Biology

(Chapter – 6) (Anatomy of Flowering Plants)

(Class – XI)

Exercises

Question 1:

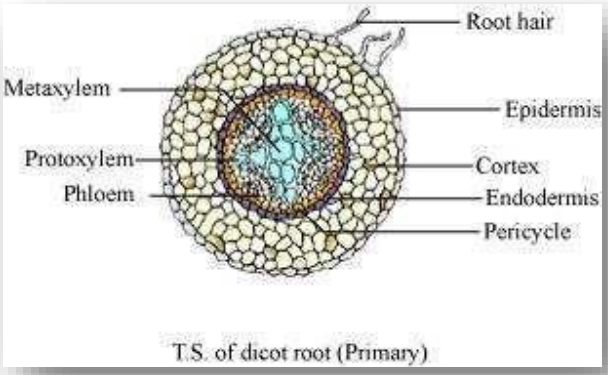
Draw illustrations to bring out anatomical difference between

(a) Monocot root and dicot root

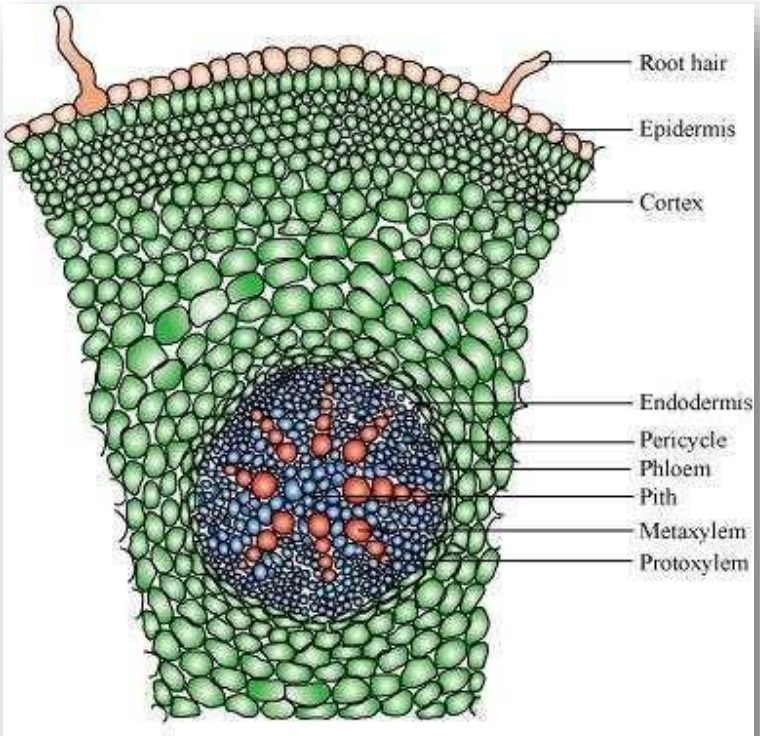
(b) Monocot stem and dicot stem

Answer 1:

