

### ONE MARK QUESTIONS

1. Why does epidermal tissue not have intercellular space?

or

What is the function of epidermis in plants?

Ans :

Epidermal tissue forms a protective layer for plants and helps to protect the internal parts of plants which prevent the plant from loss of water, attack by parasitic fungi and outer injury.

2. What is the location of stratified squamous epithelium? Also, mention its functions.

Ans :

Stratified squamous epitheliums are found in the skin. They are present in layers to prevent wear and tear.

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3. What is the structure of a neuron?

Ans :

Building block of a nervous tissue is a neuron. It has a thread-like structure with axon and cell body.

4. Mention the types of simple and complex tissues.

Ans :

**Simple** : (i) Sclerenchyma, (ii) Parenchyma, (iii) Collenchyma

**Complex** : (i) Phloem (ii) Xylem

5. Where can we find apical meristem?

Ans :

It is found in the growing tips of roots and stem. The length of roots and stem is increased due to the presence of apical meristem.

6. Which tissue is present in the husk of a coconut?

Ans :

Sclerenchyma.

7. What do you mean by aerenchyma?

Ans :

Aerenchyma is the cell with large air-filled cavities of parenchyma. It helps aquatic plants to float.

8. Name the two types of tissues.

Ans :

- (i) Animal tissues  
(ii) Plant tissues

9. Name two types of plant tissues.

Ans :

- (i) Permanent tissue  
(ii) Meristematic tissue

10. Define differentiation.

Ans :

The process of taking up permanent size, shape and function of cell is called differentiation.

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11. Give the types of meristematic tissues.

Ans :

- (i) Intercalary tissue — nodes  
(ii) Apical tissue — tips of shoot and roots  
(iii) Lateral tissue — stem sides

12. Why does the growth of plants occur only in certain specific regions?

Ans :

Growth of plants occurs only in certain specific region because the meristematic tissue is located only at these points.

13. Name the tissues which are present in the plants at the nodes.

Ans :

Intercalary tissues.

14. Mention the different types of blood cells.

Ans :

- (i) WBCs  
(ii) RBCs  
(iii) Platelets

15. Define tracheids.

Ans :

Tracheids have tapering ends and are basically elongated cells.

16. Define guard cells.

Ans :

Guard cells are kidney-shaped epidermal cells and a pair of these cells bound each stomata.

17. Which tissue gives flexibility in plants?

Ans :

Collenchyma.

18. Mention the functions of cuboidal epithelium.

Ans :

- (i) Absorption
- (ii) Excretion
- (iii) Secretion
- (iv) Mechanical support

19. What is the use of tissues in multicellular organisms?

Ans :

Tissue provides structural and mechanical strength as well as to allow division of labour in multicellular organisms.

20. Where is chlorenchyma tissue present?

Ans :

It is present in the centre of stems and roots. If it has chlorophyll then it is called chlorenchyma. It is present in green leaves.

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21. Where is parenchyma tissue present?

Ans :

Parenchyma tissue is present below the epidermis.

22. \_\_\_\_\_ tissues make the coconut husk.

Ans :

Sclerenchymatous tissue

23. Name the tissue which is responsible for the movement of our body?

Ans :

A combination of following two tissues is responsible for the movement of our body :

- (i) Muscular tissue
- (ii) Nervous tissue

24. Write the main functions of collenchyma?

Ans :

The main functions of collenchyma are to provide mechanical support, tensile strength, elasticity and flexibility to stem, leaf stalks and leaves.

25. Write the various functions of all types of epithelial tissues?

Ans :

Epithelial tissues help in protection, absorption, excretion, exchange of respiratory gases and secretion.

26. What is basement membrane?

Ans :

It is very thin non-cellular membrane on which cells of epithelial tissue rest. It also separates the epithelial tissue from the underlying tissues.

27. How is ligament different from tendons?

Ans :

Ligaments are elastic connective tissue which attach bone to bone to keep them in their place. Tendons are less elastic connective tissues which attach muscles to a bone.

28. What are blood platelets?

Ans :

Blood platelets are minute (about 2 to 4  $\mu\text{m}$  in diameter), anucleated, disc like bodies. The main function of platelets is to help in clotting of blood.

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29. What is the function of connective tissue?

Ans :

Connective tissue connects different tissues and organs. It provides support to different parts of the body by forming packing around different organs of the body.

30. Name the connective tissue that is found between skin and muscles.

Ans :

Areolar connective tissue fills the space between skin and muscles.

31. What will happen if ligaments are over stretched?

Ans :

Sprain will occur.

32. What will happen if apical meristem is damaged?

Ans :

Growth of plant in length will stop.

