

Chapter – 6 Tissues
Multiple Choice Questions

Q1. Which of the following tissues has dead cells?

- (a) Parenchyma**
- (b) Sclerenchyma**
- (c) Collenchyma**
- (d) Epithelial tissue**

Answer: Option b) Sclerenchyma

Sclerenchyma is permanent tissue with dead cells which are long and narrow, closely packed without intercellular spaces. Sclerenchyma tissue is present in stems in the vascular bundles, roots, veins of leaves, hard covering of seeds and nuts.

Q2. Find out incorrect sentence.

- (a) Parenchymatous tissues have intercellular spaces.**
- (b) Collenchymatous tissues are irregularly thickened at corners.**
- c) Apical and intercalary meristems are permanent tissues.**
- (d) Meristematic tissue, in its early stage, lacks vacuoles.**

Answer: Option c)

Apical and intercalary meristems are permanent tissues.

Apical and intercalary meristems are not permanent tissues but are meristematic tissues.

Q3. Girth of stem increases due to

- (a) apical meristem**
- (b) lateral meristem**
- (c) intercalary meristem**
- (d) vertical meristem.**

Answer: Option b) lateral meristem

Lateral meristem is on the sides of long axis of the root, stem and its branches which helps in increase of girth of the stem, i.e., secondary growth.

Q4. Which cell does not have perforated cell wall?

- (a) Tracheid's**

(b) Companion cells

(c) Sieve tubes

(d) Vessels

Answer: Option b) Companion cells

Companion cells are narrow, elongated, thin-walled, living cells which are on the sides of the sieve tubes through plasmodesmata and do not have perforated cell walls.

Q5. Intestine absorbs the digested food materials. What type of epithelial cells are responsible for that?

(a) Stratified squamous epithelium

(b) Columnar epithelium

(c) Spindle fibres

(d) Cuboidal epithelium

Answer: Option b) Columnar epithelium

Columnar epithelium consists of pillar-like cells with nuclei elongated. Its a lining of the stomach, intestine and gall bladder which helps in the absorption of water and digested food.

Q6. 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) Break of skeletal muscle

(c) Ligament break

(d) Areolar tissue break

Answer: Option c) Ligament break

It is ligament break as ligaments help to bind the bones which is an elastic connective tissue with great strength.

Q7. While doing work and running, you move your organs like hands, legs etc. Which among the following is correct?

(a) Smooth muscles contract and pull the ligament to move the bones.

(b) Smooth muscles contract and pull the tendons to move the bones.

(c) Skeletal muscles contract and pull the ligament to move the bones.

Answer: Option d)

Skeletal muscles contract and pull the tendon to move the bones.

Skeletal muscles or striated muscles are present in the body wall and the limbs, i.e biceps and triceps of arms, legs whose contraction and relaxation are in the control of organism, called voluntary muscles attached to the bones by tendons. When they contract, the tendon moves the bone for the movement of limbs.

Q8. Which muscles act involuntarily?

- (i) Striated muscles
- (ii) Smooth muscles
- (iii) Cardiac muscles
- (iv) Skeletal muscles

- (a) (i) and (ii)
- (b) (ii) and (iii)
- (c) (iii) and (iv)
- (d) (i) and (iv)

Answer: Option b)

The muscles which are not under control, are involuntary muscle, for example Smooth or unstrained muscles and cardiac muscles

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Q9. Meristematic tissues in plants are

- (a) localized and permanent
- (b) not limited to certain regions
- (c) localized and dividing cells
- (d) growing in volume

Answer: Option c) localized and dividing cells

Meristematic tissues are group of living cells which are present in the plant body and divide to form new cells.

Q10. Which is not a function of epidermis?

- (a) Protection from adverse condition
- (b) Gaseous exchange
- (c) Conduction of water
- (d) Transpiration

Answer: Option c) Conduction of water

Epidermis is the outermost layer of cells in a plant which protect the plant from injury, adverse conditions, to reduce water loss, in gaseous exchange and transpiration with the help of stomata. Xylem helps in Conduction of water.

Q11. Select the incorrect sentence.

- (a) Blood has matrix containing proteins, salts and hormones.**
- (b) Two bones are connected with ligament.**
- (c) Tendons are non-fibrous tissue and fragile.**
- (d) Cartilage is a form of connective tissue.**

Answer: Option c)

Tendons are non-fibrous tissue and fragile.

Tendons are white fibrous connective tissues to connect skeletal muscles with bones.

