# CHAPTER 1 : TISSUE

## Objective Type Questions

**Question 1(i)**

A group of similar cells to perform a specific function forms a:

1. Organ
2. Species
3. Organ system
4. Tissue

**Answer**

Tissue

**Reason** — Similar cells organise to form tissue and perform a specific function.
An organ is made up of different types of tissues working together to perform a specific function (e.g., heart, lungs). So it is a higher level than cells. A species refers to a group of organisms that can interbreed and produce fertile offspring. It is not related to cell organization. An organ system consists of multiple organs working together.

**Question 1(ii)**

The small fine branches given out from the cell body of a nerve cell are:

1. Dendrites
2. Cyton
3. Axon
4. Neurons

**Answer**

Dendrites

**Reason** — Dendrites are fine hair-like extensions from cyton. The cyton is the cell body of the neuron. It contains the nucleus and is not a branch. The axon is a single, long projection that carries impulses away from the cell body. It is not small or highly branched like dendrites (except at the terminal end). A neuron is the entire nerve cell itself, not a specific part of it.

**Question 1(iii)**

Fluid connective tissue of humans is:

1. Blood and cartilage
2. Lymph and plasma
3. Blood and lymph
4. Stroma and matrix

**Answer**

blood and lymph

**Reason** — Blood (cells+plasma) and Lymph are the fluid connective tissue. Blood is concerned with transportation of oxygen, glucose and amino acids etc. Lymph helps in immunity and returns excess tissue fluid to the bloodstream. Cartilage is a solid (supporting) connective tissue, not fluid. Plasma is just the liquid part of blood, not a separate tissue by itself. Stroma and matrix are structural components of tissues, not types of fluid connective tissue.

**Question 1(iv)**

Tissues organise to form :

1. Organ system
2. Organs
3. Organism
4. Cells

***Answer***

Organs

**Reason** — Tissues organise to form organs.
An organ system is formed when multiple organs work together to perform a major function (e.g., digestive system). So this is a higher level than organs. An organism is the complete living individual, made up of many organ systems working together. Cells are the basic unit of life and come before tissues in the level of organization.

**Question 1(v)**

In which of the plant tissues, cells actively divide to form new cells ?

1. Parenchyma
2. Sclerenchyma
3. Meristematic tissue
4. Protective tissue

***Answer***

Meristematic tissue

**Reason** — Meristematic tissues are made up of actively dividing cells. Their only function is to produce more cells leading to the growth of the plant body.
Parenchyma is a permanent tissue made of living cells that mainly store food and help in photosynthesis. Its cells are non-dividing in mature regions. Sclerenchyma provides mechanical support. Its cells are dead at maturity and do not divide. Protective tissue includes epidermis and cork. It mainly protects the plant surface and its cells do not actively divide.

**Question 1(vi)**

Which of the following tissues consists of dead cells ?

1. Collenchyma
2. Meristems
3. Parenchyma
4. Sclerenchyma

***Answer***

Sclerenchyma

**Reason** — Sclerenchyma is composed of long, narrow and thick-walled dead cells to provide strength to the plant parts.
Collenchyma is a living tissue found in young stems and leaves. It provides flexible support to the plant. Meristematic tissues consist of actively dividing living cells that help in plant growth. Parenchyma is a living tissue involved in storage, photosynthesis, and other basic functions.

**Question 1(vii)**

Which of the following tissues is found in the lining of the trachea ?

1. Ciliated epithelium
2. Cuboidal epithelium
3. Columnar epithelium
4. Squamous epithelium

***Answer***

Ciliated epithelium

**Reason** — In the lining of the trachea, the columnar epithelium has developed cilia. Such an epithelium is called ciliated epithelium.
Cuboidal epithelium is found in organs like the kidneys and glands, where it helps in secretion and absorption, not in the trachea. Simple columnar epithelium is found in the intestine for

absorption. In the trachea, it is specifically ciliated columnar epithelium, so this option is incomplete. Squamous epithelium is a thin, flat layer of cells found in areas like the alveoli of lungs for diffusion. It is not found in the trachea lining.

**Question 1(viii)**

Which of the following is not a kind of a fibrous connective tissue ?

