

# CHAPTER 6

# Tissues

## 1. OBJECTIVE QUESTIONS

1. The tissues given below are called as:  
 (a) meristematic tissues      (b) permanent tissues  
 (c) complex tissues            (d) all of these

**Ans :** (c) complex tissues

The given tissues are complex tissues.

2. Read the given statements and select the correct ones.
1. There is no demarcation of dividing and non-dividing regions in animals.
  2. Animals consume less energy as compared to plants.
  3. Most of the tissues that plants contain are living.
  4. Structural organization of organs and organ systems are more specialized animals than even in very complex plants.
  5. Growth of animals is indefinite.
- (a) 2, 3 and 5                      (b) 2, 3 and 4  
 (c) 1 and 4                         (d) 1 and 5

**Ans :** (c) 1 and 4

Animals consume more energy as compared to plants. They move around in search of food, mates and shelter and hence require more energy for their activities. Most of the plant tissues are dead. Since plants are stationary or fixed, their tissues require to be supportive which provide them structural strength. Dead cells provide mechanical strength as easily as live ones, and need less maintenance.

3. Select the longest animal cell among following.  
 (a) Nerve cell                      (b) Muscle cell  
 (c) Liver cell                        (d) Goblet cell

**Ans :** (a) Nerve cell

The longest animal cell is nerve cell.

4. Given are some differences between the tissues of plants and animals. Which of these are incorrect differences?

	Plant tissue	Animal tissue
1.	Tissue of plants are made up of lignified and dead cells.	Tissues in animals are made up of living cells.
2.	The structural organization of plants is more complicated than that of animals.	Structural organization of animals is not complex.
3.	Growth in plants is definite.	Growth in animals is indefinite.

4.	There are dividing and non-dividing tissues in plants at specific regions.	They do not possess specific regions of dividing and non-dividing tissues.
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(a) 1, 3 and 4

(b) 2 and 3

(c) 3 and 4

(d) 1, 2 and 3

**Ans :** (b) 2 and 3

Growth of plants is indefinite. Plants grow throughout their life with the help of certain tissues located in certain regions in the body. i.e., meristematic tissues. The structural organization of plants is not complex as compared to that of animals. Plant tissues are also not much complicated like that of animal tissues.

5. Parenchyma cells containing air cavities are called  
 (a) aerenchyma                      (b) sclerenchyma  
 (c) chlorenchyma                    (d) prosenchyma

**Ans :** (a) aerenchyma

In aquatic plants (hydrophytes) large air cavities are present in the parenchymatous tissue. These cavities store gases and provide buoyancy to aquatic plants to help them float. Such parenchyma are called aerenchyma.

6. Find the living cells that provides mechanical strength to the plant.  
 (a) Parenchyma                      (b) Collenchyma  
 (c) Sclerenchyma                    (d) Sclerotic cells

**Ans :** (b) Collenchyma

Collenchyma is the living cell that gives mechanical strength to the plant.

7. Which of these types of cells is most likely to divide?  
 (a) Epidermis                        (b) Parenchyma  
 (c) Meristem                         (d) Xylem

**Ans :** (c) Meristem

Meristems are the sites or regions within the plant

body where formation of new meristematic cells takes place. For example, root and shoot tips.

8. What is chlorenchyma?  
(a) It is a simple permanent tissue  
(b) It is a parenchymatic tissue of green leaves and stems  
(c) It is a photosynthetic in nature  
(d) All of the above

**Ans :** (d) All of the above

Parenchyma (simple permanent tissue) cells of green leaves and stems containing chloroplasts are called as chlorenchyma.

9. Tracheids, vessels, wood fibres and parenchymatous tissues are found in  
(a) xylem (b) cambium  
(c) cortex (d) phloem

**Ans :** (a) xylem

Xylem (wood) is a complex permanent tissue forming a part of vascular bundle. It is primarily responsible for the conduction of water and solutes from the roots up to the top of the plant. It is composed of cellular structures, such as tracheids, vessels, xylem parenchyma and xylem fibres.

