

Activity/Project 2 :

Class Work

- The onion bulb whose roots are not cut shall produce longer roots. Roots stop growing after their tips are removed.
- Growth of roots occur due to the presence of dividing cells at the root tips. Roots stop growing after removal of the dividing cells in the bulb of jar 2.
- Growth of plants occur only in regions where the dividing tissue called meristematic tissue is located. These regions are tips of stems and roots, sides of roots and stems and base of leaves and internodes.
- Apical meristem is present in root tips.
- Dead phloem causes bark to form on a tree.
- (b) (i) D, c (ii) A, d (iii) B, a (iv) C, b

Homework

1. Differences :

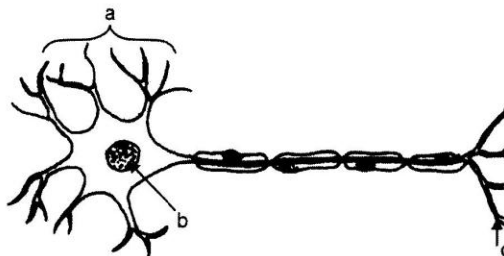
Meristematic Tissue	Permanent Tissue
(i) Cells divide repeatedly.	(i) Cells normally do not divide.
(ii) Cells are undifferentiated.	(ii) Cells are fully differentiated.
(iii) Cells are small.	(iii) Cells are large.
(iv) Intercellular spaces are absent.	(iv) Intercellular spaces are often present.
(v) Vacuoles are absent.	(v) Large vacuoles are present.
(vi) Cells are always living.	(vi) Cells may be living or dead.

- Intercalary meristem at the base of grass leaf blades allow damaged leaf blades to regrow rapidly.
- Thick trunk of trees are produced due to horizontal growth. Horizontal growth occurs due to lateral meristem.
- Student response yourself.

Activity/Project 3 :

Students Worksheet

1.



- (a) Cell Body, (b) Nucleus (c) Nerve endings
- Synapse
- Nerve endings

SUMMATIVE ASSESSMENT

VERY SHORT ANSWER TYPE QUESTIONS

|| 1 MARK ||

Previous Years' Questions

- Parenchyma provides support to plants and also stores food.
- Apical meristem is present at the growing tips of stems and roots.
- Parenchyma
- Phloem transports food from leaves to other parts of the plant.
- Xylem transports water and minerals from roots to leaves vertically upward.

6. The function of meristematic tissue is that it has the ability to divide, hence they continuously produce new cells which keep differentiating to form specialised cells of the plant.

7. Functions of Stomata :

- Stomata allow gaseous exchange between the plant and the atmosphere.
- These are sites of transpiration in plants.

8. Nervous tissue is present in the brain.

9. Type of tissue present in kidney tubules is **cuboidal epithelial tissue** and in bark of tree is **cuboidal protective tissue** (Cork).

Important Questions

10. Tissues in plants are mainly of two types : Meristematic tissues and Permanent tissues.
11. Connective tissue.
12. Meristematic tissue has power of division and helps in growth, while permanent tissue has lost the power of division temporarily or permanently.
13. (i) Parenchyma (ii) Axon (iii) Sieve tubes
(iv) Lignin (v) Cilia (vi) Cuticle
(vii) Haemoglobin (viii) Intercalated discs
14. Formed of cellulose and deposited with pectin and has pits.
15. Mature sieve tube cells and phloem fibres.
16. Squamous epithelium.
17. Cardiac muscle cells.
18. Tendon.
19. Synapse.
20. The dendrite receives impulse and axon takes away the impulse.
21. Adipose tissue.
22. Epithelial tissue.
23. Bone.
24. Squamous epithelium tissue.
25. 120 days.
26. Elastin protein.
27. Calcium phosphate.
28. Autorhythmic contraction to force the blood into the blood vessels.
29. They help in blood clotting at place of injury.
30. As they are found in the wall of visceral organs.
31. Pectin.
32. (i) Wood (ii) Bast
33. Companion cell
34. Sclerenchyma tissue
35. Epithelial tissue
36. (i) Lung alveoli (ii) Alimentary canal

SHORT ANSWER TYPE QUESTIONS (I)

Previous Years' Questions

1. O = Cytoplasm, N = Nucleus, M = Chloroplast and P = Inter cellular space.
2. Meristematic tissues are growth tissues. These tissues reliving and bring about an increase in the length and thickness of the region here they are located. Two growth regions in plants are root tip and shoot tip.
3. Sclerenchyma tissue makes the husk of a coconut.
 - Sclerenchyma cells are dead and without any protoplasm.
 - It is composed of long, narrow and thick-walled cells.
 - The walls of sclerenchyma cells are greatly thickened with deposition of lignin (acts as cement and hardens the cells).
4. Blood helps in transportation of oxygen in our body. Blood is a connective tissue where cells move in a fluid called plasma. Plasma contains cells viz RBC, WBC and platelets.

37. Squamous epithelium
38. In bone, matrix is solid.
39. Areolar tissue
40. Respiratory tract
41. (i) Skeletal muscle fibre
(ii) Smooth muscle fibre
42. Cork cells.
43. The permanent tissues are located slightly away from the tips.
44. Both parenchyma and collenchyma have living cells.
45. During the development, the cells differentiate and tissues are formed.

