

TISSUES

QUESTION BANK

Very Short Answer Questions

Question 1.

Name a plant tissue having dead cells.

Answer:

Sclerenchyma

Question 2.

What minerals is the bone matrix rich in?

Answer:

Calcium and potassium

Question 3.

Name the water conducting tissue generally present in gymnosperms.

Answer:

Tracheids

Question 4.

Presence of which chemical in cork cells makes them impervious to water and gases?

Answer:

Suberin

Question 5.

Which tissue in plants provides them flexibility?

Answer:

Collenchyma

Question 6.

Name the muscular tissue that functions throughout life without fatigue.

Answer:

Cardiac muscular tissue

Question 7.

In desert plants, how does the rate of loss of water get reduced?

Answer:

Presence of cuticle on the surface of desert plants reduce the rate of loss of water.

Question 8.

Which animal tissue helps in repair of tissue and fills the space inside the organ?

Answer:
Areolar tissue

Question 9.
What is a goblet cell?

Answer:
A goblet cell is a unicellular mucus secreting gland.

Question 10.
What is the name of bone cells?

Answer:
Osteoblast cells

Question 11.
Which blood cells deal with immune reaction?

Answer:
WBC (White blood cell)

Question 12.
Which cells are responsible for contraction and relaxation movements?

Answer:
Muscle cells

Question 13.
Which cells are responsible for carrying messages?

Answer:
Nerve cells

Question 14.
How are oxygen, food, hormone and waste material transported in the body?

Answer:
Through blood

Question 15.
What is responsible for increase in girth of the stem or root?

Answer:
The girth of the stem or root increases due to lateral meristem (cambium).

Question 16.
What is lignin?

Answer:
Lignin is a chemical substance present in the cell wall of plants which acts as a cement and hardens it.

Question 17.
What is cutin?

Answer:

Cutin is a chemical substance with waterproof quality covering the aerial parts of plants.

Question 18.

Which tissue forms a barrier to keep different body systems separate?

Answer:

Epithelial tissue

Question 19.

What is the composition of the cartilage matrix?

Answer:

Proteins and sugars

Question 20.

What are responsible for contraction and relaxation in muscles?

Answer:

Contractile proteins

Question 21.

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

(a) Jumping of frog

(b) Pumping of the heart

(c) Writing with hand

(d) Movement of chocolate in your intestine [NCERT Exemplar]

Answer:

(a) V

(b) IV

(c) V

(d) IV

Question 22.

What stimulates the movement of muscles?

Answer:

Nerve impulses

Question 23.

Give the name of the connective tissue lacking fibres.

Answer:

Blood

Question 24.

Water hyacinth floats on water surface. Explain. [NCERT Exemplar]

Answer:

Aerenchyma present in the swollen petiole provides buoyancy to the hyacinth. Thus, it floats on water surface.

Question 25.

Which structure protects the plant body against the invasion of parasites? [NCERT Exemplar]

Answer:

The epidermis has thick cuticles and waxy substances to prevent the invasion of parasites.

Question 26.

Why does an organism—plant or animal, require different types of cells in the body?

Answer:

Any organism will have a wide range of cell types. This is because each cell type specialises in one particular function. And for the proper working of an organism many functions like food transport, immunity, strength, etc., are needed to be performed properly.

Question 27.

If a potted plant is covered with a glass jar, water vapour appears on the wall of the glass jar. Why? [NCERT Exemplar]

Answer:

This happens because of transpiration due to which water is released from the plant in the form of water vapour which appears on the glass jar.

Question 28.

Why are voluntary muscles also called skeletal muscles?

Answer:

Voluntary muscles are also called skeletal muscles because they are mostly attached to the bones and help in body movement.

Short Answer Questions-I

Question 1.

What happens to the cells formed by meristematic tissue?

Answer:

The cells formed by meristematic tissue take up a specific role and lose their ability to divide. As a result, they form a permanent tissue. This process of taking up a permanent shape, size and function is called differentiation.

Question 2.

Why is the epidermis present as a thick waxy coating of cutin in desert plants?

