

CHAPTER: TISSUES

COMPLETE WORKBOOK ANSWER KEY (PAGES 36 – 47)

PAGE 36: TISSUES - INTRODUCTION & PLANT TISSUES

A. INTRODUCTION

1. What are tissues?

Ans: A tissue is a group of cells that are similar in structure and/or work together to achieve a particular function.

2. State two points of difference between plant tissues and animal tissues:

Plant Tissues	Animal Tissues
Most tissues are supportive and dead, requiring less energy and maintenance.	Most tissues are living to support active locomotion and higher energy consumption.
Growth is limited to specific localized regions	Cell growth is uniform throughout the body without dividing and non-dividing regions.

B. PLANT TISSUES - I. MERISTEMATIC TISSUE

1. Name the two types of tissues found in plants:

Ans: Meristematic tissue and Permanent tissue.

2. State three points of difference between meristematic tissues and permanent tissues:

Ans:

MERISTEMATIC TISSUES	PERMANENT TISSUES
Cells divide continuously throughout life.	Cells have lost the capacity to divide.
Cells are unspecialized/undifferentiated.	Cells are specialized to perform specific functions (differentiated).
Cells lack vacuoles, have dense cytoplasm and thin walls.	Cells usually contain large vacuoles and thin/thick walls.

PAGE 37: MERISTEMATIC & PERMANENT TISSUES

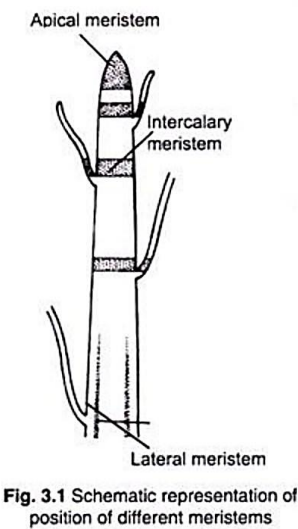
3. Describe the cells which comprise the meristematic tissue:

Ans: The cells are very active, with dense cytoplasm, thin cellulose walls, prominent nuclei, and they lack vacuoles.

Name the three meristematic tissues and state their location and function:

MERISTEMATIC TISSUE	APICAL MERISTEM	LATERAL MERISTEM (CAMBIUM)	INTERCALARY MERISTEM
LOCATION	Growing tips of stems and roots	Girth / sides of stems and roots	Base of leaves or in nodes and internodes
FUNCTION	Increases the length of the stem and root	Increases the girth or diameter of the stem/root	Facilitates growth in length of leaves and branches

4. Diagram showing location of the three meristematic tissues:



II. PERMANENT TISSUES

1. What happens to the cells formed by the meristematic tissue?

Ans: They take up a specific structure and function and lose the ability to divide, forming permanent tissue through the process of differentiation.

2. State the two types of permanent tissues and write one point of difference between them:

Ans:

SIMPLE PERMANENT TISSUE	COMPLEX PERMANENT TISSUE
Made up of only one type of cell working together.	Made up of more than one type of cell coordinating to perform a common function.

PAGE 38: SIMPLE PERMANENT TISSUES COMPARISON

3. State the differences among the simple permanent tissues found in plants:

Ans:

FEATURE	PARENCHYMA	COLLENCHYMA	SCLERENCHYMA	EPIDERMIS
CELL SHAPE	Isodiametric / Oval	Elongated	Long and narrow	Relatively flat
CELL WALL	Thin cellulose wall	Irregularly thick at corners	Very thick (Lignified)	Thick outer/side walls
INTERCELLULAR SPACES	Large spaces present	Very little space	No intercellular space	No intercellular space
LIVING / DEAD?	Living	Living	Dead	Living
LOCATION	Soft parts, leaves, roots	Leaf stalks, stems	husk, seed covers, veins	Outermost surface
FUNCTIONS	Storage, packaging	Flexibility, support	Strength and stiffness	Protection