1. Areolar tissue
2. Cartilage
3. Tendons
4. Ligaments

***Answer***

Cartilage

**Reason** — Cartilage is a Supportive connective tissue. It covers the ends of bones, and gives support to certain organs.
Areolar tissue is a loose connective tissue. It supports organs, fills spaces, and helps in repair of tissues. Tendons are fibrous connective tissues that connect muscles to bones. They are strong and slightly elastic. Ligaments are fibrous connective tissues that connect bone to bone. They are flexible and provide joint stability.

**Question 1(ix)**

The non-cellular part of blood is :

1. Lymph
2. Serum
3. Plasma
4. Tissue fluid

***Answer***

Plasma

**Reason** — Plasma is the non-cellular (liquid) part of the blood.
Lymph is a clear fluid tissue that circulates in the lymphatic system. It contains cells like lymphocytes, so it is not non-cellular blood part. Serum is the fluid obtained after blood clots and blood cells and clotting factors are removed. It is derived from plasma but is not the main circulating non-cellular component. Tissue fluid (interstitial fluid) surrounds body cells and is formed from plasma, but it is not part of blood itself.

**Question 1(x)**

The tissue in which the cells are filled with fat globules is :

1. Epithelial tissue
2. Adipose tissue
3. Nervous tissue
4. Areolar tissue

***Answer***

Adipose tissue

**Reason** — Adipose tissue contains cells filled with fat globules.
This tissue forms the covering and lining of body surfaces and organs (like skin and lining of the gut). Its cells are not filled with fat globules. Nervous tissue is made of neurons and is responsible for transmitting nerve impulses. Areolar tissue is a loose connective tissue that supports organs and fills spaces between them. It contains various cells but not fat-filled ones like adipose tissue.

**Question 2(i)**

**Assertion (A):** Meristematic tissues consist of undifferentiated, actively dividing cells.

**Reason (R):** Meristems are undifferentiated as they divide and redivide and produce a large number of cells. They are not specialized for any particular function.

1. Both A and R are true and R is the correct explanation of A.
2. Both A and R are true but R is not the correct explanation of A.
3. A is true but R is false.
4. A is false but R is true.

***Answer***

Both A and R are true and R is the correct explanation of A.

**Reason** — **A is true** as meristematic tissue consists of undifferentiated cells that actively divide to produce new cells for plant growth.
**R is true** as meristematic cells are called undifferentiated because they continuously divide and redivide, forming a large number of new cells. They do not specialize into a particular function. The continuous division and lack of specialization is exactly why meristematic tissues are undifferentiated and actively dividing.

Therefore, **Both A and R are true and R is the correct explanation of A** is the correct option.

**Question 2(ii)**

**Assertion (A):** Permanent tissues form the bulk of the plant body and they do not divide.

**Reason (R):** Permanent tissues mature into fixed, specialised cells that carry out specific functions, so they no longer retain the ability to divide.

1. Both A and R are true and R is the correct explanation of A.
2. Both A and R are true but R is not the correct explanation of A.
3. A is true but R is false.
4. A is false but R is true.

***Answer***

Both A and R are true and R is the correct explanation of A.

**Reason** — **A is true** as permanent tissues make up most of the plant body and generally do not divide.
Permanent tissues consist of mature, specialised cells that have lost their ability to divide because they are differentiated for specific functions.
**R is true** as loss of the ability to divide due to specialization directly explains why permanent tissues do not divide.

Therefore, **Both A and R are true and R is the correct explanation of A** is the correct option.

**Question 2(iii)**

**Assertion (A):** All organisms, whether unicellular or multicellular, start their life from a single celled structure called the zygote.

**Reason (R):** Zygote is formed by the fusion of two unicellular structures (gametes) during the process of fertilization among higher plants and animals.

1. Both A and R are true and R is the correct explanation of A.
2. Both A and R are true but R is not the correct explanation of A.
3. A is true but R is false.
4. A is false but R is true.

***Answer***

Both A and R are true and R is the correct explanation of A.

**Reason** — **A is true** as in sexual reproduction, both unicellular and multicellular organisms begin development from a single cell called the zygote.
**R is true** as a zygote is formed when two gametes (sperm and egg), which are unicellular structures, fuse during fertilization in higher plants and animals.
The formation of a single-celled zygote through fertilization explains why organisms start life from a single cell.