Q12. Cartilage is not found in

- (a) nose**
- (b) ear**
- (c) kidney**
- (d) larynx.**

Answer: Option c) Kidney

Cartilage is a soft skeletal tissue or connective tissue with spaced cells. The solid matrix consists of proteins and sugar. Cartilage smooths bone surfaces at joints and is present in the nose, ear, trachea and larynx.

Q13. Fats are stored in human body as

- (a) cuboidal epithelium**
- (b) adipose tissue**
- (c) bones**
- (d) cartilage.**

Answer: Option b) Adipose tissue

Adipose is a connective tissue which is a fat storing tissue in which the matrix has large, spherical or oval fat cells called adipocytes. Each fat cell consists of a fat globule. The adipose tissue is present under the skin, covering of the heart, the blood vessels, kidneys and yellow bone marrow which stores fat and prevent the body from heat loss.

Q14. Bone matrix is rich in

- (a) fluoride and calcium**
- (b) calcium and phosphorus**
- (c) calcium and potassium**
- (d) phosphorus and potassium.**

Answer: Option b)

Calcium and Phosphorus

Bone is strong and non- flexible connective tissue which forms the framework to support the body. The inorganic salts in the matrix are phosphates and carbonates of calcium and magnesium e.g., calcium phosphate, calcium carbonate, magnesium phosphate etc.

Q15. Contractile proteins are found in

- (a) bones**
- (b) blood**
- (c) muscles**
- (d) cartilage.**

Answer: Option c) Muscles

Muscular tissue consists of muscle fibres which help movement and contain proteins called contractile proteins, which contract and relax.

Q16. Voluntary muscles are found in

- (a) alimentary canal**
- (b) limbs**
- (c) iris of the eye**
- (d) bronchi of lungs.**

Answer: Option b) Limbs

Skeletal muscles or striated muscles are in the body wall and the limbs, i.e., biceps and triceps of arms, legs. The contraction and relaxation of these muscles are in the control of organism, called voluntary muscles which are attached to the bones by tendons. When they contract, the tendon is pulled and move the bone which help in the movement of limbs.

Q17. Nervous tissue is not found in

- (a) brain**
- (b) spinal cord**

(c) tendons

(d) nerves.

Answer: Option c) Tendons

The nervous tissue, consist of nerve cells, called neurons present in the brain, spinal cord and nerve which help for conduction of nerve impulses. Tendon is a connective tissue.

Q18. Nerve cell does not contain

(a) axon

(b) nerve endings

(c) tendons

(d) dendrites.

Answer: Option c) Tendons

A nerve cell or neuron have three parts:

(i) Cyton or cell body consist of nucleus and cytoplasm with Nissl's granules.

(ii) Dendrons are in cyton and branches into dendrites.

(iii) Axon is a single, long and cylindrical which forms fine branches like axon endings.

Q19. Which of the following helps in repair of tissue and fills up the space inside the organ?

(a) Tendon

(b) Adipose tissue

(c) Areolar

(d) Cartilage

Answer: Option c) Areolar

Areolar is connective tissue in animal's body between skin and muscles, around blood vessels and nerves, and in the bone marrow which fills the space in the organs, supports internal organs and repair tissues.

Q20. The muscular tissue which functions through-out the life continuously without fatigue is

(a) skeletal muscle

(b) cardiac muscle

(c) smooth muscle

(d) voluntary muscle.

Answer: Option b) Cardiac muscle

Cardiac muscles are in the wall of the heart and large veins like pulmonary veins and vena cava. Cardiac muscle fibres have blood vessels so never get fatigued.

Q21. Which of the following cells is found in the cartilaginous tissue of the body?

- (a) Mast cells
- (b) Basophils
- (c) Osteocytes
- (d) Chondrocytes

Answer: Option d) Chondrocytes

Chondrocytes are the cells in the cartilaginous tissue which maintain cartilaginous matrix.

Q22. The dead element present in the phloem is

- (a) companion cells
- (b) phloem fibres
- (c) phloem parenchyma
- (d) sieve tubes.

Answer: Option b) Phloem fibres

Phloem is a complex permanent tissue to conduct organic food from leaves to different parts of plants. It is of four types: sieve tubes, companion cells, phloem parenchyma and phloem fibres where phloem fibres are dead.

Q23. Which of the following does not lose their nucleus at maturity?

- (a) Companion cells
- (b) Red blood cells
- (c) Vessel
- (d) Sieve tube cells

Answer: Option a) Companion cells

Companion cells are elongated, thin walled, living cells with cytoplasm and a nucleus. Red blood cells of mammals, xylem and phloem lose their nuclei at maturity.

Q24. In desert plants, rate of water loss gets reduced due to the presence of

- (a) cuticle
- (b) stomata

(c) lignin

(d) suberin.