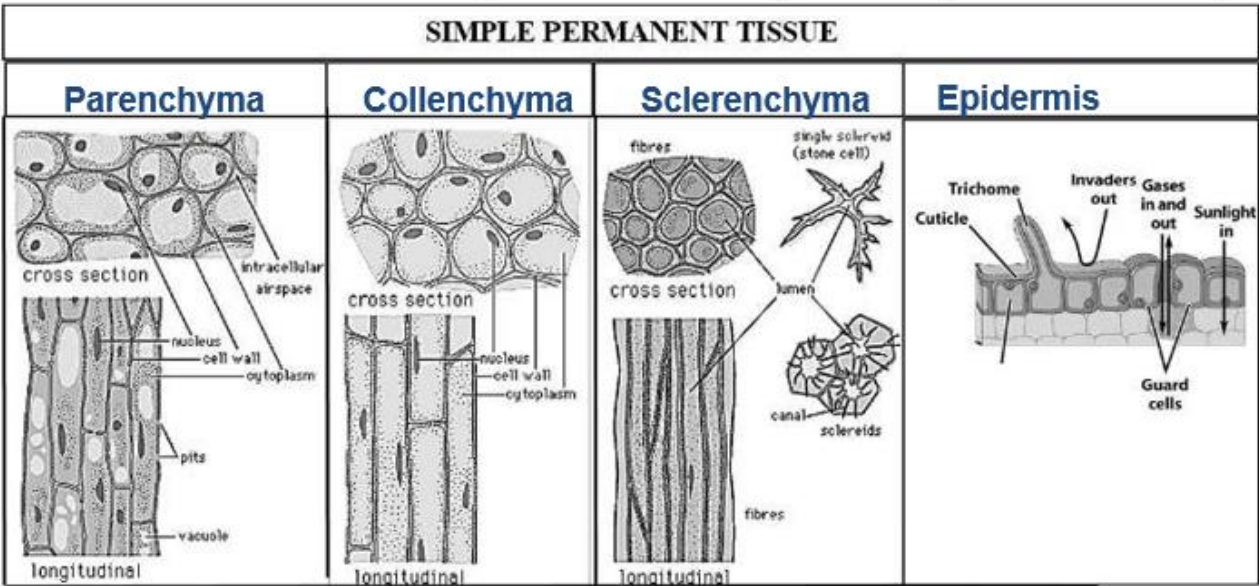
PAGE 39: PARENCHYMA MODIFICATIONS & IDENTIFICATION

4. List the two modified parenchymatous tissues, their location, structure and function:

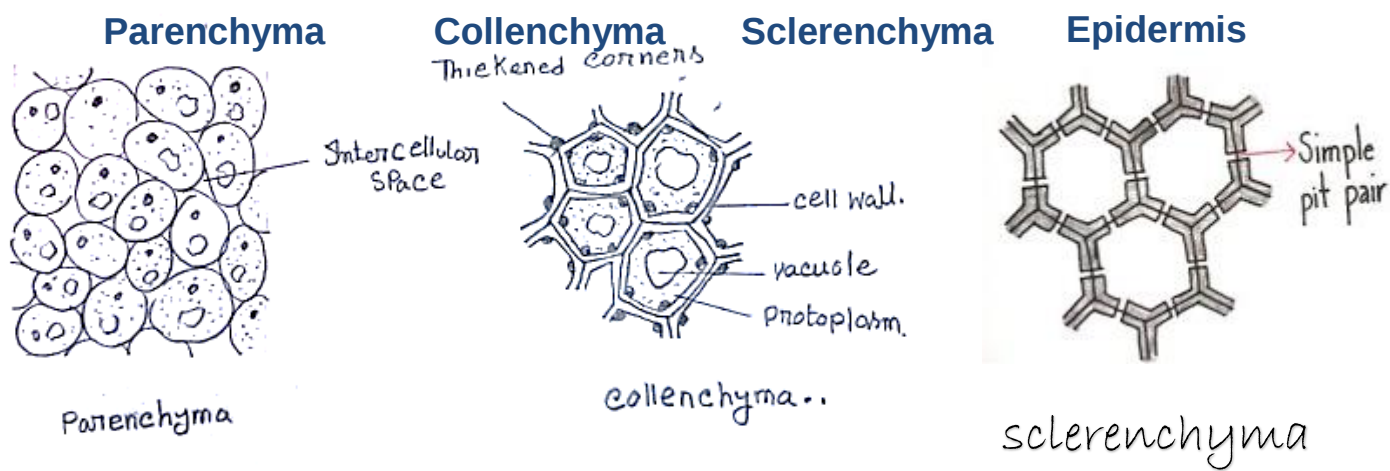
Ans:

	CHLORENCHYMA	AERENCHYMA
Location	Leaves and green stems	Aquatic plants
Structure	Parenchyma cells containing chloroplasts	Parenchyma cells with large air cavities
Function	Performs photosynthesis	Provides buoyancy to help aquatic plants float

5. Observe cross-sections and longitudinal sections and identify:



6. Diagrams:



PAGE 40: THE EPIDERMIS & STOMATA

1. What is epidermis?

Ans: The outermost protective layer of cells covering the entire surface of a plant.

2. How many layers of cells is an epidermis usually made of?

Ans: A single layer of cells.

3. What modification is observed in the epidermis of the aerial part of the plant?

Ans: Cells secrete a waxy, water-resistant layer called the cuticle on their outer surface.

4. What is the function of the cuticle?

Ans: Protects against water loss, mechanical injury, and invasion by parasitic fungi.

5. Describe the cells which make up the epidermis:

Ans: Relatively flat cells with thicker outer and side walls, arranged without intercellular spaces.

6. Why does epidermal layer form a continuous layer without intercellular spaces?

Ans: Because it plays a protective role and needs to guard internal tissues without leaving entry points.

7. What modification is observed in the epidermis of the leaf?

Ans: Presence of small pores called stomata enclosed by guard cells.

8. State the functions of stomata:

Ans: 1. Exchange of gases (CO_2 and O_2) with atmosphere. 2. Transpiration (loss of water vapor).

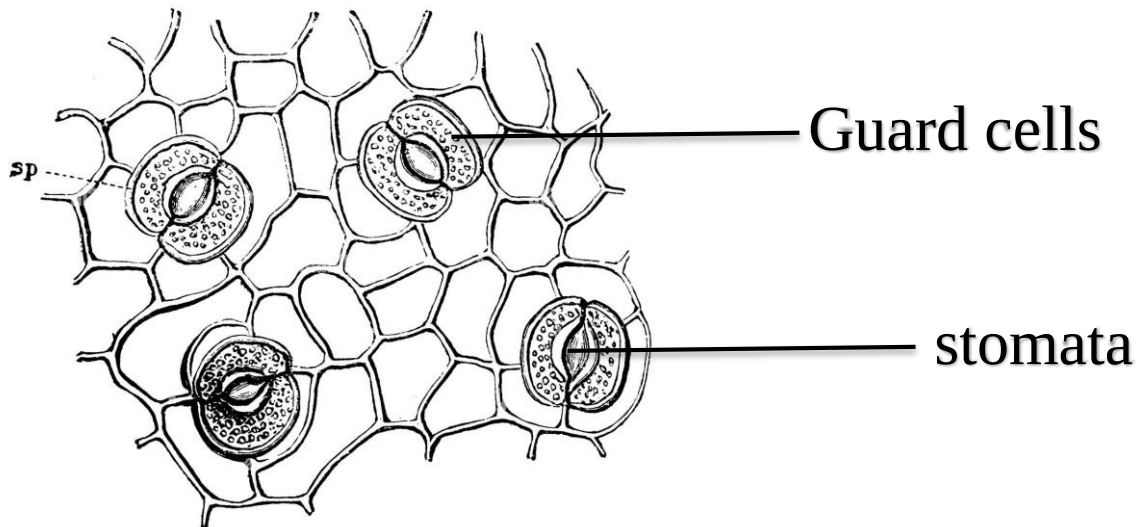
9. Name the cells that regulate the opening and closing of the stomata:

Ans: Guard cells.

