth?

- A) Lateral meristem
- B) Intercalary meristem
- C) Primary meristem
- D) Apical meristem

Answer: Lateral meristem

Solution: Lateral meristem occurs on the sides of the plant organ and helps in increasing the girth of stem and root in dicots and gymnosperms. It divides only periclinally or radially and is responsible for the increase in girth or diameter. Lateral meristems are mostly secondary in origin.

Lateral meristems are vascular cambium and cork cambium.

Q.15. The function of cell division is restricted to

- A) meristematic cells
- B) permanent cells
- C) secretory cells
- D) all above

Answer: meristematic cells



Solution: Cell division is only found in meristematic cells as they are the only type that shows growth and division. Meristematic cells also contain protoplasm which helps division and growth. Permanent cells lose the activity of division as they become specialised. Permanent cells are also devoid of protoplasm. Secretory cells also do not show any growth and division as they are specialised for secretion.

Q.16. The difference in phloem of gymnosperms and angiosperms is due to

- A) parenchyma
- B) sieve cell
- C) companion cell
- D) fibres

Answer: companion cell

Solution: Plants contain Phloem as a major conducting tissue for transport of food. In Angiosperms, Phloem consist of Sieve tube elements, Companion cells, Phloem Parenchyma, Phloem sclerenchyma while in gymnosperms it consist of Sieve cells, albuminous cells, Phloem Parenchyma, Phloem sclerenchyma. So, difference between angiosperms and gymnosperms is companion cells and albuminous cells.

Q.17. Cork cells have major component of

- A) cellular.
- B) pectin.
- C) suberin.
- D) lignin.

Answer: suberin.

Solution: Cork is a component of bark tissue used for commercial obtained primarily from *Quercus suber*, endemic to southwest Europe and northwest Africa. Cork has suberin as a major cell wall material. Suberin is macromolecule of fatty acids, diacids, hydroxy fatty acids, ester coupled fatty alcohols, glycerol, including ferulic acid and eventually other phenolic components. Due to its impervious, buoyant, elastic, fire retardant and hydrophobic nature, it is used in a variety of products such wine stoppers.

Q.18. Fascicular or vascular cambium of dicots is

- A) intercalary meristem
- B) lateral meristem
- C) apical meristem
- D) secretory tissue

Answer: lateral meristem

Solution: Fascicular cambium is a lateral meristem responsible for secondary growth of plants. Fascicular cambium is present between xylem and phloem and its activity provide secondary growth to plant that is increase in diameter of plant and thickening of stems and roots. Apical meristem and intercalary meristem increase height of plant primarily and doesnot include cambium activity.

Q.19. Termites usually do not attack the most durable part of wood, which is

- A) alburnum
- B) duramen
- C) periderm



D) bark

Answer: duramen

Solution: In old trees, secondary wood is differentiated into two distinct regions. The first is a centrally situated darker and harder wood called the heartwood or duramen which are physiologically inactive (almost dead) and the second one is an outer light-coloured zone called the sapwood or alburnum which are physiologically active. **The dark colour of heartwood is due to the deposition of tannins, resins, gums, essential oils, etc. in the cell walls and cell cavities. This duramen is not generally targeted by the termites and is the most durable portion.** The water conduction takes place through sapwood. When the sapwood gets converted into the heartwood, the most important change is the development of tyloses in the heartwood. Tyloses are balloon-like structures, develop from xylem parenchyma. These tyloses block the passage of xylem vessels so also called the tracheal plug. The heartwood is commercially used as wood. When the plant is made hollow, it will not die because the water conduction takes place through sapwood. The heartwood is well developed in *Morus alba* (Mulberry). The heartwood is absent in *Populus* and *Salix* plant. As a tree grows older thickness of heartwood increases and sapwood remains the same.

Q.20. In grasses, the plant parts removed by the grazing herbivores regenerate due to the activity of

- A) intercalary meristem
- B) leaf meristem
- C) apical meristem
- D) radial meristem

Answer: intercalary meristem

Solution: Meristem word was originated from the word “*Meristos*” (Greek = continuous division), and Nageli coined the term meristem in 1858. A group of cells which are much active and capable of showing the capability of continuous divisions is called meristematic tissue.

