

CLASS-IX

BIOLOGY

Notes

1. **Tissue** is a group of cells having similar origin, structure & function. Study of tissues is called **Histology**

2. In unicellular organism (Amoeba) single cell performs all basic functions, whereas in **multi-cellular organisms** (Plants and Animals) **shows division of labor as Plant tissue & Animal tissues.**

3. Plant tissues are two types: **Meristems & Permanent tissues.**

4. **Meristems:** The Meristems are the tissues having the power of cell division. It is found on those region of the plant which grows.

5. Types of Meristems;

1. **The Apical meristems** – It is present at the growing tip of the stem and roots and increases the length.

2. **The lateral meristems** - present at the lateral side of stem and root (cambium) and increases the girth.

3. **The intercalary meristems** - present at internodes or base of the leaves and increases the length between the nodes.

(Please refer to Fig. 6.2: location of meristems in plant body , NCERT Book Page- 69).

26. **Permanent tissues:** Two types such as Simple permanent tissues & Complex permanent tissues.

a) **Simple permanent tissues:** subdivided as

(i): **Parenchyma:** Tissues provide the support to plants. They are loosely packed and has large intracellular space.

- Parenchyma with chlorophyll which performs photosynthesis is

called as chlorenchyma.

- The parenchyma with large air spaces to give buoyancy is called as aerenchyma .Parenchyma also stores food and water.

(ii) **Collenchyma:** Tissue provides mechanical support, thickened at the corners, have very little intercellular space. It allows easy bending of various parts of a plants without breaking

(iii) **Sclerenchyma:** Tissue makes the plant hard and stiff, thickened due to lignin and no intercellular space. Cells of this tissue are dead and commonly seen in the husk of coconut.

(iv) **Guard cells& Epidermal tissue:** the tissue aids in protection and exchange of gases. Guard cells kidney shaped in dicots, dumb bell shaped in monocots to guard the stomata. The epidermal tissues of roots aid in absorption of water and minerals. The epidermal tissues in desert plants have a thick waxy coating of Cutin with waterproof quality. The epidermal tissues form the several layer thick Cork or the Bark of the tree.

(Please refer to Fig. 6.3- 6.6, NCERT Book Page-70-73).

b) **Complex permanent tissues:** The complex tissues are made of more than one type of cells. All these cells coordinate to perform a common function. They are subdivided as;

Xylem: It consists of tracheids, vessels, xylem parenchyma and xylem fibers. The cells have thick walls,

Function - aids in conduction of water and minerals.

Phloem: It consists of sieve tubes, companion cells, phloem parenchyma, and phloem fibers.

Function - Phloem transports food material to other parts of the plants.

(Please refer to Fig. 6.7, NCERT Book Page-73).

6. **Animal tissues:** Sub divided as **epithelial tissue, connective tissue, muscular tissue and nervous tissue**

i. **Epithelial tissue:** It is a protective covering forming a continuous sheet. Simple epithelium is the one which is extremely thin in one layer, whereas stratified epithelium are arranged in pattern of layers.

Depending on shape and function they are classified as:

- a) **Squamous epithelium** in the lining of mouth and esophagus.
- b) **Cuboidal epithelium** in the lining of kidney tubules and salivary glands.
- c) **Columnar epithelium** in the intestine & Columnar epithelium with cilia in the lining of respiratory tract.
- d) **Glandular epithelium** in the Glands aids in a special function as gland cells, which can secrete at the epithelial surface.

(Please refer to Fig. 6.9, NCERT Book Page-75).

ii) **Connective Tissue:** Five Types, such as;

- a) **Blood:** The Blood is a fluid connective tissue. Blood plasma has RBCs (Red Blood Cells) WBCs (White Blood Cells) and platelets. Blood plasma contains proteins, salts and hormones. Blood flows and transports gases, digested food, hormones and waste materials.
- b) **Bone:** The bone is a connective tissue with hard matrix, composed of calcium and phosphorus. A bone is connected by another bone with another connective tissue called ligaments. A bone is connected by muscle with another connective tissue called tendon.
- c) **Cartilage:** The cartilage is a connective tissue with solid matrix composed of proteins and sugars. It is commonly seen in nose, ear, trachea, and larynx.
- d) **Areolar Connective Tissue:** It is found between the skin and muscles, around the blood vessels. It supports internal organs and aids in repair of tissues.
- e) **Adipose Connective Tissue:** It is filled with fat globules for the storage of

fat. It acts as insulator.

