Chapter 4. Tissues

PAGE NO : 41

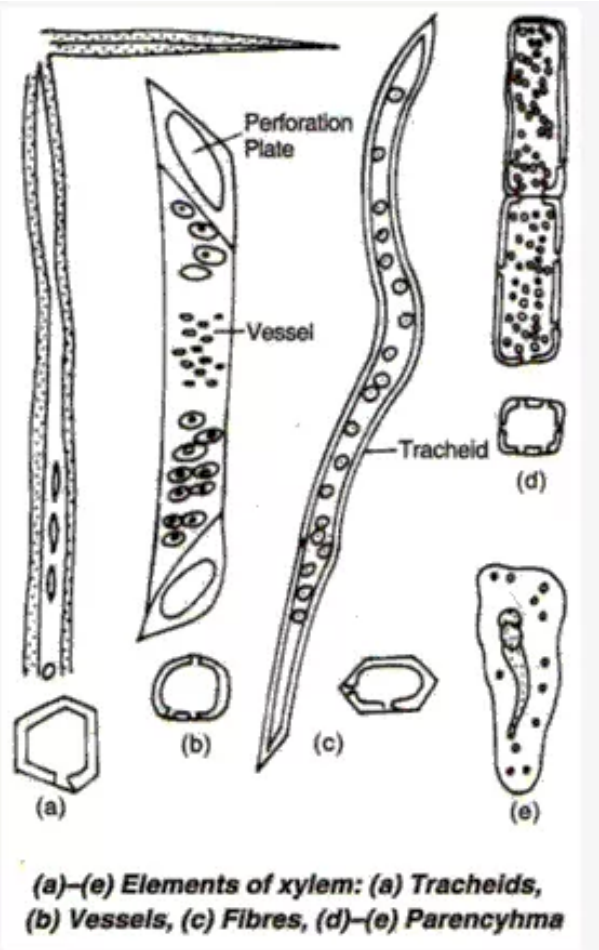
Solution 1:
Permanent tissue is a group of cells which temporarily or permanently cease to divide and thus assume permanent form and function.
Permanent tissues are of three types – simple tissues, complex tissues and special tissues.

Solution 2:
Sclerenchyma is a type of simple tissue present commonly in roots, stems, leaves and petioles. Its cells are dead, elongated and narrow with thickened and lignified cell walls.
Sclerenchyma is of two types i.e. fibres and sclerids.
Sclerenchyma gives strength, rigidity and flexibility to the plant body, thus enabling it to withstand various strains.

Solution 3:
Xylem is a complex plant tissue composed of several types of cells which are:

1. **Tracheids –** These cells are long and tubular with thick, rigid and lignified walls and pointed ends. Tracheids are present in all vascular plants. These conduct water and minerals from root to stem.
2. **Vessels** – These are long cylindrical cells with lignified walls, placed one above the other to form a pipe like structure. They participate in the conduction of water and minerals.
3. **Xylem fibres** – These are sclerenchymatous fibres found attached to xylem. These provide strength to the plant organs.
4. **Xylem parenchyma** – This is the living component of xylem. Xylem parenchyma is composed of simple parenchyma cells found in xylem. These are connected with tracheids or vessels through simple or bordered pits. Their function is to store food

material.



(a)–(e) Elements of xylem: (a) Tracheids, (b) Vessels, (c) Fibres, (d)–(e) Parenchyma

Solution 4:

Phloem is a complex plant tissue found in all parts of the plant like roots, stems and leaves and is mainly responsible for the conduction of organic food prepared by the plant.
Phloem is made up of four components which are:

1. Sieve tubes
2. Companion cells
3. Phloem parenchyma
4. Phloem fibres

PAGE NO : 42

Solution 5:

1. Tissue is a group of cells of similar structure and function.
2. Vascular tissue is the complex plant tissue in higher plants that is composed of xylem and phloem and is concerned with conducting water, minerals and organic food throughout the plant body.
3. Meristematic tissue is a group of cells which constantly divide and produce cells indefinitely throughout the life of the plant.
4. Permanent tissue refers to a group of cells which temporarily or permanently cease to divide and thus assume permanent form and function

Solution 6:

(i)

Cell	Tissue
Cell is the smallest basic structural and functional unit of all living organisms.	Tissue is a group of cells of similar structure and function.
It is present in all living organisms.	It is absent in unicellular organisms.

