UNIT 7

Organization of Tissues

BQ2HCH

TEXT BOOK EXERCISES

Section A

Ia. Match the following

1.	Sclereids	Chlorenchyma
2.	Chloroplast	Sclerenchyma
3.	Simple tissue	Collenchyma
4.	Companion cell	Xylem
5.	Trachieds	Phloem

Ans:

1.	Sclereids	Sclerenchyma
2.	Chloroplast	Chlorenchyma
3.	Simple tissue	Collenchyma
4.	Companion cell	Phloem
5.	Trachieds	Xylem

Ib. Match the contents of Column I, II and III

Column I	Column II	Column III
Columnar Epithelium	Absorption	Anchoring of muscle
Bones	Axon	Dendrites
Neurons	Body framework	Secretion
Areolar Tissue	Ground substance	Ciliated
Tongue	Trachea	Fibroblasts
Epithelium	Striated muscle	Visceral tissue

Ans:

Column I	Column II	Column III
Columnar Epithelium	Absorption	Secretion
Bones	Body frame work	Anchoring of muscle
Neurons	Axon	Dendrites
Areolar Tissue	Ground substance	Fibroblasts
Tongue	Striated muscle	Visceral tissue
Epithelium	Trachea	Ciliated

II. Choose the correct answer.

1. A meristematic tissue consists of
   a. Immature cells which are in a state of division and growth
   b. Mature cells
   c. Non-living cells
   d. Sclerenchyma cells

   Ans: a. Immature cells which are in a state of division and growth

2. The tissue composed of living thin walled polyhedral cell is
   a. Parenchyma b. Collenchyma
   c. Sclerenchyma d. None of above

   Ans: a. Parenchyma

3. The fibres consists of
   a. Parenchyma b. Sclerenchyma
   c. Collenchyma d. None of above

   Ans: b. Sclerenchyma

4. Chlorenchyma is known to develop in the
   a. cytoplasm of chlorella
   b. mycelium of a green mould such as aspergillus
   c. spore capsule of moss
   d. pollen tube of pinus.

Ans: c. spore capsule of moss

5. Companion cells are closely associated with
   a. sieve elements. b. vessel elements
   c. Trichomes d. guard cells.

Ans: a. sieve elements.

6. Which of the following is a complex tissue.
   a. parenchyma b. collenchyma
   c. xylem d. sclerenchyma

Ans: c. xylem

7. Aerenchyma is found in
   a. Epiphytes b. hydrophytes
   c. halophytes d. xerophytes

Ans: b. hydrophytes

8. Two long bones of the hand are dislocated in a person met who with an accident . Which among the following may be the possible reason.
   a. Tendon injury
   b. Break of skeletal muscle
   c. Ligament tear
   d. Rupture of Areolar tissue

Ans: c. Ligament tear

9. Unstraited muscles are found in
   a. Blood vessels
   b. Gastrointestinal tract
   c. Urinary bladder
   d. All of these

Ans: d. All of these

10. Which of the following is not found in a neuron?
    a. Sarcolemma b. Dendrite
    c. Neurolemma d. Axon

Ans: a. Sarcolemma

11. Long, unbranched multinucleated cells are
    a. Striated muscle cells
    b. Smooth muscles
    c. Cardiac muscles
    d. None of the above.

Ans: a. Striated muscle cells

12. White fibres of connective tissue are made up of
    a. Elastin b. Reticular fibres
    c. Collagen d. Myosin

Ans: d. Myosin

13. Brush bordered epithelium is found in
    a. Stomach b. Small intestine
    c. Fallopian tube d. Trachea

Ans: c. Fallopian tube

14. Smooth muscles occur in
    a. Uterus b Artery
    c. vein d. All of the above.

Ans: d. All of the above.

15. Which muscles act involuntary?
    (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)

16. Nerve cell does not contains
    a. Axon b. Nerve endings
    c. Tendons d. Dendrites

Ans: c. Tendons

17. Tendon connects
    a. Cartilage with muscles
    b. Bone with muscles
    c. Ligament with muscles
    d. Bone with bone.

Ans: b. Bone with muscles

18. In a certain type of cell division the diploid number of chromosome is reduced to half. This kind of division occurs in
    a. Testis
    b. Ovary
    c. Both ovary and testis
    d. All body cells.

Ans: c. Both ovary and testis

III. Fill in the blanks

1. The _____ tissues are made up of more than one type of cells and these wok together as a unit.

Ans: Complex

2. _____ tissues provides mechanical support to organs.