(Please refer to Fig. 6.10, NCERT Book Page-76).

Muscular tissues: They have special contractile proteins responsible for movements. Three types, such as;

Striated muscles/skeletal muscles/voluntary muscles :They are cylindrical, un-branched and multinucleated.They have dark bands and light bands.

Unstriated muscles/smooth muscles/involuntary muscles: They are commonly called as Smooth muscles, having no striations (dark bands/ light bands are absent). Commonly found alimentary canal, uterus, Iris of an Eye. They are spindle shaped. Involuntary in nature

Cardiac Muscles: They are commonly called as Heart muscles, cylindrical,branched and uni-nucleate. Involuntary in nature.

(Please refer to Fig. 6.11, NCERT Book Page-77).

Nervous Tissue: The tissue responds to stimuli. The brain, spinal cord and nerves are composed of nervous tissue or neurons. A neuron consists of Cell Body, cytoplasm, Nucleus, Dendrite, Axon, nerve ending. The neuron impulse allow us to move our muscles when we want to respond to stimuli.

(Please refer to Fig. 6.12, NCERT Book Page-78).

CBSE class IX Science
NCERT Solutions
Chapter - 6
Tissues

(Page No. 69)

1. What is a tissue?

Ans. It is a group of cells similar in origin and structure and they are specialized to perform a particular function like muscle cells in our body forms the muscle tissue that bring about body movements (specific function).

2. What is the utility of tissues in multi-cellular organisms?

Ans. There is a clear cut division of labour in multicellular organisms i.e. different parts of the body of a multicellular organism perform specific functions. For example, brain controls all other parts of body, heart pumps blood to all parts of body, kidneys remove waste materials from body, sense organs collect information from external sources for sensory perception etc. All these functions would never be possible without formation of tissues in multicellular organisms.

(Page No. 74)

1. Name types of simple tissues.

Ans. The simple tissues (found in plants) are of following three types:

- i)** parenchyma
 - ii)** collenchyma
 - iii)** Sclerenchyma
-

2. Where is apical meristem found?

Ans. The apical meristem is found at the apex (growing tips) of the stem and roots.

3. Which tissue makes up the husk of coconut?

Ans. Sclerenchymatous fibres

4. What are the constituents of phloem?

Ans. The constituents of phloem are: sieve tubes, companion cells, phloem parenchyma, phloem fibres (bast).

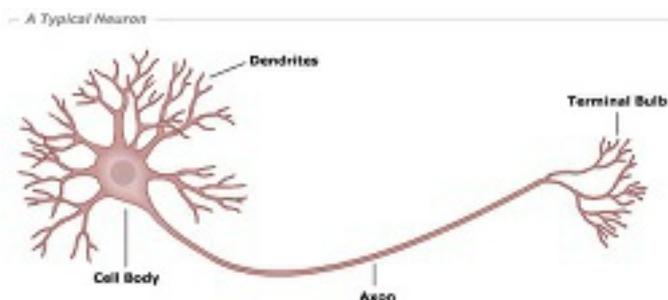
(Page No. 78)

1. Name the tissue responsible for movement in our body.

Ans. Muscle/muscular tissue.

2. What does a neuron look like?

Ans. A neuron comprises of a cell body (cyton) along with one or more short branches(Dendron) and one hair like long branch (axon).



3. Give three features of cardiac muscles.

- Ans. (i)** Cardiac muscles are involuntary i.e. they don't work under our will.
(ii) Its cells are cylindrical, branched, striated and uninucleate.
(iii) It shows rhythmic contraction and relaxation throughout the person's life.

4. What are the functions of areolar tissue?

Ans. Areolar tissue is a kind of filler tissue found between skin and muscles, around our

blood vessels and nerve cells and also in the bone marrow. Its functions are therefore

- i) To fill the space inside organs.
- ii) To help in repair and maintenance of nearby tissues/organs.
- iii) To support and prevent injuries to internal organs.

Chapter – end

1. Define the term “tissue”.

Ans. It is a group of cells similar in origin and structure and they are specialized to perform a particular function like muscle cells in our body forms the muscle tissue that brings about body movements(specific function).