Therefore, **Both A and R are true and R is the correct explanation of A** is the correct option.

**Question 2(iv)**

**Assertion (A):** Blood and lymph, both contain the same fluid (plasma) but they differ from each other in their cellular contents.

**Reason (R):** Blood contains red blood cells and platelets whereas lymph contains only white blood cells.

1. Both A and R are true and R is the correct explanation of A.
2. Both A and R are true but R is not the correct explanation of A.
3. A is true but R is false.
4. A is false but R is true.

***Answer***

Both A and R are true and R is the correct explanation of A.

**Reason** — **A is true** as blood and lymph both contain a fluid component (plasma in blood and lymph fluid derived from plasma), but they differ in cellular composition.
**R is true** as blood contains RBCs, WBCs, and platelets, whereas lymph mainly contains WBCs (especially lymphocytes) and lacks RBCs and platelets.
The difference in cellular contents directly explains why blood and lymph are distinct despite having similar fluid origins.

Therefore, **Both A and R are true and R is the correct explanation of A** is the correct option.

**Question 2(v)**

**Assertion (A):** Epithelial tissues form a protective covering of cells, found only on the outer surface of the body.

**Reason (R):** Epithelial tissues are also found around internal organs, line inner body surfaces and perform various functions like absorption, secretion, etc.

1. Both A and R are true and R is the correct explanation of A.
2. Both A and R are true but R is not the correct explanation of A.
3. A is true but R is false.
4. A is false but R is true.

***Answer***

A is false but R is true.

**Reason** — **A is false** as epithelial tissue is not found only on the outer surface of the body. While it does form the outer skin layer, it is also present internally.

**R is true** as epithelial tissues also line internal organs and cavities (like lungs, intestine, blood vessels) and perform functions such as absorption, secretion, protection, and filtration.

Therefore, **A is false but R is true** is the correct option.

**Question 3**

State whether the following statement are *True* or *False.*

1. A tissue is formed of only one type of cells.
2. Only one type of tissue forms an organ.
3. Permanent tissue is made up of undifferentiated and dividing cells.
4. Meristematic tissue is found at the growing tips of a plant.
5. Phloem is formed of dead tubular cells.

***Answer***

1. True
2. True
3. False
   ***Corrected statement*** — Permanent tissue is made up of differentiated and non-dividing cells.
4. True
5. False
   ***Corrected statement*** — Phloem is formed of living tubular cells.

**Question**

Match the items given in **Column A** with those given in **Column B:**

| Column A | Column B |
|---|---|
| (i) Fibrous connective tissue | (a) blood |
| (ii) Fluid connective tissue | (b) cartilage |
| (iii) Supportive connective tissue | (c) connects a bone to another bone |

| Column A | Column B |
|---|---|
| (iv) Ligament | (d) areolar tissue |
| (v) Tendon | (e) connects a muscle with a bone |

***Answer***

| Column A | Column B |
|---|---|
| (i) Fibrous connective tissue | (d) areolar tissue |
| (ii) Fluid connective tissue | (a) blood |
| (iii) Supportive connective tissue | (b) cartilage |
| (iv) Ligament | (c) connects a bone to another bone |
| (v) Tendon | (e) connects a muscle with a bone |

**Question**

Each of the tissues listed in **Column A** is related to one of the functions given in **Column B.** Match the correct pairs by drawing lines.

| Column A (Tissue) | Column B (Function) |
|---|---|
| (i) Epithelial tissue | (a) movement |
| (ii) Connective tissue | (b) protection |
| (iii) Vascular tissue | (c) messages |
| (iv) Nervous tissue | (d) support |
| (v) Muscular tissue | (e) transport |

***Answer***

| Column A (Tissue) | Column B (Function) |
|---|---|
| (i) Epithelial tissue | (b) protection |
| (ii) Connective tissue | (d) support |
| (iii) Vascular tissue | (e) transport |
| (iv) Nervous tissue | (c) messages |
| (v) Muscular tissue | (e) movement |

**Question**

Name the kind of tissue that

1. Carries oxygen around your body
2. Brings about movement in animals
3. Transports food to different parts of a plant
4. Transports water in plants
5. Supports an animal's body
6. Binds different tissues together
7. Conducts messages from one part of the body to another
8. is found on the surface of roots, stems and leaves.
9. is composed of elongated cells, that are thick at the corners.
10. is composed of dead cells, that provides strength to the plant parts.
11. is richly located in the brain and spinal cord.
12. is striated and branched.