Ans: Collenchyma

3. Parenchyma, collenchyma, Sclerenchyma are _____ type of tissue.

Ans: Simple tissue

4. _____ and _____ are complex tissues.

Ans: Xylem and Phloem

5. Epithelial cells with cilia are found in _____ of our body.

Ans: trachea of wind-pipe / bronchioles of respiratory tract/ kidney tubules / fallopian tubes of oviducts.

6. Lining of small intestine is made up of _____.

Ans: Epithelial tissue

7. The two types of skeletal connective tissues are _____ and _____.

Ans: Tendons,ligaments

8. Humans have 46 chromosomes. Their sperms and eggs will have _____ chromosomes each.

Ans: 23

9. During pairing of chromosomes in meiosis,the _____ chromosomes come to lie side by side.

Ans: homologous chromosomes

IV.State whether True or false. If false, write the correct statement

1. Epithelial tissue is protective tissue in animal body.

Ans: True

2. Epithelial layer does not allow regulation of materials between body and external environment.

Ans: True

3. Bone and cartilage are two types of areolar connective tissue.

Ans: False,
Bone and cartilage are two types of supportive connective tissue.

4. Striated and non- striated tissues are types of epithelial tissues.

Ans: False
Striated and non- striated tissues are types of muscular tissues.

5. As growth occurs in an individual the skin cells divide only to replace such cells that are lost from the surface.

Ans: False
As growth occurs in an individual the skin cells divide to replace such cells that are lost from the surface and also formation of more cells.

6. Parenchyma is a simple tissue.

Ans: True

7. Phloem is made up of Tracheids.

Ans: False, Xylem is made up of Tracheids.

8. Vessels are found in collenchymas.

Ans:False,Vessels are found in xylem.

Section B

I. Very short answer questions

1. Give two types of Sclerenchyma.

Ans: a) Fibres, b) Sclereids

2. Name the components of xylem and phloem.

Ans:
Xylem components:
(i) xylem tracheids (ii) xylem fibres
(iii) xylem vessels and (iv) xylem parenchyma.
Phloem components:
(i) Sieve elements (ii) Companion cells.
(iii) Phloem fibres (iv) Phloem parenchyma

3. Name the tissue that connects muscle to bone in humans.

Ans: Tendons

4. Name tissue that stores fat in our body.

Ans: Adipocytes or Fat cell

5. Name the connective tissue with a fluid matrix.

Ans: Blood, Lymph

6. Name the tissue present in the brain.

Ans: Nervous tissue

II. Short answer Questions

1. What are intercalary meristems? How do they differ from other meristems?

It lies between the region of permanent tissues and is part of primary meristem which is detached due to formation of intermittent permanent tissues. It is found either at the base of leaf e.g. Pinus or at the base of internodes e.g. grasses.

2. How would you differentiate between meristematic and permanent tissue?

Meristematic tissue	Permanent tissue
Component cells are small, spherical or polygonal and undifferentiated	Component cells are large, differentiated with different shapes
Intercellular spaces absent	Intercellular spaces present
Cell wall thin and elastic	Cell wall thick
Nucleus is large and prominent	Nucleus is less conspicuous
Cells grow and divide regularly	Cells do not normally divide

3. What is complex tissue? Name the various kinds of complex tissues.

Complex tissues are made of more than one type of cells that work together as a unit. **Common examples are xylem and phloem.**

4. Differentiate fibres from sclereids.

Fibres	Sclereids
Elongated narrow thread like	Usually broad
End walls tapering	End walls blunt
Occur in bundles	Occur singly
Narrow pits	Deep pits

5. Mention the most abundant muscular tissue found in our body.State its function

The most abundant muscular tissue found in our body is skeletal muscle or striated muscle.

Functions:

Skeletal muscle:

- These muscles are attached to the bones and are responsible for the body movements and are called skeletal muscles.

❒ They work under our control and are also known as voluntary muscles.

❒ They occur in the muscles of limbs (biceps and triceps of arms).

❒ They undergo rapid contraction.

6. Which tissue is the main component of tendons and ligaments? How do they differ in function?

The main components of tendons and ligaments are fibres and fibroblasts.

Tendons	Ligaments
They are cord like, strong, structures that join skeletal muscles to bones.	It is connect bones to bones.
Tendons have great strength and limited flexibility.	They are highly elastic structures and have great strength
They consist of parallel bundles of collagen fibres, between which are present rows of fibroblasts.	They contain very little matrix. They strengthen the joints and allow normal movement.

