Anatomy of Flowering Plants

- Three types of tissue systems are present in plants:
  - **Epidermal:** made up of epidermis, cuticle, stomata, subsidiary cells, trichomes and root hairs
  - **Ground:** all tissues except epidermis and vascular bundles constitute the ground tissue system.
  - **Vascular tissue system:** made up of xylem and phloem.

Table. 2 : Comparison of dicot and monocot root anatomy

Characteristic	**Dicot root**	**Monocot root**
Pericycle	Gives rise to secondary (lateral) roots and vascular cambium	Gives rise to lateral roots only
Vascular bundles	Diarch to hexarch,i.e., vascular bundles are 2 to 6 in number	Polyarch, i.e., usually more than 6 vascular bundles are present.
Cambium	Develops at the time of secondary growth	Cambium is absent. No secondary growth
Pith	Small and inconspicuous	Large and well developed

Table. 3: Comparison of anatomy of dicot and monocot stem.

Characteristic	**Dicot stem**	**Monocot stem**
Ground tissue	Differentiated into cortex and pith	Not differentiated into cortex and pith
Hypodermis	Collenchymatous	Sclerenchymatous
Endodermis	Single layered	Absent
Pericycle	Made up of parenchymatous and/or sclerenchymatous cells.	Absent
Vascular bundles	Almost all are of uniform size Arranged in a ring Conjoint and open.Water-containing cavities are absent.	Larger towards centre and smaller towards periphery. Scattered Conjoint and closed water-containing cavities are present
Pith	Made up of parenchymatous cells, situated in the centre	Absent
Medullary rays	Found in between the vascular bundles	Absent

Table. 4: Comparison of anatomy of angiospermic stem and root

Characteristic	**Root**	**Stem**
Epidermis	Without cuticle	May have cuticle
Hypodermis	Absent	Present-collenchymatous in dicot and sclerenchymatous in monocot
Endodermis	Distinct	Poorly developed
Vascular bundles	Radial	Conjoint
Xylem	Exarch	Endarch

Table. 5: Comparison of Anatomy of Dicot and Monocot leaf

Characteristic	Dicot leaf	Monocot leaf
Type of leaf	Dorsiventral	Isobilateral
Stomata	Usually more in number on lower epidermis.	Equal in number on lower and upper epidermis.
Mesophyll	Differentiated into two types of tissues-palisade and spongy parenchyma.	Not differentiated into palisade and spongy parenchyma.
Bulliform cells	Absent	Present, particularly in grasses.
Vascular bundles	Differ in size due to presence of reticulate venation.	Nearly similar in size due to presence of parallel venation.



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