

6

Tissues

In the Chapter

- Tissue is a group of cells similar in function and structure.
- Plant tissues are of two main types – permanent and meristematic.
- Meristematic tissue is the dividing tissue found in the growing regions of the plant.
- Permanent tissues are derived from meristematic tissue once they lose the ability to divide. They are grouped as simple and complex tissues.
- Parenchyma, sclerenchyma and collenchyma are three types of simple tissues. Phloem and xylem are types of complex tissues.
- Animal tissues can be epithelial, muscular, connective and nervous tissue.
- Depending on shape and function, epithelial tissue is grouped as squamous, columnar, cuboidal, ciliated and glandular.
- The different types of connective tissues in our body include areolar tissue, bone, tendon, adipose tissue, ligament, cartilage and blood.
- Striated, cardiac and unstriated are three types of muscle tissues.
- Nervous tissue is made of neurons which receive and conduct impulses.

Intext Exercises

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1. What is a tissue ?

Ans. A group of cells that are similar in structure and work together to achieve a particular function is called tissue.

2. What is the utility of tissue in multi-cellular organisms?

Ans. In multicellular organisms divisions of labour is due to presence of tissues. Each tissue performs a specific function efficiently.

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1. Think about which gas may be required for photosynthesis?

Ans. Carbon dioxide (CO_2) gas.

2. Find out the role of transpiration in plants.

Ans. Roles/functions of transpiration:

- (i) It is due to this that water and mineral from roots reach leaves and other parts of the plants.
- (ii) It helps in the ripening of crops and fruits.
- (iii) It helps in maintaining humidity which keeps the surrounding temperature low.

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1. Name types of simple tissues.

Ans. (i) Parenchyma (ii) Collenchyma, (iii) Sclerenchyma.

2. Where is apical meristem found?

Ans. Apical meristem is found in the tips of roots and stems. These help in the growth of roots and stems.

3. Which tissue makes up the husk of cotton?

Ans. The husks of cotton that are used in making strings and ropes are made up of phloem fibres.

4. What are the constituents of phloem?

Ans. (i) Sieve tubes, (ii) Companion cells, (iii) Phloem parenchyma, (iv) Phloem fibres.

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1. Name the tissue responsible for the movement in our body.

Ans. Muscle tissue.

2. What does a neuron look like?

Ans. A neuron looks like a long thread like structure.

3. Give three features of cardiac muscles.

Ans. (i) These muscles show rhythmic contraction and relaxation throughout life.

(ii) These are found only in the wall of the heart.

(iii) These have only one or two centrally located nuclei.

4. What are the functions of areolar tissue?

Ans. These tissues are found between skin and muscle and around the blood vessels. They fill the gap between the organs. They protect the internal organs and mend the damaged tissues.

Exercise

1. Define the term "tissue".

Ans. The group of cells having similar structure function is called tissue.

2. How many types of elements together makes xylem tissue? Name them.

Ans. Xylem tissue is made up of four elements. They are —

(i) Tracheids, (ii) Vessels, (iii) Xylem parenchyma, (iv) Xylem fibres.

3. How are simple tissue different from complex tissues in plants?

Ans. Simple tissues are made up of one type of cell which perform similar functions. Complex tissues are made up of cells of more than one type but they perform similar functions.

4. Differentiate between parenchyma, collenchymas and scleren-chyma on the basis of their cell wall.

Ans. Parenchyma

The cell wall is thin and is made up of cellulose.

Collenchyma

The cell wall is thick due to deposition lignin.

Sclerenchyma

The cell wall is thick at the corners due to deposition of pectin.