10. Identify the features of striated muscles.  
(a) Cylindrical, striped, skeletal and voluntary  
(b) Spindle, unbranched and uninucleated  
(c) Cylindrical, unstriped and without nucleus  
(d) Cylindrical, striped and branched

**Ans :** (a) Cylindrical, striped, skeletal and voluntary  
Striated muscles are cylindrical, striped, skeletal, voluntary unbranched and multinucleated.

11. Cardiac muscles are  
(a) smooth, spindle shaped and involuntary  
(b) striated, syncytial and involuntary  
(c) striated, syncytial and voluntary  
(d) striated, cross-connected and involuntary

**Ans :** (d) striated, cross-connected and involuntary

12. There are specific regions of plant body that constantly remain in the state of division. What are they?  
(a) Perisperm (b) Endosperm  
(c) Meristem (d) Stele

**Ans :** (c) Meristem

A meristem is a tissue in plants consisting of undifferentiated cells (meristematic cells). It is found in specific regions of a plant body where constant cell division takes place.

13. Muscles, which are immune to fatigue are  
(a) unstriped muscles (b) cardiac muscles  
(c) jaw muscles (d) skeleton muscles

**Ans :** (b) cardiac muscles

Cardiac muscle contracts and relaxes rapidly and continuously with a rhythm, but it never gets fatigued.

14. Which of the following helps in increasing the width and the girth of the plants?  
(a) Apical meristem (b) Lateral meristem  
(c) Intercalary (d) Permanent tissue

**Ans :** (b) Lateral meristem

Lateral meristem brings about the outward growth of plant by increasing its width and girth. Outward growth result in thickness of the plant.

15. Which of these features is associated with plasma membrane?  
(a) Permeable (b) Impermeable  
(c) Selectively permeable (d) Both (a) and (b)

**Ans :** (c) Selectively permeable

The plasma membrane allows the entry and exit of certain materials, in and out of the cell. It also prevents the movement of some other materials. Some substances like carbon-di-oxide or oxygen move across the cell membrane by process called diffusion. On the other hand, substances like water moves across the cell membrane through the process called osmosis. Therefore, the cell membrane is called a selectively permeable membrane.

16. Which of the following meristems helps to increase girth of the stem?  
(a) Apical meristem (b) Lateral meristem  
(c) Intercalary meristem (d) Vertical meristem

**Ans :** (b) Lateral meristem

Lateral meristem consists of initials which divide mainly in one plane and cause the organ to increase in diameter and girth. The lateral meristem usually occurs on the sides both in stem and root.

17. Read the given statements.

1. Many nerve cells bound together by connective tissue make up a nerve.
2. Areolar connective tissue fills the space inside the organs and helps in repair of tissues.
3. Glandular epithelium is formed by infolding of epithelial tissue.
4. Smooth muscle fibres show characteristic of both striated and unstriated muscles.
5. Skin epithelial cells are extremely thin and flat through which absorption and secretion occur.

Select the incorrect statements.

- (a) 4 and 5 (b) 1, 3 and 5  
(c) 1, 2 and 3 (d) 2, 3 and 4

**Ans :** (a) 4 and 5

Cartilage is a soft connective tissue that forms the articular surfaces at joints of long bones, tracheal rings, nasal septum, ear and larynx.

18. Identify the tissue that is present in leaf stalks below the epidermis.  
(a) Collenchyma (b) Sclerenchyma  
(c) Parenchyma (d) Xylem

**Ans :** (a) Collenchyma

Collenchyma tissue forms continuous cylindrical strands beneath the epidermis of stem or leaf

19. A person met with an accident in which two long bones of hand were dislocated. Which among the following may be the possible reason?  
 (a) Tendon break (b) Cartilage  
 (c) Ligament break (d) Areolar tissue break

**Ans :** (c) Ligament break

A person who met an accident might likely have suffered dislocation of bones due to ligaments break. It is because ligaments connect bones with another.