(a) Monocot root and dicot root

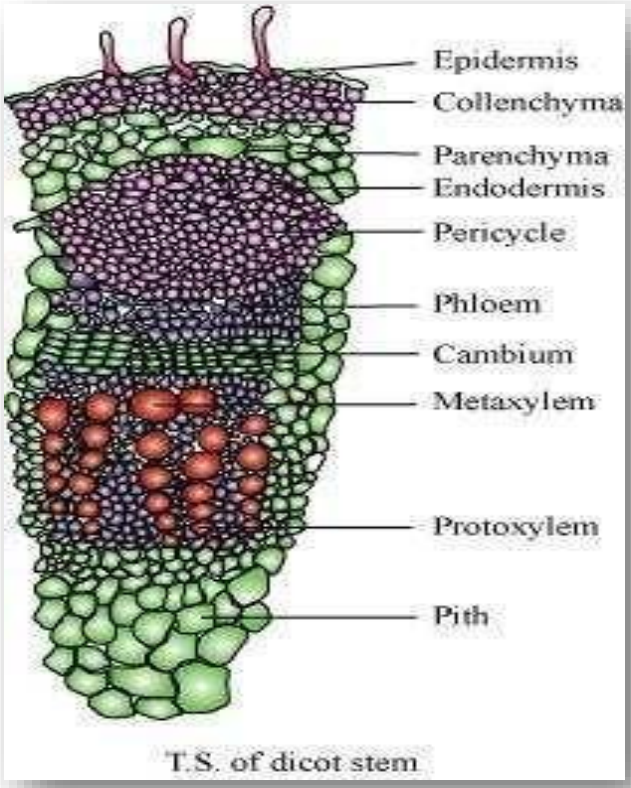


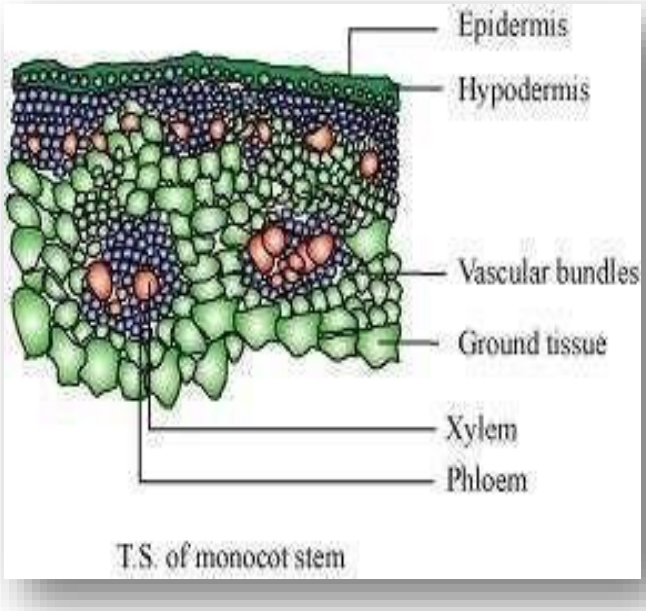
T.S. of dicot root (Primary)



T.S. of monocot root

(b) Monocot stem and dicot stem



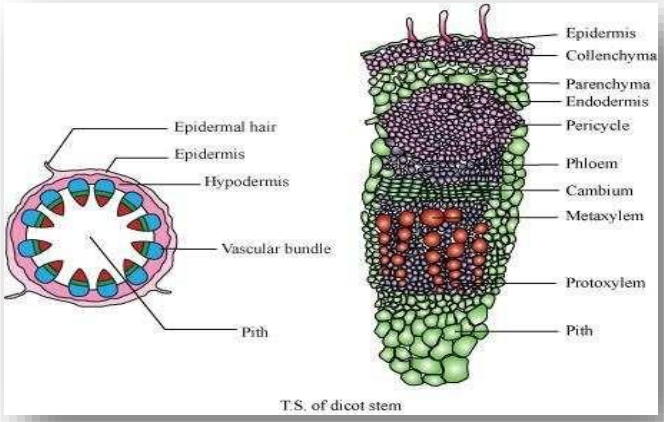


Question 2:

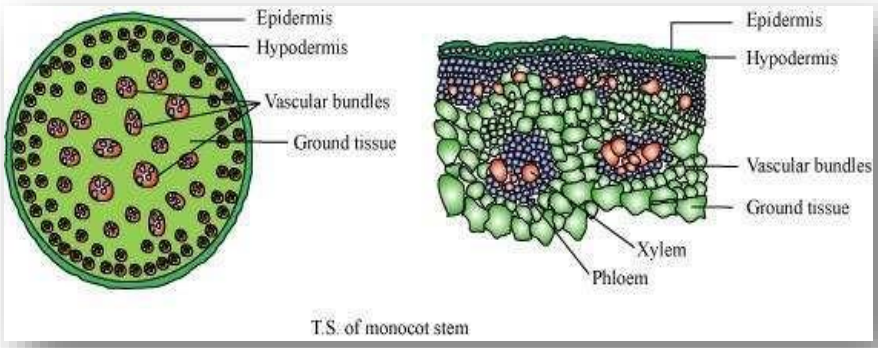
Cut a transverse section of young stem of a plant from your school garden and observe it under the microscope. How would you ascertain whether it is a monocot stem or dicot stem? Give reasons.

Answer 2:

The dicot stem is characterised by the presence of conjoint, collateral, and open vascular bundles, with a strip of cambium between the xylem and phloem. The vascular bundles are arranged in the form of a ring, around the centrally-located pith. The ground tissue is differentiated into the collenchyma, parenchyma, endodermis, pericycle, and pith. Medullary rays are present between the vascular bundles.



The monocot stem is characterised by conjoint, collateral, and closed vascular bundles, scattered in the ground tissue containing the parenchyma. Each vascular bundle is surrounded by sclerenchymatous bundle-sheath cells. Phloem parenchyma is absent and water-containing cavities are present.



Question 3:

The transverse section of a plant material shows the following anatomical features, (a) the vascular bundles are conjoint, scattered and surrounded by clerenchymatous undle sheaths (b) phloem parenchyma is absent. What will you identify it as?

Answer 3:

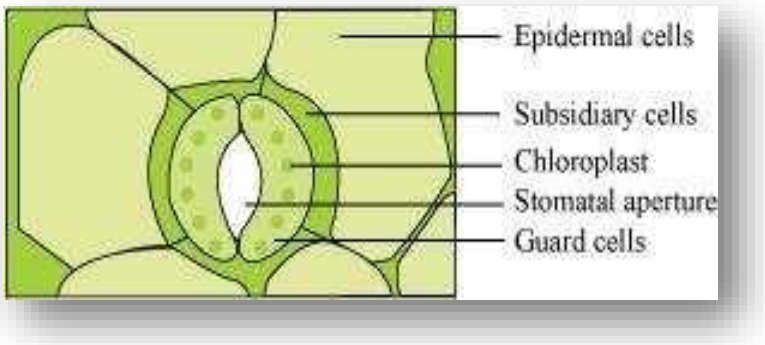
The monocot stem is characterised by conjoint, collateral, and closed vascular bundles, scattered in the ground tissue containing the parenchyma. Each vascular bundle is surrounded by sclerenchymatous bundle-sheath cells. Phloem parenchyma and medullary rays are absent in monocot stems.

