TISSUES

1. INTRODUCTION :

Study of tissue is called histology.

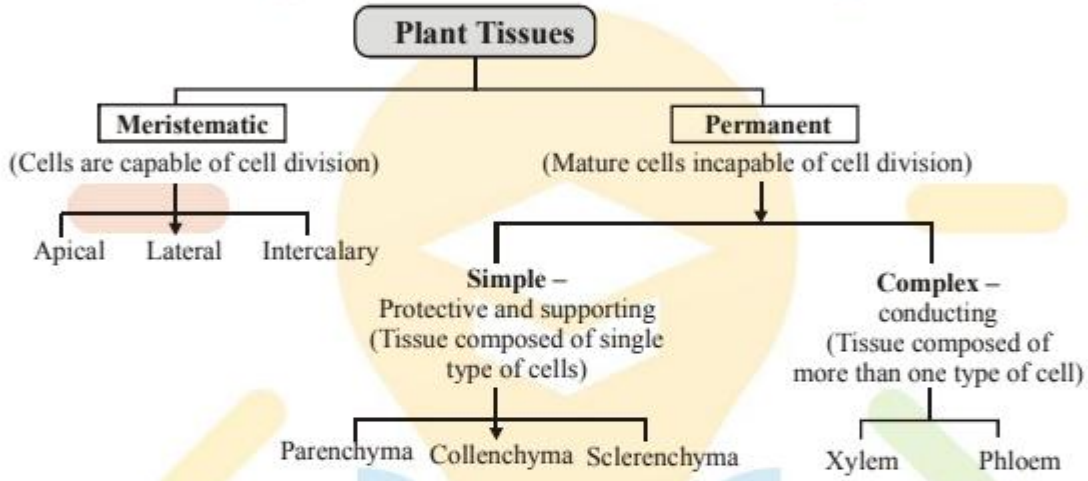
2. TISSUE ::

Definition :

A group of physically linked cells of the same type or of the mixed type, having a common origin same structure and performing an identical function.

3. PLANT TISSUES ::

The plant body is made up of different kinds of tissues. These are basically of two types : **Meristamatic** and **Permanent.**



3.1 Meristematic Tissues :

Definition :

A localized group of young cells, possessing the ability of divisions, is known as meristematic tissue and the region is known as meristem.

Occurence :

- They are present only at growing region like shoot tip, root tip and cambium.

Characteristic :

- The meristematic cells have thin cell walls.
- They are compactly arranged with no intercellular spaces.
- Meristematic cells are similar in structure.
- They may be spherical, oval, polygonal or rectangular in shape.
- They contain dense or abundant cytoplasm with a prominent nucleus.
- The vacuoles in these cells are either small and only a few or are even absent.
- The endoplasmic reticulum and mitochondria are not fully developed.
- These are the most metabolically active cells.

- They divide continuously helping in increasing the length and girth of the plant.
- They are capable of cell division and have totipotency so they are capable of giving rise to all the various all types the body of an organism.

Description of Apical, lateral & intercalary meristen :

(A) Apical Meristems :

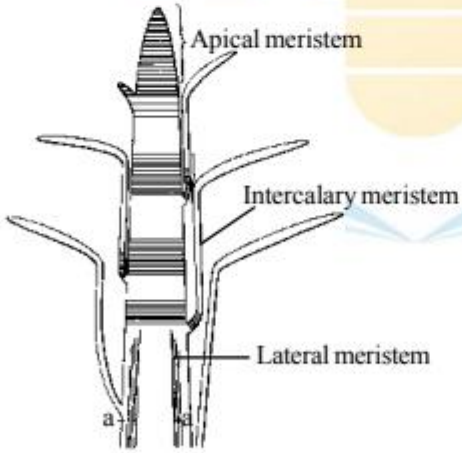
- The apical meristems are present at the tips of stem, root and branches. They arise from promeristem and form growing point at the apices of stems and roots. Apical meristem are responsible for growth in length. The initiation ofgrowth may takes place by the meristematic activity of a single apical cell (as in higher algal forms, bryophytes and pteridophytes) or a group of apical cells or apical initials (as in spermatophytes). The shoot meristems are terminal, while the root apical meristems are sub-terminal.

(B) Intercalary Meristems :

- They are the portions of the apical meristems, which got separated from them by the formation of permanent tissues in between. They are commonly found at the bases of leaves (e.g. Pinus), above the nodes (e.g. grasses) or just below the nodes (e.g. mint). Intercalary meristems help in elongation of the plant organs. They also allow fallen stems of cereals to become erect. Unlike other meristems, intercaary meristems are ultimately get fully used up in the formation of permanent tissues. However, the intercalary meristem present at the base of Pinus leaf (basal meristem) lives almost throughout the lfe of the leaf.

(C) Lateral Meristems :

- They are located along the lateral sides of stems and roots. Their activity results in radial growth and hence an increase in the girth or diameter of the organs. e.g. intra and inter-fascicular cambium in stems, vascular cambium in roots, acessary cambium, cork cambium and wound cambium. They are secondary meristems except intrafascicular cambium.



DIFFERENT TYPES OF MERISTEMS ON THE BASIS OF POSITION IN PLANT BODY

3.2 Permanent Tissues :

Definition :

These tissues are derived from the meristematic tissues but their cells have lost the ability of division and have attained their different forms.

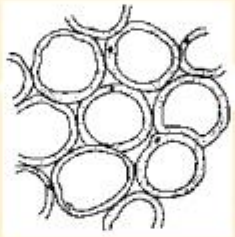
They are of **these types-Simple**, **Complex** and **Secretory** (Special).