20. Identify simple tissues.  
 (a) Parenchyma, xylem and collenchyma  
 (b) Parenchyma, collenchyma and sclerenchyma  
 (c) Parenchyma, xylem and sclerenchyma  
 (d) Parenchyma, xylem and phloem

**Ans :** (b) Parenchyma, collenchyma and sclerenchyma  
 Parenchyma, collenchyma and sclerenchyma are simple tissues.

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21. Which of the following tissues provides flexibility and mechanical support to the plant organs?  
 (a) Collenchyma (b) Sclerenchyma  
 (c) Parenchyma (d) Chlorenchyma

**Ans :** (a) Collenchyma

Collenchyma is a living tissue of primary body. The cells are thin-walled but possess thickenings of cellulose and pectic substances at the corners where number of cells join together. The tissue provides flexibility to soft aerial parts (e.g., leaves, young stems) of plant so that they can bend without breaking. The cells are compact and the inter-cellular spaces are absent.

22. A waxy, water resistant layer is observed in the xerophytic plants. What is the layer called as?  
 (a) Endodermis (b) Cortex  
 (c) Phloem (d) Epidermis

**Ans :** (d) Epidermis

A xerophyte is an organism, which is able to survive in an ecosystem with little or no water (or moisture). To reduce transpiration the epidermal cells of xerophytes (plants) secrete a waxy (fatty) water resistant layer of cutin.

23. Which component of sclerenchymal tissues harden and thicken their secondary walls?  
 (a) Suberin (b) Calcium  
 (c) Lignin (d) Magnesium

**Ans :** (c) Lignin

Sclerenchyma consists of thick, hard secondary walls due to deposition of lignin. It provides mechanical strength to the cells.

24. Inner surface of fallopian tubes, bronchi and bronchioles are lined by epithelial cells. Find the type of epithelia which lines them.  
 (a) Squamous epithelium (b) Ciliated epithelium  
 (c) Columnar (d) Cubical epithelium

**Ans :** (b) Ciliated epithelium

Columnar cells which bear cilia on their free surfaces,

lines the nasal passages, oviducts (fallopian tubes), terminal bronchioles, ventricles of brain, central canal of spinal cord of the embryo.

25. Cell walls of sclerenchyma are rich in  
 (a) cellulose (b) pectin  
 (c) lignin (d) hemicellulose

**Ans :** (c) lignin

Sclerenchyma consists of thick-walled dead cells. These cells have an extremely thick secondary walls due to uniform deposition of lignin.

26. Select the tissue which has a storage function.  
 (a) Sclerenchyma (b) Collenchyma  
 (c) Xylem (d) Parenchyma

**Ans :** (d) Parenchyma

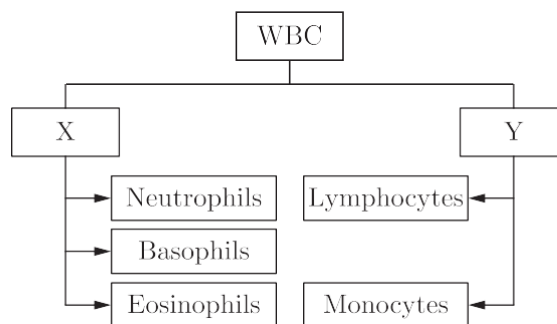
Parenchyma cells store biochemicals. These are the familiar edible parts of plants. E.g., carbohydrates in a potato, ear of a corn. These cells also store salts, pigments, organic acids, fragment oil etc. E.g., Lemons and oranges store citric acid.

27. Which gives tensile strength and hardness to the bone?  
 (a) Collagen (b) Calcium phosphate  
 (c) Both (a) and (b) (d) Proteins

**Ans :** (c) Both (a) and (b)

Collagen fibre give tensile strength and calcium phosphate provides hardness to the bones.

28. Identify X and Y in the given flow chart.



- (a) X-Erythrocytes, Y-Leucocytes  
 (b) X-Granulocytes, Y-Granulophils  
 (c) X-Granulocytes, Y-Agranulocytes

(d) X-Agranulophils, Y-Granulocytes

**Ans :** (c) X-Granulocytes, Y-Agranulocytes

**29.** What do you think is a common feature of the following tissues?

- i. Blood
- ii. Phloem
- iii. Muscles

- (a) All are tissues
- (b) All are organs
- (c) All are cells
- (d) All are organ systems

**Ans :** (a) All are tissues

Blood, phloem and muscles all are types of tissues.