2. How many types of elements together make up the xylem tissue? Name them.

Ans. Xylem tissue is made up of following 4 types of elements:

- i) Tracheids
- ii) vessels
- iii) Xylem fibres
- iv) Xylem parenchyma

3. How are simple tissues different from complex tissues in plants?

Ans.

Simple tissue	Complex tissue
i) It is made up of only one type of cells. ii) All cells of this tissue work as individual units to perform a particular function. Eg. parenchyma, collenchyma and sclerenchyma tissues.	i) It is made up of more than one type of cells. ii) Cells of this tissue work together as one single unit to bring about a particular function. Eg. xylem and phloem tissues.

4. Differentiate between parenchyma, collenchyma and sclerenchyma on the basis of their cell wall.

Ans.

Parenchyma	Collenchyma	Sclerenchyma
Cell wall is thin and made up of cellulose.	Cell wall is irregularly thickened at corners due to deposition of pectin.	Cell wall is very thick due to deposition of impermeable substance lignin.

5. What are the functions of the stomata?

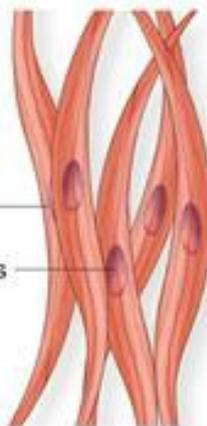
Ans. The functions of stomata are:

- i) gaseous exchange like exchange of CO₂ and O₂.
- ii) Process of transpiration i.e. loss of excess water in the form of water vapour occurs through stomata.

6. Diagrammatically show the difference between the three types of muscle fibres.

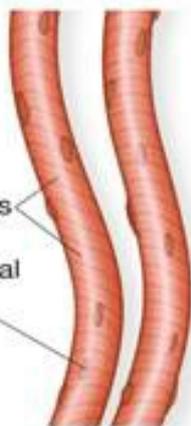
Ans.

Visceral
(smooth)



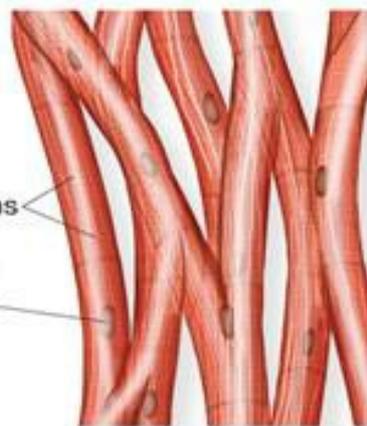
No striations
Central nucleus

Skeletal
(striated)



Striations
Peripheral nuclei

Cardiac



Striations
Central nuclei

Contracts	Slowly	Rapidly	Rapidly
Found	Viscera, blood vessels	Trunk, extremities, head and neck	Heart
Control	Involuntary	Voluntary	Involuntary

7. What is the specific function of the cardiac muscle?

Ans. Cardiac muscles are the muscles of heart that pumps blood to all parts of body and the pumping needs rhythmic contraction and relaxation of cardiac muscles throughout the life

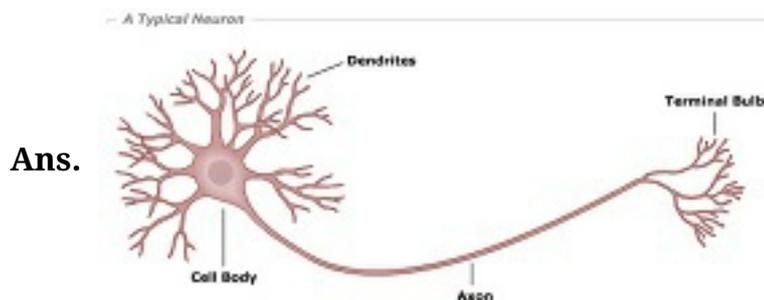
without any fatigue.

8. Differentiate between striated, unstriated and cardiac muscles on the basis of their structure and site/location in the body.

Ans.