NCERT Questions

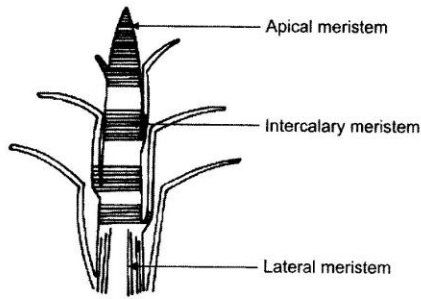
46. Tissues are a group of cells of the same origin, which are similar in structure and function.
47. In multicellular organisms, tissues provide protection, mechanical strength and give highest possible efficiency to the organisms.
48. The types of simple tissues are :
(i) Parenchyma (ii) Collenchyma
(iii) Sclerenchyma
49. The constituents of phloem are sieve tubes, companion cells, phloem fibres and phloem parenchyma.
50. A neuron looks like a miniature tree with long thin hair-like parts arising from it.
51. (i) Epithelial tissue (ii) Tendon
(iii) Phloem (iv) Adipose tissue
(v) Blood (vi) Nervous tissue
52. Skin — Epithelial tissue
Bark of tree — Protective tissue (Cork)
Bone — Connective tissue
Lining of kidney tubule — Epithelial tissue
Vascular bundle — Complex permanent tissue

|| 2 MARKS ||

5. (a) Two important functions of areolar tissue are as follows :
(i) They act as a supporting and packing tissue between organs lying in the body cavity.
(ii) They also help in repair of tissues.
- (b) The skeletal muscles show alternate dark and light bands or stripes or striations, so they are known as striated or striped muscles.
6. Apical meristems are present at the growth tips of stems and roots. Muscular tissue is responsible for movement in our body.

Chlorenchyma	Aerenchyma
(i) It contains chlorophyll	(i) It does not contain chlorophyll.
(ii) It does not contain large air cavities.	(ii) It contains large air cavities to give buoyancy to the plant.

8.



Location of meristematic tissue in plant body

Functions :

- (i) **Apical meristem** : It increases the length of stem and root.
- (ii) **Lateral meristem** : It increases the girth of stem and root.
- (iii) **Intercalary meristem** : It increases longitudinal growth of plants.

9. **Bones** provide support and flexibility to the body parts and also smoothens bone surface at joints.

Cartilage provides shape and skeletal support to the body, it also anchors the muscles and supports the main organs of the body.

Ligaments strengthen the joints and permit normal movement.

Tendons join skeletal muscles to bones.

10. Role of Epidermis in plants :

- (i) Epidermis acts as a protective tissue, covering the plant body.
- (ii) It protects the plant from excessive heat or cold and from the attack of parasitic fungi and bacteria.
- (iii) It allows exchange of gases and transpiration through stomata.
- (iv) The cuticle of epidermis checks the excessive evaporation of water.

11. The covering or protective tissue in the animal body is called epithelial tissue.

The epithelial tissue which covers the lining of blood vessels is called simple squamous epithelium.

12. Axon and dendrites.

13. Apical meristem is present at the shoot apex. It is also present in the growing tips of roots.

14.



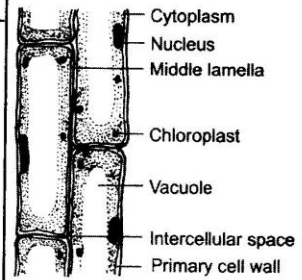
Leaf of epidermal peel

15. Sclerenchyma is the type of permanent tissue which makes the plant hard and stiff.

There are two types of sclerenchyma— (i) Fibres (ii) Sclereids

16. Differences :

Parenchyma	Collenchyma
(i) Living cells and isodiametric in shape.	(i) Living cells, cells with thick corners.
(ii) Cell walls are thin and made up of cellulose.	(ii) Cell walls are thickened at corners with extra depositon of cellulose and pectin.
(iii) Cells have distinct nucleus and a large central vacuole.	(iii) Cells have distinct nucleus and dense cytoplasm.
(iv) It stores food, waste products and forms packing tissue.	(iv) It gives mechanical support and carry out photo-synthesis.
(v) It is present in all soft parts of plant, i.e., in stems roots, leaves, flowers and fruits.	(v) It is present below the epidermis in stems and leaves.

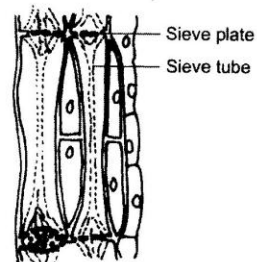


L.S. of Parenchyma

17. Differences :

Simple tissue	Complex tissue
— They are made of one type of cells, which look like each other. e.g., Parenchyma.	— They are made of more than one type of cells. e.g., Xylem.