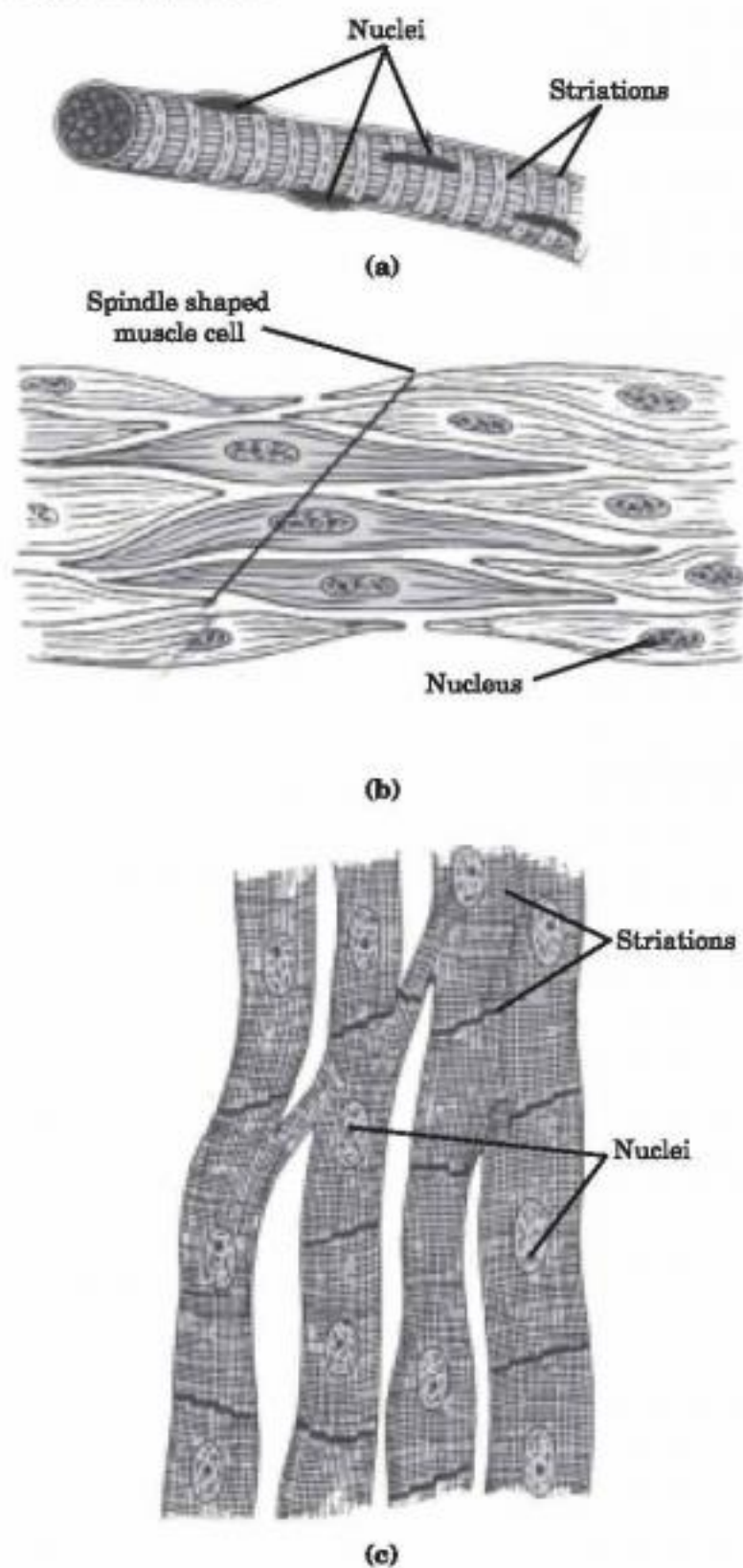
5. What are the functions of stomata ?

Ans. (i) They are involved in the exchange of gases.

(ii) They help in the removal of excess water by the process of transpiration.

6. Diagrammatically show the difference between the three types of muscle fibres.

Ans. Nucleus Spindle shaped muscle cell



Types of muscles fibres: (a) striated muscle, (b) smooth muscle, (c) cardiac muscle

7. What is the specific function of cardiac muscle ?

Ans. It helps in the rhythmic contraction and relaxation of heart wall throughout the life.

8. Differentiate between striated, unstriated and cardiac muscles on the basis of their structure and site/location in the body.