Striated muscle	Unstriated muscle	Cardiac muscle
They show light and dark bands (striations) when we stain them. Their cells are elongated and cylindrical also unbranched. Cells are multinucleate.	They don't show any striations on staining. Their cells are long but spindle shaped and unbranched. Cells are uninucleate.	They show striations on staining. Their cells are cylindrical and branched. Cells are uninucleate.
They are responsible to bring about voluntary movements (like tongue, limbs etc)	They are involuntary in action (walls of tubular organs, blood vessels etc)	They are again involuntary in their function (contraction and relaxation of heart)

9. Draw a labelled diagram of a neuron.



10. Name the following.

- Tissue that forms the inner lining of our mouth.
- Tissue that connects muscle to bone in humans.
- Tissue that transports food in plants.
- Tissue that stores fat in our body.
- Connective tissue with a fluid matrix.

(f) Tissue present in the brain.

Ans. (a) epithelial tissue

(b) tendons

(c) phloem

(d) adipose tissue

(e) blood

(f) nerve tissue

11. Identify the type of tissue in the following: skin, bark of tree, bone, lining of kidney tubule, vascular bundle.

Ans.

Skin	Epithelial tissue
Bark of tree	Sclerenchymatous tissue
Bone	Connective tissue
Lining of kidney tubule	Cuboidal epithelial tissue
Vascular bundle	Complex permanent tissue

12. Name the regions in which parenchyma tissue is present.

Ans. Parenchymatous tissue is present in the epidermis, cortex, pith of the stem, root, leaves, flowers and fruits of plants.

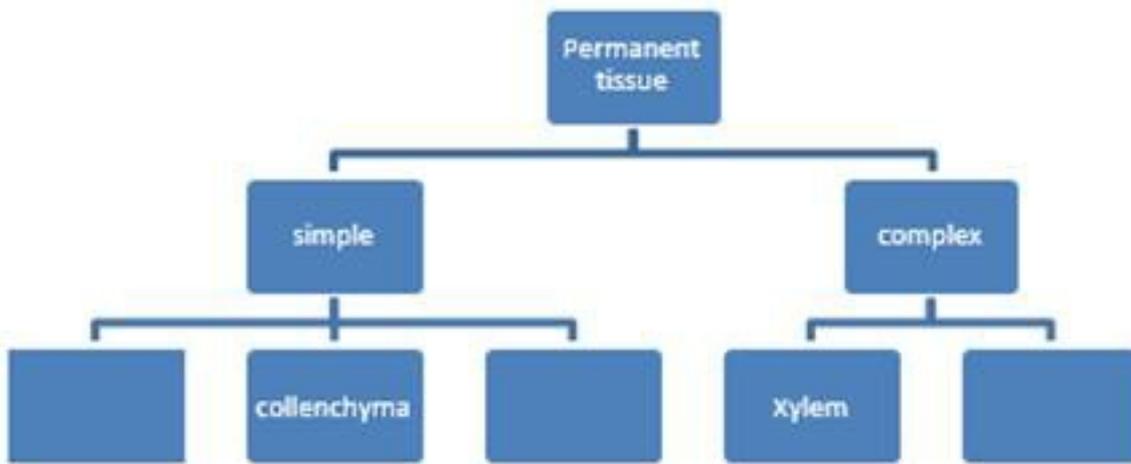
13. What is the role of epidermis in plants?

Ans. It is a protective layer to the plant parts. It can also absorb water from soil like in the roots and even allow exchange of gases through stomata. It also helps in preventing the entry of pathogens.