(I) Simple Permanent Tissues :

- These tissues are made up of cells which are structurally and functionally similar. These are of **three types -**
- **Parenchyma**
- **Collenchyma**
- **Sclerenchyma**
- **Protective tissue (Special)**

(A) Parenchyma :

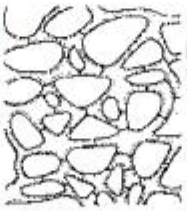
- The parenchyma tissue is composed of living cells which are variable in thin morphology and physiology but generally having thin wall and a polyhedral shape and concern with vegetative activities of the plant.
- They have inter cellular spaces between them.
- They act as storage for food and water.



Parenchyma

Types of Parenchyma :

- **Aerenchyma -**
- In hydrophytes, the intercellular space between cells become wide & filled with air.
- Such a parenchymatous tissue having large air spaces is called Aerenchyma.
- These help in gaseous exchange and provide buoyancy to plant.



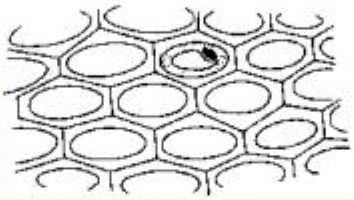
Aerenchyma

- **Chlorenchyma -**
- When parenchyma is richly supplied with chloroplasts, it is called chlorenchyma.
- They are found in leaf mesophyll, sepals, phyllaclades, phyllodes, cladodes etc. It is photosynthetic in function and posses chlorophyll.

Chlorenchyma

(B) Collenchyma :

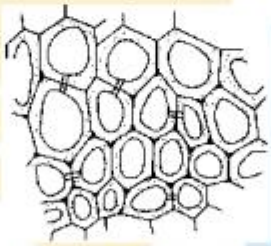
- It was discovered and coined by schleiden (1839).
- The cells are living with intercellular space in between the cells or junctional places filled with cellulose and pectin.
- Generally they are longer than parenchyma
- Usually they are known as living mechanical tissue owing to their supportive functions.
- It provides flexibility and strength to young plant organ.



Collenchyma

(C) Sclerenchyma :

- They were discovered and coined by **Mettenius** (1805).
- The cells are long, narrow, pointed at ends, thick walled and lignified. They are the dead cells.
- It impart hardness to plant parts and give mechanical strength.



Sclerenchyma

(D) Protective Tissue :

- It includes epidermis and cork.

Epidermis -

- It is usually present in the outermost layer of the plant body such as leaves, flowers, stem and roots.
- Epidermis is one cell thick and is covered with cuticle.
- Cuticle is a water proof layer of a waxy substance called cutin which is secreted by epidermal cells.
- The main function of epidermis is to protect the plant from desication and infection.

Cork -

- As roots and stem grow older with time (increase in girth), tissues at the periphery become cork cell.
- Cork cells are dead cells and they do not have any intercellular spaces.
- The walls of cork cells are heavily thickened by the deposition of an organic substance

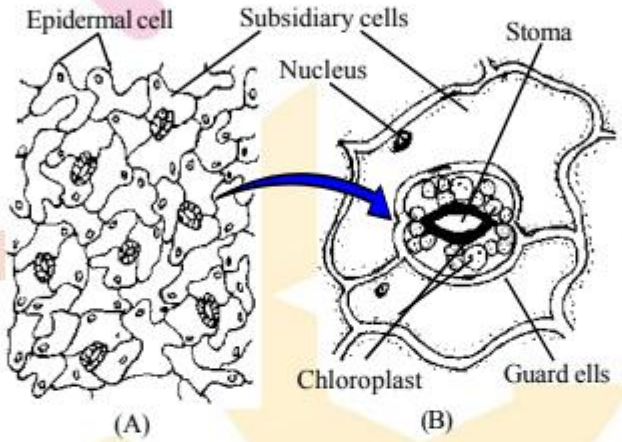
(a fatty substance), called suberin.

- Cork is protective in function. cork cells prevent desiccation (loss of water from plant body), infection and mechanical injury.
- Cork is produced by cork cambium commereially it is obtained from oak (quercus suber).
- Cork is used for making insulation boards, sports goods, bottle corks etc.

Stomata -

- Epidermis of a leaf is not continuous at some places due to the presence of small pores, called stomata.
- Each stomata is bounded by a pair of specialised epidermal cells called guard cells.
- The stomata allows gaseous exchange to occur during photosynthesis and respiration.

Structure of Stomata :



(A) Lower epidermis of a leaf to show stomata
(B) Structure of one stomata

Opening & Closing of Stomata :

- Stomata opens in presence of light, at high temperature & at low CO_2 concentration.
- When guard cells becomes **turgid** stomatal pore **opens**, while when they becomes **flaccid** stomatal pore **closes**.
- Due to **endo-osmosis** guard cells becomes **turgid** while due to **exo-osmosis** guard cells becomes **flaccid**.
- Due to increase in the amount of osmotically active sugars in guard cells, their osmotic pressure increases and water enters inside the cells increasing the turgidity of cells and hence stomata opens.
- When amount of sugar decreases, stomata closes. Several theories have been proposed by the scientist to explain the opening and closing of stomata.