### THREE MARKS QUESTIONS

33. Mention the functions of bone.

Ans :

- (i) Provides support to skeletal
- (ii) Provides shape to body
- (iii) Protects the internal organs
- (iv) Support muscles

34. Mention the functions of cartilage.

Ans :

- (i) Support to the body
- (ii) Flexibility
- (iii) At joints, smoothens surface

35. What are permanent tissues?

Ans :

The cells of meristematic tissue lose the ability to divide and get differentiated into specialised cells. These differentiated cells form different types of tissues which are known as permanent tissues. Some examples of permanent tissues are : parenchyma, sclerenchyma, etc.

36. What are areolar tissues' junctions?

**Ans :**

Areolar tissues are connective tissue found in animals. We can find them between skin and muscles, around blood vessels and nerves, in bone marrow. These tissues fill the space inside the organs. They support internal organs and help to repair tissues.

37. What are the four important types of tissues found in animal?

**Ans :**

The four animal tissues are :

- (i) Epithelial tissues,
- (ii) Connective tissues,
- (iii) Muscular tissues, and
- (iv) Nervous tissue.

38. What is the main function of vascular tissue in plants?

**Ans :**

Vascular tissue transport :

- (i) Water and dissolved minerals from roots to various parts of the plant (xylem).
- (ii) Prepare food material from leaves to different plant parts (phloem).

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39. Why do meristematic cells lack vacuoles?

**Ans :**

Meristematic cells divide frequently to give rise to new cells. So, they need dense cytoplasm and soft cell wall. Vacuoles cause hindrance in cell division as they are full to cell sap and provide turgidity and rigidity to the cell.

40. What is epithelial tissue?

**Ans :**

Epithelial tissue : Epithelial tissue forms covering of entire surface of the body and lines the internal organs, because of this epithelial tissue is called protective tissue. It also forms a barrier to keep different body system separate. In this tissue, cells are closely associated and arranged on a very thin extracellular fibrous basement membrane. Epithelial tissue may be composed of one (simple epithelium) or more layers of cells (compound epithelium).

41. What are muscular tissue? What is their function?

**Ans :**

This is a specialised tissue which is composed of contractile, fibre-like cell. This tissue is responsible for movement in our body.

**Function :** The movement of the body or limbs is

brought about by contraction and relaxation of contractile proteins present in muscle cells.

42. What are the three types of muscle fibres (muscle cells)?

**Ans :**

These are three types of muscle fibres :

1. Striated muscle (skeletal muscle or voluntary muscle),
2. Unstriated muscle (smooth muscle or involuntary muscle),
3. Cardiac muscle.

43. Write the characteristics of collenchyma.

**Ans :**

The cells in this type of tissue are living, elongated and thickened with cellulose at the corners. There is very little intercellular space. This tissue provides flexibility and mechanical support to plants. This tissue is found in hypodermis of stems and leaf stalks.

44. Describe the structure of sclerenchyma. Write its major functions.

**Ans :**

Sclerenchyma is the chief mechanical tissue of plants. The cells of this tissue are usually long, narrow and pointed at both ends. Due to deposition of lignin their walls are often very highly thickened hence the lumen or cell cavity is nearly obliterated. They are usually provided with simple pits which may be oblique or straight. It provides strength to the plant parts.

45. What are protective tissues?

**Ans :**

All parts of plants, e.g. leaves, flowers, stem, and root are covered by a single outermost protective layer called epidermis. It consists of rectangular, closely fitted relatively flat cells which lack intercellular spaces. Usually it is one cell thick and is covered with cutin. Epidermis protects internal tissues of the plant. In old dicot plants, epidermis is replaced by secondary meristem which cuts cells toward outside. Cork cells do not have intercellular spaces and are dead cells. The walls of cork cells are heavily thickened due to the position of suberin. Presence of suberin makes the cells impervious to gases and water and thus prevents evaporation of water.

46. Explain how the bark of a tree is formed. How does it act as a protective tissue?

**Ans :**

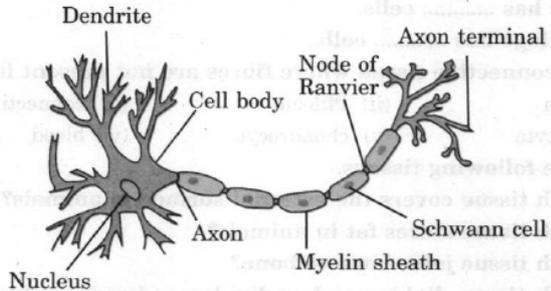
As trees grow old, a strip of secondary meristem replaces the epidermis of the stem. Cell on the outside are cut off this layer. This forms the several layer thick cork or the bark of the tree.

Bark is a mass of dead tissue lying in the peripheral region of the plant body as a hard dry covering. Its function is protection. It protects the inner tissues against the attack of fungi and insects, against loss of water by evaporation, etc.