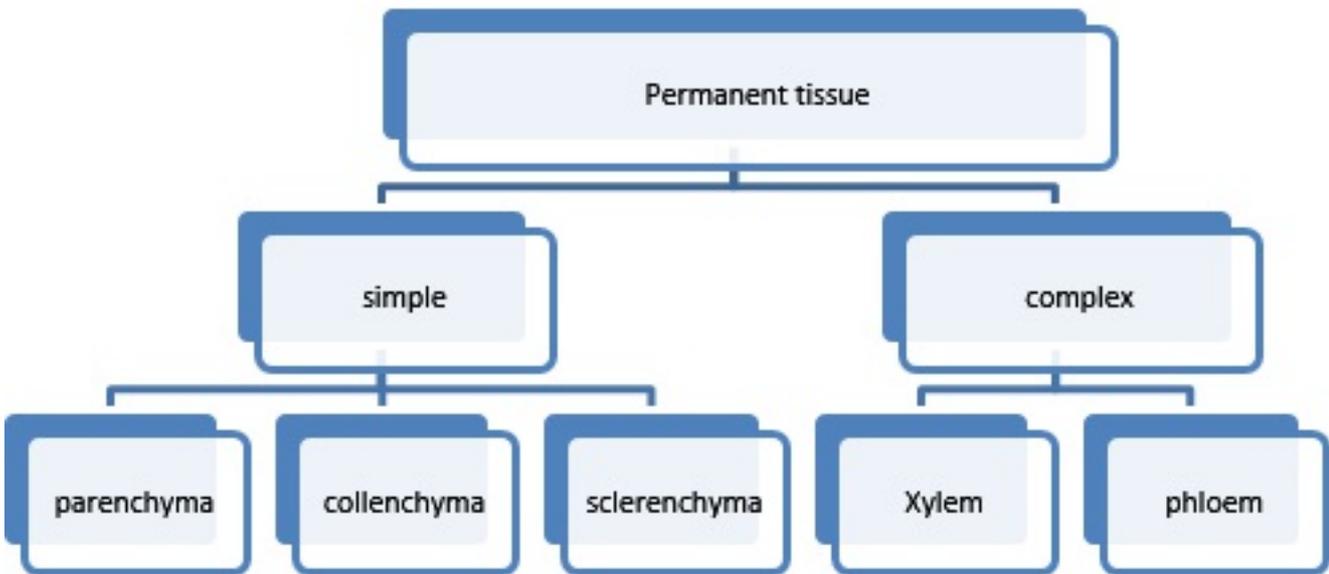
14. How does the cork act as a protective tissue?

Ans. In plants the secondary meristem cuts off many external layers of cells that are dead and arranged in a compact manner. Such layers together make cork. They have deposition of suberin which is very hard and impermeable hence protects plants from unfavorable conditions and microbial attack etc.

15. Complete the table:



Ans.



ASSIGNMENT

CLASS-IX

1. The cells of cork are dead and have a chemical in their walls that makes them impervious to gases and water. The chemical is

- (a) lignin
- (b) suberin
- (c) cutin
- (d) wax

2. The flexibility in plants is due to a tissue called

- (a) chlorenchyma
- (b) parenchyma
- (c) sclerenchyma
- (d) collenchyma

3. The tissue present in the lining of kidney tubules and ducts of salivary glands is

- (a) squamous epithelium tissue
- (b) glandular epithelium tissue
- (c) cuboidal epithelium tissue
- (d) columar epithelium tissue

4. The connective tissue that connects muscle to bone is called

- (a) ligament
- (b) tendon
- (c) nervous tissue

(d) all of the above

5. The tissue that helps in the movement of our body are

(a) muscular tissue

(b) skeletal tissue

(c) nervous tissue

(d) all of the above

6. Sieve tubes and companion cells are present in

(a) xylem

(b) phloem

(c) cork

(d) cambium

7. The size of the stem increases in the width due to

(a) apical meristem

(b) intercalary meristem

(c) primary meristem

(d) lateral meristem

8. Cartilage and bone are types of

(a) muscular tissue

(b) connective tissue

(c) meristematic tissue

(d) epithelial tissue

9. Xylem and phloem are examples of

(a) epidermal tissue

- (b) simple tissue
- (c) protective tissue
- (d) complex tissue

10. A tissue whose cells are capable of dividing and re-dividing is called

- (a) complex tissue
- (b) connective tissue
- (c) permanent tissue
- (d) meristematic tissue

