

BIOLOGY

NEET

CRASH COURSE

**ANATOMY OF
FLOWERING PLANTS**

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ANATOMY OF FLOWERING PLANTS

1. Anatomically, a plant is made of different kinds of tissues. The plant tissues are broadly classified into meristematic (apical, lateral and intercalary) and permanent (simple and complex).
2. Assimilation of food and its storage, transportation of water, minerals and photosynthates, and mechanical support are the main functions of tissues.
3. There are three types of tissue systems -epidermal, ground and vascular.
4. The epidermal tissue systems are made of epidermal cells, stomata and the epidermal appendages.
5. The ground tissue system forms the main bulk of the plant. It is divided into three zones cortex, pericycle and pith.
6. The vascular tissue system is formed by the xylem and phloem,
7. On the basis of presence of cambium, location of xylem and phloem, the vascular bundles are of different types. The vascular bundles form the conducting tissue and translocate water, minerals and food material.
8. Monocotyledonous and dicotyledonous plants show marked variation in their internal structures. They differ in type, number and location of vascular bundles.
9. The secondary growth occurs in most of the dicotyledonous roots and stems and it increases the girth (diameter) of the organs by the activity of the vascular cambium and the cork cambium.
10. The wood is actually a secondary xylem. There are different types of wood on the basis of their composition and time of production.

11. $\left. \begin{array}{l} \text{Interfascicular Cambium} \\ \text{Intrafascicular Cambium} \end{array} \right\} \text{Vascular Cambium} \left\{ \begin{array}{l} \text{Outer side - Secondary phloem} \\ \text{Inner side - Secondary xylem} \end{array} \right.$

12. $\text{Outer cortex cell} \rightarrow \text{Cork cambium (Phellogen)} \left\{ \begin{array}{l} \text{Cork tissue (Phellum)} \\ \text{Secondary cortex (Phelloderm)} \end{array} \right.$

Periderm = Phellum + Phellogen + Phelloderm

EXERCISE

- Q.1 A meristem may be defined as the group of cells which -
 (1) Add to the bulk of the Plants.
 (2) Conserve food
 (3) Divide continuously to give rise to new cells.
 (4) Elongate and add to the group of cells.
- Q.2 The secondary meristem originates from-
 (1) Promeristem (2) Primary meristem
 (3) Primary permanent tissue (4) Secretory tissue
- Q.3 The function of root cap is-
 (1) Provide protection to root apex (2) Storage of food products
 (3) Absorption of nutrients (4) None of the above
- Q.4 In quiescent zone, DNA content is -
 (1) High (2) Low (3) Very high (4) Balanced
- Q.5 Meristem present at Lamina margin is :
 (1) Apical meristem (2) Intercalary meristem
 (3) Mass meristem (4) Marginal meristem
- Q.6 Plastochron is
 (1) Period between initiation of two successive leaf primordia
 (2) Distance between two successive leaf primordia
 (3) Region of origin of root branch
 (4) Region of origin of stem branch
- Q.7 In plants, which of the following would most likely show totipotency-
 (1) Xylem vessels (2) Meristem (3) Cork (4) Sieve tube
- Q.8 Pulp of a fruit is made up of mainly
 (1) Parenchyma (2) Collenchyma (3) Sclereids (4) Meristem
- Q.9 A simple mechanical tissue devoid of lignin is -
 (1) Parenchyma (2) Collenchyma (3) Sclerenchyma (4) Chlorenchyma
- Q.10 Mechanical tissue consisting of living cells is -
 (1) Sclerenchyma (2) Collenchyma (3) Chlorenchyma (4) Parenchyma
- Q.11 Collenchyma differs from sclerenchyma in -
 (1) Retaining protoplasm at maturity (2) Having thick walls
 (3) Having a wide lumen (4) Being meristematic
- Q.12 Which of the following tissue provide tensile strength against bending & swaying-
 (1) Parenchyma (2) Collenchyma (3) Sclerenchyma (4) Sclereids
- Q.13 Tissue which develops more due to scarcity of water-
 (1) Sclerenchyma (2) Collenchyma (3) Parenchyma (4) Meristem
- Q.14 The cell functionally associated with sieve tube is -
 (1) Phloem fibres (2) Phloem Parenchyma
 (3) Companion cell (4) Collenchyma
- Q.15 Bast fibres are mostly found in -
 (1) Secondary xylem (2) Secondary phloem (3) Primary phloem (4) Primary xylem
- Q.16 Vessels and companion cells are respectively present in the xylem and phloem of
 (1) Gymnosperm (2) Pteridophyte (3) Angiosperm (4) Bryophyta
- Q.17 Complex tissues are not found in
 (1) Few bryophytes (2) Pteridophytes (3) All gametophytes (4) All spermatophytes