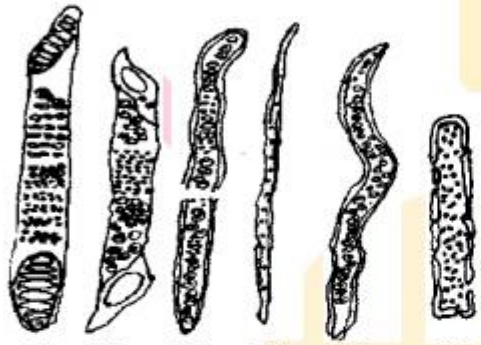
(II) Complex Permanent Tissues :

- A complex tissues can be defined as a collection of different types of cells that help in the performance of a common function.
- The important complex tissues in vascular plants are xylem and phloem. Both these together called as vascular tissues.
- Both these tissues are an assemblage of living and dead cells and may be primary or secondary, depending upon their mode of origin.

- Complex tissue transport water, mineral salts (nutrients) and food material to various parts of plant body.
- **Complex tissues are of following two types :**

(A) Xylem :

- Its main function is conduction of water and mineral salts from root to the top of plant.
- Primary xylem elements originate from procambuim of apical meristem.
- Secondary xylem elements originate from the vascular cambium of lateral meristem.
- The xylem elements are of 4 types : xylem tracheids, vessels, fibers and parenchyma.



(A - B) Vessel (C - D) Trachied (E) Fibre (F) Wood parenchyma

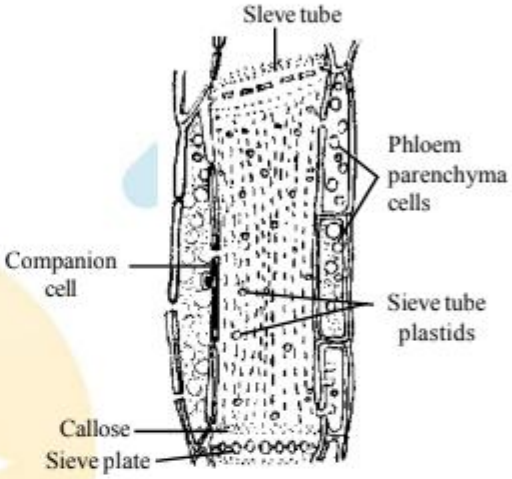


Fig. L. S. OF PHLOEM

- **Xylem Tracheids -**
- These are lignified and dead cells with bordered pits.
- They help in conduction of water in pteridophytes and gymnosperms and provide mechanical support plants.
- **Xylem Vessels -**
- The cells are long and tubular with lignified cell wall.
- The cross wall (end wall) at both the ends dissolves and form a pipe like channel.
- They help in ascent of sap in angiosperms.
- **Xylem Fibre -**
- Long and narrow sclerenchymatous fibers with tapering end. The wall is heavily lignified leaving a very narrow Lumen.
- It provides tensile strength and mechanical strength.
- **Xylem Parenchyma -**
- They are thin walled living cells present in both primary and secondary xylem.
- They store food materials.

(B) Phloem :

- The dead matter in them is known as bast.
- Its main function is conduction of food material from leaves to other plant parts.
- The phloem elements are of four type : Sieve tubes, Companion cells, Fibres and paranchyma.

❑ **Sieve Tubes -**

- These are living but lack nucleus at maturity.
- Cell wall is thin and made up of cellulose.
- The transverse walls of sieve tube form sieve plate.
- They help in conduction of food material.

❑ **Companion Cells -**

- The cells are living, thin walled, narrow and found attached to the lateral side of sieve element.
- They are absent in pteridophytes and gymnosperms.
- They support the sieve tube in transport of food.

❑ **Phloem Fibers (bast fibres) -**

- These are sclerenchymatous fibers having thick wall and narrow Luman.
- They provide mechanical support to the plant.

❑ **Phloem Parenchyma -**

- These are living and thin walled cells.
- They are absent all monocots and some dicots.
- The chief function of parenchyma is to store food material and other substances like mucilage, tanins and resins.

4. VASCULAR TISSUE SYSTEM ::

- It is the complex tissue system, consisting mainly of vascular bundles which are distributed in stele.
- The chief constituents of vascular bundle are xylem, phloem and combium.
- The xylem and phloem bundles help in mechanical support and also in conduction of water, mineral salts and manufactures food materials.
- The vascular bundles are arranged in a ring around the pith surrounded by endodermis.
- The central cylinder is called stele. First formed xylem is called protoxylem and metaxylem formed later.

Types of Vascular Bundles :

4.1 Conjoint :

- Xylem and phloem elements lie close together forming a vascular bundle, eg. stems.
- There are two types :

(A) Collateral :

- When xylem and phloem lie together on the same radius : xylem being internal and pholem being external.
- They are of two types open and closed vascular bundles.
- When cambuim is present between xylem and phloem it is open as in dicot and conifer gymnosperm stems and when there is no cambium, vascular bundle is said to be closed Ex. Monocot stems.

(B) Bicollateral :

- When two phloem patches are found external and internal to the centrally placed xylem in a collateral vascular bundle.

- Two cambium strips lie between phloem and xylem Ex. Cucurbita.

4.2 Concentric :

- Xylem and phloem are found in circles, one covering another. It is of 2 types :

(A) Amphivasal :

- Pholem is surrounded by xylem; also called leptocentric.
- Ex. Dracaena and yucca.

(B) Amphicribral :

- Xylem is surrounded by phloem ; also called hadrocentric; eg. polypodium.
- Ex. Lycopodium, Selaginella.

4.3 Radial :

- Xylem and phloem tissues occur separately on different radii, eg. roots.

4.4 Exarch, Mesarch and Endarch vascular Bundles :

- This classification is based on the relationship of metaxylem and protoxylem.

