Solution

TISSUES

Class 09 - Science

Section A

1.

(d) A is false but R is true.

Explanation:

Dendrite consists of short processes called dendrons that arises from the cyton and branches into dendrites. Axon is a single, long cylindrical process which forms fine branches terminally.

2.

(c) A is true but R is false.

Explanation:

The nail will remain at the same position even after 3 years. This is because a plant or tree grows from its tip (stem or root) not from the point at which it joins the ground. So, the tree will grow but the nail will remain at the same place on the tree trunk.

3.

(c) A is true but R is false.

Explanation:

Parenchyma tissue consists of relatively unspecialized cells with thin cell walls. They are live cells. They are usually loosely packed so that large spaces between them.

4. **(a)** Both A and R are true and R is the correct explanation of A.

Explanation:

Meristematic tissues are growth tissues and found in the growing regions of the plant. According to their position in plant, meristems are apical, lateral, and intercalary.

i. **Apical meristem -** Apical meristem is present at the growing tips of stems and roots and increases the length of the stem and the root.
ii. **Lateral meristem -** Lateral meristems are found beneath the bark. The girth of the stem or root increases due to lateral meristem (cambium).
iii. **Intercalary meristem -** Intercalary meristem is the meristem at the base of the leaves or internodes (on either side of the node) on twigs. It increases the length of the organs such as leaves and internodes.

5. **(a)** Both A and R are true and R is the correct explanation of A.

Explanation:

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

6.

(b) Both A and R are true but R is not the correct explanation of A.

Explanation:

The functions of epithelial tissues are as follows:

i. The cells of epithelial tissue form the outer layer of the skin (body surface).
ii. The epithelial tissues inside the body form the lining of the mouth and alimentary canal and protect these organs by secreting mucous.
iii. They also help in the absorption of water and nutrients.

7. **(a)** Both A and R are true and R is the correct explanation of A.

Explanation:

Epidermal cells on the aerial parts of the plant often secrete a waxy, water-resistant layer on their outer surface. This aids in protection against loss of water, mechanical injury, and invasion by parasitic fungi. Since it has a protective role to play, cells of epidermal tissue form a continuous layer without intercellular spaces.

8. **(b)** Both A and R are true but R is not the correct explanation of A.
   Explanation:
   Cells of cork or bark are dead, compactly arranged without intercellular spaces, and have a chemical called subering in their walls that makes them impervious to gases and water. In this way, it acts as a protective tissue.

9. **(a)** Both A and R are true and R is the correct explanation of A.
   Explanation:
   Animals of colder regions and fishes of cold water have a thicker layer of subcutaneous fat. The thick layer of subcutaneous fat acts as an insulator and prevents the heat of the body to escape out. The layer of fat acts as subcutaneous insulation of the body for thermoregulation.

10. **(c)** A is true but R is false.
    Explanation:
    The surface of the skin is impervious to water because it is covered by stratified keratinized squamous epithelium. This epithelium has many superficial layers of horny, scale-like remains of dead squamous cells and several deeper layers of living polygonal cells. Heavy deposits of the insoluble protein keratin are present in the dead superficial layers which make this epithelium impervious to water. Stratified cuboidal epithelium, on the other hand, lines the inner surface of the sweat gland, large salivary, and pancreatic ducts.

11. Vascular bundles consist of xylem and phloem.
12. Present day living beings which are survivor descendants of a large number of extinct life forms.
13. A miniature tree with thin hair like parts arising from its ends.
14. Cardiac muscle is the muscle of heart.
15. The epidermis has thick cuticles. Epidermal cells secrete waxy substances (cutin) on their outer surface. This prevents invasion by parasites.
16. Meristematic cells are active and continuously dividing cells so they have a prominent nucleus and dense cytoplasm. But since meristematic cells do not store food material or waste materials, they lack vacuole.
17. Blood platelets help in clotting of blood at the site of injury.
18. Collenchyma provides flexibility to the parts of the plants. It allows easy bending of leaves and stem without breaking.
19. Squamous epithelium is present in the organs where exchange of substances takes place. Squamous epithelium is found lining surfaces such as the skin, and alveoli in the lung, enabling simple passive diffusion as also found in the alveolar epithelium in the lungs.
20. **Sclerenchymatous tissue** makes up the husk of coconut.
21. Rhythmic contraction and relaxation simultaneously throughout life without getting fatigued.
22. Sieve tubes, companion cells, phloem parenchyma and phloem fibres are the constituents of phloem.
23. Plant tissues are mainly divided into two types. These are as follows:-
    a) Meristmatic tissue – It consists of actively dividing cells. The cells of this tissue are very active; they contain prominent nuclei and dense cytoplasm. They lack vacuoles. Cells of meristmatic tissues differentiate to form permanent tissues.
    b) Permanent tissue – It consists of differentiated cells which have lost the ability to divide. The cells of permanent tissues have little cytoplasm, nucleus on the periphery and a big central vacuole.
24. Areolar connective tissue fills the space inside the organs, supports internal organs and helps in repair of tissues.
25. A neuron consists of a cell body with a nucleus and cytoplasm, from which thin hair-like parts arise. It has a single long part called the axon and many short, branched parts called dendrites. The nerve endings receive the impulses.
26. It is thickened due to the presence of a chemical known as lignin.
27. Areolar tissue is commonly known as packaging tissue.
28. Epithelial tissue protects the entire body. Epithelial tissue forms a lining all over the body of the organism. It protects the inner lying parts. It is also secretory in function to secrete sebum and excrete wastes along with sweat. Sometimes it is absorptive in nature.Epithelial tissues act like a barrier to keep the different body systems separate.