10. State the function of the epidermis:

Ans: Protection of all underlying internal parts of the plant.

11. Diagram of epidermis of leaf:



PAGE 41: EPIDERMAL MODIFICATIONS (ROOT, DESERT PLANTS, WOODY TREES)

12. What modification is observed in the epidermis of the root?

Ans: Presence of long hair-like projections called root hairs.

13. Why are root hairs present in root epidermis?

Ans: They greatly increase the total surface area for water absorption.

EPIDERMIS OF DESERT PLANTS

1. How is the epidermis of desert plants different?

Ans: It may be thicker or multi-layered with a thick waxy coating of cutin.

2. Why does the epidermis of desert plants contain multiple layers and cutin?

Ans: To prevent excessive water loss through transpiration in hot, dry desert conditions.

EPIDERMIS OF WOODY TREES

1. What happens to the epidermis of woody trees?

Ans: As plants grow older, secondary meristem replaces outer epidermis with layers of cork cells (bark).

2. What is the layer of cork cells called?

Ans: Cork / Bark.

3. Name the meristematic tissue that produces this layer:

Ans: Secondary meristem (cork cambium).

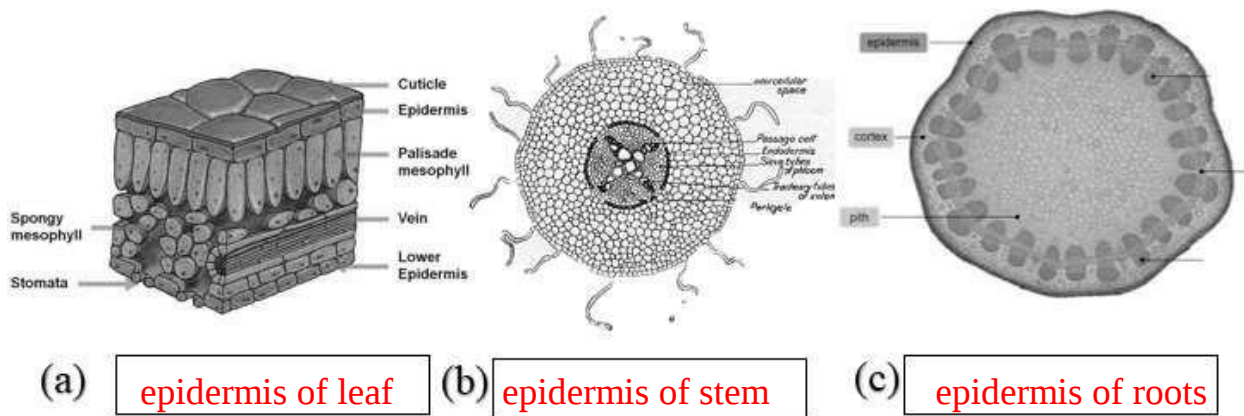
4. Describe cork cells:

Ans: Dead cells, compactly arranged without intercellular spaces and contain suberin.

5. Why do cork cells have suberin in them?

Ans: Suberin makes their cell walls impervious to gases and water.