Answer: Option a) Cuticle

Cuticle is waxy layer of aerial parts of a plant with cutin, secreted by the epidermis and prevent water loss.

Q25. A long tree has several branches. The tissue that helps in the sideways conduction of water in the branches is

(a) collenchyma

(b) xylem parenchyma

(c) parenchyma

(d) xylem vessels.

Answer: Option d) xylem vessels

Xylem vessels are long tube-like structure formed by a row of cells. The transverse walls between these cells dissolve to form continuous water channels.

Q26. If the tip of sugarcane plant is removed from the field, even then it keeps on growing in length. It is due to the presence of

(a) cambium

(b) apical meristem

(c) lateral meristem

(d) intercalary meristem.

Answer: Option d) Intercalary meristem.

Intercalary meristem is present at internodes, nodes and leaves which helps in growth and elongation of the plant. So, if the tip of the sugarcane plant is removed i.e. apical meristem, it grows in length due to intercalary meristem.

Q27. A nail is inserted in the trunk of a tree at a height of 1 metre from the ground level. After 3 years the nail will

(a) move downwards

(b) move upwards

(c) remain at the same position

(d) move sideways.

Answer: Option c) remain at the same position

The nail is at same position and after 3 years sunk into the tree due to secondary growth of the tree. The increase in height of the plant is due to primary growth of apical meristem. So the nail is at the same position as it is at a height of 1 meter from the ground level.

Q28. Parenchyma cells are

- (a) relatively unspecified and thin walled**
- (b) thick walled and specialized**
- (c) lignified**
- (c) none of these.**

Answer: Option a) relatively unspecified and thin walled

Parenchyma is simple permanent tissue cells of thin walls and contain intercellular spaces to store food, nutrients and water.

Q29. Flexibility in plants is due to

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

Answer: Option a) Collenchyma

Collenchyma is a permanent tissue in epidermis of petiole, leaves and stems of herbaceous dicots e.g., sunflower, tomato which provides flexibility and cells are elongated, irregularly thickened with less intercellular spaces.

Q30. Cork cells are made impervious to water and gases by the presence of

- (a) cellulose**
- (b) lipids**
- (c) suberin**
- (d) lignin.**

Answer: Option c) Suberin

Cork is outermost layer of old stem consisting of dead cells with no intercellular spaces. It has a deposit of suberin which is impermeable to water and gases.

Q31. Survival of plants in terrestrial environment has been made possible by the presence of

- (a) intercalary meristem**

(b) conducting tissue

(c) apical meristem

(d) parenchymatous tissue.

Answer: Option b) Conducting tissue

Xylem and phloem are the complex permanent tissues called vascular bundle which are present in higher plants and help to survive without water in terrestrial environment.

Q32. Choose the wrong statement.

(a) The nature of matrix differs according to the function of the tissue.

(b) Fats are stored below the skin and in between the internal organs.

(c) Epithelial tissues have intercellular spaces between them.

(d) Cells of striated muscles are multinucleate and unbranched.

Answer: Option c)

Epithelial tissues have intercellular spaces between them.

Epithelial tissues is a protective tissues in animal which are tightly packed into continuous sheet with small amount of cementing material and no intercellular space.

Q33. The water conducting tissue generally present in gymnosperm is

(a) vessels

(b) sieve tube

(c) tracheid's

(d) xylem fibres.

Answer: Option (a) vessels

Xylem tissue of gymnosperms lacks vessels and consist of tracheid's, fibres and parenchyma. Xylem tracheid is water conducting tissue of gymnosperms and sieve tubes transport food material.

Short Answer Type Questions

Q34. Animals of colder regions and fishes of cold water have thicker layer of subcutaneous fat. Describe why?

Answer:

A thick layer of subcutaneous fat is an insulating coat to prevent heat loss from the body. Fat is a reserve food. So, animals and fish of colder regions have a thick layer of subcutaneous fat.

Q35. Match the column (A) with the column (B)

S/No.	Column A	S/No.	Column B
a)	Fluid connective tissue	i)	Subcutaneous layer
b)	Filling of space inside the organs	ii)	Cartilage
c)	Striated muscle	iii)	Skeletal muscle
d)	Adipose tissue	iv)	Areolar tissue
e)	Surface of joints	v)	Blood
f)	Stratified squamous epithelium	vi)	Skin

Answer:

S/No.	Column A	Column B
a)	Fluid connective tissue	Subcutaneous layer
b)	Filling of space inside the organs	Cartilage
c)	Striated muscle	Skeletal muscle
d)	Adipose tissue	Areolar tissue
e)	Surface of joints	Blood
f)	Stratified squamous epithelium	Skin

Blood is a fluid connective tissue that transports nutrients, vitamins to tissues and excretory products from tissues to the liver and kidney.