- Q.18 The chief function of a vessel in a plant body is to-
 (1) Conduct sap (2) Conduct mineral salts only
 (3) Eliminate excess of water at night (4) Translocate organic nutrients
- Q.19 End walls of tracheids and vessels respectively are
 (1) Pitted & perforated (2) Perforated & pitted (3) Both perforated (4) Both pitted
- Q.20 P-protein is a constituent of
 (1) Sieve tube elements (2) Xylem parenchyma (3) Parenchyma (4) Pericycle
- Q.21 When xylem and phloem are on same radius, the vascular bundles are said to be -
 (1) Radial (2) Conjoint (3) Concentric (4) Exarch
- Q.22 A vascular bundle in which phloem is on both the sides of the xylem and separated from it by strips of cambium is said to be -
 (1) Collateral open (2) Bicollateral open (3) Concentric (4) Bicollateral closed
- Q.23 Collenchymatous hypodermis is characteristic feature of -
 (1) Dicot stem (2) Monocot stem
 (3) Monocot as well as dicot stem (4) Hydrophytes
- Q.24 In general, the cells of cortex lack -
 (1) Chlorophyll (2) Nucleus (3) Reserve food (4) Nucleolus
- Q.25 What is the characteristics of a vascular bundle of monocot stem -
 (1) Open and surrounded by a sclerenchymatous bundle sheath
 (2) Closed and not surrounded by bundle sheath
 (3) Closed and surrounded by bundle sheath
 (4) Open and not surrounded by a bundle sheath
- Q.26 In dicot root
 (1) Vascular bundles are scattered with cambium
 (2) Vascular bundles are open and arranged in a ring
 (3) Xylem and phloem are radial
 (4) Xylem is always endarch
- Q.27 In leaves, the vascular bundles are
 (1) Bicollateral & open (2) Collateral & open (3) Collateral & closed (4) Radial & exarch
- Q.28 Vascular bundles are found scattered in ground tissue in-
 (1) Maize stem (2) Sunflower stem (3) Gram root (4) Isobilateral leaf
- Q.29 The hypodermis present in maize stem is -
 (1) Parenchymatous (2) Collenchymatous (3) Sclerenchymatous (4) Meristematic
- Q.30 Passage cells are more distinct in endodermis of-
 (1) Dicot stem (2) Monocot stem (3) Dicot leaf (4) Monocot root
- Q.31 Suberin is
 (1) Polysaccharide (2) Protein (3) Fatty substance (4) Pectocellulose
- Q.32 In trees, the annual rings represent
 (1) Primary xylem (2) Secondary xylem (3) Secondary phloem (4) Cambium
- Q.33 Annual rings and growth rings are formed due to the fluctuations in the activity of
 (1) Xylem (2) Phloem (3) Xylem and phloem (4) Cambium
- Q.34 Growth rings are formed due to the activity of-
 (1) Intrastelar cambium (2) Intercalary cambium
 (3) Extrastelar cambium (4) Primary cambium
- Q.35 Sap wood differ from heart wood in being -
 (1) Darker and non conducting (2) Softer and non conducting
 (3) Lighter and conducting (4) Harder, darker and less conducting

- Q.36 External Protective tissues are-
- (1) Cortex and epidermis (2) Cork and pericycle
(3) Cortex and pericycle (4) Cork and epidermis
- Q.37 If a stem is girdled-
- (1) Root dies first (2) Shoot dies first (3) Both die together (4) None of the above die
- Q.38 Most conspicuous annual rings are formed in -
- (1) Temperate evergreen plants (2) Tropical deciduous
(3) Temperate deciduous plants (4) Tropical evergreen
- Q.39 Normally secondary growth takes place in-
- (1) Dicots & Monocots (2) Gymnosperms & Monocots
(3) Dicots & Gymnosperms (4) Only in dicots
- Q.40 In dicot root which tissue becomes dead due to activity of phellogen
- (1) All tissue outside cortex (2) Tissue outside hypodermis
(3) Tissue outside endodermis (4) Tissue outside pericycle
- Q.41 In dicot stem cork cambium is first derived from-
- (1) Outer cortex (2) Phellogen (3) Phelloderm (4) Pericycle
- Q.42 How many types of cells are present in vascular cambium
- (1) Two types, fusiform & ray initial (2) Only fusiform initial
(3) Only ray initial (4) Three types fusiform, ray and medullary rays.
- Q.43 Cork cambium is
- (1) Always primary meristem (2) Always secondary meristem
(3) May be secondary or primary meristem (4) Partly primary & partly secondary meristem
- Q.44 Suberin is chiefly deposited in the cells of
- (1) Sclerenchyma (2) Collenchyma (3) Cork (4) Phelloderm
- Q.45 Common features between lenticels and hydathodes are
- (1) Both allow exchange of gases
(2) Always remain closed
(3) There is no regulation of their opening & closing
(4) They occur on the same organ of plant

AIIMS Special

Instructions for following questions (Q.46 to Q.65), a statement of assertion (A) is followed by a statement of reason (R).