6. Identify location of epidermis in diagrams:

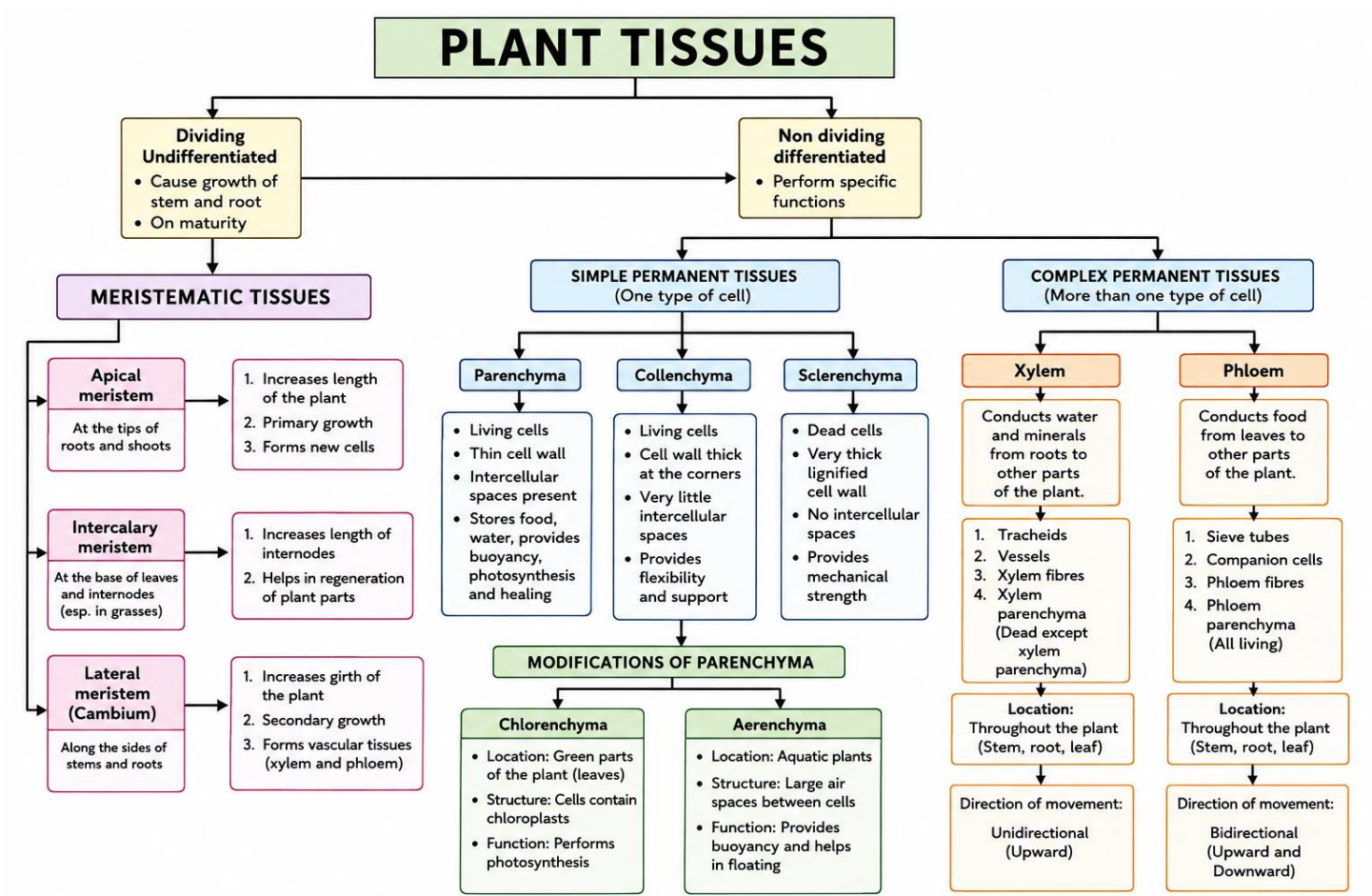


PAGE 42: COMPLEX PERMANENT TISSUE (XYLEM VS PHLOEM)

1. Name the two complex permanent tissues found in plants and state their location, structure and function:

Ans:

FEATURE	XYLEM	PHLOEM
Name of Tissue	Xylem	Phloem
Function	Transports water and minerals vertically & sideways.	Transports food (photosynthetic products) from leaves.
Direction of Movement	Unidirectional (upward from roots).	Bidirectional (both upward and downward).
Cell Composition	Tracheids (Dead), Vessels (Dead), Fibres (Dead), Parenchyma (Living).	Sieve tubes (Living), Companion cells (Living), Parenchyma (Living), Fibres (Dead).
Location	Vascular bundles in stems, roots, leaf veins.	Vascular bundles in stems, roots, leaf veins.



PAGE 44: ANIMAL TISSUES - EPITHELIAL TISSUE

1. Name the four basic types of tissues found in animals:

Ans: Epithelial tissue, Connective tissue, Muscular tissue, Nervous tissue.