18. (a)



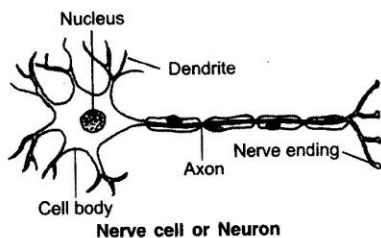
Phloem tissue

(b) Differences :

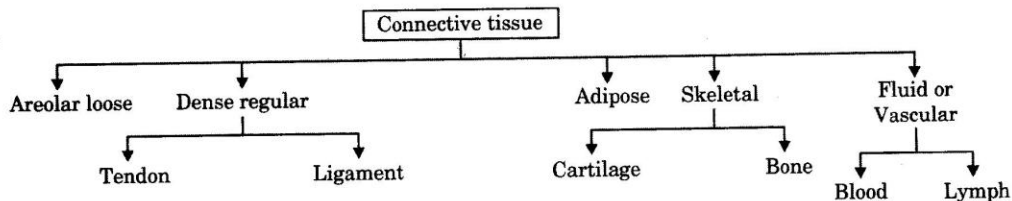
Xylem	Phloem
(i) It conducts water and minerals from roots to aerial parts of the plants.	(i) It translocates prepared food from leaves to storage organs and growing parts of body.
(ii) The main conducting cells—the vessels are dead cells.	(ii) The main conducting cells—the sieve tubes are living cells.
(iii) It provides mechanical strength to the plant.	(iii) It does not provide mechanical strength to the plant.

19. Roots do not grow after their tips are removed. Apical meristem is present at the tips of roots, which divide to increase the length of roots. When tips are removed, apical meristem is also removed and hence the roots stop growing.

20.



28.



29. The characteristic features of meristematic tissues are :
- The cells of this tissue are similar in structure and are thin-walled.
 - The shape may be oval, spherical, rectangular or polygonal.
 - They contain dense cytoplasm with single large nucleus and few or no vacuoles.
30. Permanent tissues have the following Characteristics :
- They have definite shape with thin or thick wall.
 - They may be living or dead.
 - The cells have large vacuoles in cytoplasm.
31. Nissl's granules are rough endoplasmic reticulum (RER) with ribosomes. These are located in the cyton or cell body of the neuron or nerve cell. These are the sites of protein synthesis.
32. Mast cells are oval-shaped cells of areolar connective tissue and have dense granules in their cytoplasm. These secrete matrix of connective tissue, heparin and histamine.

Important Questions

21. (i) **Similarities with striated muscles** : Both are cylindrical in shape, highly vascular and have dark and light bands.
 (ii) **Similarities with smooth muscles** : Both are small-sized, uninucleated and involuntary.
22. The permanent tissues are classified into two categories:
- Simple** which is further divided into three types, *i.e.*, parenchyma, collenchyma and sclerenchyma.
 - Complex** which is divided into xylem and phloem.
23. The cork cells are the dead tissues, present at periphery of stem and root.
 Their main function is to prevent loss of water from plants and they also act as a protective layer.
24. The complex tissues are made up of more than one type of cells but they work as single unit. They are of two types — Xylem and Phloem.
25. There are four types of tissues found in animals :
- Epithelial tissue
 - Connective tissue
 - Muscular tissue
 - Nervous tissue
26. Muscular tissues are of three types, namely :
- Striated or Skeletal or Voluntary muscles.
 - Unstriated or Smooth or Involuntary muscles and
 - Cardiac muscles.
27. Collenchyma are living tissues with thick corners due to deposition of cellulose and pectin whereas sclerenchyma are thick-walled lignified dead tissues.

33. The tissues containing only one type of cells are called simple tissues.
 Plants contain the following three types of simple tissues:
- Parenchyma
 - Collenchyma
 - Sclerenchyma
34. Simple tissues—Parenchyma, collenchyma, sclerenchyma.
 Complex tissues—Xylem, phloem.
35. Smooth muscle tissues are found in the walls of all tubular organs, such as stomach, intestine, ureter and bronchi, etc.
36. Collenchyma are circular, oval or polygonal cells located below the epidermis of dicotyledon stem. Its function is to provide mechanical support and elasticity.
37. The cells of meristem continuously divide and thus help in increasing the length and the girth of the plant.
38. Chlorenchyma are chlorophyll containing parenchyma and their function is to manufacture starch by the process of photosynthesis.

39. Vascular tissues transport :
- (i) water and dissolved minerals from roots to various parts of plants body (Xylem).
 - (ii) prepared food material from leaves to different plant parts (Phloem).

40. Comparison of three types of meristems :

Apical meristem	Intercalary meristem	Lateral meristem
(i) It is located in roots and shoot tips. (ii) It leads to increase in length of the plant.	(i) It is situated between segments of permanent tissues. (ii) It leads to increase in length in the regions other than tips.	(i) It is situated along the sides of the stem and root. (ii) It leads to increase in girth of the plant.

41. Differences :

Squamous epithelium	Columnar epithelium
(i) Cells are flat with nucleus located at the basal part. (ii) It occurs in air sacs and blood vessels.	(i) Cells are elongated with nucleus located at centre. (ii) It occurs in stomach as well as intestine.

(iii) Their main function is to provide mechanical support.	(iii) Their main function is to transport water, inorganic salts and various food materials to different parts of plant body.
(iv) They are of three types — Parenchyma, Collenchyma and Sclerenchyma.	(iv) They are of two types—Xylem and Phloem.