***Answer***

1. Carries oxygen around your body — ***Fluid connective tissue***
2. Brings about movement in animals — ***Muscular tissue***
3. Transports food to different parts of a plant — ***Phloem***
4. Transports water in plants — ***Xylem***
5. Supports an animal's body — ***Supportive connective tissue***
6. Binds different tissues together — ***Fibrous connective tissue***
7. Conducts messages from one part of the body to another — ***Nervous tissue***
8. is found on the surface of roots, stems and leaves — ***Protective Tissue***
9. is composed of elongated cells, that are thick at the corners — ***Collenchyma***
10. is composed of dead cells, that provides strength to the plant parts — ***Sclerenchyma***
11. is richly located in the brain and spinal cord — ***Nervous tissue***
12. is striated and branched — ***Cardiac muscular tissue***

**Question**

Given below are sets of four terms. **Choose the odd one** and **write** the category for the remaining terms :

1. Ligaments, Cardiac muscles, Tendons, Areolar tissue.
2. Collenchyma, Protective tissue, Sclerenchyma, Parenchyma.
3. Cuboidal tissue, Connective tissue, Columnar tissue, Ciliated tissue.
4. Striated, Cartilage, Cardiac, Unstriated muscle.
5. Cytons, Axons, Tendons, Dendrons.

***Answer***

1. **Odd one** — Cardiac muscles
   **Category of the remaining terms** — Fibrous Connective tissues

2. **Odd one** — Protective tissue
   **Category of the remaining terms** — Supporting tissues

3. **Odd one** — Connective tissue
   **Category of the remaining terms** — Epithelial tissues

4. **Odd one** — Cartilage
   **Category of the remaining terms** — Muscular tissues

5. **Odd one** — Tendons
   **Category of the remaining terms** — Parts of a Nerve cell/Neuron

**Question**

**Arrange** the following terms in a proper logical sequence :

1. Organ system, Tissues, Cells, Organisms, Organs.
2. Cambium layer, Pith, Outer Bark, Inner bark.

***Answer***

1. Cells, Tissues, Organs, Organ system, Organisms.
2. Pith, Cambium layer, Inner bark, Outer bark.

**Question**

**Note** the relationship between the first two words and **suggest** a suitable word/words for the fourth place:

1. Bones : Skull :: Cartilage : ..... .
2. Covering : Epithelial :: Contractile : ..... .
3. Xylem : Vessels :: Phloem : ..... .
4. Cuboidal epithelium : Absorption :: Columnar epithelium : ..... .
5. Parenchyma : Stores starch :: Chlorenchyma : ..... .

***Answer***

1. Bones : Skull :: Cartilage : **Trachea**.
2. Covering : Epithelial :: Contractile : **Muscular**.
3. Xylem : Vessels :: Phloem : **Sieve tubes**.
4. Cuboidal epithelium : Absorption :: Columnar epithelium : **Secretion**.
5. Parenchyma : Stores starch :: Chlorenchyma : **Performs photosynthesis**.

**Question**

**Name** the following:

1. 3 kinds of supporting tissues in plants.
2. 2 kinds of supportive connective tissues in animals.

3. 2 kinds of complex permanent tissues.
4. 4 kinds of fibrous connective tissues.
5. 3 kinds of muscular tissues.

***Answer***

1. Parenchyma, Collenchyma, Sclerenchyma
2. Cartilage and Bone
3. Xylem and Phloem
4. Areolar tissue, Adipose tissue, Tendons, and Ligaments
5. Striated muscles, Unstriated muscles, and Cardiac muscles

**Question**

**Write** the exact location of each of the following tissues :

1. Collenchyma
2. Meristematic tissue
3. Squamous epithelium
4. Cardiac muscles
5. Nervous tissue

***Answer***

1. Collenchyma is found in the leaf stalks and below the epidermis of stems.

2. Meristematic tissues are found at all growing points in a plant, like the tip of roots, stems and branches, where growth in length occurs.