29. Tendon – Tendon is a type of connective tissue that connects muscles to bones (another connective tissue that forms the framework to support the body of animals). It is a tough and non–elastic tissue. It provides limited flexibility.
Ligament – Ligament is a type of connective tissue that connects two bones in animals. It is considerably strong and a very elastic tissue. It contains very little matrix.
30. The bone matrix is rich in calcium and potassium compounds.

Section B

31. i. The tissue shown is collenchyma tissue.
The labelling of the collenchyma tissue is as follows:
A. - Wall thickenings
B. - Nucleus
C. - Vacuole
D. - Cell wall
ii. Yes, the collenchyma tissue is flexible. This is so because collenchyma cells don't have lignin in their cell wall.
iii. The function of collenchyma tissue are as follows:
a. Collenchyma tissue provides flexibility to the plant.
b. It also provides mechanical support to plants.

32. i. In the given diagram of the epidermis, A represents the epidermal cells of the roots bear long hair-like parts called root hairs. With the help of these cells, root hairs greatly increase the total absorptive surface area and help in water absorption.
ii. B represents the stomata. Stomata are the pores present in the epidermis of the leaves. Stomata help in the exchange of gases with the atmosphere during photosynthesis and respiration. Also, the process of transpiration (loss of water in the form of water vapour) takes place through stomata.
iii. C cell that represents the guard cells. These cells are kidney-shaped that enclose the stomata and thus help in the opening and closing of stomata.

33. i. The given diagram shows non-striated muscles or smooth muscles.
ii. Following are the characteristics of non-striated muscles:
a. The cells are spindle-shaped, uni-nucleated, elongated.
b. They are elongated and have no striations.
iii. The non-striated muscles or smooth muscles are found within the walls of the elementary canal, bladder, and blood vessels. The non-striated muscles or smooth muscles are involuntary in nature that is we can't control the movements of these muscles according to our will.

34. i. The tissue given in the figure is collenchyma.
ii. The cells of collenchyma are living, elongated, thickened at the corners and have very little intercellular space.
iii. It provides mechanical support and flexibility to the plant.
iv. It is present in leaf stalks, below the epidermis.

35. i. The given image shows adipose connective tissue.
ii. Adipose connective tissue is found below the skin and between internal organs.
iii. The cells of adipose connective tissue are filled with fat globules. So the storage of fats let it act as an insulator.

Section C

36. i. Tall epithelial cell.
ii. Skin epithelial cell are arranged in many layer to prevent wear and tear.
iii. Cilia can move and their movement pushes the mucus forward to clear it.
OR
The multicellular gland formed due to the inward folding of a portion of epithelial tissue is called the glandular epithelium.

37. i. Columnar.
ii. columnar epithelial.
iii. No, providing mechanical support is the main function of the cuboidal epithelium.
OR
Glandular epithelium.

38. i. Yes, meristematic tissue is composed of a single type of cell.
ii. Intercalary.

iii. Apical meristematic.

OR

Properties of cells of meristematic tissue:

a. It has dense cytoplasm.
b. It has thin cellulose walls.
c. It has prominent nuclei.

39. i. Adipose tissue.
ii. The cells of the connective tissue are loosely spaced and invaded in and intracellular matrix.
iii. Calcium and phosphorus compounds.

OR

Cartilage is found in the nose, ear, and trachea in the human body.

40. i. Apical Meristem
ii. Parenchyma tissue, in aquatic plant large air cavities are present in parenchyma to give buoyancy to plant help them to float.
iii. Collenchyma tissue provide flexibility.

OR

Husk of the coconut is hard and stiff because they are made of up sclerenchymatous tissue the cell of the tissue is dead they are long and narrow as the wall is thickened due to lignin.