NCERT Questions

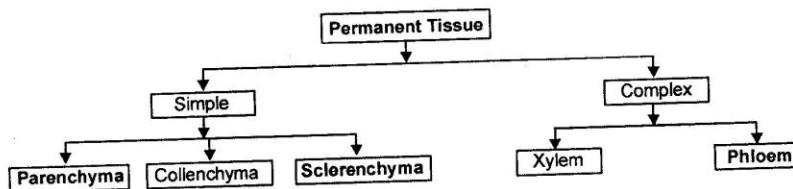
42. Areolar tissue acts as a support and packing tissue between organs lying in the body cavity and also helps in repair of tissues.
43. Four types of elements together make up the xylem tissues. They are tracheids, vessels, xylem fibres and xylem parenchyma.

44. Differences :

Simple tissues	Complex tissues
(i) They consist of only one type of cells. (ii) All the cells are similar in origin and structure.	(i) They are made up of more than one type of cells. (ii) The cells have different origin and structure.

45. The specific function of cardiac muscles is that they show rhythmic contraction and relaxation throughout the life without any fatigue under normal conditions.
46. Parenchyma tissues are found in soft parts of the plant such as cortex of roots, ground tissues in stems and mesophyll of leaves.
47. Cork acts as a protective tissue because it is thick layered and replaces the epidermis of stem. Cells of cork are dead and compactly arranged without intercellular spaces. They also have deposition of suberin on the walls that makes them impervious to gases and water.

48.



SHORT ANSWER TYPE QUESTIONS (II)

|| 3 MARKS ||

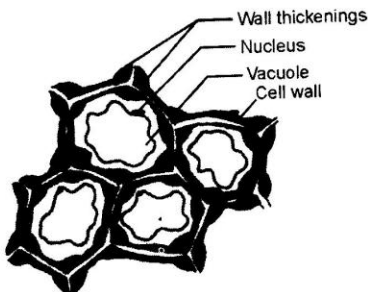
Previous Years' Questions

1. (a) Lateral Meristem: They help in increasing girth of stem and root
 (b) Intercalary meristem: They help in longitudinal growth of plants.
 (c) Apical Meristem: They help in increasing length of stem & root.
2. (a) Plasma membrane allows the entry and exit of some materials in and out of the cell. On the other hand it prevents movement of some other substances through it. Hence it is called selectively permeable membrane.
 (b) The flexibility of cell membrane enables the *Amoeba* cell to engulf in food and other material from its external environment. This process is known as endocytosis.

3. (a) It is possible due to Collenchyma tissue. It is located in stalk and stem of plants.

- The cells of this tissue are living, elongated and irregularly thickened at the corners.
- Intercellular space is very little.

(b)



4. **Bone** : Bone is a very strong and non-flexible tissue embedded in a hard matrix made up of both organic matter (protein) and inorganic matter (calcium and phosphorous compounds). It provides shape and also skeletal support to the body. It also anchors the muscles and supports the main organs of the body.

6. (i) Phloem conducts food in plants.

Differences between :

Xylem	Phloem
(i) Only one type of cells that is xylem parenchyma are living cells.	(i) It has three types of living cells— sieve tubes, companion cells and phloem parenchyma.
(ii) It conducts water and minerals from roots to aerial parts of the plants.	(ii) It translocates prepared food from leaves to storage organs and growing parts of body.
(iii) Xylem lies deeper in plant organs.	(iii) It is situated towards outer side.

(ii) **Phloem** : It is also called **bast** and is a living conducting tissue, composed of four elements — sieve tubes, companion cells, phloem parenchyma and phloem fibres.

- (a) **Sieve Tubes** : The sieve tubes do not have a nucleus but have a thin layer of cytoplasm.
- (b) **Companion Cells** : These are small elongated cells having dense cytoplasm and prominent nucleus.
- (c) **Phloem Parenchyma** : These are thin-walled living parenchymatous cells which are mainly concerned with storage and transportation of food.
- (d) **Phloem Fibres** : These are thick-walled, elongated dead sclerenchymatous cells which provide mechanical strength to the tissue.

7. (a) The given figures are of tracheids and vessels of complex tissue-xylem.

(b) **Tracheids** : They are long, tubular dead cells with lignified walls and tapering ends.

Vessels : They are very long tube-like structures formed by a row of cells placed end to end. The walls are lignified. They generally possess pits.

Cartilage : The cartilage is a specialised connective tissue which is compact and less vascular.

It provides support and flexibility to the body parts and also smoothen bone surfaces at joints. Cartilage has widely spaced cells and is present in the nose, ear, trachea and larynx.

Blood : It is a fluid (liquid) connective tissue. In this tissue, the cells move in a fluid matrix or medium called **blood plasma**. The blood plasma contains cells called blood corpuscles which include red blood corpuscles (RBCs), white blood corpuscles (WBCs) and platelets. RBCs and WBCs are living while plasma and platelets are non-living.

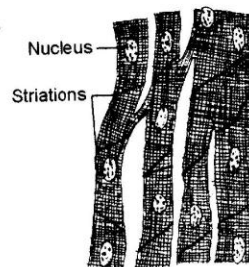
Blood flows and transports gases, digested food, hormones and waste materials to different parts of the body.