Muscle : Smooth, skeletal, cardiac

Vascular tissue : Plants - xylem and phloem

Connective tissue : Blood (Vascular tissue are specialized connective tissue having fluid matrix and free floating cells. Types : Blood, lymph)

**30.** Which fibrous tissue connects bone with to each other?

- (a) Connective tissue
- (b) Tendon
- (c) Ligament
- (d) Adipose tissue

**Ans :** (c) Ligament

Ligament connects bones to each other. They also connect other parts together. In doing so, they support an organ.

**31.** Triceps and biceps are examples of

- (a) voluntary muscles
- (b) involuntary muscles
- (c) sphincter muscles
- (d) smooth muscles

**Ans :** (a) voluntary muscles

Skeletal muscles or striated muscles are found in the body wall and the limbs (arms, legs) e.g., biceps and triceps. The contraction and relaxation of these muscles are under the control of organism, so they are also called voluntary muscles. These are attached to the bones by tendons and help in the movement of limbs.

**32.** The muscle fibre shown in the diagram is:



- (a) involuntary
- (b) voluntary
- (c) voluntary and involuntary
- (d) none of these

**Ans :** (b) voluntary

The muscle fibre in hand are voluntary muscles.

**33.** Which of the following is not the characteristic of smooth muscles?

- (a) These muscles are found in limbs.
- (b) These muscles do not show striations.
- (c) The muscle fibres are spindle-shaped tapering and uninucleate.

(d) These muscles are involuntary.

**Ans :** (a) These muscles are found in limbs. Striated muscles are found in limbs.

**34.** The husk of coconut is made up of

- (a) collenchyma tissue
- (b) parenchyma tissue
- (c) aerenchyma tissue
- (d) sclerenchyma tissue

**Ans :** (d) sclerenchyma tissue

## 2. FILL IN THE BLANK

**1.** Though cardiac muscle resembles the striated muscle but it is an .....muscle.

**Ans :** Involuntary muscle

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**2.** Meristematic tissue is found in the growing tips of ..... and .....

**Ans :** Root, stem

**3.**muscles are present in Iris of the eye, in uterus and bronchi of lungs.

**Ans :** Smooth or involuntary

**4.** A group of cells alike in form, function and origin are called .....

**Ans :** Tissue

**5.** Muscles present in our limbs are .....muscles.

**Ans :** Skeletal muscles or voluntary muscles

**6.** Xylem conducts .....and minerals from the root to the apical aparts of the plant.

**Ans :** Water

**7.** During shivering muscles contract and relax producing large amount of .....

**Ans :** Heat

**8.** Muscles contain special protein called .....proteins which contract and relax to cause movement.

**Ans :** Actin and Myosin

**9.** Meristematic tissue is made of cells that are capable of .....

**Ans :** Cell division

**10.** In eucalyptus plant xylem carries water to a height of .....

**Ans :** 200

**11.** Xylem contains ..... , vessels, fibres and xylem parenchyma.

**Ans :** Trachieds

**12.** Phloem contains sieve cells, sieve tubes,..... , fibres and parenchyma.

**Ans :** Companion cells

13. The sticky substance on the trunk of Acacia and neem etc., is .....  
**Ans :** Gum
14. Vascular tissues are xylem and .....  
**Ans :** Phloem
15. Ground tissues are parenchyma,.....and sclerenchyma.  
**Ans :** Collenchyma

### 3. TRUE/FALSE

1. Muscular tissue consists of small rounded cells.  
**Ans :** False  
 Muscular tissue consists of long elongated cells or fibres.
2. A large central vacuole is present in permanent tissues.  
**Ans :** True
3. Cork cells have suberin deposits.  
**Ans :** True
4. Collenchyma tissue is a strong, flexible, living mechanical tissue.  
**Ans :** True
5. The cytoplasm of a muscle cell is called sarcoplasm.  
**Ans :** True
6. Tendons connect muscles to bones.  
**Ans :** True
7. Cardiac muscles are a type of muscular tissue.  
**Ans :** True
8. Connective tissue is composed of cells and fibres.  
**Ans :** True
9. Nerve cells join together to form nerve fibres.  
**Ans :** True
10. The main function of xylem is to conduct food

material.