- (1) If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1).
(2) If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).
(3) If Assertion is true statement but Reason is false, then mark (3).
(4) If both Assertion and Reason are false statements, then mark (4).
- Q.46 **Assertion :** Endodermis is present between general cortex and pericycle in maize stem.
Reason : Eustele is present in maize stem.
- Q.47 **Assertion :** In Cucurbita stem, vascular bundles are conjoint, bicollateral and either open or close.
Reason : Outer and inner cambium are present and only inner cambium is functional in Cucurbita stem.

- Q.48 **Assertion** : Fusiform cells are elongated and tapering cells.
Reason : These cells form axial system consisting of vascular rays.
- Q.49 **Assertion** : Septaless tracheids are absent in *Trochodendron*.
Reason : Heteroxylous wood is present in *Trochodendron*.
- Q.50 **Assertion** : According to Hanstein, there are three histogens in dicot root.
Reason : In monocot roots, outermost groups of initials form root cap.
- Q.51 **Assertion** : In woody stems, the amount of heart wood continues to increase year after year.
Reason : The activity of the cambial ring continues uninterrupted.
- Q.52 **Assertion** : Monocot stem bear collateral open vascular bundles.
Reason : If cambium is absent, such vascular bundles are called open type.
- Q.53 **Assertion** : Water and mineral uptake by root hairs from the soil occurs through apoplast until it reaches endodermis.
Reason : Casparian strips in endodermis are suberized.
- Q.54 **Assertion** : In angiosperms, the conduction of water is more efficient because their xylem has vessels.
Reason : Conduction of water by vessel elements is an active process with energy supplied by xylem parenchyma rich in mitochondria.
- Q.55 **Assertion** : Apical meristem of root is subterminal.
Reason : At the terminal end of root, root cap is present.
- Q.56 **Assertion** : Annual ring do not occur in dicot trees growing on sea shore.
Reason : There is little climate variation.
- Q.57 **Assertion** : Tyloses are more abundant in Duramen.
Reason : They provide rigidity & strength to heart wood.
- Q.58 **Assertion** : Open vascular bundles are found in dicot stem & gymnosperm.
Reason : Cambium is absent in between xylem & phloem.
- Q.59 **Assertion** : Histogen theory is not applicable to shoot apex.
Reason : The shoot apex is not clearly divided into three layers.
- Q.60 **Assertion** : Collenchyma forms the hypodermis of dicotyledon stems.
Reason : This the reason for flexibility of dicotyledon stems.
- Q.61 **Assertion** : Various types of pits are formed in sclerenchyma.
Reason : The deposition of lignin in sclerenchyma.
- Q.62 **Assertion** : The seed coat of legume plants becomes hard.
Reason : The presence of macrosclerids in seed coat of legume plants.
- Q.63 **Assertion** : Vascular supply to leaf is called leaf trace.
Reason : The leaf trace extends between the leaf base and point where it merges with stem.
- Q.64 **Assertion** : Phloem transports prepared food material from leaves to all parts of the plants.
Reason : In phloem there are some valves which stop the flow from down wards to upwards.
- Q.65 **Assertion** : In true xerophytes major part of xylem is dead.
Reason : True xerophytes grows in water stress condition and dead tissues more developed in water stress condition.

ANSWER KEY

Q.1	3	Q.2	3	Q.3	1	Q.4	2	Q.5	4	Q.6	1	Q.7	2
Q.8	1	Q.9	2	Q.10	2	Q.11	1	Q.12	2	Q.13	1	Q.14	3
Q.15	2	Q.16	3	Q.17	3	Q.18	1	Q.19	1	Q.20	1	Q.21	2
Q.22	2	Q.23	1	Q.24	1	Q.25	3	Q.26	3	Q.27	3	Q.28	1
Q.29	3	Q.30	4	Q.31	3	Q.32	2	Q.33	4	Q.34	1	Q.35	3
Q.36	4	Q.37	1	Q.38	3	Q.39	3	Q.40	4	Q.41	1	Q.42	1
Q.43	2	Q.44	3	Q.45	3	Q.46	4	Q.47	4	Q.48	3	Q.49	3
Q.50	4	Q.51	1	Q.52	4	Q.53	1	Q.54	3	Q.55	1	Q.56	1
Q.57	1	Q.58	3	Q.59	1	Q.60	1	Q.61	1	Q.62	1	Q.63	2
Q.64	3	Q.65	1										

PREVIOUS YEAR QUESTIONS

Q.1	2	Q.2	3	Q.3	1	Q.4	2	Q.5	1	Q.6	4	Q.7	2
Q.8	2	Q.9	4	Q.10	4	Q.11	2	Q.12	1	Q.13	4	Q.14	1
Q.15	1	Q.16	2	Q.17	1	Q.18	1	Q.19	2	Q.20	2	Q.21	4
Q.22	2	Q.23	3	Q.24	1								