(A) Exarch :

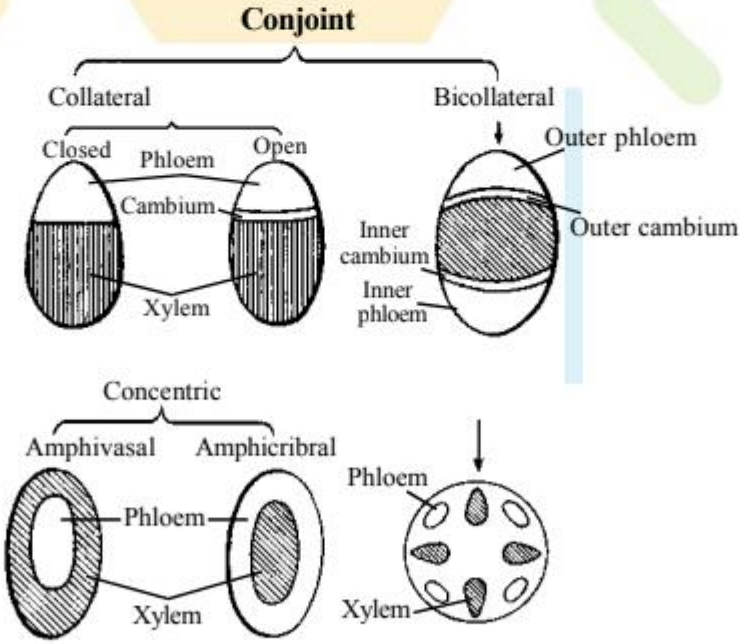
- Protoxylem is located out wardly and metaxylem towards the centre eg. roots.

(B) Mesarch :

- Protoxylem is surrounded on both sides by metaxylem eg. Leaf.

(C) Endarch :

- Protoxylem is located towards the centre and metaxylem towards the periphery eg. Stem.



DIFFERENT TYPES OF VASCULAR BUNDLES

ANIMAL TISSUES

5. ANIMAL TISSUE ::

Definition :

Tissue is assambly of cell with same origin structure and function.

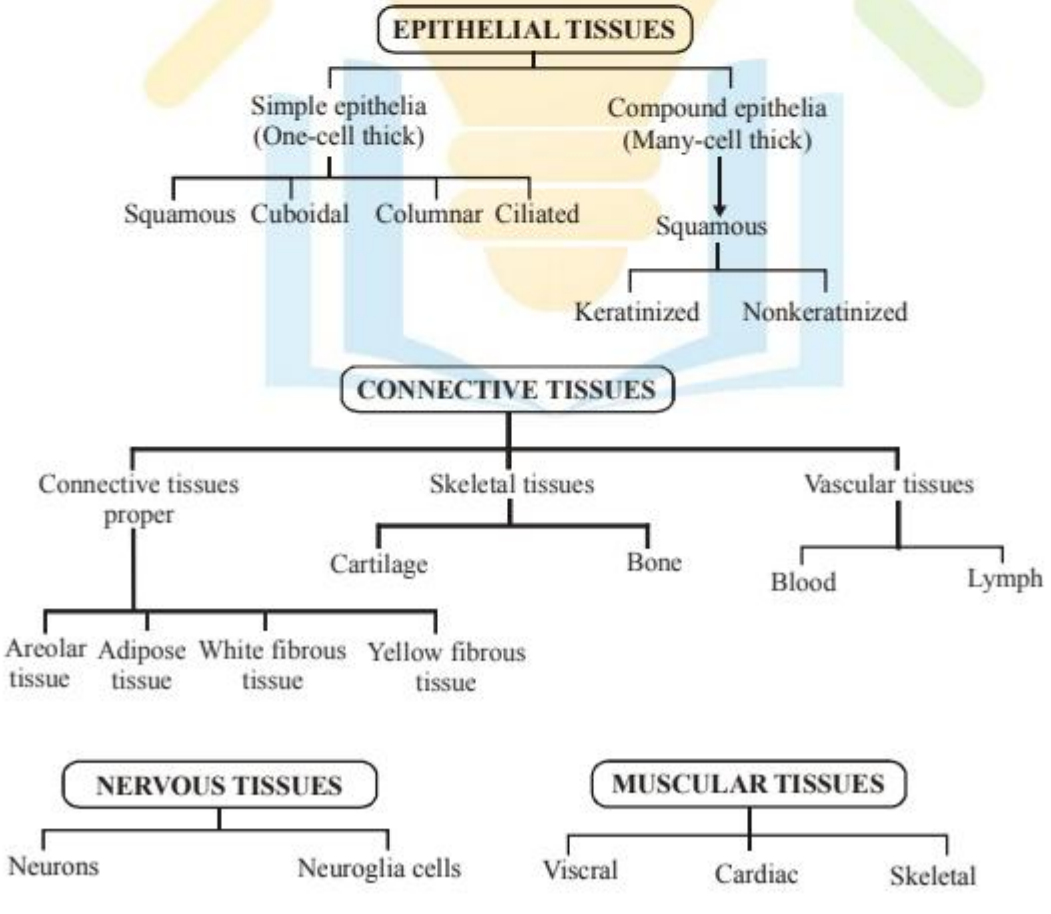
Historical Account :

- Bichat introduced the term **'tissue.'**
- Mayer introduced the term **'Histology'**
- Marcello Malpighi is the **'Founder of Histology'**.

Types of Animal Tissues :

Based on the location and function, the animal tissue are classified into **Four types** -

S.No.	Type	Origin	Function
1	Epithelial tissue	Ectoderm, Endoderm, Mesoderm	Protection, Secretion, absorption etc.
2	Connective tissue	Mesoderm	Support, binding, storage protection, circulation
3	Muscular tissue	Mesoderm	Contraction and movement
4	Nervous tissue	Ectoderm (from neural plate)	Conduction and Irritability



5.1 Epithelial Tissue :

Covering and Lining Epithelium :

Covering and lining epithelium are classified on the basis of arrangement of layers cell shapes and functions.