11. Write a note on plant tissues? (5 marks)

12. What is the function of connective tissues? Explain its types. (4 marks)

13. Draw a structure of a nerve cell (neuron). (3 marks)

14. What is the region where parenchyma tissue is present? (2 marks)

15. What is the point of difference between cardiac muscle and striated muscle? (2 marks)

16. Draw a neat diagram of a smooth muscle. (3marks)

17. Where is epical tissue present? (1 mark)

18. What are the various types of an animal tissue? (5 marks)

19. Write the difference between xylem and phloem. (3 marks)

20. Write the difference between a bone and cartilage. (2 marks)

CBSE Test Paper 01
Chapter 06 Tissues

1. Match the following with correct response. (1)

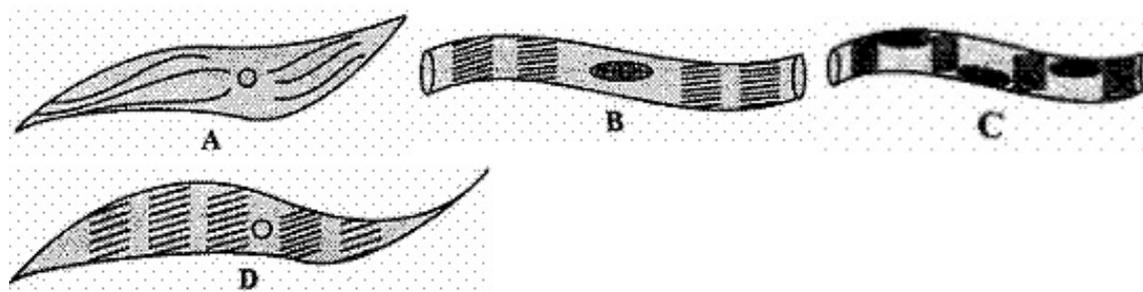
Column A	Column B
(1) RBC	(A) Alternate light & dark bands
(2) Striated muscles	(B) Neuron
(3) Smooth muscles	(C) Uninucleate
(4) Axon	(D) Transport oxygen

- a. 1-C, 2-B, 3-D, 4-A
- b. 1-B, 2-D, 3-A, 4-C
- c. 1-D, 2-A, 3-C, 4-B
- d. 1-A, 2-C, 3-B, 4-D

2. Which tissue has chloroplast in cells? (1)

- a. Sclerenchyma
- b. Aerenchyma
- c. Parenchyma
- d. Chlorenchyma

3. Out of the following, the correct diagram of the stripped muscle fibre, is the diagram labelled as: (1)



- a. D
- b. B
- c. C

- d. A
4. Which is not a function of epidermis? **(1)**
- a. Protection from adverse condition
 - b. Transpiration
 - c. Conduction of water
 - d. Gaseous exchange
5. Which one of the following is the correct definition of the tissues? **(1)**
- a. Group of dissimilar cells which perform different functions.
 - b. Group of similar cells which perform specific functions
 - c. Group of similar cells which perform similar functions.
 - d. Group of dissimilar cells which perform similar function
6. What are the functions of tendon and ligament? **(1)**
7. Which cells are responsible for contraction and relaxation movements? **(1)**
8. What is a tissue? **(1)**
9. Which type of tissue is most abundant in animals? **(1)**
10. Which type of WBC is most abundant in lymph? **(1)**
11. What is the utility of tissues in multi-cellular organisms? **(3)**
12. Discuss the cell arrangement which supports the fact that epidermis is a protective tissue. **(3)**
13. Differentiate between striated, unstriated and cardiac muscles on the basis of their structure and site/location in the body. **(3)**
14. Write the differences between xylem and phloem. **(3)**
15. Diagrammatically show the difference amongst three types of muscle fibres. **(5)**

Note:1.Practice NCERT questions in Biology fair copy.

2.Solve assignment questions in fair copy.

3.The assignment questions will carry 10 marks for PA-1

VATSALYA SR. SEC. SCHOOL

CLASS-IX

BIOLOGY

Planner-2

<u>Days</u>	<u>Chapter</u>	<u>Topics</u>
3 Days	<u>Tissues</u>	1.Plant tissues (A)Meristematic tissue. (B)Permanent tissue. (a)Simple permanent Tissue (b)Complex permanent Tissue
3 Days	<u>Tissues</u>	2.Animal tissues (A) Epithelial Tissue (B)Connective Tissue (C)Muscular Tissue (D) Nervous tissue

Note:Read the chapter and topics thoroughly and take the help of the following video links.

Video Links of chapter tissue:

Part 1:https://youtu.be/OqSw_dfhbsk

Part 2:<https://youtu.be/Gk0VcAp4SYY>

Part 3:https://youtu.be/4hoRFOGi_BI

Part 4:<https://youtu.be/duYnuUcE4T0>

Part 5:<https://youtu.be/z0pigy80ail>

Part 6:<https://youtu.be/w3bjWBIWr2Q>

Part 7:<https://youtu.be/-6w6XbqyVhg>