3. Squamous epithelium is found in the cells of the outer layer of skin.

4. Cardiac muscles are found only in the walls of the heart.

5. Nervous tissue constitutes the nervous system.

**Question**

How do you rank the following with respect to a cell, tissue, organ or organism?

1. Amoeba
2. Euglena
3. Skin
4. Lungs
5. Neuron

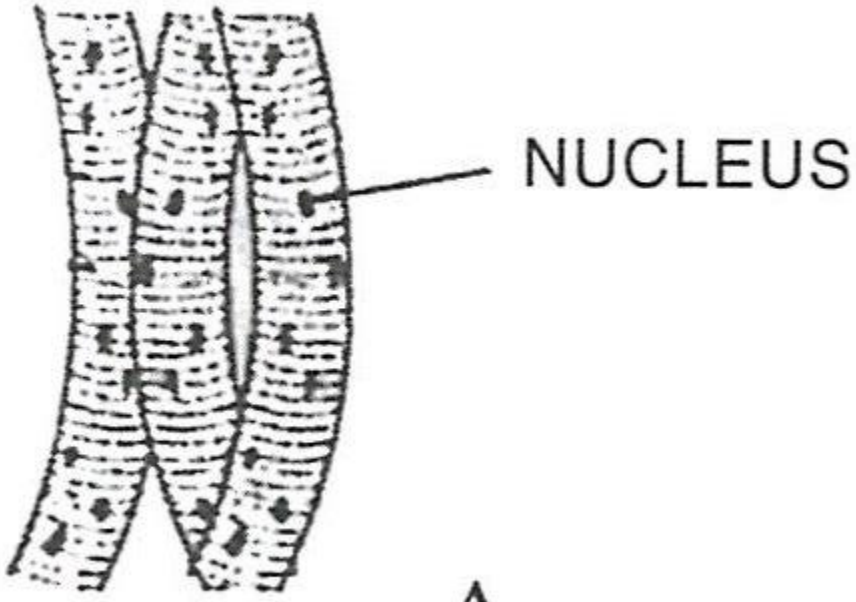
6. Cardiac muscles

***Answer***

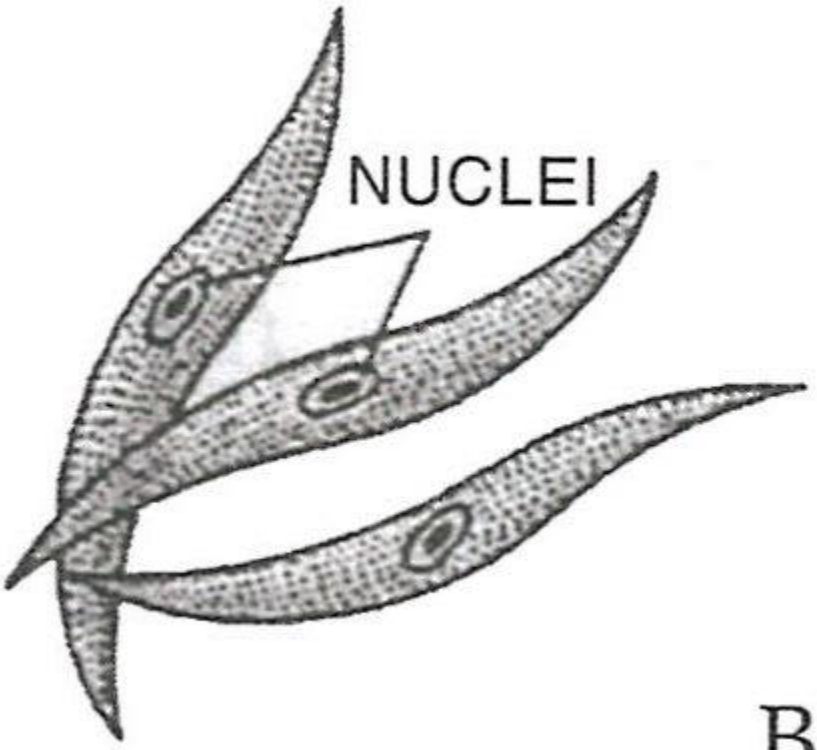
1. Amoeba: Organism (unicellular)
2. Euglena: Organism (unicellular)
3. Skin: Organ
4. Lungs: Organ
5. Neuron: Cell
6. Cardiac muscles: Tissue