41. i. Tracheids
ii. Cuticles reduce the loss of water.
iii. Phloem fibres

OR

Yes, the muscles whose functioning cannot be controlled are called involuntary muscles.

42. i. Sclerenchyma, Lignin is a chemical substance present in the cell wall of plant that acts as cement and hardens it.
ii. Due to presence of a chemical substance called suberin.
iii. The parenchyma tissue is present in the cortex of roots and sclerenchyma tissue is present in the veins of the leaves.

OR

Collenchyma tissue in plants provides them flexibility.

43. i. Collenchyma.
ii. No, aerenchyma helps aquatic plants to float.
iii. No, apical and intercalary meristems are not permanent tissue.

OR

Provides strength to the plant parts.

44. i. Tendon.
ii. Matrix of a bone cell composed of calcium and phosphorus compound.
iii. Muscles are connected to the bone by the structure called tendon.

OR

Ear, Nose, and Trachea.

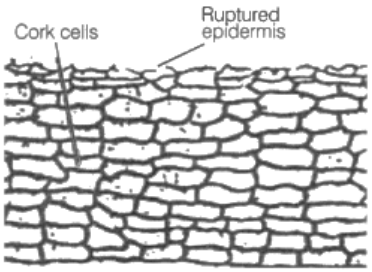
45. i. Cambium tissue help in the secondary growth of the plant.
ii. Between mature tissue segments, intercalary meristematic growth occurs.
iii. Meristematic tissues are mostly found at the apices of root and shoot.

OR

The cambium is called the lateral meristem because it increases the girth of the axis.

Section D

46. The protective tissue or the outermost covering of cells in plants is known as the epidermis, which performs protective function (protecting plants from adverse conditions). It is usually made up of a single layer of cells. In dry habitats, epidermis gets thicker to protect the plant from undue loss of water.



On aerial parts of the plant, epidermal cells often secrete a waxy, water-resistant layer on their outer surface. This waxy covering aids in protecting the plant against loss of water, mechanical injury and invasion by parasitic fungi. The cells of epidermal tissue are present in a continuous layer without intercellular spaces.

Small pores are present on the epidermis of the leaf. These pores are called stomata. They are enclosed by two kidney-shaped cells called guard cells. They help in gaseous exchange and transpiration.

As the plant grows older, a strip of secondary meristem replaces the epidermis of the stem. This forms several layers thick cork or bark of the tree in which cells are dead and compactly arranged without intercellular spaces.

47. The cells of striated muscle fibres are long or elongated, non-tapering and cylindrical and unbranched. These cells have a number of nuclei. These muscle fibres show alternate dark and light bands or striations (under the microscope) and hence, they are called striated muscles. Striated muscles occur in muscles of limbs, body wall, face, neck, etc.

Functions of striated muscles are as follows:

(i) Striated muscles are powerful and undergo rapid contraction. They are also called skeletal muscles.

(ii) Striated muscles provide the force for locomotion and all other voluntary movements of the body. Hence, they are also called voluntary muscles.

On the other hand, some muscles do not bear any bands, stripes or striations across them (under the microscope) and hence, they are called smooth or unstriated muscles. The cells of these muscle fibres are uninucleate. Smooth muscles occur as bundles or sheets of elongated fusiform or spindle-shaped cells or fibre. They are held together by loose connective tissues. These muscles are found in the walls of internal organs such as the alimentary canal, stomach, intestine, ureters, bronchi, iris of the eye, ducts of glands and blood vessels.

Functions of unstriated or smooth muscles are as follows:

(i) Smooth muscles do not work according to our will, so they are also called involuntary muscles. Movement of food in the alimentary canal or the contraction and relaxation of blood vessels are involuntary movements.

(ii) Smooth muscles contract slowly but can remain contracted for a long period of time. The ingested food passes to the next step of digestion in the alimentary canal due to this characteristic.

48. There are five types of connective tissues:-

(i) **Areolar connective tissue:** It is a loose and cellular connective tissue. It joins skin to muscles, fills spaces inside organs, and is found around muscles, blood vessels, nerve and in the bone marrow.

Functions:

(a) It acts as a supporting and packing tissue between organs lying in the body cavity.

(b) It helps in repair of tissues after an injury.

(c) It also helps in combating foreign toxins.

(d) It fixes skin to underlying muscles.

(ii) **Dense regular connective tissue:** It is a fibrous connective tissue. It is characterised by ordered and densely packed collection of fibres and cells. Dense regular connective tissue is the principal component of tendons and ligaments.

Functions:

(a) Tendons: Tendons are cord-like, strong, inelastic structures that join skeletal muscles to bones.