Areolar tissue is connective tissue. It acts as a supporting and packaging tissue and joins muscles to skin and space inside the organs.

Skeletal muscles are striated muscles.

Adipose tissues are fat reservoirs present below the skin called as subcutaneous layer.

Surface of joints is covered by cartilage which provides support and flexibility to the body parts and smoothens the surface at joints.

Stratified squamous epithelium has keratin which lines the skin and covers the external surface.

Q36. Match the column I with the column II

Column I	Column II
A. Parenchyma	Thin walled, packing cells
B. Photosynthesis	Carbon fixation
C. Aerenchyma	Localised thickenings
D. Collenchyma tissue	Buoyancy
E. Permanent tissue	Sclerenchyma

Answer:

Column I	Column II
A. Parenchyma	Thin walled, packing cells
B. Photosynthesis	Carbon fixation
C. Aerenchyma	Localised thickenings
D. Collenchyma tissue	Buoyancy
E. Permanent tissue	Sclerenchyma

Parenchyma are thin-walled cells in soft parts of the plant. In hydrophytes like water hyacinth, Hydrilla etc., large air cavities are present in parenchyma to give buoyancy to plant.

Q37. If a potted plant is covered with a glass jar, water vapours appear on the wall of glass jar. Explain why?

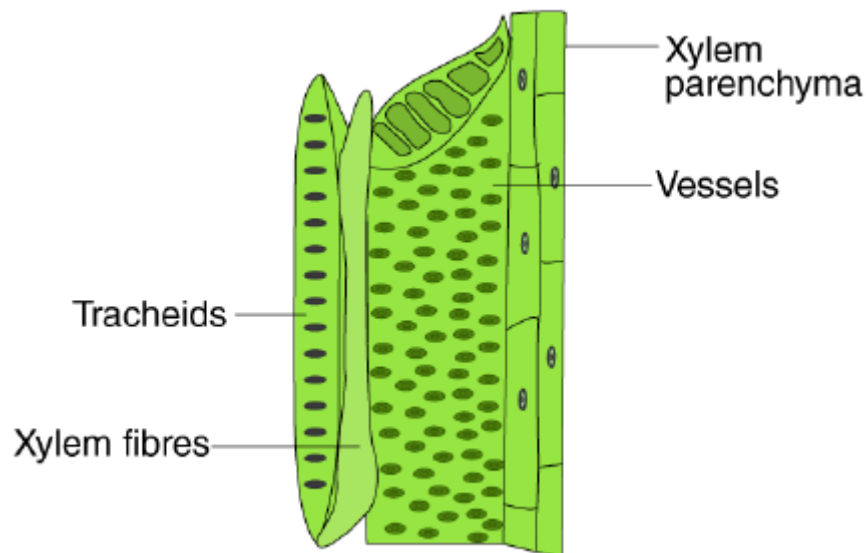
Answer:

Transpiration occurs from the stomata on leaves. Potted plant covered with a glass jar; water vapours condense by transpiration as water droplets on inner walls of glass jar.

Q38. Name the different components of xylem and draw a living component.

Answer:

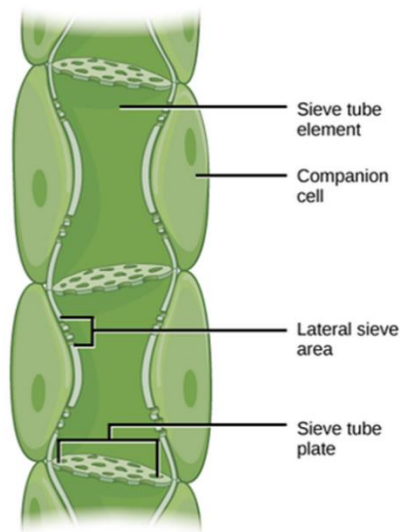
Different components of xylem are tracheid's, vessels, xylem parenchyma and fibres. Xylem parenchyma is living component of xylem.



Q39. Draw and identify different elements of phloem.

Answer:

Different elements of phloem are sieve tubes, companion cells, phloem fibres and phloem parenchyma.