(A) Glands -

Definition :

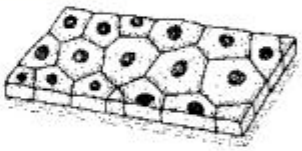
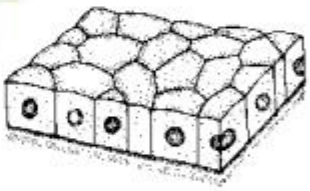
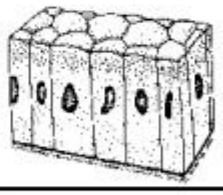
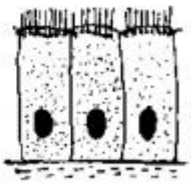
- A cell, a tissue or an organ which secretes certain chemical compounds required for particular functions is called a gland.
- Glands in a vertebrate body may originate from ectoderm, mesoderm and endoderm.
- Cell of the gland are secretory in nature.

❑ Types of Glands :

- On basis of presence of absente of duct.

(a) Exocrine gland -

SUMMARY CHART OF EPITHELIAL TISSUES

Structure	Location	Function	Diagram
Simple Squamous			
Single layer of flat scale-like cells, large centrally located nucleus.	Alveoli, Bowman's capsule, blood vessel (endothelium) heart, visceral and peritoneal lining of coelom (mesothelium)	Filtration, absorption and seceretion	
Simple cuboidal			
Single layer of cube-shaped cells, centrally located nucleus	Surface of ovary, inner surface of cornea and lens of eye, kidney tubules salivary and pancreatic ducts and thyroid vesicles.	Secretion and absorption.	
Simple Columnar (Nonciliated)			
Single layer of nonciliated rectangular cells, contains goblet cells nuclei at bases of cells.	Lines stomach, small and large intestine, digestive glands and gallbladder.	Secretion and absorption.	
Simple Columnar (Ciliated)			
Single layer of ciliated rectangular cells, contain goblet cells, nuclei at bases of cells.	Oviduct, fallopian tube, neurocoel of CNS, few portions of upper respiratory tract.	Movement of gametes, cerebrospinal fluid and mucus by ciliary action.	
Stratified Squamous	**Non keratinized**		
Several layers of cells, deep layers are cuboidal to columnar, surface layers flat and scale-like.	Mouth, oesophagus, part of epiglottis and vagina.	Protection and absorption	
	Keratinized		
	Dry surface of skin.	Impermeable to water	

- gland with duct eg. salivary, tear, gastric and intestinal glands.

(b) Endocrine gland -

- Gland without ducts, secrete hormones passing directly to blood eg. pituitary, thyroids, adrenals etc.
- On basis of mode of secretion.

(c) Holocrine :

- Complete cell is filled with secretory products. The cell dies and discharges the contents.
- Discharged cell is replaced by new cell, eg. sebaceous gland.

(d) Apocrine :

- Secretory products accumulate at the apical margin.
- It pinches off from rest of the cell.
- The cell repairs the lost part eg. mammary glands.

(e) Merocrine :

- No damage to the cell secretion diffuses out through the cell surface eg. pancreas, salivary gland.

5.2 Muscular Tissue :

- Locomotion and movements are due to muscular tissues contain highly contractile muscle cells.
- It is made up of muscle fibres.
- On the basis of their structures and functions, they can be divided as striated, unstriated and cardiac muscles.
- Muscle is a contractile tissue which brings about movements, regarded as motors of the body.
- Muscle cells are elongated slender like cells and called muscle fibres.
- The muscles are of three types : as compared below :

5.3 Connective Tissues :

- Tissues which bind together the various tissues in an organ to support different parts of the body and form packaging around different organs.

5.4 Connective Tissue Proper :

- It includes fatty tissues.

COMPARATIVE CHARACTERISTICS OF STRIATED UNSTRIATED AND CARDIAC MUSCLES

Characteristics	Striped	Unstriped	Cardiac
Location	Occur in the body wall, limbs, tongue, pharynx and beginning of oesophagus	Occur in the wall of hollow viscera, iris of the eye and dermis of the skin.	Occur in the walls of heart, pulmonary veins and superior venacava.
Other names	Also called striated, skeletal and voluntary muscle fibres	Also called non-striated, smooth, visceral and involuntary muscle fibres.	Also called heart muscle fibres.
Shape	Cylindrical	Spindle	Cylindrial
Action	Voluntary	Involuntary	Involuntary
Light & Dark bands	Present	Absent	Absent
Branching	Absent	Absent	Present

Areolar Tissues -

- It is the simplest type of connective tissue distributed widely in the body of animals. (Areolar tissue is found between skin and muscles).
- It consists of the matrix, fibres and some cells.

(a) Matrix -

- It is sticky mass of amorphous (transparent) semi-solid and jelly-like ground substances in which fibres and cells remained embedded.

(b) Fibres -

- They are of two types :
  - White collagen fibres
  - Yellow elastic fibres

(c) Cells

- **Fibroblast** - Form matrix and fibres.
- **Mast cell** - Secrete histamine heparin and serotonin.

Adipose Tissue -

- Fibroblast cells become enlarged, and small fat globules in these cells join together to form a large globule.
- It helps in maintaing the body temperature.
- It also acts as a shock absorber.
- It occurs beneath the skin and in the connective tissue surrounding the heart and kidney.