7. What are the fibres present in the matrix of loose connective tissue ?

collagen fibres, elastin fibres and fibroblast cells.

8. How are collagen fibres organized in dense connective tissues

Dense connective tissue is a fibrous connective tissue densely packed with fibres and fibroblasts. It is the principal component of tendons and ligaments.

9. What is skeletal connective tissue? How is it helpful in the functioning of our body?

Skeletal muscle: These muscles are attached to the bones and are responsible for the body movements and are called skeletal muscles. They work under our control and are also known as voluntary muscles. The muscle fibres are elongated, non-tapering, cylindrical, unbranched and showing alternating dark and light bands, giving them the striped or striated appearance. These cells possess many nuclei (multinucleate). They occur in the muscles of limbs (biceps and triceps of arms).They undergo rapid contraction.

10. Which tissue is called middleman between tissue cells and blood? Why?

❒ The matrix consists of collagen fibres, elastin fibres and fibroblast cells.

❒ It joins skin to muscles, fills space inside organs and is found around muscles, blood vessels and nerves.

❒ The matrix of this tissue plays an important role in diffusion of oxygen and nutrients from small blood vessels.

❒ It also helps in repair of tissues after injury and fixes skin to underlying muscles.

11. Why should gametes be produced by meiosis during sexual reproduction?

i. The constant number of chromosomes in a given species is maintained by meiotic division.

ii. Crossing over causes genetic variations among the species from one generation to the next.

12. In which stage of mitosis the chromosomes align in an equatorial plate? How?

Ans: Metaphase,

The duplicated chromosomes arrange on the equatorial plane and form the metaphase plate. Each chromosome gets attached to a spindle fibre by its centromere which is known as the chromosomal fibre. The centromere of each chromosome divides into two, each being associated with a chromatid.

13. Write one point of difference between
    a) Bone and cartilage
    b) Simple and compound epithelial tissue.

Bone	Cartilage
It is solid, rigid and strong, non-flexible skeletal connective tissue.	They are soft semi rigid flexible and less vascular in nature.
The matrix of the bone is rich in calcium salts and collagen fibres which gives the bone its strength.	The matrix is composed of large cartilage cells chondrocytes.
Bones support and protect soft tissues and organs.	cartilage provides support and flexibility to the body parts.
Bones are present the skeletal system.	cartilage present in the tip of the nose,external ear, end of long bones,trachea and larynx.

Simple Epithelial Tissue	Complex Epithelial Tissue
It is formed of single layer of cells.	It consists of more than one layer of cells and gives a stratified appearance.
It forms a lining for the body cavities and ducts. It is also found on the secretory and absorptive surfaces.	They also cover the dry surface of the skin, the moist surface of the buccal cavity and pharynx.

14. Why is blood considered to be a connective tissue?

The blood is the fluid connective tissues which link different parts of the body. The cells of the connective tissue are loosely spaced and are embedded in an intercellular matrix.

15. Give the sequence of the events occurring during prophase of mitosis.

During this stage chromosomes become short and thick and are clearly visible inside the nucleus. Centrosome splits into two daughter centrioles, they move apart and occupy opposite poles of the cell. Each centriole is surrounded by radiating rays, termed as aster rays. Spindle fibres appear between the two centrioles. Nuclear membrane and nucleolus disappear gradually.

16. Why is meiosis called reductional division and mitosis as equational division?

Meiosis:

The process of meiosis involves divisions of genetic material.

The first division is called reduction division.

First division reduces the number of chromosomes diploid(2n) to haploid(n).

Mitosis:

The process of cell division where chromosomes replicate and get equally distributed in two daughter cells.

The chromosome number in each daughter cell is equal to that is diploid.

Hence mitosis is known as equational division.

III.Long Answer Questions :

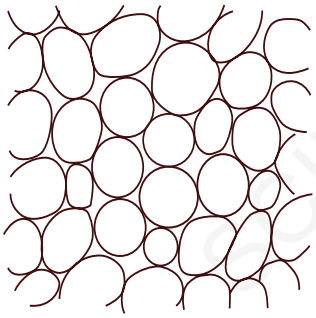
1. What are permanent tissues? Describe the different types of simple permanent tissue.

Permanent tissues are those in which, growth has stopped either completely or for the time being. At times, they become meristematic partially or wholly. Permanent tissues are of two types namely (i) simple tissue and (ii) complex tissue.