(b) Ligament: They are an elastic structure which connects bones to bones.

(iii) **Adipose tissue:** Adipose tissue is an aggregation of fat globules. The cells that primarily compose adipose tissue are called adipocytes or lipocytes or fat cells. The adipose tissue is abundant below the skin, between the internal organs and in the yellow

bone marrow.

Functions:

(a) It serves as a reservoir of fat.

(b) It provides shape to the limbs and the body.

(c) It keeps visceral organs in position. It forms shock-absorbing cushions around kidneys and eyeballs.

(d) It acts as an insulator and reduces heat loss from body, i.e. it regulates body temperature.

(iv) **Skeletal tissue:** The skeletal or supporting tissue includes bone and cartilage which form the endoskeleton of vertebrate body.

(a) Cartilage: The cartilage is a specialised connective tissue which is compact and less vascular. Cartilage can be found in ear, nose tip, epiglottis, inter-vertebral discs, end of long bones, lower ends of ribs and rings of trachea. There are three varieties of cartilage - hyaline, elastic, and fibro-cartilage. The most abundant type is hyaline, found as supportive tissues in the nose, ears, trachea, larynx, and smaller respiratory tubes.

(b) Bone: Bone is very strong and non-flexible tissue. Bone cells are embedded in a hard matrix. Like cartilage, bone is a specialised connective tissue.

Functions:

(a) Cartilage provides support and flexibility to body parts such as ears and nose. It smoothens bone surfaces at the joints.

(b) Bone provides shape and skeletal support to body.

(c) Bone supports and protects vital body organs such as brain, lungs, etc.

(d) Bone anchors the muscles.

(v) **Fluid connective tissue:** Fluid connective tissue links the different parts of the body and maintains continuity in the body. It includes blood and lymph.

(a) Blood: In this tissue, cells move in a fluid or liquid matrix or medium called plasma. Blood flows in blood vessels called arteries, veins, and capillaries which are connected together to form the circulatory system. Blood contains red blood cells (RBCs), white blood cells (WBCs) and platelets suspended in the plasma.

(b) Lymph: Lymph is a colourless fluid that has filtered out of the blood capillaries.

Functions:

(a) Blood flows and transports gases, nutrients, hormones and vitamins to the tissues, and transports waste products from the tissues to the liver and the kidney.

(b) Lymph transports the nutrients (oxygen, glucose) that may have filtered out of the blood capillaries back into the heart to be re-circulated in the body.

(c) Lymph brings CO_2 and nitrogenous wastes from tissues to the blood.

49. Cork covers the old stems of woody trees.

Characteristics of cork are as follows:

i. Cells of cork are dead at maturity.
ii. These cells are compactly arranged.
iii. Cells do not contain intercellular spaces.
iv. Cells possess chemical substance suberin in their walls.
v. They are several layers thick.
vi. Cork is impervious to gases and water.

As plants grow older, a strip of the secondary lateral meristem (called cork cambium) develops in the cortical region. It cuts cells towards both the outer and inner sides. Gradually, this secondary tissue replaces the epidermal layer of the stem. This forms several layer thick corks.

Role of cork is mentioned below:

i. It protects the internal tissues from mechanical injury and from parasitic attacks.
ii. It contains small pores (called lenticels) for gaseous exchange.
iii. It provides mechanical strength.

50. Permanent tissues are derived from meristematic tissue but their cells have lost the power of division and have attained their definite form.

Permanent tissues are classified into - Simple permanent tissue and Complex permanent tissue.

i. Simple permanent tissues: These tissues are composed of cells which are structurally and functionally similar. Simple permanent tissues are further classified into the following three types:-
    a. Parenchyma: Parenchyma forms the bulk of the plant body. Parenchyma cells are living and possess the power of division.

b. Collenchyma: Collenchyma tissue is also living. It is characterised by the deposition of extra cellulose at the corners of the cells.

c. Sclerenchyma: Sclerenchyma cells are dead cells and they are devoid of protoplasm. The cell walls of sclerenchyma are largely thickened due to deposits of lignin.

ii. Complex permanent tissues: The complex tissues consist of more than one type of cells having a common origin. All these cells coordinate to perform a common function.

Complex permanent tissues are of the following two types:-

a. Xylem: Xylem is a vascular and mechanical tissue. It is a conducting tissue. Xylem is composed of four different types of cells: (i)Tracheids (ii) Vessels (iii) Xylem parenchyma (iv) Xylem sclerenchyma. Except xylem parenchyma, all other xylem elements are dead and bounded by thick lignified walls.

b. Phloem: Like xylem, phloem is vascular but has no mechanical function. Phloem is composed of following four elements: (i) Sieve tubes (ii) Companion cells (iii) Phloem parenchyma (iv) Phloem fibres. Except phloem fibres, all other phloem elements are living.

