Answers to exercises in the worksheet

A. 1. b) 2. b) 3. c) 4. c)
5. b)

B. 1. Sclerenchyma 2. Epithelial 3. Striated 4. cyton
5. lacunae

C. 1. *T* 2. *T* 3. *F* 4. *T*
5. *F*

D. 1. Lateral meristem is located on the lateral side of the stems and roots of plants. Their function is to increase the thickness of plants.

2. Xylem is mainly formed of dead cells. It provides mechanical support to the plant and also stores food. The main function of xylem is the upward conduction of water and dissolved minerals from roots to various parts of plants.

   Phloem is mainly made up of living cells along with some dead cells. Phloem tissue is specialized to transport food synthesized by leaves to various parts of the plant. Phloem tissue provides mechanical support to the plant and helps in the storage of food.

3. Adipose tissue is a fat-storing connective tissue. Adipose tissue is found beneath the skin, around the heart, below the eyeballs, and around some other organs. Besides storing fat, adipose tissue acts as an insulator in the body. It also acts as a cushion to the vital body organs such as the heart and kidneys; thus preventing these organs from mechanical stress.

   The cells present in adipose tissues are called adipocytes.

4. Blood is a red fluid connective tissue. Blood is formed of plasma and blood cells. Blood cells are highly specialized non-dividing cells that float in blood plasma. They are red blood cells, white blood cells, and platelets. Blood forms 8–10% of body weight. It flows through a closed system of tubes called blood vessels.

   Blood performs several functions in the body. Some of these functions are as follows:

   - It transports and distributes nutrients, oxygen, dissolved salts, and hormones to various tissues in the body.
   - It removes excretory wastes and carbon dioxide from tissue cells and helps in their elimination from the body.
   - White blood cells protect the body from microbial infections and diseases.
   - Blood platelets help in blood clotting at the site of injury.

5. A neuron is a structural and functional unit of the nervous tissue. When several neurons are joined end to end, a nerve is formed.

A neuron has the following parts:

- Cell body (cyton): It is a star-shaped structure. It is filled with cytoplasm, which contains a large nucleus.
- Axon: It is the long cylindrical structure arising from the cyton. Its end is divided into several fine branches. Axon conducts messages from the cell body to other neurons through dendrons.
- Dendrons: These are small and highly branched projections arising from the axon. They receive messages from the axon and convey them towards the cyton of another neuron.

Answers to exercises in the textbook

Learning Milestone (Page 5)

1. Apical 2. meristematic 3. chlorenchyma 4. Sclerenchyma
5. aerenchyma

Learning Milestone (Page 11)

1. *T* 2. *F* 3. *F* 4. *F* 5. *T*

Check Your Knowledge

A. 1. a) 2. b) 3. a) 4. c) 5. b)
6. d) 7. d) 8. b) 9. c) 10. b)
11. c) 12. b)

B. 1. Tissue 2. intercalary 3. epidermis 4. Xylem, phloem
5. Tendon 6. Cardiac

C. 1. *F* 2. *T* 3. *T* 4. *F* 5. *F*

D. 1. e) 2. c) 3. d) 4. b) 5. a)

E. 1. A tissue can be defined as a group of similar cells, more or less alike in size and shape, performing the same function, and having a common origin.

2. The kind of permanent tissues found in plants is simple permanent tissues and complex permanent tissues. Simple permanent tissues include protective tissue and supportive tissue whereas complex permanent tissues include xylem and phloem.

3. Characteristics of meristematic tissues are as follows:

   a) They are made up of living cells. Cells are compactly arranged. They do not have any intercellular spaces between them.

b) Cells are thin-walled and may be rounded, oval, polygonal, or rectangular in shape.

c) They have dense granular cytoplasm.

d) The nucleus is large and clearly visible.

Note: Learners can write any two.

4. Collenchyma tissue is found in stems and leaf stalks of plants.
5. The function of phloem is to transport food synthesized by leaves to various parts of the plant. It also provides mechanical support to the plant and helps in the storage of food.
6. The function of tendons is to connect muscles to bones whereas ligaments connect bones to bones.