1. THE EPITHELIAL TISSUE

a. What are epithelial tissues?

Ans: Covering or protective tissues in the animal body.

b. Where are they found?

Ans: Skin, lining of mouth, lining of blood vessels, lung alveoli, kidney tubules, outer covers of organs.

c. What are the different functions of epithelial tissue?

Ans: Protection, absorption, secretion, gas exchange, and barrier maintenance.

d. Describe the epithelial cells:

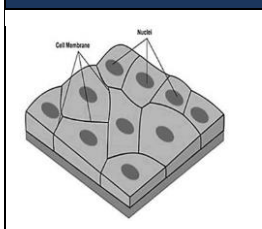
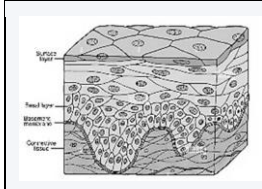
Ans: Tightly packed continuous sheets, minimal intercellular spaces, resting on an extracellular basement membrane.

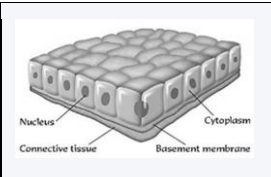
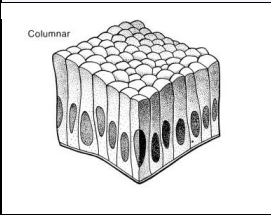
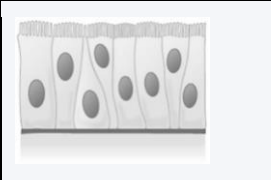
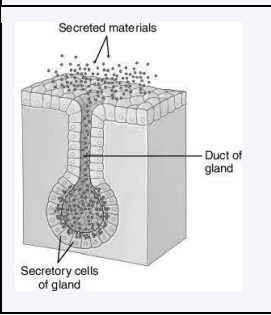
e. Is the structure of the epithelium found in all organs the same?

Ans: No, structural variations correlate directly with their specific functions.

f. Characterise different types:

Ans:

	NAME	CELLS	FUNCTION	LOCATION
	Simple Squamous	Extremely thin and flat	Selective permeability	Oesophagus, mouth lining, alveoli, capillaries
	Stratified Squamous	Arranged in many layers	Prevents wear and tear	Skin

	Cuboidal	Cube-shaped cells	Mechanical support	Kidney tubules, ducts of salivary glands
	Columnar	Tall, pillar-like cells	Absorption	Inner lining of intestine
	Ciliated Columnar	Tall cells with cilia	Pushes mucus / ovum forward	Respiratory tract/ fallopian tube
	Glandular	Folded inward forming glands	Secretes chemical fluids	Sweat and salivary glands

Kindly note : The tissues marked in red are not shown on the work book . Kindly divide the rows to add the diagram and information about these two tissues (columnar and glandular epithelium)

PAGE 45: CONNECTIVE TISSUE

1. What is a connective tissue?

Ans: Tissue that connects, supports, binds, or separates other tissues or organs in the body.

2. Describe the cellular structure:

Ans: Cells are loosely spaced and embedded in an intercellular matrix.

3. What kind of matrix may be found?

Ans: Jelly-like, fluid, dense, or rigid matrix.

4. What does the nature of the matrix depend on?

Ans: Differs in concordance with the specific function of the tissue.

5. Name and describe seven connective tissues:

Ans:

NAME	Tendon	Ligament	Areolar Tissue	Adipose Tissue	Bone	Cartilage	Blood
CELLS			Immune cells	adipocytes filled with fat globules	osteocytes	Chondrocytes	RBCs, WBCs, platelets
MATRIX	Fibrous, great strength, limited flexibility	Elastic, strong, minimal matrix	Loose matrix		Hardened with Calcium and Phosphorous	solid protein/sugar matrix	Fluid called plasma(salts / hormones / proteins dissolved in it)

LOCATION	Connects muscles to bones.	Connects bone to bone at joints.	Between skin and muscles . around nerves and blood vessels , Inside internal organs , In bone marrow	Beneath the skin , between internal organs		Nose, ear, trachea , Ends of bones at joints	
FUNCTION	Connects muscles to bones.	Connects bone to bone at joints.	Fills space, supports organs, repairs tissue.	Stores fat, acts as thermal insulator under skin.	Forms framework, protects main organs	Smoothens bone surfaces;	Transports gases, nutrients, hormones, waste.