Intercalary meristems are the portions of apical meristems. These portions are separated from the apex during the growth of the axis due to the formation of permanent tissues. Intercalary meristems are found mostly at the base of the nodes (e.g., *Mentha viridis*- Mint), or the at base of internodes (e.g., the stem of many monocots viz., Wheat, Grasses, Pteridophytes like *Equisetum*) or at the base of the leaf or petioles (e.g., *Pinus*). In grasses, intercalary meristems are found between mature stem regions. In grasses, the plant parts removed by the grazing herbivores regenerate due to activity of the intercalary meristems.

Q.21. In (i), protoxylem lies towards periphery and metaxylem lies towards centre. Such an arrangement of primary xylem is called as (ii).

	(i)	(ii)
(i)	stems	endarch
(ii)	stems	exarch
(iii)	roots	endarch
(iv)	roots	exarch

- A) (i)
- B) (ii)
- C) (iii)
- D) (iv)

Answer: (iv)

Solution: If in a vascular bundle, order of **development of the primary xylem** is **centrifugal** then, protoxylem is present in the centre while metaxylem lies on the periphery, hence called **endarch**. This type of vascular bundle is found in **monocot and dicot stems**. If the **development of the primary xylem** is **centripetal** then the metaxylem or later formed xylem is present towards the centre while protoxylem or the first formed xylem is present towards the periphery in the stelar region, hence called **exarch**, such an arrangement can be seen in the monocot and dicot roots.

Q.22. Which of the following tissue systems constitutes bulk of the plant body?

- A) Epidermal tissue system



- B) Ground tissue system
- C) Vascular tissue system
- D) Both (a) and (c)

Answer: Ground tissue system

Solution: Ground tissue system is the largest tissue system that include major portion of the plant body except epidermal tissue and vascular tissue. It forms the bulk of the body and consists of mainly parenchymatous, collenchymatous, sclerenchymatous, glandular and laticiferous tissues. Like hypodermis, cortex, endodermis, pericycle, medullary rays and pith all are the part of ground tissue system.

Q.23. Vascular bundle is enclosed within a well developed sclerenchymatous sheath in

- A) monocot stem
- B) dicot stem
- C) monocot root
- D) dicot root

Answer: monocot stem

Solution: In the monocot stem, the vascular bundle is scattered throughout the ground tissue, determined by atactostele. There is a well-developed sclerenchymatous bundle sheath encloses each vascular bundle. For the same reason, they are also called fibrovascular bundles. These vascular bundles are conjoint, closed and collateral.

Q.24. Lenticels are involved in

- A) Food transport
- B) Photosynthesis
- C) Transpiration
- D) Gaseous exchange

Answer: Gaseous exchange

Solution: Instead of cork cells, cork cambium cuts off closely arranged parenchymatous cells on the outer side. Lens shaped openings called lenticels are formed as these parenchymatous cells rupture the epidermis. These lenticels permit the exchange of gases between the outer atmosphere and the internal tissue of the stem. These occur in most woody trees. One of the characteristics used for tree identification is the shape of lenticels.

Q.25. Hypodermis is _____ in sunflower stem and _____ in maize stem.

- A) parenchymatous, collenchymatous
- B) collenchymatous, sclerenchymatous
- C) sclerenchymatous, collenchymatous
- D) sclerenchymatous, parenchymatous

Answer: collenchymatous, sclerenchymatous



Solution:

In collenchyma cells, intercellular space is absent. Irregular thickening of cellulose is present on the corner of the cells. It provides elasticity and support to the growing tissue. Its distribution is unique in plants. It is present only in the aerial part of the dicot stem. In the dicot stem, its location is the Hypodermis.

In the monocot stem, Hypodermis is sclerenchymatous with a large number of vascular bundles scattered. Xylem are of endarch type.

Thus, in sunflower stem (dicot), Hypodermis is made up of collenchyma, which may be green, whereas, in maize stem (monocot), Hypodermis is made up of sclerenchymatous cells.

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