F. 1. A meristematic tissue is a group of young cells that have the capacity of continuous cell division. This tissue is found in all the growing parts of a plant, such as root tips and shoot tips.

a) The function of apical meristem is to increase the length of plants.

b) The function of lateral meristem is to increase the thickness of plants.

c) The function of intercalary meristem is to help in the growth of plants at internodes.

2. Cardiac muscles are branched and form an interconnecting network. Cardiac muscles have a single nucleus in each cell. They are found only in the walls of the heart. Their function is to pump blood from the heart into blood vessels.

On the other hand, voluntary muscles are present in the form of bundles. They have alternate bands of light and dark colour. They have more than one nucleus in a single cell. They are responsible for the movement of bones and muscles. They are present in the face, neck, and limbs.

Smooth muscles do not have light and dark colour bands. Their contraction and relaxation are not under the control of our will. These muscles are found in the walls of the oesophagus, stomach, intestines, and blood vessels. They are responsible for all involuntary actions in our body, such as breathing and peristalsis.

3. A neuron is a structural and functional unit of the nervous tissue.

A neuron has the following parts:

Cell body (cyton): It is a star-shaped structure. It is filled with cytoplasm, which contains a large nucleus.

Axon: It is the long cylindrical structure arising from the cyton. Its end is divided into several fine branches. Axon conducts messages from the cell body to other neurons through dendrons.

Dendrons: These are small and highly branched projections arising from the axon. They receive messages from the axon and convey them towards the cyton of another neuron.

4. a) Blood transports and distributes nutrients, oxygen, proteins, dissolved salts, and hormones to various tissues in the body. It removes excretory wastes and carbon dioxide from tissue cells and helps in their elimination from the body.

   b) Cardiac muscles are found in the walls of the heart. They work tirelessly throughout the life. Their function is to pump blood from the heart into blood vessels.

   c) The areolar tissue is found beneath the skin, in the kidneys and surrounds the muscle bundles and blood vessels. The function of areolar tissue is to repair the tissue after injury.

   d) Adipose tissue is a fat-storing connective tissue. Adipose tissue is found beneath the skin, around the heart, below the eyeballs, and around some other organs. Besides storing fat, adipose tissue acts as an insulator in the body. It also acts as a cushion to the vital body organs such as the heart and kidneys; thus preventing these organs from mechanical stress.

G. Connective tissue proper: Areolar tissue, adipose tissue, tendons, and ligaments

Supportive connective tissue: Bone and cartilage

Fluid connective tissue: Blood lymph

Muscular tissue: Striated muscles, and unstriated muscles, cardiac muscles

Analyze This

1. a) i) Parenchyma ii) Collenchyma iii) Sclerenchyma

   b) The function of parenchyma tissue is to synthesize and store food.

   The function of collenchyma is to provide flexibility to leaves and the stem.

   c)

Collenchyma	Sclerenchyma
It is made up of living cells.	It is made up of dead cells.
They appear polygonal, oval, or circular.	They are formed of long, narrow, fibrelike cells with pointed ends.
Cell walls are thick due to the deposition of cellulose.	Cells walls are thick due to the deposition of lignin.

2. a) Neuron

   b) i) Dendrite ii) Axon iii) Axon terminal

   c) The function of a neuron is to transmit information in the form of messages.

3. a) i) Apical meristem ii) Lateral meristem

   b) Apical meristem is located on the tips of roots and shoots. They help in the growth of the root and shoot systems.

Lateral meristem is located on the lateral side of the stems and roots of plants. Its function is to increase the thickness of plants.

4. The muscle cell shown in the picture is striated muscle.
   a) These muscles are called voluntary muscles because their contraction is under the control of our will.
   b) No, these muscles are not branched.
   c) These muscles are called skeletal muscles because their muscle bundles are attached to the bones and are responsible for their movements.
5. a) The part (i) is tendon and (ii) is a ligament.
   b) Tendons are present at the end of each skeletal muscle and connect muscles to bones.

      Ligaments are elastic in nature and connect bones to bones.
   c) If an individual damage his knee tendon, he or she will not be able to walk properly because the muscle will no longer be attached to the bone, which ultimately affects its locomotion.