Ans. Striated muscle

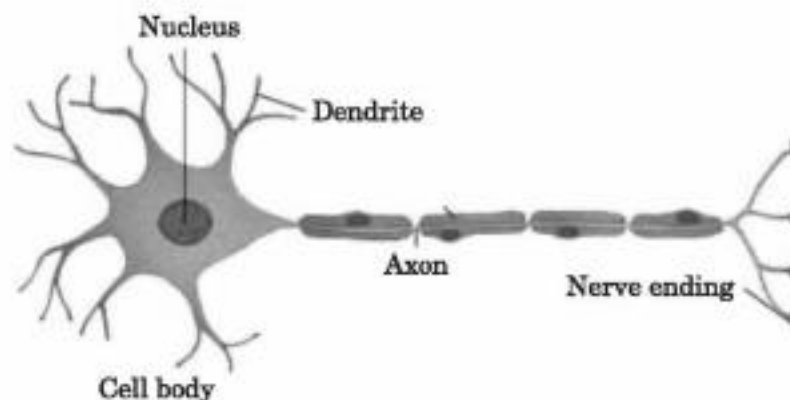
1. The cells are long cylindrical and unbranched.
2. Multiple nuclei are present on the periphery.
3. Hand, feet and other skeletal muscles.

Unstriated muscle

1. The cells are long, triangular and unbranched.
2. Single centrally located nucleus.
3. Walls of stomach intestine, ureter, bronchi.

Cardiac muscle

1. The cells are cylindrical and branched.
2. One or two centrally located nuclei.
3. Present in the heart.

9. Draw a labeled diagram of a neuron.**Ans.****10. Name the following :**

- (a) Tissue that forms the inner lining of our mouth.
- (b) Tissue that connects muscle to bone in humans.
- (c) Tissue that transports food in plants.
- (d) Tissue that stores fat in our body.
- (e) Connective tissue with a fluid matrix.
- (f) Tissue present in brain.

Ans. (a) Squamous epithelium

(b) Tendon

(c) Phloem

(d) Adipose tissue

(e) Blood

(f) Nervous tissue

11. Identify the types of tissue in the following : skin, bark of tree, bone, lining of kidney tubule, vascular bundle.**Ans.** (i) Skin — Squamous epithelium

(ii) Bark of tree — Cork (protective tissue)

(iii) Bone — Connective tissue

(iv) Lining of kidney tubule — Cuboidal epithelium

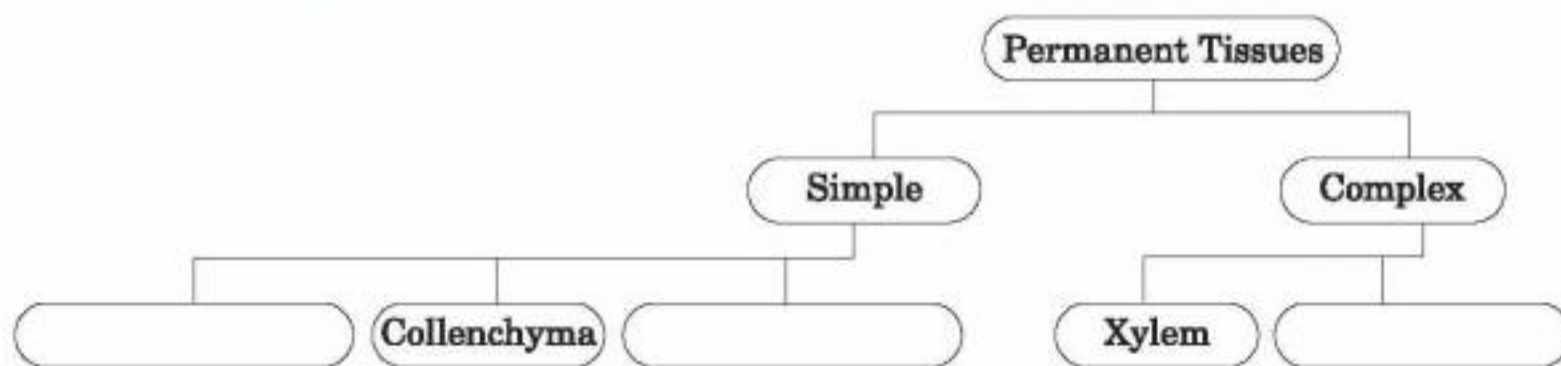
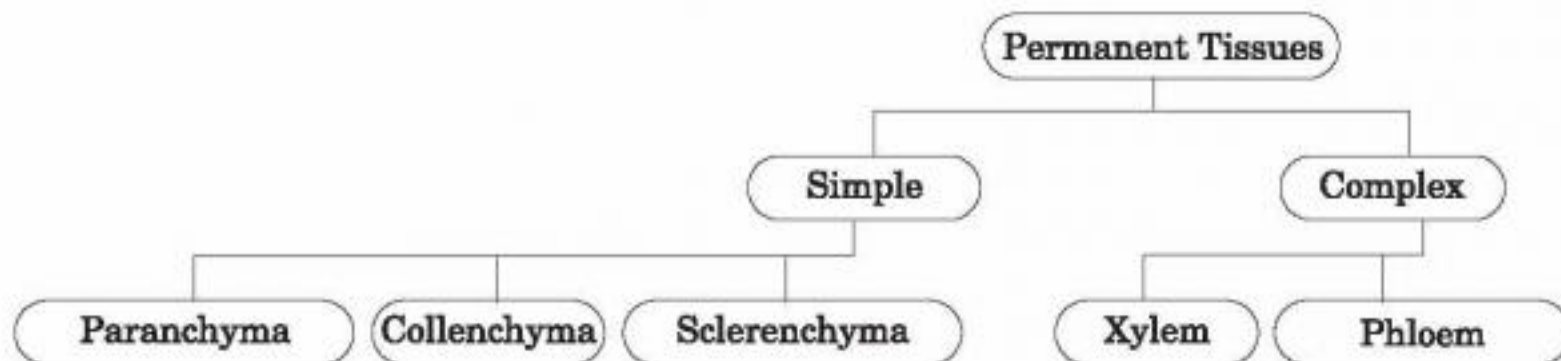
(v) Vascular bundle — Conductive tissue