Answer:

A thick waxy coating of cutin is present in desert plants to prevent excessive loss of water during transpiration. Due to this, plants can survive in scarcity of water in deserts.

Question 3.

Write a short note on 'phellogen'.

Answer:

As plants grow older, the outer protective tissue undergoes certain changes. A layer of secondary meristem develops which is called as phellogen. It is also known as cork cambium. It replaces epidermis of stem and roots.

Question 4.

How are glandular epithelium formed?

Answer:

An epithelial cell often acquires additional specialisation as gland cells, which can secrete substances at the epithelial surface. Sometimes, a portion of the epithelial tissue folds inward and a multicellular gland is formed. This is glandular epithelium.

Question 5.

Describe the function of bones.

Answer:

Bones form the framework that supports the body. It also anchors the muscles and serve as storage site of calcium and phosphate. It provides shape to the body and protects vital body organs such as brain, lungs, tissue, etc.

Question 6.

How are messages conveyed from one place to another within the body?

Answer:

Nervous tissue is made up of neurons that receive and conduct impulses. Neurons are highly specialised for being stimulated and then transmitting the stimulus very rapidly from one place to another within the body. Impulses are the passage of electrical activity along the axon of a nerve cell.

Question 7.

- (a) What is the lining of blood vessels made up of?
- (b) What is the lining of small intestine made up of?
- (c) What is the lining of kidney tubules made up of?
- (d) Where are the epithelial cells with cilia found?

Answer:

- (a) Squamous epithelium
- (b) Columnar epithelium
- (c) Cuboidal epithelium
- (d) Respiratory tract

Short Answer Questions-II

Question 1.

Describe the structure and function of stomata.

Answer:

Stomata are small pores present in the epidermis of leaves and are enclosed by two kidney-shaped cells called guard cells.

Function of stomata:

- Necessary for exchanging gases with the atmosphere during photosynthesis and respiration.
- Transpiration, i.e., loss of water takes place through them.

Question 2.

Why are xylem and phloem called complex tissues? How are they different from one other ? [NCERT Exemplar]

Answer:

Xylem and phloem are called as complex tissues as they are made up of more than one type of cells. Following are the differences between xylem and phloem:

Xylem	Phloem
1. Xylem mainly consists of dead cells (except xylem parenchyma).	1. Phloem consists of living cells (except phloem fibre).
2. It conducts water and minerals from roots to aerial parts of the plant.	2. It translocates prepared food from leaves to storage organs and growing parts of the body.

Question 3.

Write a short note on xylem.

Answer:

Xylem is complex permanent tissue and is also known as conduction tissues. It consists of tracheids, vessels, xylem parenchyma and xylem fibres. The cells have thick walls, and many of them are dead. Tracheids and vessels are tubular structures. This allows them to transport water and mineral vertically upwards. The parenchyma stores food and helps in the lateral conduction of water. Fibres are mainly supportive in function.

Question 4.

Write a short note on phloem.

Answer:

Phloem is a complex permanent tissue. It is made up of four types of elements: sieve tubes, companion cells, phloem fibres and the phloem parenchyma. Sieve tubes are tubular cells with perforated walls. Phloem transports food from leaves to other parts of the plant. Except for phloem fibres, all the phloem cells are living.

Question 5.

Write a short note on blood.

Answer:

Blood is a type of connective tissue. It has a liquid matrix called plasma, in which the red blood cells (RBCs), white blood cells (WBCs) and platelets are suspended. The plasma contains proteins, salts and hormones. Blood flows and transports gases, digested food, hormones to tissues and waste materials from tissue to the liver and kidney.

Question 6.

What are involuntary muscles? Where are they found?

Answer:

The muscles which do not move on our will are called involuntary muscles. The movement of food in the alimentary canal or the contraction and relaxation of blood vessels are involuntary movements. These muscles are also called as smooth muscles. They are also found in the iris of the eye, in ureters and in bronchi of the lungs.

Question 7.

