Plant Tissues

Improve your learning

Q. 1. A. Define the terms (AS 1)

Tissue:

Answer : Tissue is a group of cells similar in structure and performing similar functions. Four types of tissues in the plants are as follows:

i. Meristematic tissues: are tissues that bring about overall growth and repair.

ii. Dermal tissues: are that form outer coverings.

iii. Ground tissues: are tissues that form the bulk of the plant body, helping in packing other tissues

iv. Vascular tissues: are tissues that help in transport of materials.

Q. 1. B. Define the terms (AS 1)

Meristematic tissue:

Answer : Meristematic tissues are the tissues present on the tip, sides and in between layers of other tissues.

Meristematic tissues at the growing tip that bring about growth in length are called as apical meristematic tissues.

Tissues present around the edges in a lateral manner and giving rise to growth in girth of the stem are called lateral meristematic tissues.

Areas from which branching takes place or a leaf or a flower stalk grows this kind of meristematic tissue called as intercalary meristematic (also called as Cambium) tissue.

Q. 1. C. Define the terms (AS 1)

Dermal tissue:

Answer : Tissues that form outer coverings are called as dermal tissues. Dermal tissue (Dermis) usually consists of a single layer of tissues having variations in the types of cell based on their functions and location.

Three different types of the epidermis (outer most layer), mesodermal (The middle layer) and endodermis (the innermost layer). In desert plants, it may be even more thick and waxy. Small pores in the epidermis of the leaf, called stomata.

Q. 2. A. Differentiate in between the following (AS 1)

Meristematic tissue and Ground tissue

Answer :

Meristematic tissue	Ground tissue
Tissues that bring about overall growth and repair are called Meristematic Tissues.	Tissues that form the bulk of the plant body, helping in packing other tissues are called as Ground tissues.
Meristematic tissues at the growing tip that bring about growth in length are called as apical meristematic tissues.	The ground tissue is useful for storing food and providing physical support to the plant body.
There are three types of meristematic tissues apical, lateral, intercalary meristematic tissues.	There are three types of ground tissues. They are parenchyma, collenchyma and sclerenchyma.

Q. 2. B. Differentiate in between the following (AS 1)

Apical meristem and lateral meristem

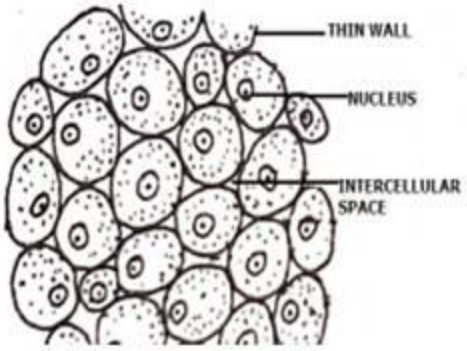
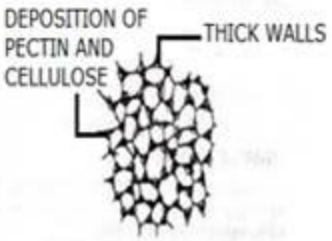
Answer :

Apical meristem	lateral meristem
Meristematic tissues at the growing tip that bring about growth in length are called as apical meristematic tissues.	Tissues present around the edges in a lateral manner and giving rise to growth in girth of the stem are called lateral meristematic tissues.

Q. 2. C. Differentiate in between the following (AS 1)

Parenchyma and collenchyma

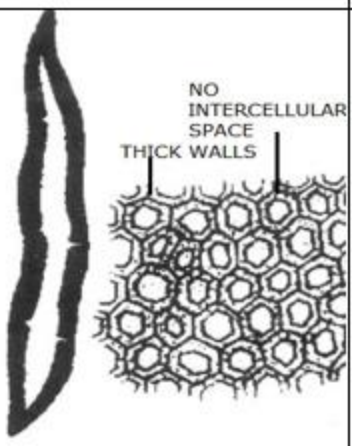
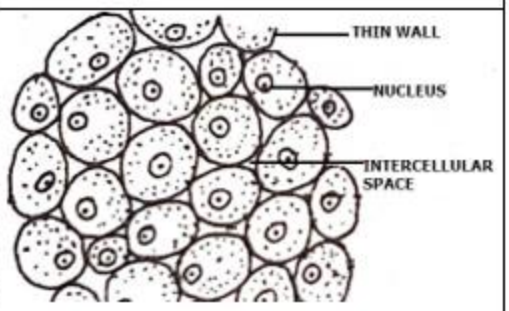
Answer :