47. What is the structure of a neuron?

Ans :

A neuron has a cell body with a nucleus and cytoplasm. A long and thin hair-like structure arises from the body. Every neuron has one long part known as the axon, and many short and small branched structures known as dendrite. A single nerve cell is known as neuron and length of some neuron may be even a metre.



48. What is a cardiac muscle? Mention its features too.

Ans :

Cardiac muscle is an extremely specialized tissue developed to pump blood throughout the body.

Features :

- (i) Cylindrical in shape
- (ii) Branched and single celled
- (iii) Striated muscle fibres
- (iv) Involuntary in nature

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49. Differentiate between bone and cartilage.

Ans :

Bone	Cartilage
Porous	Non-porous
Non-flexible and hard	Flexible and not very hard
Blood vessels present	Blood vessels absent
Matrix is made up of mineral and protein salts.	Matrix is made up of proteins.

50. Complete the sentences.

- (i) \_\_\_\_\_ conducts minerals and water.
- (ii) \_\_\_\_\_ conducts food in higher plants.
- (iii) Blood is a \_\_\_\_\_ type of tissue.
- (iv) Bone has \_\_\_\_\_ cells.
- (v) Cartilage has \_\_\_\_\_ cells.
- (vi) The connective tissue where fibres are not present is \_\_\_\_\_.

Ans :

- (i) Xylem
- (ii) Phloem
- (iii) connective
- (iv) osteocyte
- (v) chondrocyte
- (vi) blood

51. Name the following tissues.

- (i) Which tissue covers the external surface in animals?
- (ii) Which tissue stores fat in animals?
- (iii) Which tissue joins bone to bone?
- (iv) Which tissue divides and re-divides and responsible for growth in plants?

Ans :

- (i) Epithelial tissue
- (ii) Adipose tissue
- (iii) Ligament
- (iv) Meristematic tissue

52. Define stomata with diagram.

Ans :

They are small holes on the surface of leaves which helps in exchange of gases and also in transpiration.

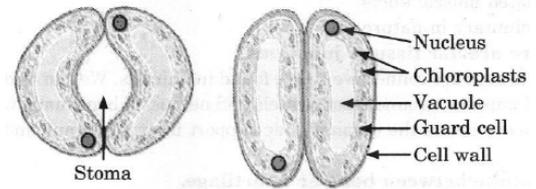


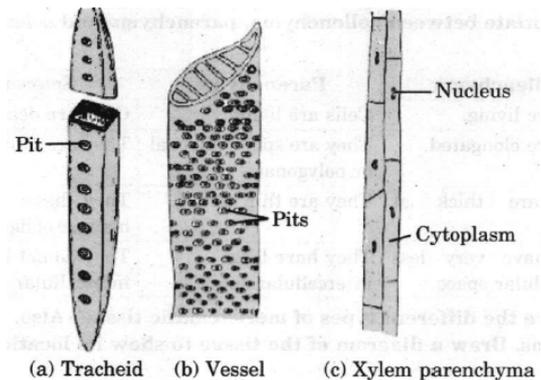
Figure: (a) Open Stomata (b) Closed Stomata

53. Name and mention the function of each xylem cell with diagram.

Ans :

Name and function of xylem cells are :

- 1. Xylem parenchyma — It stores food. It also helps in sideways flow of water.
- 2. Xylem fibres — They are supportive.
- 3. Tracheids and vessels — They help in transportation of minerals and water.



54. Differentiate between tendon and ligament.

Ans :

Tendon	Ligament
Flexible and strong	Flexible and elastic
Connects bone to muscles	Connects bone to bone
Strong and flexible	Elastic and flexible

55. Differentiate between striated muscles and unstriated muscles.

Ans :

Striated muscles	Unstriated muscles
Voluntary muscles	Involuntary muscles
Shows alternate light and dark bands	Such bands are not present.
Skeletal muscles	Smooth muscles
They are cylindrical.	They are tapering.
They are multinucleated.	They are uninucleated.

56. Differentiate between blood and bone.

Ans :

Blood	Bone
Liquid tissue	Hard tissue
Helps to transport substances	Helps in the movement and support our body
It has RBCs, WBCs, plasma and blood platelets.	It has osteocytes.

57. Blood is called the connective tissue. Give reason.

Ans :

Blood is made up of cells and plasma (fluid). Red blood cells, white blood cells and platelets are also present in blood. Plasma collects all these cells. Blood transports water and foods to various parts of our body and connects them.

58. Differentiate between collenchyma, parenchyma and sclerenchyma.

Ans :

Collenchyma	Parenchyma	Sclerenchyma
Cells are living.	Cells are living.	Cells are dead.
They are elongated.	They are spherical, oval or polygonal.	They are narrow and long.
They are thick at corners.	They are thin walled.	They have a thick wall because of lignin deposition.
They have very less intercellular space	They have large intercellular space.	They do not have intercellular space.