(a) White fibrous connective tissue -

- It is made up of a matrix containing bundles of collagen fibres which are almost in elastic and has a great tensile strengt.
- Ex. Tendons (Connecting muscle to bone).

(b) Yellow fibrous connective tissue -

- It is made up of a matrix containing only elastic fibres.
- Ex.- Ligaments (connecting two bones).

5.5 Skeletal Connective Tissue :

The skeletal or supporting tissue includes cartilage and bone which form the endoskeleton of vertebrate body. It is of **two types** :

(A) Cartilage (B) Bones

(A) Cartilage :

Cartilage is semirigid skeletal connective tissue.

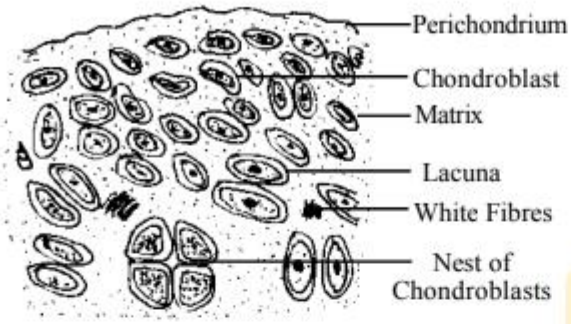
Type of Cartilage :

- **Hyaline Cartilage -**

- It is most primitive cartilage type.
- Its matrix is transparent, homogenous and pearly white or bluish green in colour.
- It gives glass like appearance.

Occurence :

Hyaline cartilage is found at End of limb bone Nasal septum.



T.S. OF HYALINE CARTILAGE

- **White Fibrous Cartilage -**

➤ Its matrix is rich in bundles of this thick white collagen fibres.

➤ It is toughest and less flexible.

Occurence :

White fibrous cartilage is found at Intervertebral disc which acts as shock absorber.

- **Yellow Elastic Cartilage -**

➤ Its matrix is packed with yellow or elastic fibres.

➤ It appears yellow and opaque.

Occurence :

It is found in pinna of ear and at the tip of nose.

- **Calcified Cartilage -**

➤ It calcified cartilage matrix is deposited with calcium salt.

➤ It is brittle, inelastic and very hard.

Occurence :

It is found in the suprascapula of pectoral girdle of frog, Vertebrae of shark.

(B) Bone :

The bone cells are of following there kinds -

(a) Bone forming cells (osteoblast)

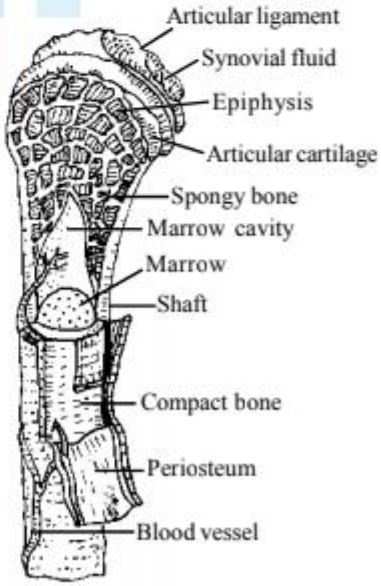
(b) Bone maintaining cells (osteocyte)

(c) Bone dissolving cells (osteoclast)

Type of bone :

(a) Dermal bones or membranous bones (investing bones) :

These bones are formed by ossification of the dermis of the bone, eg. Phalanges and Clavicle.



PARTS OF A LONG BONE

(b) Cartilagenous bones or replacing bones :

These bones are formed by ossification of the cartilage, eg. girdle bones, limb bones.

(c) Sesamoid bone :

These bones are formed by ossification of the tendon, eg. patella and fabella located on the knee cap.

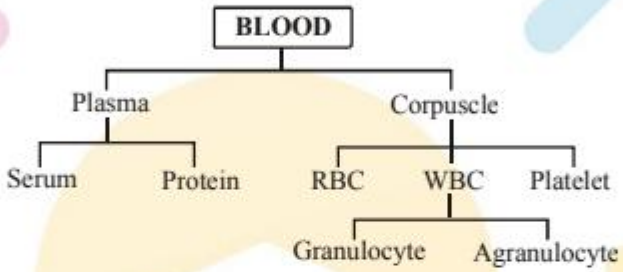
5.6 Vascular Tissue :

Fluid Connective Tissue :

Fluid connective tissue links the different parts of body and maintains a continuity in the body. It includes blood and lymph.

(A) Blood -

- It is a fluid connective tissue.



Functions of blood -

- Blood transports nutrients, hormones and vitamins to the tissues and transports excretory products from the tissues to the liver and kidney.
- The red blood corpuscles (RBC's) carry oxygen to the tissues for the oxidation of food stuff.
- The white blood cells (WBC's) fight disease either by engulfing and destroying foreign bo dies or by producing antitoxins and antibodies that neutralise and harmful effects of germs.
- Granulocytes include neutorphils, eosinophils and basophils.
- Agranulocytes include lymphocytes and monocytes.
- Blood platelets disintegrate at the site of injury and help in the clotting of blood.

(B) Lymph -

Nature :

- Lymph is a colourless fluid that has filtered out of the blood capillaries. Red blood corpuscles and some blood proteins are absent in it. In the lymph, white blood cells are found in abundance.

Functions :

- Lymph transports the nutrients (oxygen, glucose) that may have filtered out of the blood capillaries back into the heart to be recirculated in the body.
- It brings CO_2 and nitrogenous wastes from tissue fluid to blood.