	Parenchyma	collenchyma
characteristics	Spherical, thin walled	Elongated cells with unevenly thickened walls.
Location	Throughout the plant	Beneath the epidermis young stem
Function	Photosynthesis, respiration, storage, Regeneration also called storage tissues.	Flexible support system, contains chloroplast.
appearance		

Q. 2. D. Differentiate in between the following (AS 1)

Sclerenchyma and parenchyma

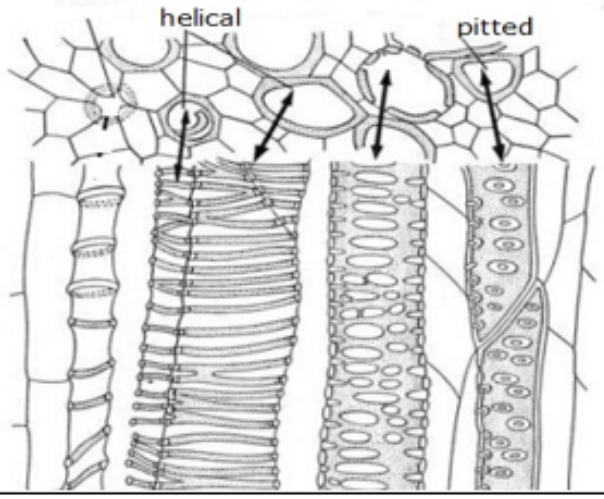
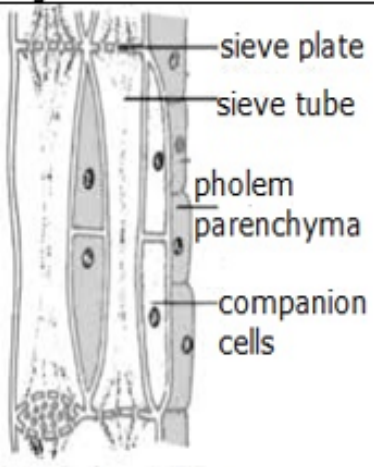
Answer :

	Sclerenchyma	Parenchyma
Characteristics	With primary and secondary walls	Spherical, thin walled
Location	Fibers in wood, bark, leaves, stem. Sclerites in fruits and seeds.	Throughout the plant
Function	Structural support	Photosynthesis, respiration, storage, regeneration, also called storage tissues.
Appearance		

Q. 2. E. Differentiate in between the following (AS 1)

Xylem and phloem

Answer :

	Xylem	phloem
1.	It transports water and minerals from roots to apical parts of the plant.	It transports food material from leaves to growing parts of plants
2.	, xylem fibers, xylem parenchyma.	Phloem consists of sieve tubes, sieve cells, companion cells, phloem fibers, phloem parenchyma.
3.	Only xylem parenchyma is living.	Sieve tubes, sieve cells, companion cells and phloem parenchyma are living.
4.		

Q. 2. F. Differentiate in between the following (AS 1)

Epidermis and bark

Answer :

Epidermis	bark
Single layered group of cells that covers plants leaves, flowers, roots and stem is Epidermis.	Woody stem and some other stem structures produce a secondary covering called periderm or secondary meristem that replaces epidermis as a protective covering called Bark.
The dermal layer protects the plants from loss of water, mechanical damage and invasion by parasitic and disease-causing organisms.	In big trees the dermal tissue forms several layers above the epidermis.

Q. 3. A. Name the following (AS 1)

Growing tissue, which causes growth in the length of the plant.

Answer : Apical meristematic tissues

Explanation: Meristematic tissues at the growing tip that bring about growth in length are called as apical meristematic tissues.

Q. 3. B. Name the following (AS 1)

Growing tissue, which causes growth in the girth of the plant.

Answer : Lateral meristematic tissues

Explanation : Tissues present around the edges in a lateral manner and giving rise to growth in girth of the stem are called lateral meristematic tissues.

Q. 3. C. Name the following (AS 1)

Large air cavities in the aquatic plants.

Answer : Aerenchyma.

Explanation: The Parenchyma which contains large air cavities or spaces is called Aerenchyma.

Q. 3. D. Name the following (AS 1)

Food material in parenchyma.

Answer : Storage tissue.