Differentiate between voluntary and involuntary muscles. Give one example of each type. [NCERT Exemplar]

Answer:

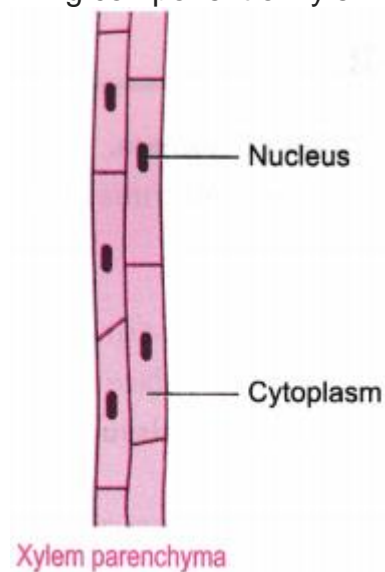
Voluntary muscles can be moved by the conscious will when we want them to move. For example, muscles of limbs or skeletal muscles. Involuntary muscles function on their own. We cannot start or stop them from working by our desire. Examples are cardiac muscles and smooth muscles.

Question 8.

Name the different components of xylem and draw a living component. [NCERT Exemplar]

Answer:

Xylem consists of tracheids, vessels, xylem parenchyma and xylem fibres. The only living component of xylem is xylem parenchyma.



Long Answer Questions

Question 1.

Why are plants and animals made of different types of tissue?

Answer:

Plants and animals are two different types of organisms. Plants are autotrophic organisms, so they prepare their own food by photosynthesis. Moreover, plants are stationary or fixed organisms. Since they do not consume or need much energy, so most of the tissues of plants are supportive. Most of these tissues such as xylem, phloem, sclerenchyma and cork are dead tissues, i.e., they do not contain living protoplasm.

Animals on the other hand, are heterotrophic organisms. They have to move in search of food, mate and shelter; so they need more energy as compared to plants. Most of these tissues contain living protoplasm.

There are some tissues in plants which divide throughout life. They divide for the growth and reproduction of the plants. In contrast to plants, growth in animals is uniform.

Question 2.

Differentiate between parenchyma and collenchyma.

Answer:

Parenchyma	Collenchyma
1. The tissue consists of thin-walled cells.	1. The tissue consists of localised thickening in the cell walls.
2. It is distributed in almost all the parts of the plant body.	2. It occurs mostly in the aerial parts of the plant, restricted to the outer layers.
3. The cells of parenchyma assimilate and store food. They also store waste products.	3. Collenchyma are the chief mechanical tissues in the young parts of the plant.
4. Parenchyma cells are loosely packed.	4. Collenchyma cells are compactly packed.

Question 3.

Differentiate between collenchyma and sclerenchyma.

Answer:

Collenchyma	Sclerenchyma
1. It consists of living cells.	1. It consists of dead cells.
2. The cells contain cytoplasm.	2. Cytoplasm is absent in these cells.
3. Its cell wall is cellulosic.	3. Its cell wall is lignified.
4. The thickening of cell wall is not uniform.	4. Cell wall thickening is uniform.
5. Lumen of cell is wide.	5. Lumen of the cell is narrow.
6. It provides mechanical support and elasticity to the plant body.	6. It is chiefly a mechanical tissue.

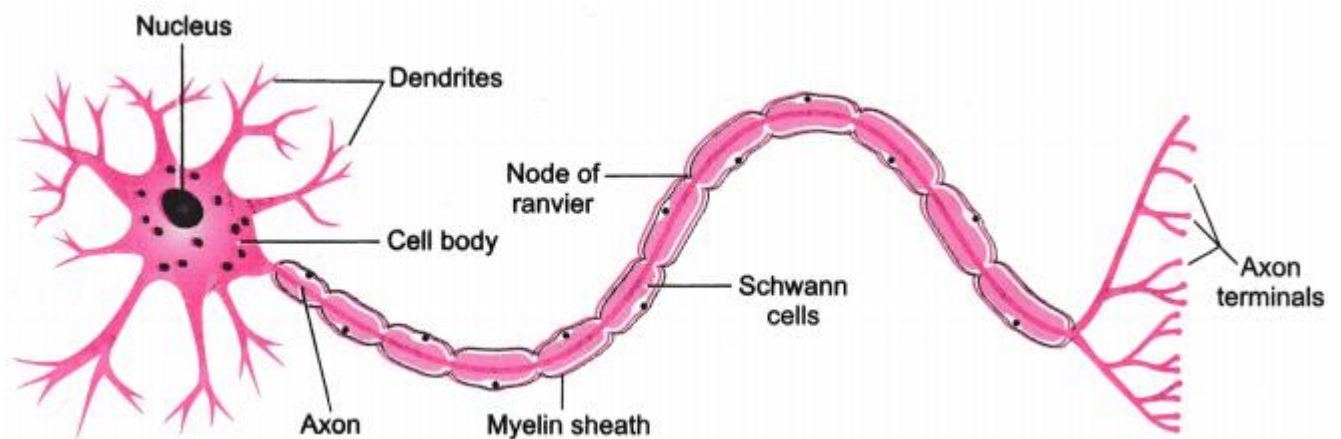
Question 4.