**Ans :** False

Xylem conducts water and minerals and phloem conducts food.

11. A neuron consists of three parts.  
**Ans :** True
12. Permanent tissues forms the bulk of the plant body.  
**Ans :** True
13. Involuntary muscles are found in the stomach wall.  
**Ans :** True
14. Ligament consists of white fibres.  
**Ans :** False  
 Ligaments are composed of yellow elastic tissue whereas tendons are composed of white fibrous tissue.
15. Nerve cells are also called dendrons.  
**Ans :** False  
 Nerve cells are also called neurons. Dendrons are a part of nerve cell. (They are short processes arising from the cyton and further branch into thin dendrites.)
16. Sensory epithelium is found in nasal passages and retina of eyes.  
**Ans :** True
17. Connective tissue is composed of cells and fibres.  
**Ans :** True
18. Squamous epithelial cells are thin, flattened and fitted like tiles in a floor.  
**Ans :** True
19. Epithelium is a covering tissue, lining the cavities in the body viscera.  
**Ans :** True
20. Tissues are made up of similar cells which have similar functions.  
**Ans :** True

### 4. MATCHING QUESTIONS

**DIRECTION :** Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in column-I have to be matched with statements (p, q, r, s) in column II.

1.

Column I		Column II	
(A)	Jute	(p)	Cutin
(B)	Cork	(q)	Lignin
(C)	Cuticle	(r)	Suberin
(D)	Pear	(s)	Sclereids

	A	B	C	D
(a)	r	s	p	q
(b)	q	r	p	s
(c)	s	r	p	q
(d)	r	s	q	p

**Ans :** (b) A-q, B-r, C-p, D-s

2.

Column I		Column II	
(A)	Dermal tissue	(p)	Covers, protects
(B)	Meristematic	(q)	Makes up bulk of plant; stores nutrients
(C)	Ground tissue	(r)	Conduct water and dissolved nutrients
(D)	Vascular tissues	(s)	Adds new cells through growth

	A	B	C	D
(a)	r	s	p	q
(b)	q	r	p	s
(c)	s	r	p	q
(d)	r	s	q	p

**Ans :** (c) A-r, B-s, C-q, D-p

3.

Column I		Column II	
(A)	Loose connective	(p)	Ears and joints
(B)	Dense connective	(q)	Circulatory system
(C)	Blood	(r)	Under skin
(D)	Cartilage	(s)	Ligaments and tendons

	A	B	C	D
(a)	r	s	p	q
(b)	q	r	p	s
(c)	s	r	p	q
(d)	r	s	q	p

**Ans :** (d) A-r, B-s, C-q, D-p

4.

Column I		Column II	
(A)	Parenchyma	(p)	Water transport
(B)	Sclerenchyma	(q)	Provide buoyancy to aquatic plants
(C)	Tracheids	(r)	Storage, division
(D)	Aerenchyma	(s)	Mechanical strength

	A	B	C	D
(a)	r	s	p	q
(b)	q	r	p	s
(c)	s	r	p	q
(d)	r	s	q	p

**Ans :** (a) A-r, B-s, C-p, D-q

## 5. ASSERTION AND REASON

**DIRECTION :** In each of the following questions, a statement of Assertion is given and a corresponding statement of Reason is given just below it. Of the statements, given below, mark the correct answer as:

- Both assertion and reason are true and reason is the correct explanation of assertion.
- Both assertion and reason are true but reason is not the correct explanation of assertion.
- Assertion is true but reason is false.
- Both Assertion and Reason are false.

- Assertion :** Parenchyma cells help in storage of food.  
**Reason :** Parenchyma cells are the main seats of photosynthesis.