Q40. Write true (T) or false (F)

- a) **Epithelial tissue is protective tissue in animal body.**
- b) **The lining of blood vessels, lung alveoli and kidney tubules are all made up of epithelial tissue.**
- c) **Epithelial cells have a lot of intercellular spaces.**
- d) **Epithelial layer is permeable layer**
- e) **Epithelial layer does not allow regulation of materials between body and external environment.**

Answer:

- a) True
- b) True
- c) False - Epithelial cells have no intercellular spaces.
- d) True
- e) False - Due to its permeability, epithelial layer plays a vital role in exchange of materials between body and external environment.

Q41. Differentiate between voluntary and involuntary muscles. Give one example of each type.

Answer:

Voluntary muscles are under the control of our will e.g., skeletal muscles are in our limbs like arms and legs. Muscles in stomach, intestine etc. are smooth muscles and muscles in heart are cardiac muscles which are not in our control.

Q42. Differentiate the following activities on the basis of voluntary (V) or involuntary (IV) muscles.

(a) Jumping of frog

(b) Pumping of the heart

(c) Writing with hand

(d) Movement of chocolate in your intestine

Answer:

- a) Jumping of frog is voluntary (V).
- b) Pumping of heart is involuntary (IV).
- c) Writing with hand is voluntary (V).
- d) Movement of chocolate in your intestine is involuntary (IV).

Q43. Fill in the blanks.

(a) Lining of blood vessels is made up of _____.

(b) Lining of small intestine is made up of _____.

(c) Lining of kidney tubules is made up of _____.

(d) Epithelial cells with cilia are found in _____ of our body.

Answer:

- (a) squamous epithelium
- (b) columnar epithelium
- (c) cuboidal epithelium
- (d) respiratory tract

Q44. Water hyacinth floats on water surface. Explain

Answer:

Water hyacinth (*Eichhornia crassipes*) is a free-floating aquatic plant with aerenchyma in spongy petiole. Aerenchyma is a network with large air cavities to store gases, makes the plant light to float on the surface of water.

Q45. Which structure protects the plant body against the invasion of parasites?

Answer:

Epidermis is a layer of parenchymatous cells which is outermost covering of plant and consists of compact cells without intercellular spaces. It has a thick, waxy, water-resistant layer, cuticle to prevent loss of water, mechanical injury and the attack of parasites.

Q46. Fill in the blanks.

(a) Cork cells possess _____ on their walls that makes them impervious to gases and water.

(b) _____ have tubular cells with perforated walls and are living in nature.

(c) Bone possesses a hard matrix composed of _____ and _____.

Answer:

(a) suberin

(b) Sieve tubes

(c) inorganic, organic substances

Q47. Why is epidermis important for the plants?

Answer:

Epidermis is important for the plants due to following functions:

(a) to protects internal tissues.

(b) to acts as a water-resistant layer to prevent loss of water by transpiration.

(c) It protects the plant from parasite.

(d) It has stomata on leaves and young stems, for exchange of gases in photosynthesis, respiration and transpiration.

(e) Root hairs of the epidermis help in absorption of water and minerals from the soil.

Q48. Fill in the blanks.

(a) _____ are forms of complex tissue.

(b) _____ have guard cells.

(c) Cells of cork contain a chemical called _____.

(d) Husk of coconut is made of _____ tissue.

(e) _____ gives flexibility to plants.

(f) _____ and _____ are both conducting tissues.

(g) Xylem transports _____ and _____ from soil.

(h) Phloem transports _____ from _____ to other parts of the plant.

Answer:

(a) Xylem and phloem

(b) Stomata

(c) suberin

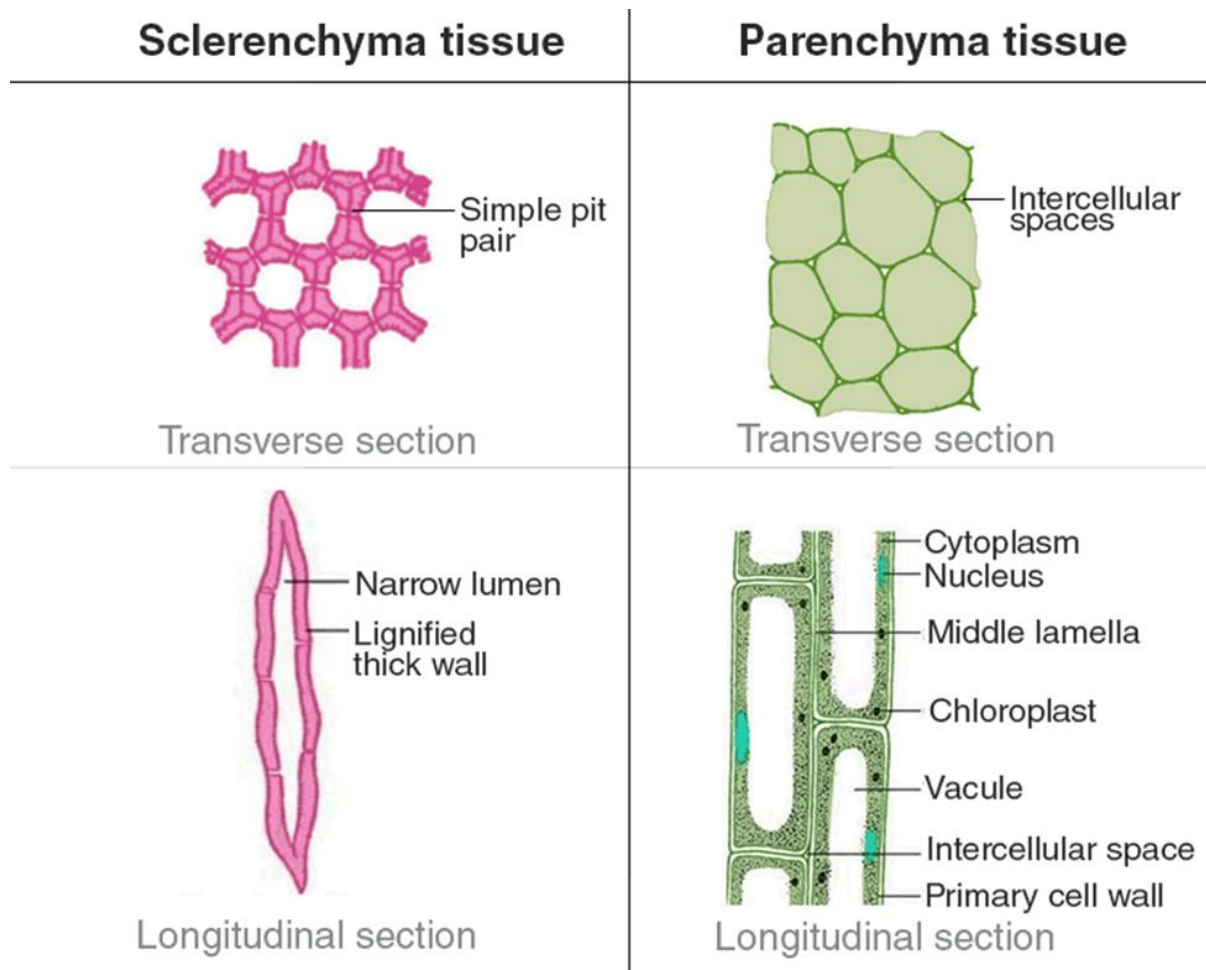
- (d) sclerenchyma
- (e) Collenchyma
- (f) Xylem; phloem
- (g) water; minerals
- (h) food; leaves

Long Answer Type Question

Q49. Differentiate between sclerenchyma and parenchyma tissues. Draw well labelled diagrams.

Answer:

S/No	Parenchyma	Sclerenchyma
1.	They are thin walled with cellulose cell walls	They are thick walled with lignified cell walls
2.	It is made up of living cells.	It is made up of dead cells.
3.	Cells are loosely packed with large intercellular spaces.	No intercellular spaces occur between the cells
4.	It is a storage tissue and stores nutrients and water in stem and roots.	It is a mechanical tissue and give mechanical strength to the plant.
5.	Some cells with chlorophyll form chlorenchyma for photosynthesis Other cells have large air cavities and form aerenchyma which provides buoyancy to the hydrophytic plants.	The cells are long and narrow, make the plant hard and stiff. It is present in the stem in vascular bundles, veins of leaves and hard covering of seeds and nuts



Q50. Describe the structure and function of different types of epithelial tissues. Draw diagram of each type of epithelial tissue.

Answer:

Depending upon the shape and function of the constituent cells, epithelial tissues are of following types:

- a) Squamous (cells flattened)
- b) Columnar (cells tall, columnar or pillar like)
- c) Cuboidal (cells cube-like)
- d) Ciliated (cells with cilia)
- e) Glandular (cells secretory in nature)
- f) Stratified (cells many layered)

a) **Squamous epithelium:** The cells are thin and flat and form a delicate lining or covering of cavities of ducts and blood vessels, chambers of the heart, the skin, the mouth, pharynx, oesophagus, anal canal, vagina and lower part of urethra. It protects mechanical injury and from germs or chemicals. It helps in excretion, gas exchange and secretion of coelomic fluid.

b) **Columnar epithelium:** It consists of cells which are like a column to form the lining of stomach and intestines; in salivary glands, sweat glands, oil glands, mammary gland ducts

and parts of urethra which helps in protection, absorption and secretion. Columnar epithelium of intestine helps in the absorption of water and digested food.