What is a neuron? Write the structure and functions of a neuron.

Answer:

Nervous tissue contains highly specialised unit cells called nerve cells or neurons. Each neuron has the following three parts:

- The cyton or cell body: It contains a central nucleus and cytoplasm with characteristic deeply stained particles, called Nissl granules.
- The dendrites: These are short processes arising from the cyton.
- The axon: It is a single, long, cylindrical process of uniform diameter. It carries impulses away from the cell body.



Functions:

Neurons have the ability to receive stimuli from within or outside the body and conduct impulses to different parts of the body. The impulses travel from one neuron to another neuron and finally to the brain or spinal cord.

Question 5.

Differentiate between meristematic tissue and permanent tissue.

Answer:

Meristematic tissue	Permanent tissue
1. The cells divide repeatedly.	1. The cells are derived from meristematic tissue and do not divide.
2. The cells are undifferentiated.	2. The cells are fully differentiated.
3. The cells are small and isodiametric.	3. The cells are variable in shape and size.
4. Intercellular spaces are generally absent.	4. Visible intercellular spaces are present.
5. Vacuoles are absent.	5. Large vacuoles are present in mature cells.
6. Metabolism occurs at high rate.	6. Metabolism occurs at low rate.
7. The cell walls are thin.	7. Cell walls may be thin or thick.

Question 6.

Briefly describe striated and smooth muscles with their functions.

Answer:

The striated muscle fibres are long or elongated, non-tapering, cylindrical and unbranched. These cells have a number of nuclei called sarcolemma. These muscle fibres shows alternate dark and light stripes or striations and so they are called as striated muscles. These muscles occur in muscles of limbs, body wall, face, neck, etc.

Functions of striated muscles:

- Striated muscles are powerful and undergo rapid contraction and expansion.
- Striated muscles provide the force for locomotion and all other voluntary movements of the body.

The smooth muscles are also known as unstriated or involuntary muscles. Smooth muscles occur as bundles or sheets of elongated fusiform or spindle-shaped cells or fibres. They are held together by loose connective tissue. These muscle fibres are uninucleate and do not bear any bands, stripes or striation across them.

These muscles are found in the walls of the alimentary canal and internal organs, ducts of glands and blood vessels. Smooth muscles are also found in the stomach, intestine, ureters, bronchi, iris of the eye, etc.

Functions of smooth muscles:

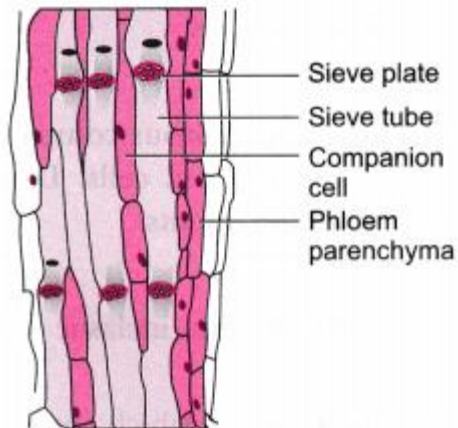
- Smooth muscles do not work according to our will, so they are also called involuntary muscles. Movement of food in the alimentary canal or the contraction and relaxation of blood vessels are involuntary movements.
- Smooth muscles contract slowly but can remain contracted for a long period of time. Due to this characteristic, the food passes to the next step of digestion in the alimentary canal.