Explanation: The Parenchyma which stores water or food or waste products is called Storage Tissue.

Q. 3. E. Name the following (AS 1)

Pores essential for gaseous exchange and transpiration.

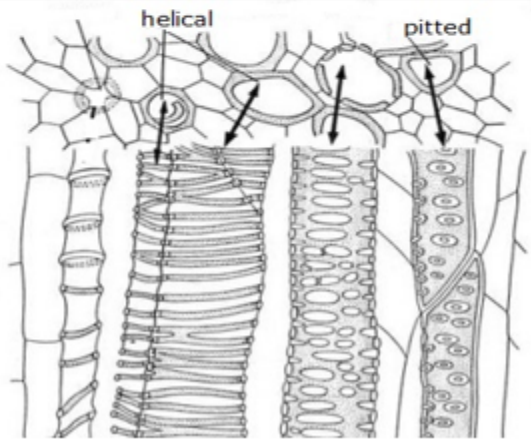
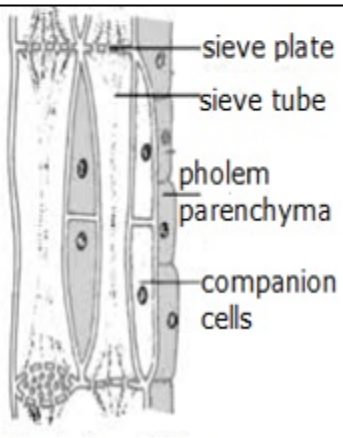
Answer : Stomata

Explanation: Stomata are dermal tissues that are essential for gaseous exchange and transpiration.

Q. 4. A. Compare and contrast the following (AS 1)

Xylem and phloem

Answer :

	Xylem	**phloem**
1.	It transports water and minerals from roots to apical parts of the plant.	It transports food material from leaves to growing parts of plants
2.	Xylem consists of tracheid's, vessels, xylem fibers, xylem parenchyma.	Phloem consists of sieve tubes, sieve cells, companion cells , phloem fibers, phloem parenchyma.
3.	Only xylem parenchyma is living.	Sieve tubes, sieve cells, companion cells and phloem parenchyma are living.
4.		

Q. 4. B. Compare and contrast the following (AS 1)

Meristematic tissue and Dermal tissue.

Answer :

Meristematic tissue	Dermal tissue
Tissues that brings growth regions are called **Meristematic tissues.**	Tissues that form outer coverings are called as **Dermal tissues.**
On the basis of their location, they are of three types apical, lateral and intercalary meristematic tissues.	On the basis of their functions and location. This tissue are three different types of epidermis (outer most layer), mesoderm (The middle layer) and endodermis (the innermost layer).
The walls of meristematic tissues are thin than dermal tissues.	The walls of dermal tissues are thicker than meristematic tissues.
Tissues function is overall growth and repair.	The function of dermal layer is protection of the plants from loss of water, mechanical damage and invasion by parasitic and disease causing organisms.

Q. 5. A. Give reasons to the following (AS 1)

Xylem is a conductive tissue

Answer : Xylem transports materials away from the root Xylem contains elongated tracheid cells, tubular vessels, fibers and parenchyma water to great heights in the plant body. It is up to nearly 200 ft of Eucalyptus plants and up to nearly 330 ft in the red wood trees. The xylem Tracheary elements consist of cells known as tracheids and vessel members, both of which are typically narrow, hollow, and elongated. Water moves from tracheid to tracheid which serves to prevent the passage of damaging air bubbles. Vessel members are the principal water-conducting cells in angiosperms. Water flows relatively unimpeded from vessel to vessel through these perforations.

Q. 5. B. Give reasons to the following (AS 1)

Epidermis gives protection

Answer : The dermal layer protects the plants from loss of water, mechanical damage and invasion by parasitic and disease-causing organisms. In big trees, the dermal tissue forms several layers above the epidermis known as bark. In desert plants, it may be even more thick and waxy.

Q. 6. "Bark cells are impervious to gases and water". What experiment will you perform to prove this? (AS 3)

Answer : As the stem ages and grows, changes occur that transform the surface of the stem into the bark. The epidermis is a layer of cells that cover the plant body, including the stems, leaves, flowers, and fruits that protects the plant from the outside world. In

old stems, the epidermis, cortex, and primary phloem become separated from the inner tissues by thicker formations of cork. Due to the thickening cork layer, these cells die because they do not receive water and nutrients. This dead layer is the rough corky bark that forms around tree trunks and other stems.