5. **Tissue A** : It is Adipose tissue. Adipose tissue is found below the skin and between internal organs.

Tissue B : These are cardiac muscles. They are present in the heart.

(c) Tracheids and vessels transport water and minerals vertically.

8.



Striated Muscle	Smooth Muscle
(i) It is present in limbs, tongue, etc.	(i) It is present in visceral organs.
(ii) It is arranged in bundles.	(ii) It is arranged in sheets.

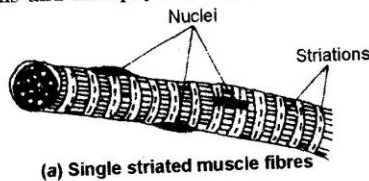
9. Collenchyma tissue is responsible for flexibility in plants.

Parenchyma	Collenchyma	Sclerenchyma
(i) Living cells and isodiametric in shape.	(i) Living cells, with thick corners.	(i) Dead cells, long and narrow with tapered ends.
(ii) Cell walls are thin and made up of cellulose.	(ii) Cell walls are thickened at corners with extra deposition of cellulose and pectin.	(ii) Cell walls are thick due to heavy deposition of lignin.
(iii) Cells have distinct nucleus and a large central vacuole.	(iii) Cells have distinct nucleus and dense cytoplasm.	(iii) Cells do not have nucleus and cytoplasm.
(iv) It stores food, waste products and forms packing tissue.	(iv) It gives mechanical support and carry out photosynthesis.	(iv) It gives rigidity and mechanical strength to the plant.
(v) It is present in all soft parts of plant, i.e., in stems, roots, leaves, flowers and fruits.	(v) It is present below the epidermis in stems and leaves.	(v) It is present in xylem and phloem, in shells of nuts, in hard seeds, pulp of pear, etc.

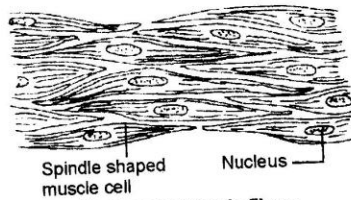
10. Parenchyma :

- It is the most common simple tissue in plants with relatively little specialisation.
- They are living cells which form the bulk of the plant body and possess the power of division.
- The cells are isodiametric in shape.
- The cell wall is thin and made up of cellulose.
- The cells are loosely packed with large intercellular spaces occurring in-between cells.
- The parenchyma tissues are found in soft parts of the plant such as cortex of roots, ground tissues in stems and mesophyll of leaves.

11.

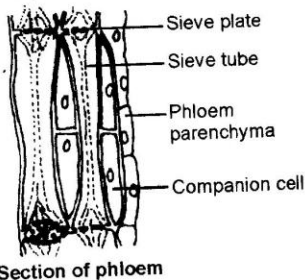


(a) Single striated muscle fibres



(b) Smooth muscle fibres

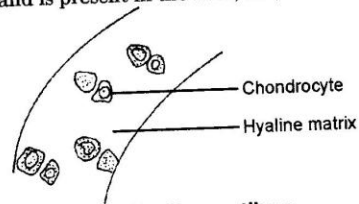
12. (a) The two types of complex tissues are xylem and phloem.
 (b) The tissue phloem is responsible for the translocation of food from the leaves to the different parts of the plant.



Section of phloem

13. Cartilage smoothens bone surfaces at joints.

Cartilage : The cartilage is a specialised connective tissue which is compact and less vascular having an extensive matrix of delicate network of collagen fibres and having cells, chondrocytes. It provides support and flexibility to the body parts and also smoothens bone surfaces at joints. Cartilage has widely spaced cells and is present in the nose, ear, trachea and larynx.



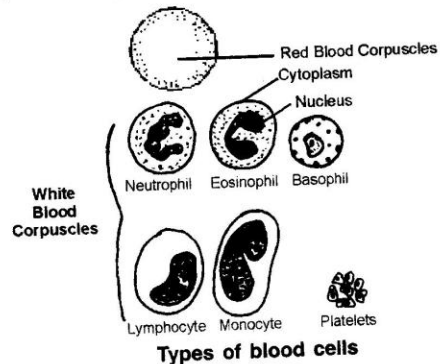
Hyaline cartilage

14. Smooth muscles are present in the iris of the eye. We cannot move or stop the smooth muscles at are will and hence they are called involuntary muscles. Smooth muscles are uninucleate whereas striated muscles are multinucleate.

15. The three different types of blood cells are red blood cells (RBCs), white blood cells (WBCs) and platelets.

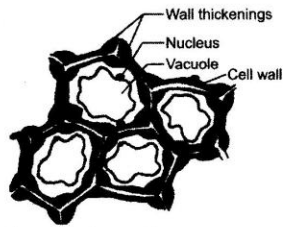
Functions :

- (i) RBCs transport respiratory gases, oxygen and carbon dioxide.
- (ii) WBCs of blood fight with diseases by producing antibodies and engulfing the germs.
- (iii) Blood platelets help in the clotting of blood.