**Question 3**

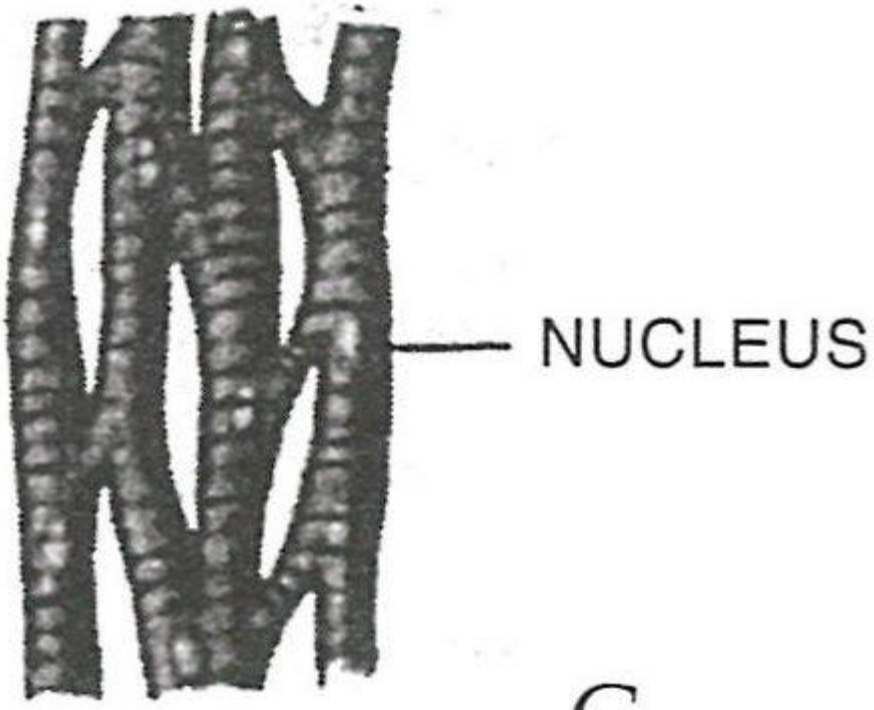
Study the figures given below and answer the following questions :




A.




B.




C.

(i) **Identify** the kind of tissues shown as A, B and C.

(ii) **Write** one specific location of each in the human body.

(iii) **Mention** one common function of all.

(iv) **Write** one structural difference between the tissues A and B.

(v) **Which** of these two tissues are not under the control of our will ?

***Answer***

(i) The tissues shown in figures A, B, and C are:
A → Striated muscles
B → Unstriated muscles
C → Cardiac muscles

(ii) One specific location of each in the human body:

- **Striated muscles** are found in face.
- **Unstriated muscles** are found in the iris of the eyes.
- **Cardiac muscles** are found only in the walls of the heart.

(iii) All the muscle types can contract and relax. Thus, they help the body in all its movements and locomotion.

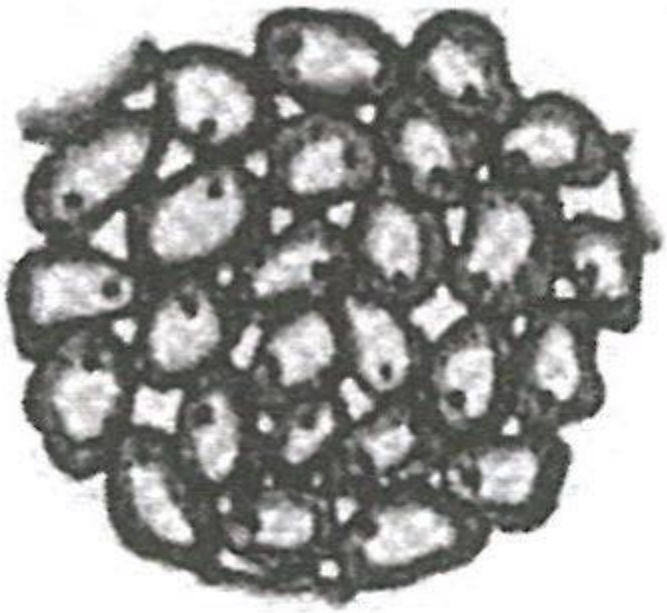
(iv) One structural difference between the tissues A and B:

| Striated muscles | Unstriated muscles |
|---|---|
| Striated muscles are skeletal, and stripped. They are attached to the bones. | Unstriated muscles are smooth, a unstripped. |