Xylem and phloem are both conducting tissues and also known as vascular tissues; together, both of them constitute the vascular bundle.

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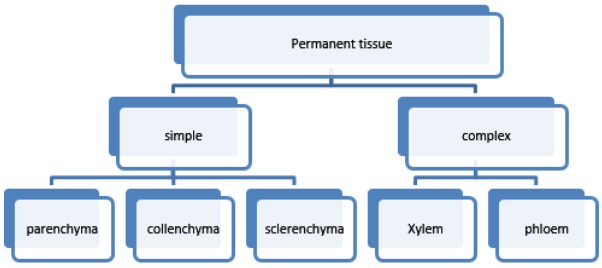
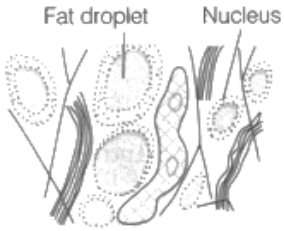


51. i. Digrammatic representation of Adipose tissue



Adipose tissue is a fat-storing connective tissue. Its matrix is packed with large oval fat cells or adipocytes. The fat cells are arranged into globules separated by collagen and elastic fibres. It mainly stores reserve fat. It acts as an insulator and works as a shock absorber for visceral organs. It acts as shock-absorbing cushions around the heart, kidneys, eyeball, etc.

ii. Differences between adipose and blood tissue are as follows:

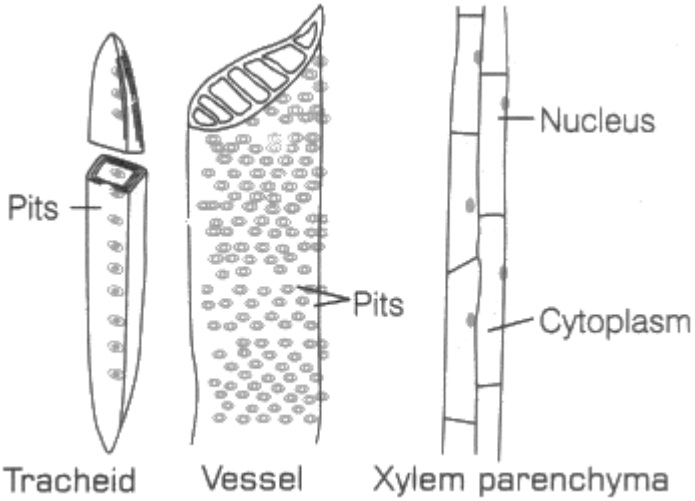
Adipose Tissue	Blood Tissue
1. Adipose tissue is a type of loose connective tissue located mainly beneath the skin.	1. Blood tissue is a fluid connective tissue containing the plasma, red blood cells (RBCs), white blood cells (WBCs) and platelets.
2. The matrix contains fibres.	2. The matrix does not contain fibres.
3. It stores and metabolises fats.	3. It helps in the transport of substances and respiratory gases.

52. i. Different organisms whether unicellular or multicellular need to perform many functions in the body such as respiration, digestion, locomotion. In multicellular organisms, cells present in a group and specialized in one particular function form a tissue. Some tissues help in growth, while others in locomotion and some in body movement. So, if cells are not organized in these tissues, then a highly organized and specialized process will become disorganized. There will be no coordination in the functioning of the cells and body.

ii. The squamous epithelial cells line the cavities of the mouth, oesophagus, alveoli, and blood vessels. This tissue gives protection against mechanical injury and also blocks the entry of germs. If the squamous epithelium is arranged in many layers, it is known as a compound squamous tissue called the stratified squamous epithelium. We find these kinds of tissues in the skin and also the lining of the oesophagus.

53. In plants, there are pipe-like vessels through which water and minerals can enter the plants. These vessels are made up of elongated cells and thick walls. A group of cells forms a tissue which performs a specialized function within the organisms. These are conducting tissues. These conducting tissues are divided into two types which are xylem and phloem.

i. **Xylem:** It is a vascular tissue that spreads from the top to bottom of the plant. It helps in the transportation of water and minerals from roots to other parts of the plant.