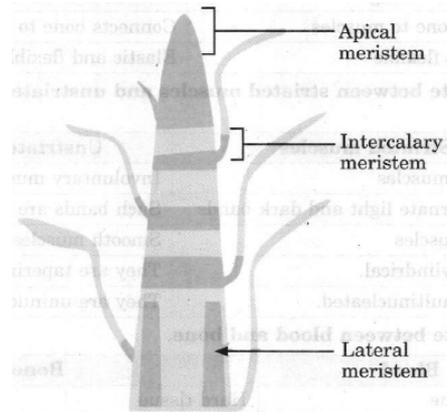
59. What are the different types of meristematic tissue? Also, mention their functions. Draw a diagram of the tissue to show its location.

Ans :

There are three types of meristematic tissues which

are as follows :

1. Apical meristem : Growth in length
2. Lateral meristem : Growth in breadth or thickness
3. Intercalary meristem : Growth in inter-nodes



60. What are the four main functions of epithelial tissue?

Ans :

The main functions of epithelial tissue are :

1. It forms the outer layer of skin and hence it protects the underlying cells from drying, injury, bacterial and chemical effects.
2. It forms lining of mouth, alimentary canal and other internal organs and thus protects these organs.
3. It helps in absorption of water and other nutrients in alimentary canal.

Some of them are greatly specialized and perform secretory function.

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61. What are characteristic structural features of meristematic cells?

Ans :

Meristematic cells have :

1. Thin cell walls.
2. Abundant or dense cytoplasm and single large nucleus.
3. Spherical, oval, polygonal or rectangular shape.
4. No intercellular spaces between them.
5. Either no vacuoles at all or few vacuoles.

62. List any four salient features of meristematic tissue?

Ans :

- (i) This tissue consists of actively dividing cells.
- (ii) This tissue is present in growing regions of plants.
- (iii) In this tissue, cells are packed closely without intercellular spaces.
- (iv) Cells of this tissue have thin cell walls, dense cytoplasm and prominent nuclei.

63. There was a paralytic patient, who cannot walk.

- (i) Which tissues are responsible for the movement of the body?
- (ii) Which tissues are present in spine and brain?

Ans :

- (i) Muscular and nervous tissues are responsible for the movement of the body.

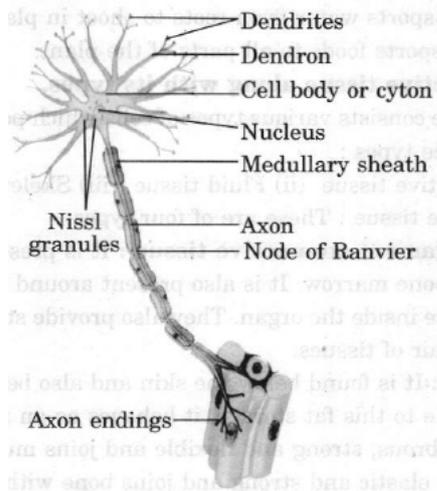
- (ii) Nervous tissues are present in spine and brain.

## FIVE MARKS QUESTIONS

64. Explain the structure of a nervous tissue with details about its location and function.

Ans :

**Structure :** It consists of nerve cells joined end to end. A nerve cell has a cell body with cytoplasm and nucleus. From that, long and thin hair like structure arise. Every neuron has one long part known as the axon, and many short and small branched structures known as dendrite. A single nerve cell is known as a neuron and sometimes may even be a metre long.



**Location :** Nervous tissue is found in spinal cord, brain and nerves.

**Function :** Nervous tissues are a specialized cell that does the function of exchanging information. Nervous tissues transmit and receive stimuli from one organ to another organ in the body and allow moving muscles and react to stimuli.

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65. Explain the structure of parenchyma. What are its major modifications?

Ans :

**Parenchyma :** It is the basic or fundamental tissue found in plants. Cells of this tissue are thin walled, circular or polygonal. They are living with a nucleus and a vacuole. Intercellular spaces are present between the cells of this tissue. Two modifications of parenchyma are chlorenchyma and aerenchyma.

- (a) **Chlorenchyma :** Sometimes cells of the parenchyma contain chlorophyll and perform photosynthesis. This kind of parenchyma is known as chlorenchyma.
- (b) **Aerenchyma :** In aquatic plants, parenchyma contains big air spaces in between them. Such a parenchyma tissue is known as aerenchyma.