(ii)

Parenchyma	Collenchyma
It is concerned with photosynthesis, storage of various materials and wound healing	It provides mechanical support and elasticity to the plant body.
Parenchyma cells have thin cell walls.	The cell wall of collenchyma cell is unevenly thickened.

(iii)

Organ	Organelle
It is macroscopic.	It is microscopic.
Several tissues coordinate together to form an organ.	There are many organelles present within a cell.
Example –Heart, lung, brain, kidney	Example – Mitochondria, plastid, ER, Golgi apparatus

(iv)

Collenchyma	Sclerenchyma
Collenchyma cells are living.	Sclerenchyma cells are dead.
Its cell walls show uneven thickening.	Cell walls show uniform thickening.
Collenchyma provides mechanical support and elasticity to the plant body.	Sclerenchyma gives strength and rigidity to the plant body.
Collenchyma may carry out photosynthesis if chloroplast is present.	Sclerenchyma never carries out the function of photosynthesis.

(v)

Nervous tissue	Nervous system
Several neurons group together to form nervous tissue.	Nervous system is formed by the coordination of organs like brain and spinal cord as well as nerves.
Nerve tissue transmits signals or impulses within the body.	Nervous system makes the organism respond suitably to its environment.

(vi)

Blood	Lymph
It is red in colour.	It is a colourless fluid.
RBCs and WBCs are present.	RBCs are absent, whereas WBCs are found in abundance.
Blood transports respiratory gases, food, hormones etc. throughout the body.	Lymph protects body against infection.

(vii)

Bone	Cartilage
It is a hard and rigid tissue.	It is a flexible tissue.
It is porous.	It is non-porous.
It has a good supply of blood vessels and nerves.	It has no blood vessels or nerves.
It is the main skeletal tissue of the body and is present throughout the body.	It is found only in certain parts of the body like nose, ear, bronchial tubes, rings of trachea, between vertebrae and at the end of long bones.
It gives shape, support and protection to the body.	It provides flexibility and support to the body parts.

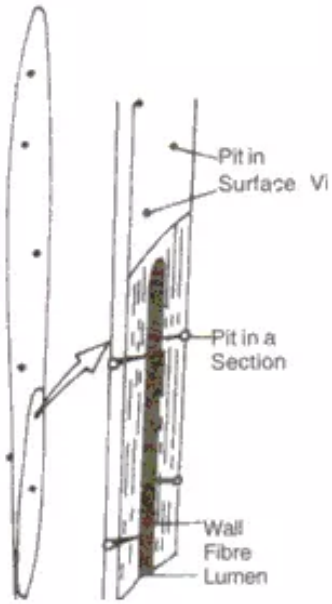
(viii)

Tendon	Ligament
Tendons connect muscles to bones.	Ligaments connect two bones at joints.

Solution 7:

(i) Sclerenchyma

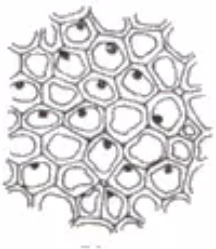
Structure – Cells of sclerenchyma are dead. These cells are elongated, narrow, pointed at both ends, thick walled and lignified. Their cell walls are thick due to secondary deposition of lignin.



Function – Sclerenchyma gives strength, rigidity and flexibility to the plant body, thereby enabling it to withstand various strains.

(ii) Collenchyma

Structure – It is a mechanical tissue consisting of living cells with usually no intercellular spaces. The cell wall is unevenly thickened and the walls are rich in hemicelluloses.



Function – Collenchyma provides mechanical support and elasticity to the plant body. Collenchyma may carry out photosynthesis if chloroplast is present.

(iii) Bone

Structure – It is a hard, inflexible and porous skeletal tissue well supplied with blood vessels and nerves. The bone matrix has a rigid mass of inorganic salts of calcium and magnesium. The bone cells called osteocytes are arranged in the form of thin circular layers around a central canal. Osteocytes are present in small spaces connected to one another by a system of canals.

T.S. of Bone

Function – Bone gives shape, support and protection to the body parts.