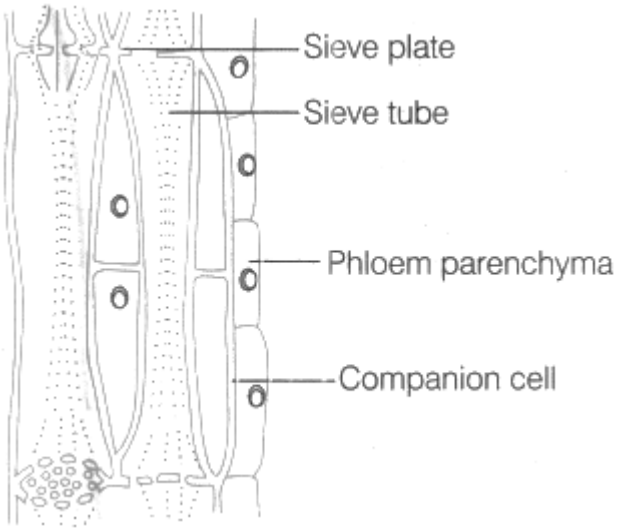
Elements of xylem:

a. **Tracheids and Vessels**: It is Tubular structure and transport water and minerals vertically.
b. **Parenchyma:** It stores food and helps in sideways conduction of water.
c. **Fibres**: It is supportive in function.

ii. **Phloem** It transports food from leaves to other parts of the plant. Food is prepared in leaves by the process of photosynthesis.

Elements of phloem:

a. **Sieve tubes**: It is tubular cells with perforated walls. These consist of living cells.
b. **Companion cells:** It is small elongated cells with dense cytoplasm.
c. **Phloem parenchyma** : It is Thin-walled cells. Mainly function in storage and transportation of food.
d. **Phloem fibres** It is Thick-walled cells. These are dead cells. Provide mechanical strength to tissue.



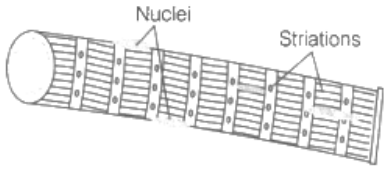
Both xylem and phloem maintain a transportation system within the plants. There is continuous transportation of food, water and minerals within the plant. This transportation is necessary for the proper growth and maintenance of the plant.

54.

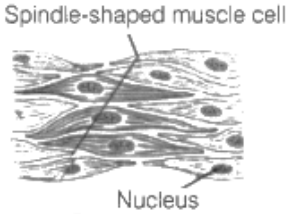
Types	**Striated Muscles**	**Unstriated Muscles**	**Cardiac Muscles**
Structure	These are made up of long, cylindrical, unbranched and multinucleate cells. These show alternate light and dark striations.	These muscles are made up of long uninucleate cells with pointed ends.	These are made up of cells, which are cylindrical, branched and uninucleate.
Striations	They show alternate light and dark bands or striations.	These do not show striations.	These muscles show faint striations.
Site/Location	These are located in limbs and are mostly attached to bones to help in body movement.	These are mostly present in the walls of the alimentary canal. blood vessels,	These are present only in the walls of the heart.

		ureters, bronchi of the lungs and in the iris of eyes.	

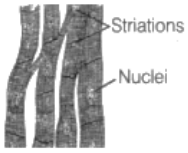
i. Striated muscle



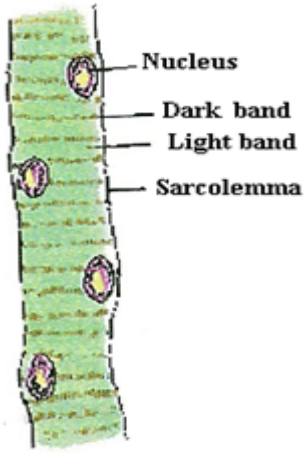
ii. Smooth muscle



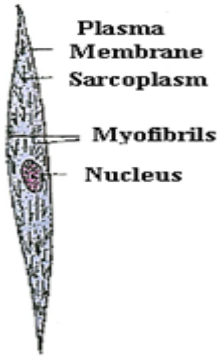
iii. Cardiac muscle



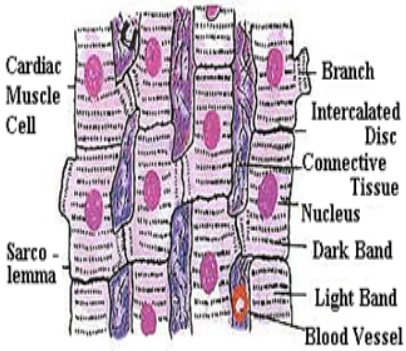
55.