66. Explain plant tissue in detail.

Ans :

Plant tissue is mainly divided into two categories :

- Meristematic tissue
- Permanent tissue

**Meristematic tissue :** The cells divide very fast. It helps in the growth of the plants. The shape of the cell is oval, round and polygonal. There is no intercellular space. There are three types of meristematic tissues :

- (i) Apical meristem : Growth in length
- (ii) Lateral meristem : Growth in breadth or thickness
- (iii) Intercalary meristem : Growth in inter-nodes

**Permanent tissue :** When meristematic tissue stops dividing and gets mature, then it forms permanent tissue. There are two types of permanent tissues :

- (i) Simple tissue
  - (ii) Complex tissue
- (i) **Simple Tissue :** Simple tissues are same in structure and perform the same functions. There are three types of simple tissues :
- (a) Parenchyma : It is present in soft parts.
  - (b) Collenchyma : It provides mechanical strength to plants and is found in stalks.
  - (c) Sclerenchyma : It provides support as well as flexibility to plants.
- (ii) **Complex Tissue :** They are different in structure but perform the same function in group. There are two types of complex tissues :
- (a) Xylem : It transports water from roots to shoot in plants.
  - (b) Phloem : Transports foods to all parts of the plant.

67. Explain connective tissue along with its types.

Ans :

Connective tissue consists various types of cells which perform the same function. These are of three types :

- (i) Proper connective tissue
- (ii) Fluid tissue
- (iii) Skeletal tissue

Proper connective tissue : These are of four types—

**Areolar and ligament connective tissue :** It is present between muscles and skin and in the bone marrow. It is also present around nerves and blood vessels. They fill the space inside the organ. They also provide strength to internal organs and helps in repair of tissues.

**Adipose tissue :** It is found below the skin and also between internal organs. It stores fat and due to this fat storage, it behaves as an insulator.

**Tendon :** It is fibrous, strong and flexible and joins muscles with bone.

**Ligament :** It is elastic and strong and joins bone with bone.

Fluid tissue consists of :

**Blood :** It is a liquid tissue called plasma which has RBCs, WBCs, plasma and blood platelets. It helps to transport substances like gases, hormones, digested food and waste material.

**Lymph :** It transports digested fat and white blood cells in plasma.

Skeletal tissue is made up of :

**Bone :** It is a hard tissue which helps in the movement and support of our body.

**Cartilage :** It softens the bone surface at joints. It is

found in our ear, nose, trachea and larynx.

68. Explain epidermis in plants.

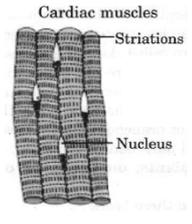
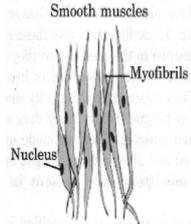
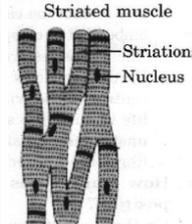
Ans :

It forms the outermost layer of the plant. It is comprised of a single cell layer. This tissue forms a protective layer for plants and that helps to protect the internal parts of plants. It helps in protection against loss of water, attack by parasitic fungi and mechanical injury.

Epidermis has small pores known as stomata. They are small holes or pores on the surface of leaves which help in exchange of gases and also in transpiration. Epidermis has long parts like hair that provide greater surface area for water absorption in roots. In plants found in deserts, epidermis consists of a thick waxy coating called cutin which makes the outer layer water resistant.

69. Give the difference between the types of muscle fibres diagrammatically.

Ans :

Cardiac muscles	Smooth muscles	Striated muscles
They are present in the heart.	They are present in lungs and alimentary canal.	Connected with bones.
They are involuntary.	They are involuntary.	They are voluntary.
They have one nucleus.	They have one nucleus.	They have many nuclei.
They are branched.	They are spindle shaped.	They are long and cylindrical.
		

70. Explain complex tissue in plants.

Ans :

Generally, complex tissues consist of more than one type of cell. They are different in structure but together perform the same function.

There are two types of complex tissues :

- Xylem** : It transports water from roots to shoot in plants. The movement is only in one direction that is, from roots to shoot. It provides mechanical support to the plant. It has mostly dead elements. Its elements are tracheids, xylem sclerenchyma, xylem parenchyma, vessel elements.
- Phloem** : Conduct foods to all parts of the plant. The movement of phloem is bidirectional that is, movement in both the directions is possible. Its elements are mostly living. Its elements are sieve

tubes, phloem parenchyma, companion cells and intermediary cells.

Above given both complex tissues are conductive tissues and form the vascular bundle.