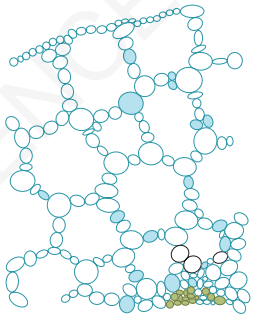
Simple tissue are homogeneous -composed of structurally and functionally similar cells. eg., Parenchyma, Collenchyma and Sclerenchyma.

Parenchyma

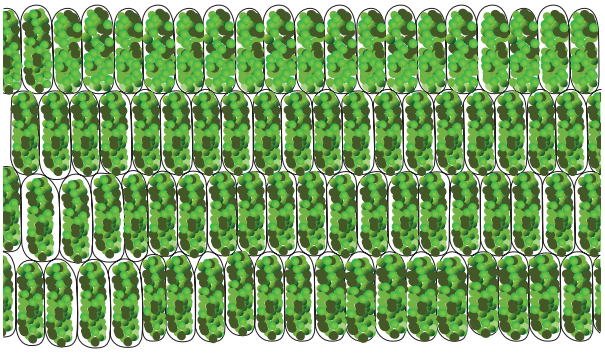
Parenchyma are simple permanent tissue composed of living cells. Parenchyma cells are thin walled, oval, rounded or polygonal in shape with well developed spaces among them. In aquatic plants, Parenchyma possesses intercellular air spaces, and is named as Aerenchyma. When exposed to light, parenchyma cells may develop chloroplasts and are known as Chlorenchyma.



Parenchyma



Aerenchyma



Chlororenchyma

Functions:

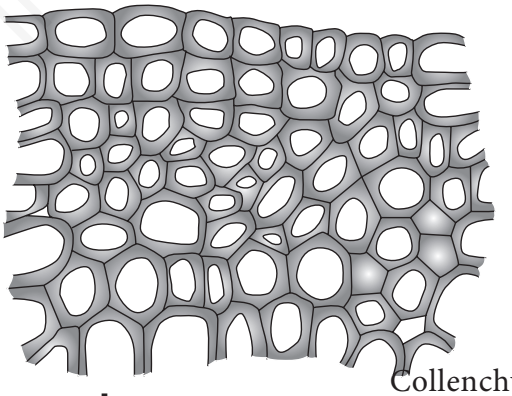
Parenchyma may store water in many succulent and xerophytic plants. It also serves the functions of storage of food reserves, absorption, buoyancy, secretion etc.,

Collenchyma

Collenchyma is a living tissue found beneath the epidermis. Cells are elongated with unevenly thickened non-lignified walls. Cells have rectangular oblique or tapering ends and persistent protoplast. They possess thick primary non-lignified walls.

Functions:

They provide mechanical support for growing organs.



Collenchyma

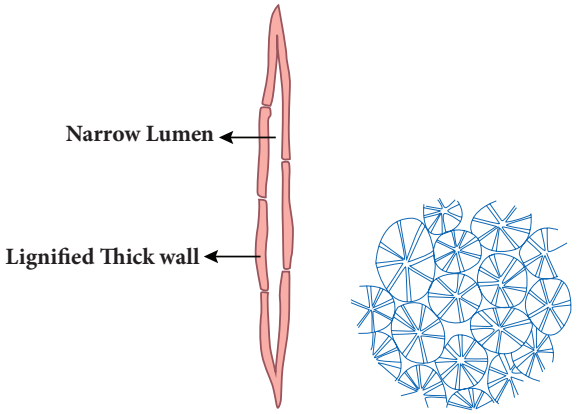
Sclerenchyma

Sclerenchyma consists of thick walled cells which are often lignified. Sclerenchyma cells do not possess living protoplasts at maturity. Sclerenchyma cells are grouped into (i) fibres and (ii) sclereids.

Fibres are elongated sclerenchymatous cells, usually with pointed ends. Their walls are lignified. Fibres are abundantly found in many plants. The average length of fibres is 1 to 3 mm, however in plants like Linum usitatissimum (flax), Cannabis sativa (hemp) and Corchorus capsularis (jute), fibres are extensively longer ranging from 20 mm to 550 mm.

Sclereids

Sclereids are widely distributed in plant body. They are usually broad, may occur in single or in groups. Sclereids are isodiametric, with liginified walls. Pits are prominent and seen along the walls. Lumen is filled with wall materials. Sclereids are also common in fruits and seeds.



(a) Fibres (b) Sclereids

2. What are meristems? Describe the distribution and functions of various types of meristems.

Meristematic tissues are group of immature cells that are capable of undergoing cell division.