5.7 Nervous Tissue :

Characteristics -

- Brain, Spinal cord and nerves are all composed of nervous tissue.
- It is made of highly specialised cells called nerve cells or neurons.
- It has the ability to receive stimuli from within or outside the body.

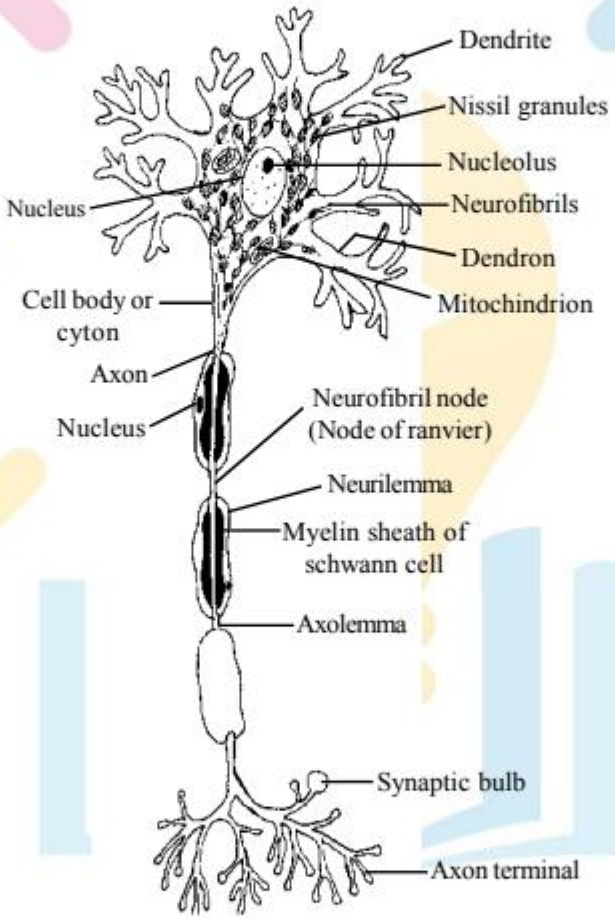
- It conducts impulse to different parts of the body which travels from one neuron to another neuron.
- Nerve cell do not divide.

Each neuron has following three parts -

- The cyton or cell body which contains a central nucleus and cytoplasm with characteristic deeply stained particles, called Nissl's granules (i.e. RER).
- The dendrons which are short processes arising from the cyton and further branching into dendrites.
- Single long process is called axon.

5.7.1 Neuroglia or Glial Cells :

- These are non nervous cells which lie between the neurons of CNS, ganglia and retina of the eye.
- These are many times (10 times approx) more numerous than neurons.



NEURON OR NERVE FIBRE

EXERCISE - 1

A. VERY SHORT ANSWER TYPES QUESTIONS

Q.1 Define a tissue ?

Q.2 What is Histology ?

Q.3 Which tissue is involved in the transportation of water in plants ?

Q.4 Which tissue is responsible for the formation of Aerenchyma ?

Q.5 Write fuction of phloem ?

Q.6 Give main function of sclerenchyma ?

Q.7 Name four types of xylem elements ?

Q.8 Name fluid connective tissue ?

Q.9 What is the nature of mammary gland on the basis of mode of secretion ?

Q.10 Mention two function of nervous tissue.

B. SHORT ANSWER TYPES QUESTIONS

(About 30–40 words)

Q.11 What is tendon. State its function ?

Q.12 Give two difference between blood and lymph ?

Q.13 What is parenchyma ? How does it differ from sclerenchyma ?

Q.14 Name the complex tissue in plants. State their function ?

Q.15 What is exocrine gland ?

C. LONG ANSWER TYPES QUESTIONS

(More than 60–70 words)

Q.16 Differentiate between striped, unstriped and cardiac muscle.

Q.17 Name the componants and state the function of xylem tissue.

Q.18 Write the functions of simple permanent tissue in plants ?

Q.19 How many types of elements are present in the phloem ? Name tham.

Q.20 What is vascular bundle ? Give the structure of various types of vascular bundles with well labelled diagrams and examples ?

D. FILL IN THE BLANKS

Q.21 Water and minerals are conducted by ..... in plants.

Q.22 In higher plants food is conducted by.....

Q.23 Blood is a.....tissue.

Q.24 A tendon attaches a ..... to a ..... .

Q.25 Cardiac muscle is found in ..... .

E. TRUE OR FALSE

Q.26 Mast cell secrete Heparin.

Q.27 Osteoblast form bone.

Q.28 Alveoli is lined with columnar epithelium.

Q.29 White blood cells carry oxygen to the tissues for the oxidation of food stuff.

Q.30 Pinna is formed of cartilage.

Q.31 Unstriped muscles occur in the wall of hollow viscera, iris of eye and dermis of the skin.

Q.32 Yellow fibres provide elasticity to the tissues.

Q.33 Parenchyma is a dead tissue.

Q.34 Lymphocyte and monocyte are granulocytes.

F. SINGLE CHOICE QUESTIONS

Q.35 White fibres of connective tissue are made up

of –

(a) Elastin (b) Reticular fibre

(c) Collagen (d) Myosin

Q.36 Fluid part of blood after removal of corpuscles is –

(a) Plasma (b) Lymph

(c) Serum (d) Vaccine

Q.37 Which type of tissue forms glands ?

(a) Epithelial (b) Connective

(c) Nervous (d) Muscle

Q.38 Exocrine gland is –

(a) Liver (b) Pancreas

(c) Thymus (d) Adrenal

Q.39 Which of the following tissues is composed of mainly dead cells ?