PAGE 46: MUSCULAR TISSUE

1. What is muscular tissue?

Ans: Tissue made of elongated cells responsible for body movement.

2. What are muscle cells also known as?

Ans: Muscle fibres.

3. State the function of muscles:

Ans: To bring about movement in body parts and internal organs.

4. How do muscles cause movement?

Ans: By contraction and relaxation of contractile proteins.

5. What makes muscle fibres contract and relax?

Ans: Special proteins called contractile proteins.

6. Voluntary vs. Involuntary:

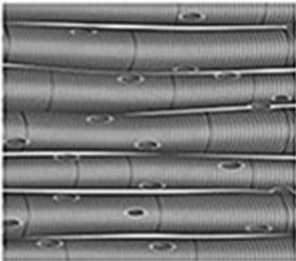
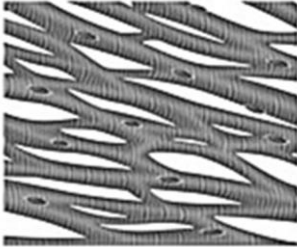
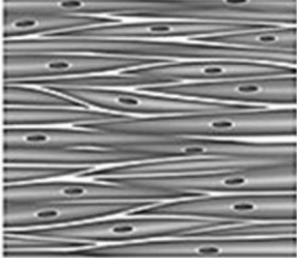
Ans: Voluntary muscles move under conscious control; involuntary muscles work automatically.

7. Striated vs. Unstriated:

Ans: Striated muscles show light/dark bands; unstriated muscles lack bands and are spindle-shaped.

8. Types of Muscular Tissues:

Ans:

FEATURE	STRIATED (SKELETAL)	CARDIAC	SMOOTH (UNSTRIATED)
			
Name	Striated / Skeletal	Cardiac	Smooth / Unstriated
Nuclei	Multinucleate	Uninucleate	Uninucleate
Branching	Unbranched	Branched	Unbranched

Striations	Present	Present	Absent
Cell Shape	Long, cylindrical	Cylindrical	Spindle-shaped (pointed)
Voluntary?	Voluntary	Involuntary	Involuntary
Location	Attached to bones, limbs	Heart wall	Alimentary canal, iris

PAGE 47: NERVOUS TISSUE

1. What are nerve cells also known as?

Ans: Neurons.

2. What do nerve cells respond to?

Ans: Stimuli.

3. What is a stimulus?

Ans: An agent or change in environment that evokes a functional response.

4. Once stimulated, what do nerve cells do?

Ans: Transmit the stimulus rapidly from one place to another in the body.

5. What is the signal transmitted by nerve cells called?

Ans: Nerve impulse.

6. State the function of nervous tissue:

Ans: Receives stimuli and conducts electrical impulses to coordinate body activities.

7. Name the parts showing presence of this tissue:

Ans: Brain, spinal cord, and nerves.

8. What is a nerve?

Ans: Many nerve fibres bound together by connective tissue.

9. Difference between a nerve and a nerve cell:

Ans: A nerve cell (neuron) is a single cell; a nerve is a bundle of many axon fibres bound by connective tissue.

10. Parts of a neuron:

Ans: Cell body (cyton), axon, dendrites, and nerve endings.

11. Short branches:

Ans: Dendrites.

12. Long branch:

Ans: Axon.

13. How long can a single nerve cell be?

Ans: Up to 1 metre long.

14. The nervous tissue is solely responsible for movement and locomotion in animals. True or false?

Justify your answer.

Ans: FALSE. Movement requires functional integration of BOTH nervous tissue (signal transmission) and muscular tissue (contraction).

15. Identify labelled parts of Neuron:

Ans: (a) Dendrite

(b) Cell Body

(c) Axon

(d) Nerve Ending