Cells of bark are dead and compactly arranged without intercellular spaces. They have a chemical called suberin in their walls that make them impervious to gases and water.

Bark tissues of made of woody vascular plants and consists of various biopolymers, tannins, lignin, suberin, and polysaccharides. Up to 40% of the bark tissue is made of lignin which forms an important part of a plant providing structural support by crosslinking between different polysaccharides, such as cellulose makes them impervious to gases and water.

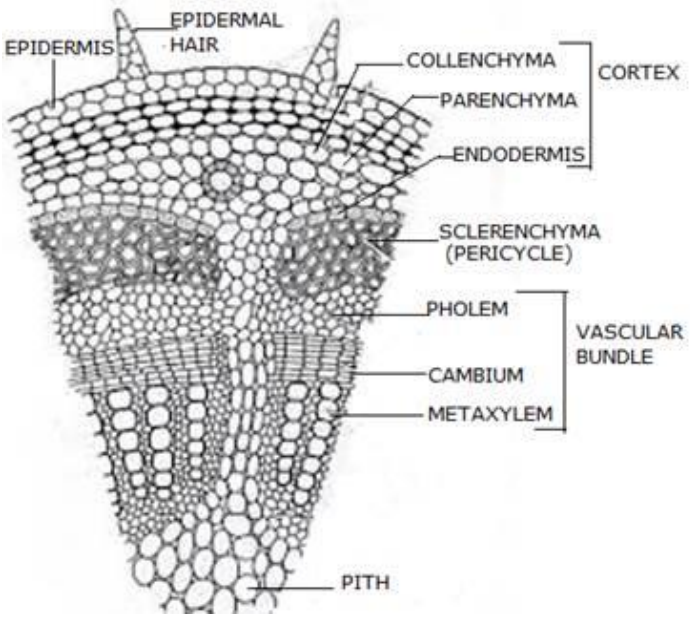
Q. 7. Chlorenchyma, Aerenchyma and storage tissue – Even though these three are parenchyma. Why do they have special names? (AS 1)

Answer : The cells of the parenchyma are soft, thin-walled and loosely packed. All parenchyma cells differ in their function.

The Parenchyma which contains chloroplasts is called “Chlorenchyma”. The Parenchyma which contains large air cavities or spaces is called “Aerenchyma”. The Parenchyma which stores water or food or waste products is called “Storage Tissue”.

Q. 8. Draw and label the diagram of the T.S. of the stem (AS 5)

Answer :



Q. 9. A. Describe the functions of - Meristem, Xylem, and phloem (AS 1)

MERISTEM:

Answer : MERISTEM: Meristematic tissues are the tissues present on the tip, sides and in between layers of other tissues. Depending on where the plant the meristem is, the meristem tissue can give rise to new leaves, flowers, or roots. The meristem is integral in plant growth—without it, plants would have no source for the production of new cells.

Apical meristem is found at the ends of roots (root apical meristem) or the tops of shoots (shoot apical meristem) of a plant responsible for the plant's growth in length or height.

The shoot apical meristem found above ground, is composed of undifferentiated cells develop to become one of three primary meristems: the protoderm, ground meristem, or procambium. The protoderm will go on to form the epidermal tissues of the plant; the ground meristem will form the cortex and pith of the plant; and the procambium will become xylem and phloem, the vascular tissues of the plant.

The root apical meristem found below ground, is responsible for the growth and development of a plant's roots. The root meristem produces cells in a bilateral direction, meaning that it yields two types of tissues at the same time.

Lateral meristem is responsible for lateral growth, or growth in diameter. This type of growth is known as secondary growth because it is growth around an already established stem.

Intercalary meristem or the basal meristem is located between mature, differentiated tissues. Although being relatively near an apical meristem and also composed of mostly undifferentiated cells, the intercalary meristem is distinctly different. It works independently of the apical meristem to promote the vertical growth of the plant. This allows leaves to continue growing despite being cut, in the way blades of grass continue to grow after being mowed.