(a) Phloem (b) Epidermis

(c) Xylem (d) Endodermis

G. FILL THE BOX WITH APPROPRIATE WORD

Q.40 Cells of plant tissue capable of division.

- ☐

Q.41 Plant tissue concerned with the transportation of food.

- ☐

Q.42 Plant tissue concerned with conduction of water and minerals. -

☐

Q.43 Blood cells which deal with immune reaction.

- ☐

Q.44 Blood RBC - ☐

H. MATCH THE COLUMNS

Q.45 Each of the tissues listed in the left hand column is related to one of the words in the right hand column.

Column - I	Column - II
1. Squamous epitheium	a. Tip of nose
2. Elastic cartilage	b. Blood capillary
3. Columnar epithelum	c. Intestine
4. Granulocyte	d. Coelomic lining
5. Agranulocyte	e. Eosinophill
	f. Monocyte
	g. Platelet
	h. Tip of bones

I. ASSERTION-REASON TYPE QUESTIONS

The following questions consist of two statement each : assertion (A) and reason (R). To answer these questions, mark the correct alternative as described below :

(a) If both **A** and **R** are true and **R** is the correct explanation of **A**.
(b) If both **A** and **R** are true but **R** is not correct explanation of **A**.
(c) If **A** is false but **R** is true.
(d) If both **A** and **R** are false.

Q.46 **A :** In dicot stem, the vascular bundles are open.
R : Cambium is present between xylem and phloem of vascular bundle in dicot stem.

Q.47 **A :** Exocrine gland are without ducts secrete hormones passing directly to blood.
R : Endocrine gland are with duct.

EXERCISE - 2

A. SINGLE CHOICE QUESTIONS

Q.1 Primary tissues of a plant –
(a) Are present only in embryo
(b) Are present only in the seedling
(c) Are responsible for adding to the length of roots and shoots
(d) Are responsible for adding to the diameter of existing roots and shoots

Q.2 Which of the following tissues is composed of dead cells –
(a) Ground tissue (b) Xylem
(c) Phloem (d) Epidermis

Q.3 Collenchyma is –
(a) Commonly present in roots
(b) Always present in roots
(c) Rarely present in roots
(d) Never present in roots

Q.4 White fibres connects –
(a) Cartilage with muscle
(b) Bone with muscle
(c) Cartilage with muscle
(d) Bone with bone

Q.5 Neuroglia in nervous system is a type of –
(a) Vascular tissue (b) Actin
(c) Muscular tissue (d) Connective tissue

B. MULTIPLE CHOICE QUESTIONS

Q.6 Nerve is –
(a) A group of fibres bound by a membrane
(b) A group of fibres bound together by loose connective tissue
(c) A group of neurons only
(d) None of these

Q.7 Lymph can be defined as –
(a) Blood minus plasma
(b) Blood minus RBCs
(c) Blood minus WBCs
(d) Blood without RBCs

Q.8 Aerenchyma is found is –

(a) Sciophytes (b) Hydrilla

(c) Lithophytes (d) Hydrophytes

Q.9 Which is not a component of xylem ?

(a) Tracheid

(b) Companion cell

(c) Sieve tube

(d) Wood parenchyma

Q.10 Aerenchyma provides –

(a) Flexibility of plants

(b) Buoyancy to plants

(c) Mechanical strength to plants

(d) Help floating

C. PASSAGE BASED QUESTIONS

PASSAGE (Q.11 TO Q. 15)

This tissue is of mesodermal origin whose main function is allow movement & locomotion. It is of three types. Type I is present in pumping organ of body. Type II is present in internal organs and type III remain attached to skeleton.

Q.11 Identify the tissue discussed above ?

Q.12 Name type-I tissue & give its two characters ?

Q.13 Name type II and give its two characters ?

Q.14 Name type III and its two characters ?

Q.15 Name another tissue of mesodermal origin.

ANSWER

EXERCISE -1

A. VERY SHORT ANSWER TYPES QUESTIONS

1. A group of cells having a common origin and performing similar functions are called tissue.
2. Study of tissue is Histrology.
3. Xylem.
4. Parenchyma
5. Transport of food material.
6. Mechanical and protective in function.
7. Tracheids, vessels, xylem parenchyma, xylem fibres.
8. Blood and Lymph.
9. Apocrine
10. Excitability and conductivity.

D. FILL IN THE BLANKS

21. Xylem **22.** Phloem
23. Connective **24.** Muscle and Bone
25. Heart

E. TRUE OR FALSE

26. True **27.** True **28.** False
29. False **30.** True **31.** True
32. True **33.** False **34.** False

F. SINGLE CHOICE QUESTIONS

35. a **36.** a **36.** a **37.** a
38. a **39.** c

G. FILL THE BOX WITH APPROPRIATE WORD

40. Meristematic tissue **41.** Phloem
42. Xylem **43.** Lymph
44. Lymph

H. MATCH THE COLUMNS

45. 1-b, d ; 2-a ; 3-c ; 4-f ; 5-e

I. ASSERTION-REASON TYPE QUESTIONS

46. a **47.** d

EXERCISE -2

A. SINGLE CHOICE QUESTIONS

1. c **2.** b **3.** c
4. b **5.** d

B. MULTIPLE CHOICE QUESTIONS

6. b **7.** b, d **8.** b, d

9. b, c **10.** b, d

C. PASSAGE BASED QUESTIONS

PASSAGE (Q.11 TO Q. 15)

11. Muscular
12. Cardiac Muscle
13. Visceral - It is spindle shaped and involuntary.
14. Skeletal - it is voluntary and striated.
15. Connective.