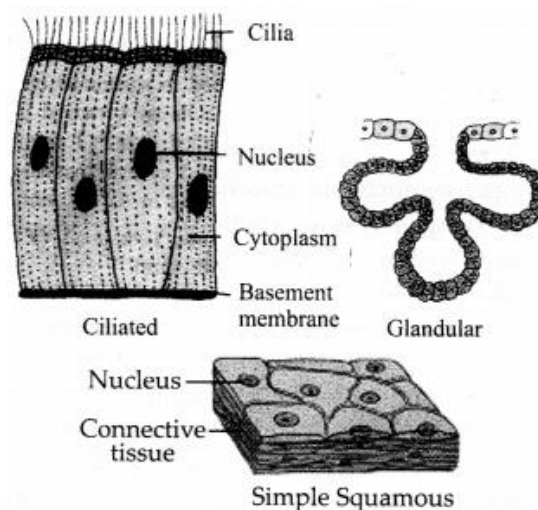
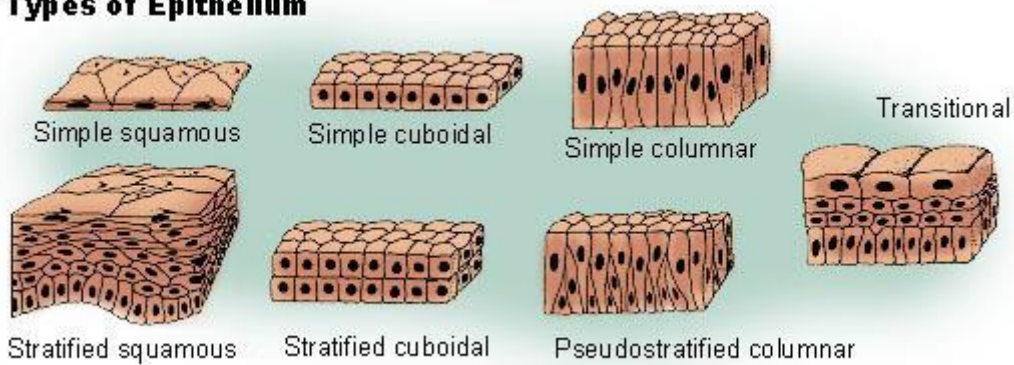
c) **Cuboidal epithelium:** It is long, broad and cube-like, with nucleus. It lines the salivary ducts, pancreatic ducts, sweat glands, salivary glands, thyroid glands, ovaries and lines the sperm-producing tubules. Their functions are protection, secretion, absorption, excretion and gamete formation.

d) **Ciliated epithelium:** It is cuboidal or columnar cells, has numerous, thin, delicate, hair-like projections called cilia on outer surface of the cells. It is lining the wind-pipe (trachea), kidney tubules, oviducts (Fallopian tubes) and ventricles of the brain and helps in the movement of mucus, urine, eggs, sperms and cerebrospinal.

e) **Glandular epithelium:** consists of columnar cells to secrete chemicals. It lines gastric glands, pancreatic lobules, intestinal glands, etc.

f) **Stratified epithelium:** cells are arranged in many layers. It is found in epidermis of skin, lining of the mouth cavity.

Types of Epithelium



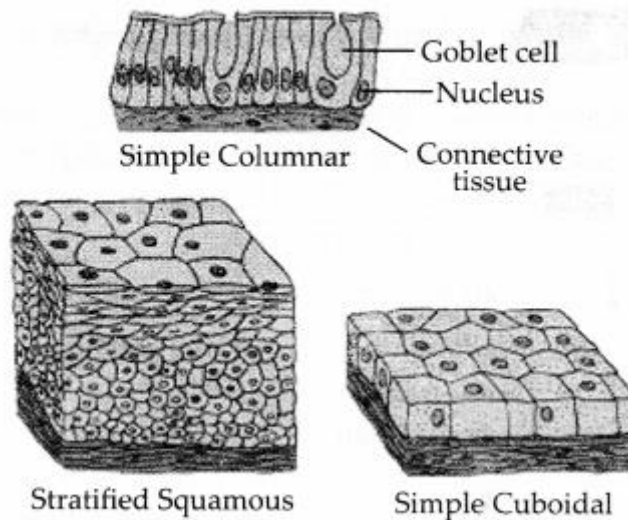


Fig.: Different types of epithelial tissue

Q51. Draw well labelled diagrams of various types of muscles found in human body.

