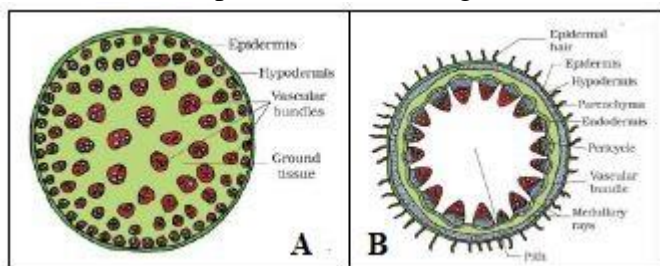


Each question from 1 to 10 carries 1 score.

- 1) What are trichomes?
- 2) Name the xylary element which is absent in Gymnosperms.
- 3) State the functions of stomata.
- 4) Identify the anatomical specimens A and B given below.



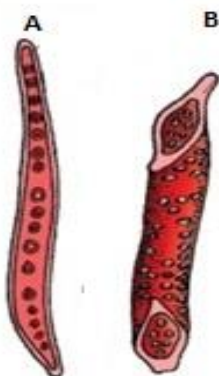
- 5) Which meristem helps in the regeneration of plant parts in grasses?
- 6) Mention the commercial significance of phloem fibres (bast fibres).
- 7) What are root hairs? What is its function?
- 8) What are complex tissues?
- 9) Which cells help in the radial conduction of water within xylem?

10) Fill in the blank.

Tissue system	A. Epidermal tissue system
	B. Ground tissue system
	C. _____

Each question from 11 to 20 carries 2 scores.

- 11) Inner to the endodermis lies a few layers of thick-walled parenchymatous cells referred to as pericycle.
 - a) How it is arranged in a dicot stem
 - b) What is its function in dicot root?
- 12) Differentiate between endarch and exarch xylem.
- 13) What are casparian strips? Where is it seen?
- 14) Explain the structure and arrangement of mesophyll tissue in a dicot leaf.
- 15) Xylem is considered as a complex tissue. List its components. Write two functions of xylem.
- 16) State the function of lateral meristems. Mention three types of lateral meristems.
- 17) Identify and differentiate the xylem elements A and B given below.



- 18) What are conjunctive tissues?
- 19) T.S of a Dicot stem shows different layers of cells and are listed below. Arrange these layers in a sequential order starting from the outer epidermis to the innermost pith .

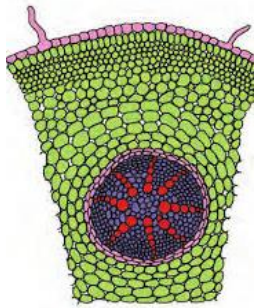
(Pericycle, Cortex, Endodermis, Hypodermis)

1- Epidermis	2- _____	3- _____	4 - _____	5 - _____	6 - Pith
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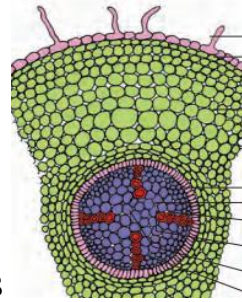
- 20) What are meristems? Mention its types.

Each question from 21 to 25 carries 3 scores.

21) Identify the specimen A and B given below. Differentiate between the vascular bundles in A and B.



A



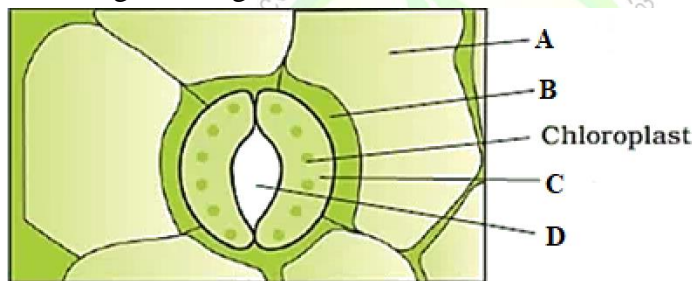
B

22) Some anatomical features of stem is listed below. Assign them in respective columns.