71. Explain the structure of three types of muscle fibres. Also write the locations where they are found in the body.

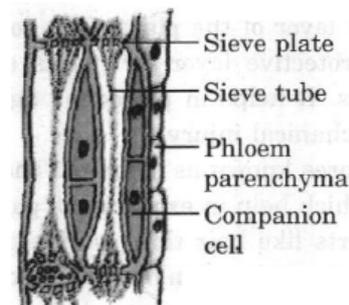
Ans :

The followings are the three types of muscle cells :

- Unstriated muscles (also known as smooth, involuntary muscles)** : This type of muscular tissue consists of spindle-shaped, long uninucleated cells. This type of muscles are present in alimentary canal, blood vessels, iris of eye, in ureters and bronchi of lungs, etc.
- Striated muscles (also known as voluntary muscles because of their function being in our control or will)** : This type of muscular cells are long multinucleated and enclosed in a membrane called sarcolemma. Each fibre has several longitudinal filaments embedded in cytoplasm. These filaments give these muscles striated appearance. These muscles are attached to the skeleton; so they are called skeletal muscles.
- Cardiac muscles** : These muscles are found in heart. They are not under the control of the will. They contract rhythmically and involuntarily throughout life without the sign of fatigue. Structurally they show the characters of both unstriated and striated muscles. They are made up of branched fibres. These fibres are uninucleated and show alternate light and dark bands (striation).

72. Draw a labelled diagram of section of a phloem.

Ans :



73. What is the difference between meristematic cells and permanent cells?

Ans :

Difference between meristematic cells and permanent cells :

Meristematic cells	Permanent cells
They have dense cytoplasm and a large centrally placed nucleus.	They have a large central vacuole and normal nucleus.

These cells are capable of dividing to _produce new cells.	They attain permanent shape and are not capable of producing new cells.
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Collenchyma cells may contain chlorophyll and can also help in the manufacture of starch and sugar.	They do not contain chlorophyll in any condition as they are dead cells.
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74. How many types of meristems are present in plants, on the basis of position?

Ans :

On the basis of location of meristem, it is classified into three types :

1. Apical meristem is present at the tip of stem, roots and their branches.
2. Intercalary meristem is found at the leaf base, above the nodes (i.e. at the base of internodes as in grasses) or below the nodes (i.e. at the uppermost region of internode as in mint).
3. Lateral meristem
4. Vascular cambium and cork cambium are the examples of lateral meristem.
5. Vascular cambium is found in vascular bundles while cork cambium is found underneath the bark of trees. Both of these cause increase in girth of plants.

75. Differentiate between parenchyma and collenchyma.

Ans :

Difference between parenchyma and collenchyma :

Parenchyma	Collenchyma
It is living and mainly storage tissue.	It is living and mainly provides tensile strength to stem and leaf stalk.
Parenchymatous cells have large intercellular spaces. Their walls do not have thickening at the corners.	Collenchymatous cells have very little intercellular spaces. They have thickening at corners of cell walls.

76. Differentiate between collenchyma and sclerenchyma.

Ans :

Difference between collenchyma and sclerenchyma :

Collenchyma	Sclerenchyma
The cells of collenchymas are living and have the cytoplasm and the nucleus.	The cells are dead. They do not have the cytoplasm and the nucleus.
The collenchyma cells have thickening of cellulose at the corners.	The sclerenchymatous cells have thickening of lignin.
They provide mechanical support and elasticity to the plant parts.	They mainly provide mechanical support and stiffness to plants or their parts.

77. Describe the structure of phloem.

Ans :

**Structure of phloem :** The main conducting part of the phloem is sieve tube which is formed of elongated cylindrical cells arranged in vertical rows. The walls between the cells have many minute pores through which food material can pass from one cell to the next. The porous walls between the cells is termed as sieve plate. Each sieve tube member is supported by a long parenchymatous cell called companion cell which helps the sieve tubes in the conduction of food material. Phloem also contains phloem fibres, which provide support. Another component of phloem is parenchyma cells which stores food.

78. Differentiate between chlorenchyma and arenchyma.

Ans :

Difference between chlorenchyma and arenchyma :

Chlorenchyma	Arenchyma
Parenchyma which contains chlorophyll is called chlorenchyma.	Parenchyma which has large air cavities is called aerenchyma.
Chlorenchyma is found in green parts, especially leaves of plants.	Aerenchyma is found in aquatic plants.
They perform photosynthesis.	They give buoyancy to the plants to help them float.

79. What is xylem? Explain its structure. Which one of its component is very important and why?

Ans :

Xylem is a complex plant tissue which transports water and dissolved minerals from roots to all other plant parts.

**Structure :** Xylem consists of four kinds of cells (also known as elements).

**Tracheids :** A tracheid is an elongated, hollow cell with its both ends tapering. The walls of these cells are thick by the deposition of lignin. At certain spots lignin is not present. These spots are termed as pits. The tracheids are dead cells.

**Vessels :** These are tube-like structures formed by a number of cells placed end to end with their transverse walls dissolved. The side walls of these tubes also have deposition of lignin. The thickening of the walls show various kinds of patterns. They are also dead cells.

**Xylem Parenchyma :** They are parenchymatous, thin walled, living cells. They help in lateral conduction of water and sap. They also store food.