Types of blood cells

16. (a)



A collenchyma tissue

- (b) (i) Sclerenchyma tissue.
 (ii) A chemical called suberin makes cork impervious to gases and water.
17. Phloem is made up of four types of elements – sieve tubes, companion cells, phloem fibres and phloem parenchyma.
 If the phloem at the base of a branch is removed, the area below the cut will not receive food from the leaves of that branch. But it will continue to receive food from the other branches and the plant will not die. Food can move in phloem in both the directions.

18. Differences :

Epithelial tissue	Connective tissue
(i) It is a covering or protective tissue.	(i) It connects various body organs.
(ii) Cells are tightly packed.	(ii) Cells are loosely spaced.
(iii) Epithelial tissues are separated from the underlying tissue by a fibrous membrane.	(iii) Connective tissue are not separated from other tissues by any membrane.

19. Xylem is a complex permanent tissue which conducts water and mineral salts upward from roots to leaves. The four elements of xylem are —
 Tracheids, vessels, xylem parenchyma and xylem fibres
 Functions of each of the elements are —
- (i) **Tracheids** – They transport water and minerals vertically.
 (ii) **Vessels** – They also transport water and minerals vertically.
 (iii) **Xylem parenchyma** – It stores food and helps in sideways conduction of water.
 (iv) **Xylem fibres** – They are mostly supportive in function.

20. Function:

- (a) **Squamous epithelium** : It forms lining of mouth and alimentary canal and protect these organs.
 (b) **Fluid connective tissue** : It transports gases, digested food hormones and waste materials to different parts of the body.
21. (a) **Simple Squamous Epithelium** : Simple squamous epithelium consists of extremely thin and flat cells forming a delicate lining, e.g., the oesophagus and the lining of the mouth. Skin epithelial cells are arranged in many layers to prevent the wear and tear. Since they are arranged in a pattern of layers, the epithelium is called Stratified Squamous Epithelium.

- (b) **Columnar Epithelium** : It consists of tall cells which are pillar-like having elongated nuclei. It is found in the inner lining of the intestine where absorption and secretion occurs. This columnar epithelium facilitates movement across the epithelial barrier.

22. The outermost layer of plant body such as stem, root and leaves are modified into protective tissue. They are of two types – Epidermis and cork.

Their functions are –

- (i) It protects the plant from excessive heat or cold and from the attack of parasitic fungi and bacteria.
 (ii) The cuticle of epidermis checks the excessive evaporation of water.
 (iii) It provides protection against mechanical injury, fire, etc.
23. Neurons are the structural and functional unit of the nervous system. Neurons are found in brain, spinal cord and nerves.

Functions :

- (i) Nervous tissue controls all the body activities.
 (ii) It coordinates among various body parts during any body function.
 (iii) Dendrons carry nerve impulses towards the cyton whereas axon carries impulses away from the cyton.
24. Xylem is composed of four different types of cells – tracheids, vessels, xylem parenchyma and xylem fibres. Xylem transports water and minerals vertically from roots to leaves. If the xylem of the roots of a plant are blocked, the root will not be able to transport water and mineral to the leaves. The plant will therefore not be able to manufacture its food and will die.

25. Differences :

Bone	Cartilage
(i) Bones are hard and non-flexible.	(i) Cartilages are flexible.
(ii) Blood vessels present.	(ii) Blood vessels absent.
(iii) Matrix is made up of protein and mineral salts.	(iii) Matrix is made up of protein.
(iv) A narrow cavity is often present in the interior.	(iv) A narrow cavity is always absent.
(v) Matrix is arranged in concentric circles.	(v) Matrix is uniform, not in concentric circles.
(vi) It is porous.	(vi) It is non-porous.

26. **Parenchyma** : It is the most common simple tissue in plants with relatively little specialisation. They are living cells which form the bulk of the plant body and possess the power of division.

Functions of Parenchyma :

- (i) The main function of parenchyma is to store and assimilate food and serve as food storage tissue.

- (ii) Due to turgidity property, parenchyma forms the means of support to the stem of herbaceous plants.
 - (iii) Parenchyma cells of leaves containing chlorophyll are called chlorenchyma. They carry out photosynthesis.
 - (iv) Parenchyma cells of aquatic plants containing large air cavities are called aerenchyma, which give buoyancy to plants to help them float.
 - (v) Parenchyma serves as a packing tissue to fill the spaces between other tissues and maintain the shape and firmness of the plant.
 - (vi) Transport of materials through cells or cell walls of parenchyma cells.
27. (a) Tissue that forms the inner lining of our mouth – *Epithelial tissue*.
- (b) Tissue that stores fat in our body – *Adipose tissue*.
- (c) Tissue that transports food in plants – *Phloem*.
28. Function of –
- (a) **Stomata** : It allows gaseous exchange between the plant and the atmosphere.
- (b) **Root nodules** : It fixes atmospheric nitrogen in the soil.
- (c) **Cardiac muscle fibre** : Rhythmic contraction and relaxation of heart throughout life.