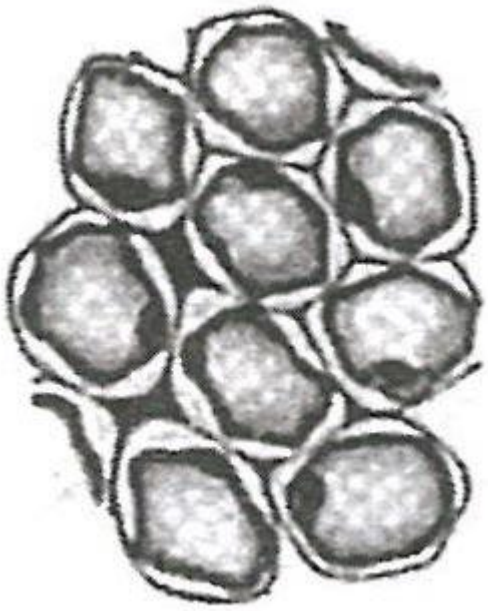
(v) Unstriated muscles are not under the control of our will.

**Question 4**

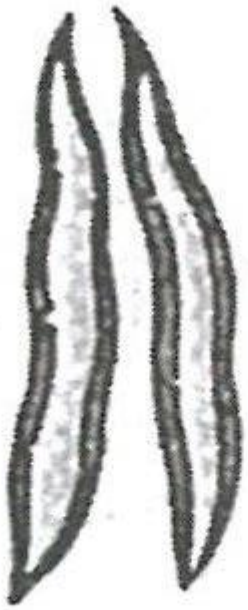
The figures given below represent three kinds of supporting tissues in plants.



A



B



**C**

(i) **Mention** the name of tissues (A), (B) and (C).

(ii) **Write** one structural difference between the tissues A and B.

(iii) **Which** of these tissues is located in the petiole of a leaf ?

(iv) **Write** one functional difference between the tissues A and C.

(v) **Name** the tissue in which the cells are long, narrow, thick-walled and dead.

***Answer***

(i) The name of tissues (A), (B) and (C) are:
A → Parenchyma
B → Collenchyma
C → Sclerenchyma

(ii) One structural difference between Parenchyma and Collenchyma:

| Parenchyma | Collenchyma |
|---|---|
| Parenchyma is composed of large thin walled cells, usually with intercellular spaces. | Collenchyma is made up of living cells which are and are thick at the corners or edges. |

(iii) Collenchyma is located in the petiole of a leaf.

(iv) One functional difference between Parenchyma and Sclerenchyma:

| Parenchyma | Sclerenchyma |
| --- | --- |
| Parenchyma stores food material. | Sclerenchyma provides a rigid mechanical and structural support to th |

(v) Sclerenchyma is composed of cells that are long, narrow, thick-walled and dead.

## Case Study

**Question 1**

Leesha fell from her bicycle and fractured one bone in her forearm. The X-ray confirmed a crack, so the doctor placed her arm in a plaster cast to keep the bone steady until it healed. While explaining the treatment, the doctor told her that bones are strong because of certain minerals stored in them.

(i) Bones are classified under which type of animal tissue?

(ii) Name two minerals that make bones strong.

(iii) State one important role of bones in vertebrates apart from movement.

(iv) Mention one other tissue in vertebrates that provides support and has a structure similar to bone.

(v) Name one location in the human body where the tissue mentioned in (iv) is found.

***Answer***

(i) Bones are classified as connective tissue.

(ii) Two minerals that make bones strong are calcium and phosphorus.

(iii) One important role of bones (apart from movement) is protection of internal organs (e.g., skull protects the brain, rib cage protects the heart and lungs).

(iv) Another tissue that provides support and has a structure similar to bone is cartilage.

(v) One location where cartilage is found in the human body is the tip of the nose (it is also found in the ear and joints).