Q. 9. B. Describe the functions of - Meristem, Xylem, and phloem (AS 1)

Xylem:

Answer : Xylem consists of tracheids, vessels, xylem fibers, xylem parenchyma. Which transports water and minerals from roots to apical parts of the plant. Functions are to transport materials away from the root Xylem containing elongated tracheid cells, tubular vessels, fibers and parenchyma water to great heights in the plant body. It is up to nearly 200 ft of Eucalyptus plants and up to nearly 330 ft in the red wood trees. The xylem Tracheary elements consist of cells known as tracheids and vessel members, both of which are typically narrow, hollow, and elongated. Water moves from tracheid to

tracheid which serves to prevent the passage of damaging air bubbles. Vessel members are the principal water-conducting cells in angiosperms. Water flows relatively unimpeded from vessel to vessel through these perforations.

Q. 9.C. Describe the functions of - Meristem, Xylem, and phloem (AS 1)

Phloem:

Answer : It transports food material from leaves to growing parts of plants. Phloem consists of sieve tubes, sieve cells, companion cells, phloem fibres, phloem parenchyma. Sieve tubes, sieve cells, companion cells and phloem parenchyma are living.

The sap is a water-based solution, but rich in sugars made by photosynthesis. These sugars are transported to non-photosynthetic parts of the plant, such as the roots, or into storage structures. During the plant's growth period, usually during the spring, storage organs such as the roots are sugar sources, and the plant's many growing areas are sugar sinks.

The movement in phloem is multidirectional. After the growth period the leaves are sources, and storage organs are sinks. Developing seed-bearing organs (such as fruit) are always sinks. Because of this multi-directional flow, coupled with the fact that sap cannot move with ease between adjacent sieve-tubes, it is not unusual for sap in adjacent sieve-tubes to be flowing in opposite directions.

Q. 10. While observing internal parts of plants, how do you feel about its structure and functions? (AS 6)

Answer : Plants that we observe around us are usually multi-cellular. They perform several life processes such as growth, respiration, excretion, photosynthesis. Plants internal structure is responsible for these processes.

Types of Tissues	
a) Meristematic	meristematic tissues are the tissues present on the tip, sides and in between layers of other tissues. Meristematic tissues at the growing tip that bring about growth in length are called as apical meristematic tissues. Tissues present around the edges in a lateral manner and giving rise to growth in girth of the stem are called lateral meristematic tissues. Areas from which branching takes place or a leaf or a flower stalk grows these kinds of meristematic tissue called as intercalary meristematic (also called as Cambium) tissue.
b) Dermal	Tissues that form outer coverings are called as Dermal tissues. Dermal tissue (Dermis) usually consists of a single layer of tissues having variations in the types of cell based on their functions and location. Three different type of epidermis (outer most layer), mesodermis (The middle layer) and endodermis (the innermost layer). In desert plants it may be even more thick and waxy. Small pores in the epidermis of the leaf, called stomata.
c)Ground	Tissues that form the bulk of the plant body, helping in packing other tissues are called as Ground tissues. The ground tissue is useful for storing food and providing physical support to the plant body. There are mainly three types of ground tissues. They are parenchyma, collenchyma and sclerenchyma. The cells of the parenchyma are soft, thin walled and loosely packed.
d)Vascular	Xylem is responsible for transport of materials away from the root. Phloem helps in the transportation of the material away from the photosynthetic parts of the plants. Hence, they are known as conducting or vascular tissues. xylem and phloem together form the vascular bundles. The vascular tissue gives mechanical support to the plant as well.

Q. 11. If you want to know more about tissues in plants what questions you are going to ask? (AS 2)

Answer : Few questions that arise to know more about plants tissues are as follows , Are all the cells similar, How are the cells arranged ,Are all the cells similar , Is there any difference in their arrangement, What can we infer from the above activities, How will the leaves come Which portion of the plant is responsible for this transport.

Q. 12. Collect information about dermal tissues of plants in what way they help to them. (AS 4)

Answer : Dermal tissues of plants help them in following ways –

a) In desert plants cell walls of dermal tissues are even more thick and waxy.

b) Epidermis the dermal tissue layer has Small pores called stomata. They are enclosed by two kidney shaped cells, called guard cells.

c) Cells of the roots have long-hair like parts, called root hairs.

d) The dermal layer protects the plants from loss of water, mechanical damage and invasion by parasitic and disease-causing organisms.

e) In big trees the dermal tissue forms several layers above the epidermis. It is called bark.

f) Stomata and root hair are also dermal tissues that are essential for gaseous exchange and transpiration as well as absorption of water and minerals respectively. Photosynthesis is also carried out by certain cells of dermal tissue.