On the basis of their position in the plant, meristems are of three types: i) pical meristem ii) Intercalary meristem and iii) Lateral meristem.

i. Apical meristem:

- These are found at the apices or growing points of root, shoot and bring about increase in length. They include both pro-meristem as well as primary meristem.

ii. Intercalary meristem:

- It lies between the region of permanent tissues and is part of primary meristem which is detached due to formation of intermittent permanent tissues.

It is found either at the base of leaf e.g. Pinus or at the base of internodes e.g. grasses.

iii. Lateral Meristem:

- These are arranged parallel to sides of origin and normally divide radially to give secondary permanent tissues. These increase the thickness of the plant part.

Functions of Meristematic Tissue:

Meristems are actively dividing tissues of the plant, that are responsible for primary (elongation) and secondary (thickness) growth of the plant.

3. Write about the elements of Xylem

Xylem

Xylem is a conducting tissue which conducts water, mineral nutrients upward from root to leaves. Xylem is also meant for mechanical support to the plant body. Xylem is composed of different kinds of elements. They are (i) xylem tracheids (ii) xylem fibres (iii) xylem vessels and (iv) xylem parenchyma.

i. Xylem tracheids

They are elongated or tube-like dead cells with hard, thick and lignified walls. Their ends are tapering, blunt or chisel-like. These cells are devoid of protoplast. They have large lumen without any content. Their function is conduction of water and providing mechanical support to the plant.

ii. Xylem fibres

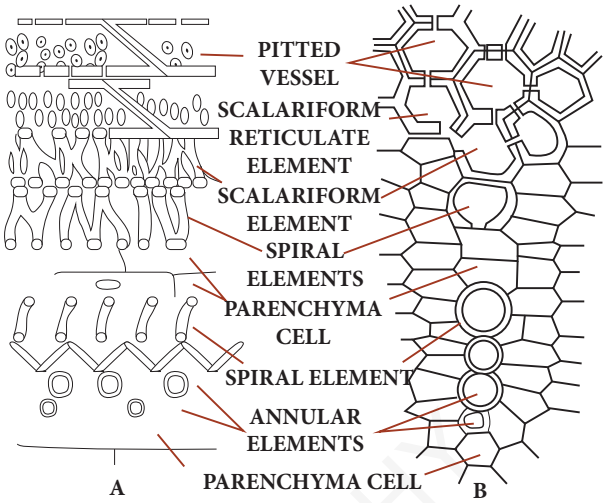
These cells are elongated, lignified and pointed at both the ends. Xylem fibres help in conduction of water and nutrients from root to the leaf and also provide mechanical support to the plant.

iii. Xylem vessels

They are long cylindrical, tube like structures with lignified walls and wide central lumen. These cells are dead as these do not have protoplast. They are arranged in longitudinal series in which the partitioned walls (transverse walls) are perforated, and so the entire structure looks-like a water pipe. Their main function is transport of water and minerals from root to leaf, and also to provide mechanical strength.

iv. Xylem parenchyma

Its cells are living and thin walled. The main function of xylem parenchyma is to store starch and fatty substances.



A. xylem longitudinal section
B. xylem transverse section

4. List out the differences between mitosis and meiosis.

Mitosis	Meiosis
Occurs in somatic cells.	Occurs in reproductive cells
Involved in growth and occurs continuously throughout life.	Involved in gamete formation only during the reproductively active age.
Consists of single division	Consists of two divisions
Two diploid daughter cells are formed.	Four haploid daughter cells are formed.
The chromosome number in the daughter cell is similar to the parent cell (2n).	The chromosome number in the daughter cell is just half (n) of the parent cell.
Identical daughter cells are formed	Daughter cells are not similar to the parent cell and are randomly assorted.

5. Give one reason for the following
   a. Blood is fluid connective tissue
   b. Skeletal muscles contain contractile proteins
   c. Heart muscles are involuntary in nature

a. The blood and the lymph are the fluid connective tissues which link different parts of the body. The cells of the connective tissue are loosely spaced and are embedded in an intercellular matrix.

b) Skeletal muscle: These muscles are attached to the bones and are responsible for the body movements and are called skeletal muscles. They work under our control and are also known as **voluntary muscles**. They occur in the muscles of limbs (biceps and triceps of arms).They undergo rapid contraction.

c.Cardiac muscle: It is a contractile tissue present in the heart. The muscle fibres are **cylindrical**, **branched** and **uninucleate**. The branches join to form a network called as **intercalated disc** which are unique distinguishing features of the cardiac muscles. The intercellular spaces of the cardiac muscle are filled with loose connective tissue supplied with blood capillaries. The contraction of cardiac muscle is involuntary and rhythmic.