Important Questions

29. (i) Complex tissue (Phloem)
- (ii) Meristematic tissue
- (iii) Stomata.
30. (a) **Function of Areolar tissue** : It joins different tissues and helps in keeping the organs in place and in normal shape.
- (b) **Function of Tendon** : It forms extensible attachment of muscles to bones.
- (c) **Function of Ligament** : It connects bone to bone at joints and holds them in position.
31. The common simple tissues of plant body along with functions are as follows :
- (i) **Parenchyma** : It stores and assimilates food and serves as food storage tissue.
- (ii) **Collenchyma** : It provides mechanical support and elasticity, and thus is a mechanical tissue.
- (iii) **Sclerenchyma** : It provides mechanical strength to the plants.
32. Tissues are a group of cells of the same origin, which are similar in structure and function.
- Functions of connective tissue :**
- (i) They connect different tissues and organs.
- (ii) They provide the structural framework and support to the body.
- Difference between ligament and tendon :**
- Ligaments** are elastic and connect bone to bone whereas **tendons** are strong and connect muscles to bones.

33. Connective tissue contains the following types of cells :
- (i) **Fibroblasts** : They form ground substance and fibres.
- (ii) **Adipose Cells** : They store fats in their vacuoles.
- (iii) **Macrophages** : These may be free moving or fixed phagocytes (leucocytes or WBCs). They are involved in the destruction and removal of invading bacteria, foreign bodies and damaged cells from tissues.
- (iv) **Mast cells** : They secrete substances such as heparin, histamine and serotonin. They promote inflammation of the infected area.
- (v) **Immunocytes** : These include cells such as lymphocytes and plasma cells both producing antibodies for the immune response.
34. The functions of skeletal connective tissue are given below :

- (i) It forms the supporting framework of body.
- (ii) It protects vital organs of body, e.g., brain, heart, lungs, etc.
- (iii) It gives definite shape to the body.
- (iv) It provides surface for attachment of muscles to increase their efficiency.
35. The functions of plasma of blood are given below :
- (i) It transports nutrients from intestine to different body parts.
- (ii) It transports oxygen from lungs to body tissues and also transports carbon dioxide from body organs to the lungs.
- (iii) It transports blood from heat for homeothermy.
- (iv) It transports wastes from the body tissues to the kidneys.
- (v) Plasma proteins, prothrombin and fibrinogen help in blood clotting.
- (vi) Plasma protein globulins act as antibodies and provide immunity.
36. The functions of epithelial tissues are as follows :
- (i) They protect the inner or underlying cells from injury, drying, bacterial and chemical effects.
- (ii) They form lining of various internal body parts.
- (iii) They help in the absorption of water and other nutrients.
- (iv) They also help in excretion or elimination of waste.

37. Differences :

Tracheids	Vessels
(i) They are unicellular.	(i) They are multicellular.
(ii) The ends are tapering or oblique.	(ii) The ends are rounded or transverse.
(iii) They are small-sized.	(iii) They are large-sized.
(iv) More lignified, so have narrow lumen.	(iv) Less lignified, so have wide lumen.
(v) Found in pteridophytes (ferns), gymnosperms and a few angiosperms.	(v) Found only in angiosperms.

38. Differences :

Fibres	Sclereids
(i) These are elongated cells.	(i) These are broad.
(ii) These have tapering ends.	(ii) These have blunt ends.
(iii) These are usually unbranched.	(iii) These may be branched or unbranched.
(iv) These are formed from meristematic cells.	(iv) These are formed from parenchyma cells.

39. Differences :

Blood	Lymph
(i) It is red vascular tissue.	(i) It is white vascular tissue.
(ii) It occurs in blood vessels.	(ii) It occurs in lymph vessels and around the body tissues.
(iii) It is formed of plasma, erythrocytes, leucocytes and platelets.	(iii) It is formed of plasma and only leucocytes.
(iv) Haemoglobin is present in RBCs.	(iv) Haemoglobin is absent.
(v) Its functions include transportation of materials, defence, blood clotting, etc.	(v) It acts as an intermediary between blood and tissue.

40. Differences :

Axon	Dendron
(i) It is always single in number.	(i) It may be one or more in number.
(ii) It is long and may or may not be branched.	(ii) It is small-sized and is always branched.
(iii) It conducts nerve impulses away from cyton, so are efferent in nature.	(iii) It conducts nerve impulses towards the cyton, so are afferent in nature.

41. Blood is a fluid connective tissue. In blood, the cells move in a fluid matrix (or medium) called blood plasma. The cells in blood differ from the other connective tissue cells, both in structure and functions.

The blood plasma is a straw coloured, slightly alkaline fluid. Blood plasma contains cells called blood corpuscles and blood platelets. Blood cells are of two types— Erythrocytes (red blood corpuscles or RBCs) and Leucocytes (white blood corpuscles or WBCs).

Blood circulates within the blood vessels throughout the body and thus connects every part of the body.

NCERT Questions

42. Three features of cardiac muscles are :

- (i) Cardiac muscles are composed of branched, cylindrical and uninucleate cells.
- (ii) They have intercalated discs and don't feel fatigue under normal condition.
- (iii) They are involuntary in action and occur in the heart only. The muscles of the heart show rhythmic contraction and relaxation throughout life.

43. The difference on the basis of their cell wall is :

Parenchyma	Collenchyma	Sclerenchyma
Cell walls are thin and made up of cellulose.	Cell walls are thickened at corners with extra deposition of cellulose and pectin.	Cell walls are thick due to heavy deposition of lignin.