Answer:

The three types of muscular tissues in human body are:

- (i) Skeletal (striated) muscle tissue
- (ii) Smooth (Non- striated) muscle tissue
- (iii) Cardiac muscle tissue.

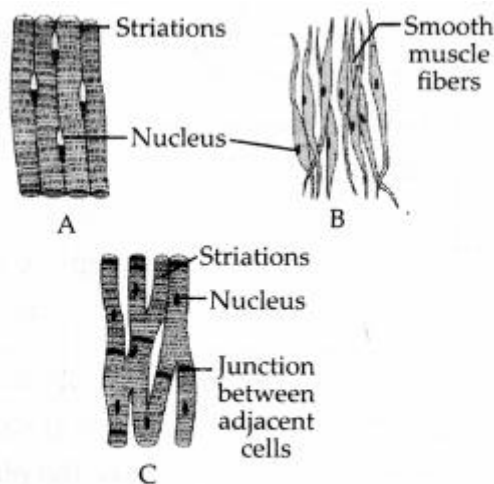


Fig.: A. Skeletal muscle tissue.
 B. Smooth muscle tissue.
 C. Cardiac muscle tissue *

Q52. Give reasons for:

- (a) Meristematic cells have a prominent nucleus and dense cytoplasm but they lack vacuole.**
- (b) Intercellular spaces are absent in sclerenchymatous tissues.**
- (c) We get a crunchy and granular feeling, when we chew pear fruit.**
- (d) Branches of a tree move and bend freely in high wind velocity.**
- (e) It is difficult to pull out the husk of a coconut tree.**

Answer:

(a) Meristematic cells have nucleus and dense cytoplasm as they are metabolically active and undergoes division. Meristematic cells lack vacuole as they do not store food material, waste material, sap etc.

(b) Sclerenchyma cells have lignified cell walls so are compact and have no intercellular spaces.

(c) Pear fruit have sclerenchymatous stone cells or sclereids. So, we get a crunchy and granular feeling.

(d) Collenchyma tissue present in the branches of a tree gives flexibility so, branches bend freely in wind velocity without breaking.

(e) The husk of a coconut is sclerenchymatous fibres which have compact cells with thick lignified cell walls and no intercellular spaces. So, it is difficult to remove husk of a coconut.

Q53. List the characteristics of cork. How are they formed? Mention their role.

Answer:

1) Cork covers the old stems trees. Characteristics are:

- a) Mature cells of cork are dead.
- b) The cells are compactly.
- c) Cells have no intercellular spaces.
- d) Cells consist of chemical substance suberin in their walls.
- e) They are several layers thick.
- f) Cork is impermeable to gases and water.
- g) As plants grow older, secondary lateral meristem called cork cambium grows in the cortical region.

2) Role of cork is:

- a) It protects the internal tissues from mechanical injury and parasite.
- b) It has small pores called lenticels for gaseous exchange.
- c) It gives mechanical strength.

Q54. Why are xylem and phloem called complex tissues? How are they different from one another?

Answer:

Both xylem and phloem consist of more than one type of cells, to perform a common function called complex tissues.:

S/No	Xylem	Phloem
1.	Xylem have tracheid's, vessels, xylem, parenchyma and xylem fibres.	Phloem has sieve tubes, companion cells, phloem parenchyma and phloem fibres
2.	It transports water and minerals from soil to aerial parts of plant.	It transports food from leaves to other parts of the plant and from storage.
3.	Xylem parenchyma are dead cells.	Phloem fibres are living cells.

Q55. (a) Differentiate between meristematic and permanent tissues in plants.

(b) Define the process of differentiation.

(c) Name any two simple and two complex permanent tissues in plants

Answer:

S/No.	Meristematic tissue	Permanent tissue
1.	Cells of this tissue divide throughout their life.	Cells of this tissue lose the ability to divide.
2.	It is at apical meristem in apices (tips) of roots and shoots.	Permanent tissues are throughout the plant body.
3.	Cells are very active with dense cytoplasm, thin walls and nuclei. They lack vacuoles.	Cells are vacuolated. Their cell walls are thin or thick.
4.	Cell wall of the cells is cellulosic.	Cells are made up of cellulose or lignin or suberin.
5.	Cells are living.	Cells are living (parenchyma) or dead(sclerenchyma).
6.	Intercellular spaces are absent.	Intercellular is present or absent.

b) Differentiation is the process of transformation of unspecialised into specialised cells by the loss of ability to divide and take permanent shape, size, structure and function.

(c) Simple Permanent tissues in plants are parenchyma, collenchyma and sclerenchyma. Complex permanent tissues in plants are xylem and phloem.