Striated muscle fibre



Smooth muscle fibre



Cardiac muscle fibres

56. Yes, we can control some of the actions of our body, but some are not under our control. The actions which we can control are known as voluntary actions like the movement of hand and limbs. We can move these parts of our body whenever we want to, but some actions of our body like contraction and relaxation of heart, blinking of an eye, etc., are not under our will, i.e. we cannot stop functioning of heart if we want to do so. The actions, which can be manipulated by our wishes are known as voluntary actions. The muscles, which can perform voluntary actions are voluntary muscles.
These muscles are also called skeletal muscles or striated muscles. These muscles are mostly attached to bones and help in body movement. Their cells are long, cylindrical, unbranched and multinucleate (having many nuclei).
The actions, which are not under our control are known as involuntary actions. These actions are performed by smooth muscles or involuntary muscles. Their cells are long with pointed ends (spindle-shaped) and uninucleate (single nucleus).

57.

Plant Tissues	Animal Tissues
In plants, dead supportive tissues are more abundant as compared to living tissues.	In multicellular animals living tissues are more common as compared to dead tissues.
They require less maintenance energy as they are autotrophic and can make their own food.	They require more maintenance energy as they are heterotrophic and have to move in search of food.
There is a differentiation of tissues into meristematic and permanent tissues, which are localized in certain regions of plant-based on their dividing capacity.	Such differentiation is absent in animals as their growth is uniform.
Due to the activity of meristematic tissue plants continue to grow throughout life.	Animals do not show growth after reaching maturity. Reparative growth is, however, present.
The organization of plant tissues is simple.	The organization of animal tissues is complex with the development of more specialized and localized organs and organ systems.
Tissue organization is meant for a stationary habit of plants.	Tissue organization is targeted towards the high mobility of animals.

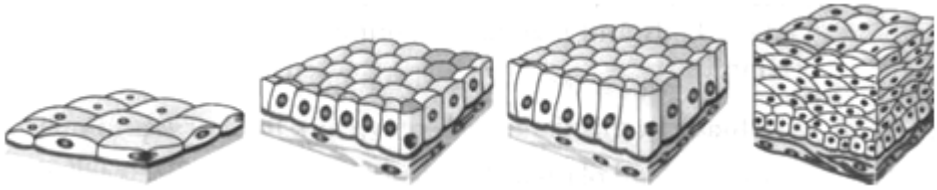
58. Differences between meristematic and permanent tissues are:

Meristematic tissue	**Permanent tissue**
Cells of this tissue divide throughout their life.	Cells of this tissue lose the ability to divide to take up specific functions.
Meristematic tissues are located at specific regions of the plant.	Permanent tissues are distributed throughout the plant body.
Cells of this tissue are very active, have dense cytoplasm, thin walls, and prominent nuclei. They lack vacuoles.	Cells of this tissue are vacuolated, vary in shape and size. Their cell walls may be thin or thick.
The cell wall of the cells is cellulosic.	Cells wall may be made up of cellulose or lignin or suberin.
Cells of this tissue are living.	Cells of this tissue may be living (parenchyma) or dead(sclerenchyma).
Intercellular spaces are not present in cells.	Intercellular space may be present or absent.

59. Differences between bone and cartilage are as follows:

Point of Difference	Bone	Cartilage
Structure	It is strong and non-flexible tissue, whose cells are embedded in a hard matrix, which is composed of calcium and phosphorus compounds.	It is soft and flexible tissue, whose solid matrix is composed of proteins and sugars. Also, it has widely spaced cells.
Function	It forms the framework that supports the body and anchors the muscles that support the main organs of the body.	It smoothens bone surfaces at the joints.
Location	It is present in the skeletal system of vertebrates.	It is present in nose, ear, trachea, and larynx.

60. Epithelial tissues can be (A) Squamous epithelium (Either simple squamous epithelium or stratified squamous epithelium) (B) Columnar epithelium (C) Cuboidal epithelium or (D) Glandular epithelium



The structure and function of different types of epithelial tissues are as follows:-

A. Squamous epithelium can be of two types:-

a. Simple squamous epithelium: Simple squamous epithelial cells are a simple flat kind of epithelium. They are extremely thin and flat. They form a delicate lining. They are present in the lining of the blood vessels or the alveoli (in lungs) where transportation of substances occurs through a selectively permeable membrane. They are also present in the esophagus and the lining of the mouth are also covered with this type of cells.

b. Stratified squamous epithelium: Stratified squamous epithelial cells are arranged in a pattern of layers. E.g. Skin epithelial cells are arranged in many layers to prevent wear and tear.

B. Columnar epithelium: Columnar epithelial cells are present where absorption and secretion occur as in the inner lining of the intestine. These cells are long or columnar (pillar-like). They facilitate movement across the epithelial barrier. In the respiratory tract, the columnar epithelial tissue has hair-like projections (cilia) on the outer surfaces of epithelial cells. The movement of the cilia pushes the mucus forward and clears it.