(iv) Crystal

Structure – Three common types of crystals are found in plants: druses (spherical crystal aggregates), raphides (long pointed needles found in bundles), and prisms. Despite the variety of crystal structures found throughout the plant cells, all crystals contain calcium oxalate.

Function – Crystals either protect plants from animals or they may provide extra support.

(v) Phloem

Structure – Phloem is a complex plant tissue found in all parts of the plant like roots, stems and leaves. It is made up of four components which are:

(a) Sieve tubes

(b) Companion cells

(c) Phloem parenchyma

(d) Phloem fibres

Function – Phloem carries out the conduction of organic food prepared by the plant.

Solution 8:

There are two main types of epithelial tissues. These are:

(a) Simple and
(b) Compound

Simple epithelial tissue is further divided into six sub-groups which are:

- Columnar epithelium
- Ciliated epithelium
- Cuboidal epithelium
- Squamous epithelium
- Glandular epithelium
- Sensory epithelium

Compound epithelial tissue is of two types:

1. Stratified epithelium
2. Transitional epithelium

Functions of epithelial tissue are:

- It forms a protective layer over the body and protects the underlying cells from drying up, injury, germs and harmful chemicals.
- It absorbs water and other nutrients inside the body.
- Some of these cells secrete ear wax, mucus, milk and digestive juices.

Solution 9:

Nerve cell or neuron is a cell of the nervous system, capable of transmitting signals or

impulses within the body. Each neuron consists of a cell body or cyton with a nucleus and elongated hair like extensions called axons and dendrites.
Nervous tissue is found in brain, spinal cord and nerves and carries out transmission of signals or impulses within the body.

Solution 10:
Blood is called a tissue since it contains many blood cells i.e. RBCs, WBCs and platelets working together to perform a common function. Blood connects the body systems together bringing the needed oxygen, nutrients, hormones and other signaling molecules, and removing the wastes.

Solution 11:
(i) Epithelial tissue:
Structure: The cells of epithelium are compactly placed, tightly held together and form a continuous sheet. Epithelial cells are supported below on a basement membrane. These cells may be of different shapes and sizes.
Types:
There are two main types of epithelial tissues which are:
(a) Simple and
(b) Compound
Functions:
(i) It forms a protective layer over the body and protects the underlying cells from drying up, injury, germs and harmful chemicals.
(ii) It absorbs water and other nutrients inside the body.
(iii) Some of these cells secrete ear wax, mucus, milk and digestive juices.
(ii) Muscular tissue:
Structure – Muscle tissue consists of cells which are elongated and large-sized, hence they are also called muscle fibres. These fibres are of various sizes. Contractile proteins are present in the muscle cells which bring about their contraction and relaxation. The cytoplasm of muscle fibre is called sarcoplasm and is bounded by a membrane called sarcolemma.
Types: Muscle tissue is of three types:

1. Striated muscle tissue
2. Unstriated muscle tissue
3. Cardiac muscle tissue

Functions –

1. Muscles bring about all voluntary movements done by a person.
2. All the involuntary movements needed to keep the body alive are possible due to muscles.
3. Connective tissue

Structure – This tissue has homogenous matrix which forms its main bulk. The connective tissue cells are living, separated from each other and are few in number. The matrix varies in size and shape and may be solid, gel like or liquid. The nature of the matrix decides the function of the connective tissue.
Types –
The following are the different types of connective tissue:
(a) Loose areolar connective tissue

(b) Fibrous connective tissue
(c) Cartilage connective tissue
(d) Bone
(e) Fluid connective tissue

Functions –

(i) Connective tissue connects and binds various organs of our body.
(ii) It gives support to the body and forms the skeleton to provide a definite shape.
(iii) It transports nutrients, hormones, oxygen and waste material within the body.

(iv) Nervous tissue:

Structure – The cells of nervous tissue is called neuron. It is capable of transmitting signals or impulses within the body. Each neuron consists of a cell body or cyton with a nucleus and elongated hair like extensions called axons and dendrites. Axons bundle together to form the nerve.

Functions – Nervous tissue is found in brain, spinal cord and nerves. It carries out transmission of signals or impulses within the body.

