Tissues

Case Study Based Questions

Case Study 1

The term meristem was coined by Carl Wilhelm von Nageli in 1858. Meristematic tissues are the cells or groups of cells that have the ability to divide. These cells divide continuously and thus helps in increasing the length and thickness of the plant. These cells continue to divide until a time when they get differentiated and then lose the ability to divide. Meristematic tissue is also called growing tissue. The cells of this tissue are very active, have dense cytoplasm, thin cellulose walls and prominent nuclei. They lack vacuoles.

Read the given passage carefully and give the answer of the following questions:

Q1. Which meristem helps in increasing the girth of the plant?

a. Primary meristem

b. Apical meristem

c. Intercalary meristem

d. Lateral meristem

Q2. Which of the following statements given below is correct about meristematic tissue?

a. It is made of cells that are incapable of cell division.

b. It is made of cells that are capable of cell division.

c. It is composed of single type of cells.

d. It is composed of more than one type of cell.

Q3. Meristematic cells are characterised by:

a. thin cell walls and many vacuoles

b. thin cell walls and no vacuoles

c. thick cell walls and many vacuoles

d. thick cell walls and no vacuoles

Q4. The meristem present at the base of the internode is:

a. lateral meristem

b. apical meristem

c. intercalary meristem

d. All of these

Q5. Read the following statements regarding meristematic tissues and select the correct ones.

(i) These tissues are localised in certain specific regions.

(ii) Cells of meristematic tissue have dense cytoplasm with prominent nucleus.

(iii) Differentiation leads to the development of various types of meristematic tissues.

a. (i) and (ii)

b. (ii) and (iii)

c. (i) and (iii)

d. (i), (ii) and (iii)

Solutions

1. (d) Lateral meristem

2. (b) It is made of cells that are capable of cell division.

3. (b) thin cell walls and no vacuoles.

4. (c) intercalary meristem

5. (a) (i) and (ii)

Case Study 2

The permanent tissues in a plant are those tissues that contain non-dividing cells. The cells are also modified to perform specific functions in the plants. The cells of the permanent tissue are derived from the meristematic tissue. The permanent tissue in plants mainly helps in providing support, protection as well as in photosynthesis and conduction of water, minerals and nutrients. Permanent tissue cells may be living or dead.

Read the given passage carefully and give the answer of the following questions:

Q1. Which of the following are simple permanent tissues?

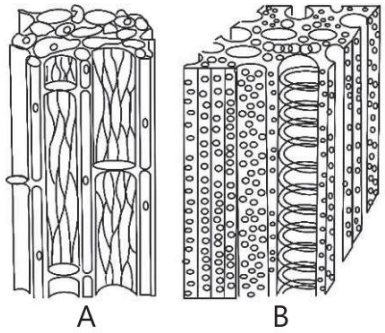
a. Parenchyma, xylem and phloem

b. Parenchyma, collenchyma and sclerenchyma

c. Parenchyma, xylem and sclerenchyma

d. Parenchyma, phloem and sclerenchyma

Q2. Identify A and B in the given diagram.



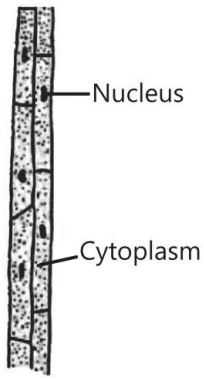
a. A-xylem, B-phloem

b. A-parenchyma, B-sclerenchyma

c. A-phloem, B-xylem

d. A-phloem, B-parenchyma

Q3. Identify the type of cell in the given diagram.



a. Xylem parenchyma

b. Companion cells

c. Tracheids

d. Vessels

Q4. Parenchyma cells are:

a. relatively unspecified and thin walled

b. thick walled and specialised

c. lignified

d. None of the above

Q5. 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

Solutions

1. (b) Parenchyma, collenchyma and sclerenchyma

2. (c) A-phloem, B-xylem

3. (a) Xylem parenchyma

4. (a) relatively unspecified and thin walled

5. (b) conducting tissue

Case Study 3

The term 'Connective Tissue' was introduced in 1830 by Johannes Peter Müller. Connective tissue is one of the many basic types of animal tissue, along with epithelial tissue, muscle tissue and nervous tissue. As the name implies, they support and connect different tissues and organs of the body. They are widely distributed in every part of the body. The cells of connective tissue are loosely spaced and embedded in an intercellular matrix. The matrix may be jelly like, fluid, dense or rigid. The nature of matrix differs in concordance with the function of the particular connective tissue.