44. Functions of stomata :

- (i) Exchange of gases, i.e., O₂ and CO₂ between the plants and the atmosphere takes place through stomata.
- (ii) Plants eliminate excessive water in the form of vapour through stomatal openings.
- (iii) Stomatal opening gets closed when there is shortage of water. Thus, reduces loss of water. Stomatal openings also close down during night. Thus, stomata regulate water loss from plants, i.e., they regulate transpiration.

LONG ANSWER TYPE QUESTIONS

Previous Years' Questions

1. (a) Differences :

Tendon	Ligament
(i) It is strong and non-flexible.	(i) It is elastic and flexible.
(ii) It joins muscles to bones.	(ii) It joins bones to bones.
(iii) It is formed of white fibrous connective tissue.	(iii) It is formed of yellow fibrous connective tissue.

(any two)

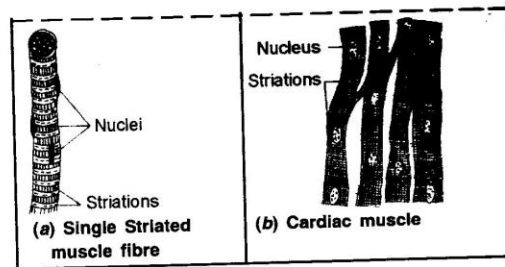
|| 5 MARKS ||

- (b) Phloem consists of four elements — Sieve tubes, companion cells, phloem parenchyma and phloem fibres.
- (c) Cardiac muscles show rhythmic contraction and relaxation of the heart and help to pump and distribute blood to various parts of the body.
- (d) (i) Squamous epithelium
(ii) Parenchyma.
- (e) Ciliated columnar epithelium pushes the mucus forward in the respiratory tract to clear it.

2. Muscles present in heart is cardiac muscles and that present in limbs is voluntary or striated muscles.

Differences :

Striated muscle	Cardiac muscle
(i) It is arranged in bundles.	(i) It is arranged as a network.
(ii) Its ends are blunt.	(ii) Its ends are flat and zig-zag.



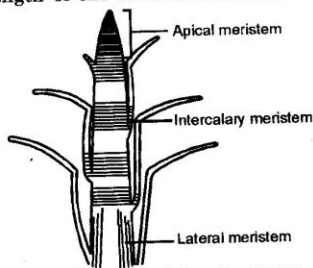
3. **Differences :**

Striated muscle	Unstriated muscle	Cardiac muscle
(i) It is present in limbs, tongue, etc.	(i) It is present in visceral organs.	(i) It is present in myocardium of heart.
(ii) It is arranged in bundles.	(ii) It is arranged in sheets.	(ii) It is arranged as a network.
(iii) Its ends are blunt.	(iii) Its ends are tapering.	(iii) Its ends are flat and zig-zag.
(iv) Its surface covers the sarcolemma.	(iv) Its surface covers the plasma membrane.	(iv) Its surface covers the sarcolemma.
(v) The cells of this tissue are multinucleate.	(v) The cells of this tissue are uninucleate.	(v) The cells of this tissue are uninucleate.
(vi) It contracts rapidly but soon undergoes fatigue.	(vi) It contracts slowly and does not get fatigued.	(vi) It contracts rapidly but does not get fatigued.
(vii) It is striated.	(vii) It is non-striated.	(vii) It is striated.
(viii) It is voluntary.	(viii) It is involuntary.	(viii) It is involuntary.
(ix) It is also called skeletal or voluntary muscle.	(ix) It is also called unstriated or involuntary muscle.	(ix) It is also called involuntary or heart muscle.
(x) Alternate light and dark bands or striations.	(x) No striations.	(x) Faint regular striations.

4. (a) **Meristematic tissue (Meristems) :** It consists of undifferentiated, actively dividing cells. Meristematic tissues are growth tissues and are found in those regions of the plant that grows, for example, the root tip, shoot tip and cambium. These tissues are living and bring about an increase in the length and girth (thickness) of the plant. According to their position in the plant, meristems are apical, lateral and intercalary.

(b) **Types of Meristems :**

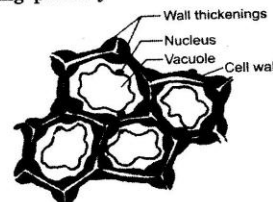
- (i) **Apical meristems :** They are present at the growth tips of stems and roots. They act as pro-meristems from which other meristems are derived and help in increasing the length of the stem and the root.



Location of meristematic tissue in plant body

- (ii) **Lateral meristems (cambium) :** They lie on the lateral sides of stem and root and help in increasing the girth of the stem or root. They act as secondary meristems.
- (iii) **Intercalary meristems :** They lie at the base of the leaves or internodes on twigs, and help in longitudinal growth of plants by adding primary tissues.

5. (a)



Transverse section of Collenchyma tissue

(b) **Differences :**

Parenchyma	Collenchyma
(i) Living cells and isodiametric in shape.	(i) Living cells, cells with thick corners.
(ii) Cell walls are thin and made up of cellulose.	(ii) Cell walls are thickened at corners with extra deposition of cellulose and pectin.