Solution 12:

(a) – (v)
(b) – (i)
(c) – (iv)
(d) – (ii)
(e) – (vi)
(f) – (iii)

Solution 13:

1. Nervous tissue
2. Cardiac muscle tissue
3. Adipose tissue
4. Xylem
5. Phloem

Solution 14:

The three kinds of muscles found in human body are:

1. **Striated muscle** – An example is leg muscle
2. **Unstriated muscle** – An example is muscles in walls of uterus
3. **Cardiac muscle** – An example is heart muscle

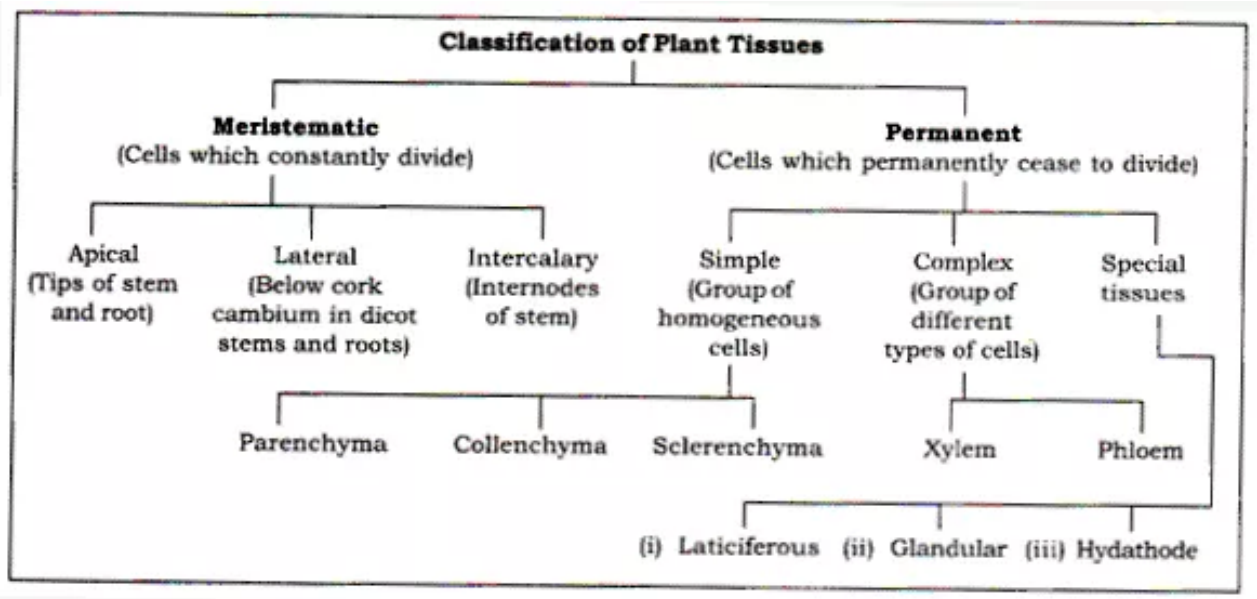
Solution 15:

1. Tissue
2. Unicellular organism
3. Organ

Solution 16:

1. Stratified epithelial tissue
2. Apical meristem
3. Ligament
4. Ciliated epithelium
5. Cuboidal epithelium

Solution 17:



Solution 18:

In man, cartilage is found in nose, ear, bronchial tubes, rings of trachea, between vertebrae and at the end of long bones such as ribs.

It differs from bone in following ways:

Cartilage	Bone
It is a flexible tissue.	It is a hard and rigid tissue.
It is non-porous.	It is porous.
It has no blood vessels or nerves.	It has a good supply of blood vessels and nerves.
It is found only in certain parts of the body like nose, ear, bronchial tubes, rings of trachea, between vertebrae and at the end of long bones.	It is the main skeletal tissue of the body and is present throughout the body.
It provides flexibility and support to the body parts.	It gives shape, support and protection to the body.

Solution 19:

1. False
2. True
3. False
4. True
5. True
6. True

Solution 20:

1. (b) sclerenchyma
2. (c) tissue
3. (d) tracheid
4. (b) thin walled and living

5. (d) dicot stems
6. (b) phloem
7. (a) blood devoid of RBCs
8. (a) one bone to another
9. (d) striated and involuntary
10. (a) vascular connective tissue