Question 7.

Draw and identify different elements of phloem. [NCERT Exemplar]

Answer:

Sieve tubes, companion cells, phloem fibres and phloem parenchyma are the different elements of phloem.



Question 8.

What is a permanent tissue? Classify permanent tissues and describe them.

Answer:

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

Permanent tissues are classified into the following two types:

(i) Simple permanent tissue

(ii) Complex permanent tissue

(i) Simple permanent tissues: These tissues are composed of cells which are structurally and functionally similar.

Simple permanent tissues are further classified into the following three types:

- Parenchyma: Parenchyma forms the bulk of the plant body. Parenchyma cells are living and possess the power of division.
- Collenchyma: Collenchyma tissue is also living. It is characterised by the deposition of extra cellulose at the corners of the cells.
- Sclerenchyma: Sclerenchyma cells are dead cells and they are devoid of protoplasm. The cell walls of sclerenchyma are largely thickened with deposition of lignin.

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

Complex tissues are of the following two types:

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

- Phloem: Like xylem, phloem is also vascular but has no mechanical function. Phloem is composed of following four elements: (i) Sieve tubes (ii) Companion cells (iii) Phloem parenchyma (iv) Phloem fibres.

Except phloem fibres, all other phloem elements are living. Xylem and phloem are both conducting tissues and are also known as vascular tissues. Together, both of them constitute vascular bundle.

Question 9.

Describe the types of connective tissues along with their functions.

Answer:

There are five types of connective tissues:

(i) Areolar connective tissue: It is a loose and cellular connective tissue. It joins skin to muscles, fills spaces inside organs, and is found around muscles, blood vessels and nerves.

Functions:

- It acts as a supporting and packing tissue between organs lying in the body cavity.
- It helps in repair of tissues after an injury.
- It also helps in combating foreign toxins.
- It fixes skin to underlying muscles.

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

Functions:

- Tendons: Tendons are cord-like, strong, inelastic structures that join skeletal muscles to bones.
- Ligament: They are an elastic structure which connects bones to bones.

(iii) Adipose tissue: Adipose tissue is basically an aggregation of fat cells. The adipose tissue is abundant below the skin, between the internal organs and in the yellow bone marrow.

Functions:

- It serves as a fat reservoir.
- It provides shape to the limbs and the body.
- It keeps visceral organs in position.
- It forms shock-absorbing cushions around kidneys and eyeballs.
- It acts as an insulator. Being a poor conductor of heat, it reduces heat loss from body, i.e., it regulates body temperature.

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

- Cartilage: The cartilage is a specialised connective tissue which is compact and less vascular. Cartilage can be found in ear pinna, nose tip, epiglottis, intervertebral discs, end of long bones, lower ends of ribs and rings of trachea.
- Bone: Bone is a strong and non-flexible tissue. Like cartilage, bone is also a specialised connective tissue.

Functions:

- Cartilage provides support and flexibility to the body parts. It smoothens the surface at joints.
- Bone provides shape and skeletal support to body.
- Bone protects vital body organs such as brain, lungs, etc.
- Bone anchors the muscles.

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

- Blood: In this tissue, cells move in a fluid or liquid matrix or medium called blood plasma. Blood occurs in blood vessels called arteries, veins, and capillaries which are connected together to form the circulatory system.
- Lymph: Lymph is a colourless fluid that has been filtered out of the blood capillaries.