12. Name the regions in which parenchyma tissue is present.**Ans.** Parenchyma tissue is present in cortex and marrow of roots and stems. When it bears chlorophyll, it is found in green leaves.**13. What is the role of epidermis in plants?****Ans.** The epidermis forms a continuous layer or covering without any intercellular space. It protects all the plant parts.**14. How does cork act as a protective tissue?****Ans.** Cork acts as a protective layer because—

(i) It has dead cells and it forms layer without leaving any intercellular space.

(ii) Suberin is deposited on its wall which makes it able to help the exchange of gases.

So, cork protects from excessive water loss and effects of the environment.

15. Complete the table.**Ans.****Additional Questions****1. Where is apical meristem found?****Ans.** Apical meristem is found at the growing tips of stems and roots.**2. Mention any two locations where meristematic tissues are found in plants?****Ans.** (i) At the tips of roots and shoots. (ii) At the base of internodes.**3. What is the function of meristematic tissue?****Ans.** Meristematic tissues are responsible for the growth of plants. These tissues are present at growing regions like tips of roots and shoots.**4. Name the tissue which allows easy bending in various parts of a plant.****Ans.** Collenchyma.**5. Which structure protects the plant body against the invasion of parasites?****Ans.** Cork cells.**6. Name the tissue that stores in our body.****Ans.** Adipose tissues.**7. What are two special types of parenchyma?****Ans.** (i) Aerenchyma and (ii) Collenchyma.**8. Name any two types of simple tissues.****Ans.** (i) Parenchyma, (ii) Collenchyma.**9. Which one of the following is a tissue: Liver, bone, testis, ovary?****Ans.** Bone is a tissue.**10. Name the type of wood where vessels are absent.****Ans.** Soft wood of gymnosperms like pinus.**11. What is the function of phloem parenchyma?**

Ans. Storage of food and slow conduction of food.

12. Name two conducting (vascular) tissues in plants.

Ans. Xylem and phloem.

13. What are sieve elements?

Ans. Sieve elements are the parts of phloem.

14. What are tracheids?

Ans. Elongated tube-like structures in xylem.

15. Give the function of xylem fibres.

Ans. They give strength and support to the plant.

16. What are companion cells?

Ans. Specialized parenchyma cells associated with the sieve-tube members.