Read the given passage carefully and give the answer of the following questions:

Q1. Which of the following is not a type of WBC?

a. Neutrophils

b. Eosinophils

c. Basophils

d. Erythrocytes

Q2. Bone and cartilage are types of:

a. nervous tissues

b. muscle tissues

c. connective tissues

d. epithelial tissues

Q3. Match the type of connective tissues listed under Column I with the functions listed under Column II. Choose the choice, which gives the correct combination of the alphabets of the two columns.

Column I (Connective Tissues)	Column II (Functions)
A. Ligament	(i) Stores fat
B. Tendons	(ii) Connects bone to bone
C. Areolar tissue	(iii) Connects muscle to bone
D. Adipose tissue	(iv) Forms blood cells
	(v) Filling tissue

a. A-(ii), B-(iii), C-(v), D-(i)

b. A-(ii), B-(iv), C-(v), D-(i)

c. A-(ii), B-(iii), C-(v), D-(iv)

d. A-(ii), B-(iii), C-(i), D-(iv)

Q4. Bone matrix is rich in:

a. fluoride and calcium

b. calcium and phosphorus

c. calcium and potassium

d. phosphorus and potassium

Q5. 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

Solutions

1. (d) Erythrocytes

2. (c) connective tissues

3. (a) A-(ii), B-(iii), C-(v), D-(i)

4. (b) calcium and phosphorus

5. (c) Ligament break

Case Study 4

Epithelial tissue or epithelium forms the outer covering of the skin and also lines the body cavity. It forms the lining of respiratory, digestive, reproductive and excretory tracts. They perform various functions such as absorption, protection, sensation and secretion. 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. Epithelial cells may be squamous, cuboidal or columnar in shape and may be arranged in single or multiple layers.

Read the given passage carefully and give the answer of the following questions:

Q1. Name the tissue present under the skin and arranged in a pattern of layers.

Q2. Name any one location in our body which bears ciliated epithelium.

Q3. Name the epithelial tissue which has pillar-like tall cells.

Q4. State how the epithelium is separated from the underlying tissue.

Q5. Write a short note on epithelial tissue cells.

Solutions

1. Stratified squamous epithelium

2. Respiratory tract

3. Columnar epithelium

4. Epithelium is separated from underlying tissue by an extracellular fibrous basement membrane.

5. Epithelial tissue cells are tightly packed and forms a continuous sheet. They have no intercellular spaces.

Case Study 5

Muscular tissue is a specialised tissue in animals which applies forces to different parts of the body by contraction. It is made up of thin and elongated cells called muscle fibers. It controls the movement of an organism. In mammals the three types

are: skeletal or striated muscle tissue, smooth muscle (non-striated) muscle; and cardiac muscle. Skeletal muscle tissue consists of elongated muscle cells called muscle fibers, and is responsible for movements of the body. Smooth and cardiac muscle contract involuntarily, without conscious intervention. Striated or skeletal muscle only contracts voluntarily, upon the influence of the central nervous system.

Read the given passage carefully and give the answer of the following questions:

Q1. Write two features of cardiac muscles.

Q2. Which muscle has spindle-shaped cells?

Q3. Why are smooth muscles called involuntary muscles?

Q4. Name the protein present in muscle fibre.

Q5. Why striated muscles are called as voluntary muscles?

Solutions

1. Two features of cardiac muscles are:

(i) They are cylindrical, branched and uninucleate.

(ii) They are involuntary in nature and show rhythmic contraction and relaxation throughout life.

2. Smooth muscles.

3. They are involuntary as their functioning cannot be directly controlled.

4. Contractile protein, which contract and relax to cause movement.

5. Striated muscles are under our conscious control and their movement can be controlled by us (e.g. Bicep muscles), unlike as in the case of involuntary muscles, hence they are called voluntary muscles.