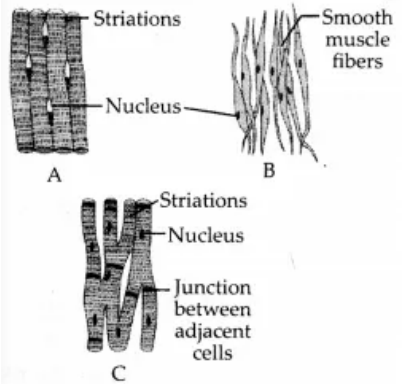
C. Cuboidal epithelium: Cuboidal epithelium is made up of cube-shaped cells which provide mechanical support. They form the lining of the kidney tubules and ducts of salivary glands.

D. Glandular epithelium: A multicellular gland or glandular epithelium is formed when a portion of the epithelial tissue folds inward and a multicellular gland is formed. An epithelial cell sometimes acquires additional specialisation as a gland cell. Gland cells can secrete substances at the surface of the epithelium.

61. The three main types of muscular tissues found in the human body are:

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

The well-labelled diagrams of these tissues are as follows:

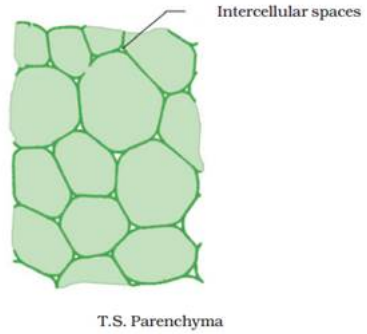


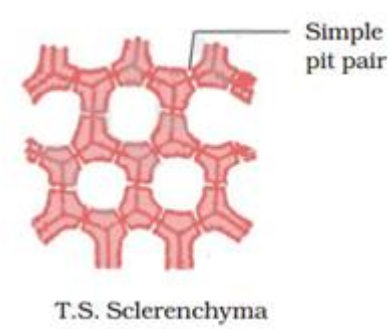
A. Skeletal muscle tissue.
B. Smooth muscle tissue
C. Cardiac muscle tissue

62. i. They increase the total absorptive surface area and help in absorption.
ii. Cutin has a waterproof quality and helps in preventing water loss due to transpiration. It also protects plants from the entry of pathogens, etc.
iii. They help in the gaseous exchange and transpiration process.
iv. To prevent water loss.
v. Suberin makes cork cells impervious to gases and water.

63.

Parenchyma	Sclerenchyma
Cells are live.	Cells are dead.
Cells have thin cell walls.	The cell wall is thick due to the deposition of lignin.
Intercellular spaces are present between cells.	No intercellular spaces are found between the cells.
Cells are oval in shape.	Cells are long in shape.
Some cells contain chloroplast.	The chloroplast is absent.
Storage of food is a major function.	Structural rigidity is the main function.
Found in soft parts.	Found in hard parts.





64. i. Differentiation is the process by which meristematic tissue takes up a permanent shape, size and function.
ii. Large air cavities present in parenchyma (aerenchyma) of aquatic plants help the plant to maintain buoyancy in water.
iii. Epidermis of plants living in dry habitats are thicker in order to prevent loss of water.
iv. a. Xylem parenchyma consists of living cells having thin cell walls.
b. Phloem fibres are the dead element of phloem.
v. Tracheids and vessels of xylem are the two conducting tissues, which conduct water and minerals vertically.

65. Both xylem and phloem consist of more than one type of cells, which coordinate to perform a common function.

Xylem	Phloem
Is composed of tracheids, vessels, xylem parenchyma and xylem fibres.	Is composed of sieve tubes, phloem parenchyma, phloem fibres and companion cells.
Only xylem parenchyma is composed of a living cell in xylem tissue.	Only phloem fibre is composed of the dead cell is in the phloem.
Transports water and minerals.	Transports food.
Movement of materials is in one direction.	Movement of materials is in both directions.

Section E

66. State whether the given statement is True or False:

(i) **(a)** True
Explanation: {
True

(ii) **(a)** True
Explanation: {
True

(iii) **(a)** True
Explanation: {
True

(iv) **(a)** True
Explanation: {
True

(v) **(a)** True
Explanation: {
True

(vi) **(a)** True
Explanation: {
True

(vii) **(b)** False
Explanation: {
False. The cells of collenchyma tissue are living, elongated, and irregularly thickened at the corners.

(viii) **(a)** True
Explanation: {
True

(ix) **(b)** False
Explanation: {
False. Phloem transports food from leaves and storage organs to all other parts of the plant.

(x) **(b)** False
Explanation: {
False. Due to its permeability, the epithelial layer plays an important role in regulating the exchange of materials between the body and the external environment.