Question 4:

What is stomatal apparatus? Explain the structure of stomata with a labelled diagram.

Answer 4:

Stomata are small pores present in the epidermis of leaves. They regulate the process of transpiration and gaseous exchange. The stomatal pore is enclosed between two bean-shaped guard cells. The inner walls of guard cells are thick, while the outer walls are thin. The guard cells are surrounded by subsidiary cells. These are the specialised epidermal cells present around the guard cells. The pores, the guard cells, and the subsidiary cells together constitute the stomatal apparatus.



Question 5:

Name the three basic tissue systems in the flowering plants. Give the tissue names under each system.

Answer 5:

No.	Tissue system	Tissues present
1.	Epidermal tissue system	Epidermis, trichomes, hairs, stomata
2.	Ground tissue system	Parenchyma, collenchyma, sclerenchyma, mesophyll
3.	Vascular tissue system	Xylem, phloem, cambium

Question 6:

How is the study of plant anatomy useful to us?

Answer 6:

The study of plant anatomy helps us to understand the structural adaptations of plants with respect to diverse environmental conditions. It also helps us to distinguish between monocots, dicots, and gymnosperms. Such a study is linked to plant physiology. Hence, it helps in the improvement of food crops. The study of plant-structure allows us to predict the strength of wood. This is useful in utilising it to its potential. The study of various plant fibres such as jute, flax, etc., helps in their commercial exploitation.

Question 7:

Describe the internal structure of a dorsiventral leaf with the help of labelled diagrams.

Answer 7:

Dorsiventral leaves are found in dicots. The vertical section of a dorsiventral leaf contains three distinct parts.

[1] Epidermis:

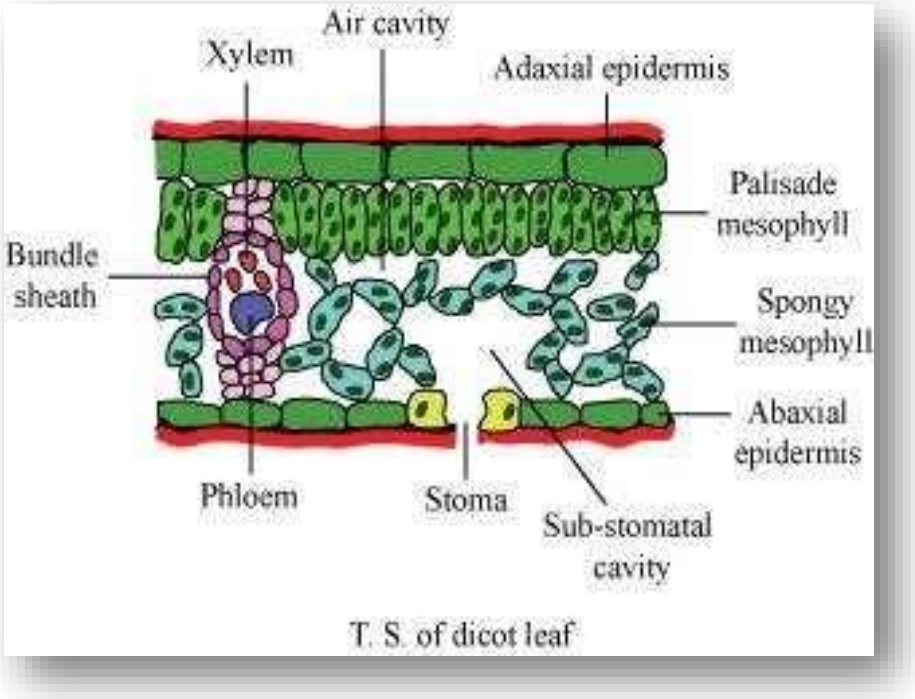
Epidermis is present on both the upper surface (adaxial epidermis) and the lower surface (abaxial epidermis). The epidermis on the outside is covered with a thick cuticle. Abaxial epidermis bears more stomata than the adaxial epidermis.

[2] Mesophyll:

Mesophyll is a tissue of the leaf present between the adaxial and abaxial epidermises. It is differentiated into the palisade parenchyma (composed of tall, compactly-placed cells) and the spongy parenchyma (comprising oval or round, loosely-arranged cells with inter cellular spaces). Mesophyll contains the chloroplasts which perform the function of photosynthesis.

[3] Vascular system:

The vascular bundles present in leaves are conjoint and closed. They are surrounded by thick layers of bundle-sheath cells.



T. S. of dicot leaf