**Xylem Fibres :** They are lignified dead fibres which provide mechanical support to plant.

The most important element of xylem is vessel because

most of the water and minerals are carried upward through this component of xylem.

80. Differentiate between :
- (i) Xylem and phloem
  - (ii) Vessel and sieve tube
  - (iii) Tracheid and vessel

Ans :

(i) Xylem and phloem

Xylem	Phloem
It consists of tracheids, vessels, xylem parenchyma and xylem fibres.	It consists of sieve tubes, companion cells, phloem parenchyma and phloem fibres.
Three components except xylem parenchyma are dead.	Three components except phloem fibres are living.
It transports water and minerals from roots to other parts of the plant.	It transports prepared food from leaves to the other plants.

(ii) Vessel and sieve tube

Vessel	Sieve tube
It is tabular system made up of a number of dead cells with hollow lumen.	It is a tabular structure made up of a number of living cells with vacuolated cytoplasm.
Vessel conducts water and minerals.	Sieve tube conducts organic nutrients.
The wall is lignified.	The wall is not lignified.
The wall is thick.	The wall is thin.
The end walls dissolve completely.	The end walls are perforated to form sieves plate.
Besides conduction of sap, a vessel provides mechanical strength.	It does not provide any mechanical strength.

(iii) Tracheids and vessel

Tracheids	Vessel
A vessel consists of a large numbers of cells fused together in a single life.	A tracheid consists of a single cell.
The ends are blunt.	The ends are pointed.
The walls between adjacent cells of a vessel are usually absent.	The walls between adjacent tracheids remain intact.
The vessel is quite long (about 10 cm).	The tracheid is comparatively short (generally 1 mm).
The wall is less thickened.	The wall is more thickened.
The lumen is wide.	The lumen is narrow.

81. What are three main categories of connective tissue?

Ans :

Categories of connective tissue are :

**Connective tissue proper :** There is a matrix in which generally two types of (white and yellow) fibres are present. In between these fibres some connective tissue cells are present. Example of this kind of connective tissues are aerolar tissue and adipose tissue.

**Skeletal tissue :** This type of tissues form the skeleton of an organism. It is of two types : Cartilage and bone.

- a. Cartilage has solid matrix called chondrin, in which fibres and cells known as chondrocytes are present. Usually cells are present in clusters of 2-3 cells in small spaces called lacunae. Cartilage is found in the regions of pinna, nose, trachea and larynx.
- b. In bones, matrix is formed of a protein called ossein impregnated with phosphate and carbonates of calcium and magnesium.

**Fluid tissue :** Blood and lymph are examples of fluid connective tissues. These are specialized connective tissues. It consists of liquid matrix with no fibres. In liquid matrix called plasma corpuscles remain suspended. Blood transports food material, gases and other substances to the various parts of the body.

82. Write main characteristic features of skeletal, smooth and cardiac muscles.

or

Differentiate between striated, unstriated and cardiac muscle fibres. Give three points of difference.

Ans :

	Character	Skeletal (striated muscles)	Smooth muscles	Cardiac muscles
1.	Shape of cell	Cells are long cylindrical, non-tapering and unbranched.	Cells are long with tapering ends (spindle shape) and unbranched.	Cells are non-tapering, cylindrical and branched.
2.	Nucleus	Many nuclei (multinucleated) which are situated towards the periphery of muscle fibre.	The cells have only one nucleus (uninucleated) situated in the centre.	Each cell contains one or two nuclei situated in the centre.
3.	Striations	Transverse alternate light and dark bands (striations) are present.	Striations are absent.	Cells have faint striations.
4.	Mode of contraction	Voluntary (work upon our will), contract rapidly but soon undergo fatigue.	The control of involuntary muscle is not under our will. Contract comparatively slow but do not fatigue.	Involuntary they rhythmically contract and relax throughout life without fatigue under normal conditions.
5.	Location	Hands, legs.	Wall of stomach, intestine, ureter, bronchi, etc.	Present in heart.

83. Explain the structure of a fluid connective tissue.

Ans :

Blood is a fluid connective tissue. Blood consists of :

1. Blood plasma, 2. Blood cells.

**1. Blood plasma :** It is the fluid matrix which contains 85 to 95% water, 7% different types of proteins, 0.9% of salts, about 0.1% glucose and a very small amount of hormones, wastes, etc. In the plasma, blood corpuscles (cells) are suspended.

**2. Blood cells :** Three kinds of blood cells are found suspended in the blood plasma.

These are : (i) Red blood corpuscles (Erythrocytes) or RBCs (ii) White blood corpuscles (leucocytes) or WBCs and (iii) Blood platelets.

**(i) Red blood corpuscles (Erythrocytes) or RBCs :** The red blood corpuscles are biconcave, disc-like cells which are devoid of nucleus. They contain a substance called haemoglobin because of this they appear red in colour. The most important function of the RBCs is the transport of oxygen and carbon dioxide.