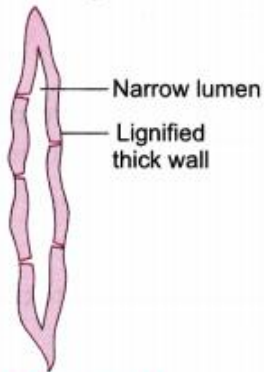
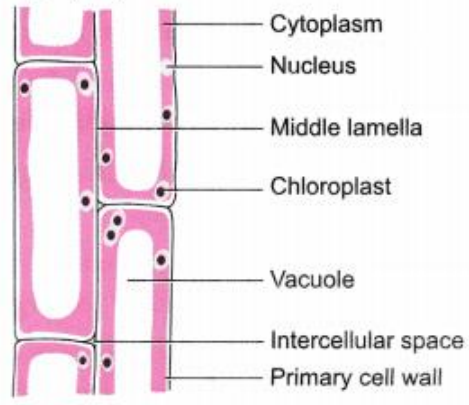
Functions:

- Blood transports nutrients, hormones and vitamins to the tissues and transports excretory products from the tissues to the liver and kidney.
- Lymph transports the nutrients (oxygen, glucose) that may have filtered out of the blood capillaries back into the heart to be recirculated in the body.
- Lymph brings CO₂ and nitrogenous wastes from tissues to the blood.

Question 10.

Differentiate between sclerenchyma and parenchyma tissues. Draw well labelled diagram. [NCERT Exemplar]

Answer:

Sclerenchyma	Parenchyma
<ol style="list-style-type: none"> 1. Cells are thick-walled and lignified. 2. Tissues are made up of dead cells. 3. No intercellular spaces between the cells are found. 4. Provides strength to the plant parts. 5. The cells are long and narrow, make the plant hard and stiff. The tissue is present in the stem around vascular bundles, in the veins of leaves and the hard covering of seeds and nuts.  <p data-bbox="359 1070 598 1108">L. S. of Sclerenchyma</p>	<ol style="list-style-type: none"> 1. Cells are thin-walled and unspecialised. 2. These are living cells. 3. Cells are usually loosely packed with large intercellular space. 4. Stores nutrient and water in stem and roots. 5. Some cells contain chlorophyll called chlorenchyma and perform photosynthesis. Other cells have large air cavities called aerenchyma which provide buoyancy to the hydrophytic plants.  <p data-bbox="933 1137 1157 1176">L. S. of Parenchyma</p>

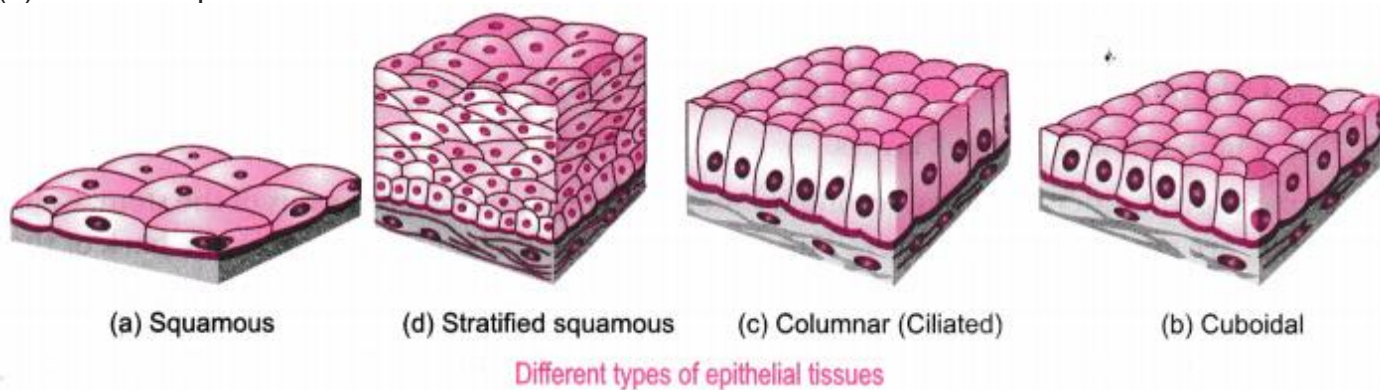
Question 11.

Describe the structure and function of different types of epithelial tissues. Draw the diagram for each type of epithelial tissue. [NCERT Exemplar]

Answer:

Epithelial tissues are of following types:

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



(a) Simple squamous epithelium: They are present in cells lining blood vessels or

lung alveoli where transportation of substances occurs through a selectively permeable surface, there is a simple flat kind of epithelium.