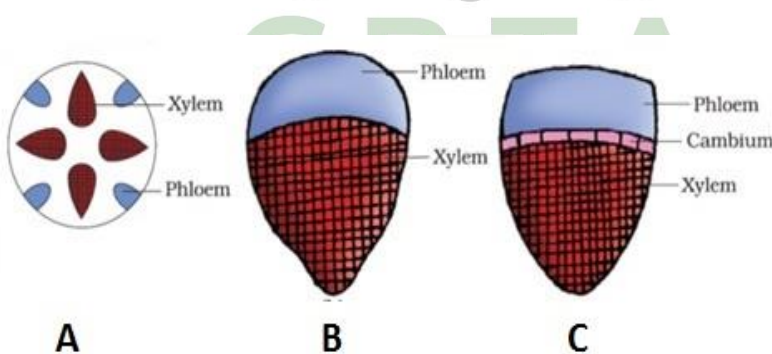
- Vascular bundles are arranged in a ring.
- Sclerenchymatous bundle sheath.
- Vascular bundles are conjoint and closed.
- Semi-lunar patches of sclerenchyma.
- Vascular bundle is conjoint, open,
- Large number of scattered vascular bundles

Dicot stem	Monocot stem

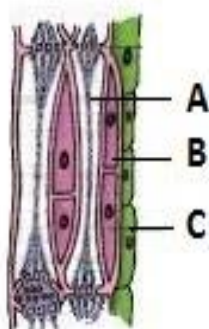
23) Identify A, B, & C in the given diagram. State the function of C.



24) Three different types of vascular bundles A, B, & C are given below. Identify and comment upon each.



25) Diagram of phloem is given below. Label A, B, & C. Comment on the function of B?



ANSWERS

- 1) The epidermal hairs on the shoot system are called trichomes. 2) Vessels.
 3) Stomata regulate the process of transpiration and gaseous exchange 4) A-Monocot stem, B-Dicot stem
 5) Intercalary meristem. 6) Bast fibres of hemp, jute and flax are used commercially.
 7) The root hairs are unicellular elongations of the epidermal cells and help absorb water and minerals from soil.
 8) The complex tissues are made of more than one type of cells and these work together as a unit. Xylem and phloem constitute the complex tissues in plants. 9) Ray parenchyma cells. 10) Vascular tissue system.
 11) a) In dicot stem pericycle is present on the inner side of the endodermis and above the phloem in the form of semi-lunar patches of sclerenchyma. b) In dicot root initiation of lateral roots and vascular cambium during the secondary growth takes place in these cells.
 12) In stems, the protoxylem lies towards the centre (pith) and the metaxylem lies towards the periphery of the organ. This type of primary xylem is called endarch. In roots, the protoxylem lies towards periphery and metaxylem lies towards the centre. Such arrangement of primary xylem is called exarch.
 13) Casparian strips are depositions of waxy material – suberin, which is impermeable to water. It is seen on the tangential and radial walls of the endodermal cells.
 14) In dicot leaf mesophyll contains two types of cells – the palisade parenchyma and the spongy parenchyma. Palisade parenchyma is made up of elongated cells, which are arranged vertically and parallel to each other. Spongy parenchyma is oval or round and are loosely arranged below the palisade cells up to the lower epidermis.
 15) Tracheids, vessels, xylem fibres and xylem parenchyma.
 Functions -1) Conduction of water and minerals 2) Provides mechanical strength.
 16) Lateral meristems are responsible for producing the secondary tissues in plants.
 Fascicular vascular cambium, interfascicular cambium and cork-cambium.
 17) A- Tracheids –They are elongated or tube like xylem cells with tapering ends.
 B-Vessels-They are long cylindrical tube-like xylem cells with large central cavity.
 18) The parenchymatous cells which lie between the xylem and the phloem are called conjunctive tissue.
 19) 2-Hypodermis, 3-cortex, 4-Endodermis, 5-Pericycle
 20) Meristems are regions of active cell division. It is of two types –primary meristems and secondary meristems. Primary meristems include apical and intercalary meristem. Secondary or lateral meristems include fascicular vascular cambium, interfascicular cambium and cork-cambium.
 21) A-Monocot root. Usually more than six (polyarch) xylem and phloem bundles.
 B-Dicot root. Usually two to four xylem and phloem patches.
 22)

Dicot stem	Monocot stem
Vascular bundles are arranged in a ring	Large number of scattered vascular bundles
Vascular bundle is conjoint, open	Vascular bundles are conjoint and closed
Semi-lunar patches of sclerenchyma	Sclerenchymatous bundle sheath.

- 23) a) A- Epidermal cell. B- Subsidiary cell. C- Guard cell. D – Stomatal pore.
 b) The guard cells regulate the opening and closing of stomata.
 24) A-Radial - Xylem and phloem are arranged in an alternate manner along the different radii as in roots.
 B- Conjoint closed- Xylem and phloem are jointly situated along the same radius of vascular bundles.
 Cambium is absent between xylem & phloem, which is seen in the monocot stems.
 C- Conjoint open - Xylem and phloem are jointly situated along the same radius of vascular bundles.
 Cambium is present between xylem & phloem, which is seen in the dicot stems.
 25) A- Sieve tube cell. B – Companion cell. C- Phloem parenchyma.
 b) The nucleus of companion cells controls the functions of sieve tubes. The companion cells help in maintaining the pressure gradient in the sieve tubes.