**(ii) White blood corpuscles (Leucocytes) or WBCs :** These cells are comparatively large in size, colourless and irregular in appearance. They are devoid of haemoglobin. They protect our body from diseases by destroying germs.

**(iii) Blood platelets :** These are small, 2-4  $\mu$  in diameter. They are without nucleus. Their main function is to liberate some substances which helps in blood clotting.

(a) Exchange of gases in plants.

(b) Root nodules are found in leguminous plants. They harbour bacteria which can fix free atmospheric nitrogen into nitrates and nitrites which plants like pulses can use for protein synthesis.

(c) Cardiac muscles show rhythmic contraction and relaxation throughout life. Because of this heart can pump the blood.

**86. Differentiate between :**

(i) Meristematic cells and permanent cells

(ii) Parenchyma and collenchyma

(iii) Collenchyma and sclerenchyma

(iv) Sclerenchyma fibres and sclereids

**Ans :**

(i)

	<b>Meristematic Cells</b>	<b>Permanent Cells</b>
1.	Contains dense cytoplasm and a large centrally placed nucleus.	Contains large central vacuole and normal nucleus.
2.	Are capable of dividing into new cells.	Are not capable to produce new cells.

(ii)

	<b>Parenchyma</b>	<b>Collenchyma</b>
1.	It is living and mainly storage tissue. It may store waste products like tannin, resins, crystals, etc.	It is living and mainly provides tensile strength to the organ in which they are present.
2.	They may or may not have intercellular space. Their walls do not have thickening at the corners.	They usually do not have intercellular space. They have thickening at the corners of cell walls.

(iii)

	<b>Collenchyma</b>	<b>Sclerenchyma</b>
1.	Are living and have the cytoplasm and the nucleus.	Are dead and do not have the cytoplasm and the nucleus.
2.	They have thickening of cellulose and pectin at the corner of its cells.	They do not have such thickening.
3.	They provide mechanical support and elasticity to the organ of the plant.	They mainly provide mechanical support to plant and seed coat of plants such as nuts. It provides stiffness to the organ.

**84. Differentiate between bone and cartilage.**

**Ans :**

<b>Bone</b>	<b>Cartilage</b>
Bone is inflexible and hard.	Cartilage is usually flexible or elastic and soft.
Its matrix contains protein ossein and calcium phosphate.	The matrix of the cartilage contains protein chondri and usually lacks calcium.
Bone cells (i.e., osteocytes) have irregular outline due to the presence of a number of protoplasmic outgrowths.	The cells of cartilage, chondrocytes, are oval in outline.
The lacunae (cavities or space) are provided with numerous fine branches called canaliculi.	The canaliculi are absent.
Its matrix shows concentric lamellae.	Matrix is homogeneous.
Bone has Haversian canals and narrow cavity.	Cartilage is devoid of such structures.

**85. Give one function of each of the following :**

(a) Stomata, (b) Root nodules, (c) Cardiac muscle fibres.

**Ans :**

4.	They mainly contain chlorophyll and can also help in the manufacture of starch and sugar.	They are dead cells and do not contain chlorophyll.
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(iv)

	<b>Sclerenchyma Fibres</b>	<b>Sclereids</b>
1.	These are dead sclerenchymatous cells and are long pointed at both end and have lignified cells.	These are dead sclerenchymatous cells and are isodymmatric, having no definite shape.
2.	They give mechanical support to plants to withstand various strains.	They provide local mechanical needs. They provide firmness and hardness to the plant part, e.g. shell of nuts.

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87. Describe the structure of cartilage and bone.

Ans :

**Cartilage :** It is a solid but semi-rigid and flexible connective tissue. It has large bluntly angular cartilage cells called chondrocytes. They occur in clusters of 2 and 3 in small spaces (lacunae) scattered in the matrix. Cartilage smoothens bone surfaces at joints and is also present in the nose, ear, trachea and larynx.

**Bone :** Bone is a solid, rigid and strong connective tissue. Its matrix become hard due to the deposition of salts of calcium and phosphorous. Osteocytes or bone cells are present in irregular spaces lacunae in the matrix, interconnected by fine canals called canaliculi. In this tissue, matrix deposits in concentric rings around narrow longitudinal cavities called haversian canals. These canals carries blood vessels and nerves.

88. What are the two main components of blood? Why is blood considered a type of connective tissue?

Ans :

- (i) Blood has two main components :
  - (a) Fluid (liquid) matrix called plasma.
  - (b) Suspended red blood cells (RBCs), white blood cells (WBCs) and platelets.
- (ii) Blood is considered as connective tissue because :
  - (a) It has the same origin as the other connective tissues.
  - (b) It flows to different parts of the body and thus connects different parts of the body with one another to exchange materials and gases.

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