(b) Stratified squamous epithelium: Skin epithelial cells are arranged in many layers to prevent wear and tear. Since, they are arranged in a pattern of layers, the epithelium is called stratified squamous epithelium.

(c) Columnar epithelium: Where absorption and secretion occur, as in the inner lining of the intestine, these tall epithelial cells are present. This columnar epithelial facilitates movement across the epithelial barrier. In the respiratory tract, the columnar epithelial tissue also has cilia, which are hair-like projections on the outer surfaces of epithelial cells. These cilia can move and their movement pushes the mucus forward to clear it. This type of epithelium is thus ciliated columnar epithelium.

(d) Cuboidal epithelium: These form the lining of the kidney tubules and ducts of salivary glands where these provide mechanical support. Sometimes, a portion of the epithelial tissue folds inward and a multicellular gland is formed. This is glandular epithelium.

Question 12.

Give reasons:

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

Answer:

- (a) Meristematic cells are continuously dividing cells so they have a prominent nucleus and dense cytoplasm. But since these cells do not store food material or waste materials, they lack vacuole.
- (b) Sclerenchyma cells have lignified cell walls which makes them compact and leaves no intercellular spaces.
- (c) Pear has sclerenchymatous stone cells which are granular in texture. Hence, we get the crunchy and granular feeling while chewing a pear.
- (d) The branches of a tree have collenchyma cells which provide tensile strength to plant parts. So, it move and bend freely when wind blows.
- (e) The husk of a coconut tree is made up of sclerenchyma cells which have lignified cell walls. Lignin makes the cells compact and leaves no intercellular spaces.

Question 13.

List the characteristics of cork. How are they formed? [NCERT Exemplar]

Answer:

The characteristics of cork are as follows:

- Cells of cork are dead at maturity.
- These cells are compactly arranged.
- Cells do not possess intercellular spaces.

- Cells possess a chemical substance 'suberin' in their walls.
- There are several thick layers.

As plants grow older, a strip of secondary meristem replaces the epidermis of the stem. Cells on the outside are cut off from this layer. This forms the several-layer thick cork or the bark of the tree.

Question 14.

Write a short note on epithelial tissue. Describe the functions of epithelium tissue.

Answer:

The covering or protective tissue in the animal body are epithelial tissues. Epithelial tissue cells are tightly packed and form a continuous sheet. They have only a small amount of cementing material between them and almost no intercellular spaces. Epithelium covers most organs and cavities within the body. It forms a barrier to keep different body systems separate. The skin, the lining of the mouth, the lining of blood vessels, lung alveoli and kidney tubules are all made of epithelial tissue.

Functions of epithelial tissue:

- Epithelial cells protect the underlying cells from drying, injury and chemical effects. They also protect the body from viral or bacterial infections.
- It helps in the absorption of water and nutrients.
- It performs secretory function by secreting useful chemicals like sweat, saliva, enzymes from the food, etc., in the body.

HOTS (Higher Order Thinking Skills)

Question 1.

A person met with an accident in which two long bones of the hand were dislocated. What could be the reason?

Answer:

Dislocation of the bones of the hand was caused due to the breakage of the ligament which connects the two bones and keeps them in place.

Question 2.

If the tip of a sugarcane plant is removed from the field, even then it keeps on growing in length. Why?

Answer:

Removing the tip of the sugarcane does not remove the intercalary meristem of the plant. It is this meristem which increases the length of the plant.

Question 3.

A nail is inserted in the trunk of a tree at a height of 1 metre from the ground level. After 3 years, where will the nail be present?

Answer:

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

Question 4.

The root tips of a plant were cut and the plant was replanted. What will happen to the plant and why?

Answer:

The plant will die within few days of replanting it. This is because since the root tips are cut, the roots won't grow because of absence of meristematic tissue. And if the roots will not grow, proper absorption of water and minerals will not occur.

Question 5.

Tissue A and tissue B constitute tissue C. A carries water while B carries food for the plants. Identify A, B, C.

Answer:

A. Xylem

B. Phloem

C. Vascular bundles