**Ans :** (b) Both assertion and reason are true but reason is not the correct explanation of assertion.

The functions of the parenchymatous tissue is store food material in the form of starch, proteins, oils and fats. The parenchymatous tissues in root and stem tubers are good examples. The xylem and phloem parenchyma also store starchy food. The parenchymatous cells that contain chloroplasts are the main seats of photosynthesis, e.g., palisade cells of leaf.

- Assertion :** Vascular or conductive tissue is a distinctive feature of complex plants.

**Reason :** Vascular tissue has made survival of complex plants possible in terrestrial environment.

**Ans :** (b) Both assertion and reason are true but reason is not the correct explanation of assertion.

Xylem and phloem are vascular tissues that conduct water, minerals and food to various parts of plants. Vascular tissue is a distinctive feature of the complex plants, one that has made their survival in terrestrial environment possible.

- Assertion :** The inner lining of intestine has tall epithelial cells.

**Reason :** Columnar epithelium facilitates absorption and secretion.

**Ans :** (a) Both assertion and reason are true and reason is the correct explanation of assertion.

Where absorption and secretion occur, such as in the inner lining of the intestine, tall epithelial cells or columnar epithelium is present. This epithelium facilitates movement or diffusion across the epithelial barrier.

**4. Assertion :** Permanent tissue is composed of mature cells.

**Reason :** Meristematic tissue is a group of actively dividing cells.

**5. Assertion :** Most of plant tissues are dead.

**Reason :** Due to sedentary existence of plants, dead cells provide mechanical strength more easily than live ones and need less maintenance.

**Ans :** (a) Both assertion and reason are true and reason is the correct explanation of assertion.

**6. Assertion :** Ciliated epithelium helps in movement of particles.

**Reason :** Cilia help in movement.

**Ans :** (a) Both assertion and reason are true and reason is the correct explanation of assertion.

The function of the cilia is to move particles, free cells or mucus in a specific direction. It is present in inner surfaces of some hollow organs such as Fallopian tubes, bronchioles and small bronchi and help in movement of the particles present there. Thus, the function of ciliated epithelium (as it possesses cilia) is the movement of particles.

**7. Assertion :** Meristematic tissues constitute the major portion of the plant body.

**Reason :** Meristematic tissues consist of differentiated cells.

**Ans :** (d) Both Assertion and Reason are false.

Meristematic tissues, after differentiation, give rise to permanent tissues. These constitute the major portion of the plant body.

**8. Assertion :** Surface of skin is impervious to water.

**Reason :** Surface of skin is covered by stratified cuboidal epithelium.

**Ans :** (c) Assertion is true but reason is false.

Surface of skin is impervious to water because it is covered by stratified keratinized squamous epithelium. This epithelium has many superficial layers of horny, scale-like remains of dead squamous cells and several deeper layers of living polygonal cells. Heavy deposits of the insoluble protein keratin are present in the dead superficial layers which makes this epithelium impervious to water. Stratified cuboidal epithelium, on the other hand, lines the inner surface of sweat gland, large salivary and pancreatic ducts.

**9. Assertion :** Lateral meristems add thickness of plants.

**Reason :** Lateral meristems divide only in one plane.

**Ans :** (a) Both assertion and reason are true and reason is the correct explanation of assertion.

Lateral meristems are present along the side of the stem. Vascular cambium in the gymnosperms and the angiosperms is a good example of lateral meristems. Lateral meristem is always composed of a single layer of rectangular cells that divide only in one plane and produce new vascular tissues on either side.

**Ans :** (b) Both assertion and reason are true but reason is not the correct explanation of assertion.

A meristematic tissue is a group of cells that are in a continuous state of division or retain their power of

division. Permanent tissues are composed of mature cells that, after undergoing complete growth, have assumed a definite shape, size and function and have temporarily or permanently lost the power of division.

**10. Assertion :** Vessel and sieve tube both are meant for transport purposes.

**Reason :** Vessels are lignified.

**Ans :** (b) Both assertion and reason are true but reason is not the correct explanation of assertion.

Vessel is a long distance channel for water transport. Sieve tube is a long distance channel for transport of organic nutrients. The wall of vessel is lignified. Lignification is absent in sieve tubes.