17. Name a plant which does not have tissues.

Ans. Chlamydomonas (unicellular plant).

18. What is meristematic tissue?

Ans. The meristematic tissue is the dividing tissue present at the growing regions of plant.

19. What are permanent tissues? Give their two types.

Ans. The permanent tissues are derived from meristematic tissue when they lose the ability to divide. Permanent tissues are classified as simple and complex tissues.

20. What is ligament?

Ans. A connective tissue that joins bones to bones.

21. Name the chief mechanical supporting tissue in plants.

Ans. Collenchyma.

22. Name the kind of tissue which forms inner lining of the blood vessels.

Ans. Squamous epithelium.

23. Which chemical is released at the synapse?

Ans. Acetylcholine.

24. Define organ.

Ans. A number of tissues together form an organ.

25. State the role of ligament in our skeleton systems.

Ans. It connects bone to bone.

26. State the role of tendons in our skeletal system.

Ans. The tendons connect the muscle to the bone.

27. State the main difference between tendon and ligament.

Ans. Tendon connects the muscle to a bone while ligament joins bone together.

28. Name the epithelium that lines inner surface of urinary bladder.

Ans. Transitional epithelium.

29. Where does areolar tissue occur?

Ans. Beneath the epithelia of hollow visceral organs, skin and on the walls of veins and arteries.

30. What are the three types of cells found in areolar tissue?

Ans. Mast cells, macrophage and fibroblasts.

31. Where do you find hyaline cartilage?

Ans. At the extremity of larynx, trachea and long bones.

32. Which tissue stores fat globules?

Ans. Adipose tissue.

33. Write the function of collenchyma tissue.

Ans. It prevents the tearing of leaves.

34. Write any two characteristic features of parenchyma tissue.

Ans. (i) Cell wall is thin.

(ii) Made up of cellulose.

35. What do you mean by aerenchyma?

Ans. Aerenchyma is a modified parenchyma tissue. Large cavities are present between parenchyma cells of aquatic plants to help in buoyancy.

36. (a) Name the epithelial tissue which has hair-like projections on the outer surface of cells.

(b) Where are these tissues found in our body and what is their function?

Ans. (a) The columnar epithelium has hairlike projections on the outer surfaces of the epithelial cells. Due to these cilia, the epithelium is also called ciliated columnar epithelium.

(b) The columnar epithelium forms the lining of stomach and intestine and is also present in the respiratory tract (trachea). In trachea, movement of cilia pushes the mucus forward to clear it.

37. Write one function each of the following:

(a) Adipose tissues

(b) Sclerenchymatous tissues

(c) Cell wall

Ans. (a) Functions of Adipose tissues: Adipose tissue stores fat and acts as an insulator and keeps the body warm.

(b) Function of Sclerenchymatous tissues: Sclerenchymatous tissues act as a mechanical and protective tissue.

(c) Function of cell wall: Cell wall provides rigidity, structural strength and definite shape to the cell. It also transports various substances across the cell.

Multiple Choice Questions

1. Select the incorrect sentence.

(a) Blood has matrix containing proteins, salts and hormones.

(b) Two bones are connected with ligament.

(c) Tendons are non-fibrous tissue and fragile.

(d) Cartilage is a form of connective tissue.

Ans. (c) Tendons are non-fibrous tissue and fragile.

2. Cartilage is not found in

(a) nose

(b) ear

(c) kidney

(d) larynx

Ans. (c) kidney

3. Fats are stored in human body as

(a) cuboidal epithelium (b) adipose tissue

(c) bones

(d) cartilage

Ans. (b) adipose tissue

4. **Bone matrix is rich in**
(a) fluoride and calcium
(b) calcium and phosphorus
(c) calcium and potassium
(d) phosphorus and potassium

Ans. (b) calcium and phosphorus

5. **Contractile proteins are found in**
(a) bones
(b) blood
(c) muscles
(d) cartilage

Ans. (c) muscles

6. **Voluntary muscles are found in**
(a) alimentary canal
(b) limbs
(c) iris of the eye
(d) bronchi of lungs

Ans. (b) limbs.

7. **Nervous tissue is not found in**
(a) brain
(b) spinal cord
(c) tendons
(d) nerves

Ans. (c) tendons

8. **Nerve cell does not contain**
(a) axon
(b) nerve endings
(c) tendons
(d) dendrites

Ans. (c) tendons

9. **Which of the following helps in repair of tissue and fills up the space inside the organ?**
(a) Tendon
(b) Adipose tissue
(c) Areolar
(d) Dendrites

Ans. (c) Areolar

10. **The muscular tissue which functions throughout the life continuously without fatigue is**
(a) skeletal muscle
(b) cardiac muscle
(c) smooth muscle
(d) voluntary muscle

Ans. (b) cardiac muscle

11. **Which of the following cells is found in the cartilaginous tissue of the body?**
(a) Mast cells
(b) Basophils
(c) Osteocytes

(d) Chondrocytes

Ans. (d) Chondrocytes

12. The dead element present in the phloem is

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

Ans. (b) phloem fibres

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

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

Ans. (a) Companion cells

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

- (a) cuticle
- (b) stomata
- (c) lignin
- (d) suberin

Ans. (a) cuticle

15. A long tree has several branches. The tissue that helps in the side ways conduction of water in the branches is

- (a) collenchyma
- (b) xylem parenchyma
- (c) parenchyma
- (d) xylem vessels

Ans. (d) xylem vessels

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

- (a) cambium
- (b) apical meristem
- (c) lateral meristem
- (d) intercalary meristem

Ans. (d) intercalary meristem

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

- (a) move downwards
- (b) move upwards
- (c) remain at the same position
- (d) move sideways.

Ans. (c) remain at the same position

18. Parenchyma cells are

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

Ans. (a) relatively unspecified and thin walled

19. Flexibility in plants is due to

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

Ans. (a) collenchyma

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

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

Ans. (c) suberin

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

- (a) intercalary meristem
- (b) conducting tissue
- (c) apical meristem
- (d) parenchymatous tissue

Ans. (b) conducting tissue

22. Choose the wrong statement.

- (a) The nature of matrix differs according to the function of the tissue.
- (b) Fats are stored below the skin and in between the internal organs.
- (c) Epithelial tissues have intercellular spaces between them.
- (d) Cells of striated muscles are multinucleate and unbranched.

Ans. (c) Epithelial tissues have intercellular spaces between them.

23. The water conducting tissue generally present in gymnosperm is

- (a) vessels
- (b) sieve tube
- (c) tracheids
- (d) xylem fibres

Ans. (c) tracheids

24. Which of the following tissues has dead cells ?

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

Ans. (b) Sclerenchyma

25. Find out the incorrect sentence.

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

Ans. (c) Apical and intercalary meristems are permanent tissues.

26. Girth of stem increases due to

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

Ans. (b) lateral meristem

27. Which cell does not have perforated cell wall ?

- (a) Tracheids
- (b) Companion cells
- (c) Sieve tubes
- (d) Vessels

Ans. (b) Companion cells

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

- (a) Stratified squamous epithelium
- (b) Columnar epithelium
- (c) Spindle fibres
- (d) Cuboidal epithelium

Ans. (b) Columnar epithelium

29. A person met with an accident in which two long bones of hand were dislocated. Which among the following may be the possible reason ?

- (a) Tendon break
- (b) Break of skeletal muscle
- (c) Ligament break
- (d) Areolar tissue break

Ans. (c) Ligament break.

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

- (a) Smooth muscles contract and pull the ligament to move the bones.
- (b) Smooth muscles contract and pull the tendons to move the bones.
- (c) Skeletal muscles contract and pull the ligament to move the bones.
- (d) Skeletal muscles contract and pull the tendon to move the bones.

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

31. Which muscles act involuntarily?

- (i) Striated muscles
 - (ii) Smooth muscles
 - (iii) Cardiac muscles
 - (iv) Skeletal muscles
- (a) (i) and (ii) (b) (ii) and (iii)
(c) (iii) and (iv) (d) (i) and (iv)

Ans. (b) (ii) and (iii)

32. Meristematic tissues in plants are

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

Ans. (c) localised and dividing cells

33. Which is not function of epidermis ?

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

Ans. (c) Conduction of water