Section C

I. Assertion and Reason

Direction : In each of the following questions, a statement of Assertion is given and a corresponding statement of Reason is given just below it. Of statements, given below, mark the correct answer as

a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

b. If both Assertion and Reason are true that Reason is not the correct explanation of Asssertion.

c. If Assertion is true but Reason is false.

d. If both Assertion and Reason are false

1. Assertion: Non-striated muscles are said to be voluntary in nature.
   Reason: Non-striated muscles are under the control of our will.

Ans: c. If Assertion is true but Reason is false.

2. Assertion:Materials are exchanged between epithelial and connective tissues by diffusion.
   Reason: Blood vessels are absent in epithelial tissue.

Ans:

a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

II. Value Based Questions - Thinking Skills

1. What is the consequence that occur if all blood platelets are removed from the blood?

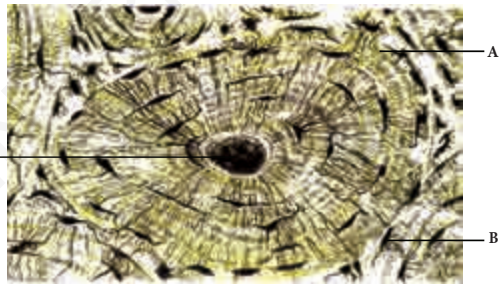
   If all blood platelets are removed from blood. Blood will not clot.

   If small injury occur on our body part blood loss will occur.

2. Which are not true cells in the blood? Why?

   Red blood corpuscles are not true cells in the blood. because they lack nucleus.

3. Identify the figure given below

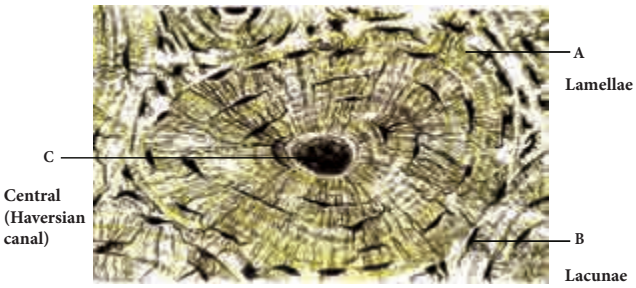


(a) Label the parts a, b and c

(b) What is the chemical composition of the tissue?

(c) What is the function of c?

a) T.S of Bone

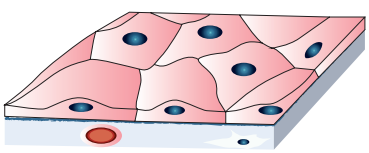


b) The matrix of the bone is rich in calcium salts and collagen fibers.

C) The matrix of the bone is rich in calcium salts and collagen fibres which gives the bone its strength. The matrix of the bone is in the form of concentric rings called **lamellae**. The fluid filled spaces present between the lamellae are called lacunae in which are present the bone cells

called **osteocytes** that communicate with each other by a network of fine canals called **canaliculi**. The hollow cavities of spaces are called marrow cavities filled with **bone marrow**. They provide shape and structural framework to the body. Bones support and protect soft tissues and organs.

4. Identify figures A and B



A

B

a. _____ epithelium forms the outer lining of the buccal cavity.

b. _____ epithelium consist of cells that are tall and pillar-like.

c. Which one allows diffusion of substances?

d. Which is called pavement epithelium?

e. Which epithelium lines the gastrointestinal tract and epiglottis?

a) Squamose Epithelium
b) Columnar Epithelium
c) Squamose Epithelium
d) Squamose Epithelium
e) Columnar Epithelium

5. If cell (A) has undergone one mitotic division and another cell (B) has completed its meiotic division. The number of cells produced in A and B would be

Cell A : **Cell B :**

Ans:
Cell A : 2 cells **Cell B : 4 cells**

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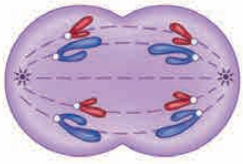
6. Identify the stage of mitosis from the following picture given below . List the chromosomal events in this stage.



Anaphase :

The centromeres attaching the two chromatids divide and the two daughter chromatids of each chromosome separate and migrate towards the two opposite poles. The migration of the daughter chromosomes is achieved by the contraction of spindle fibres.

7. Identify the following relationship

Cuboidal : Epithelial
Cardiac : Cardiac muscle
Granulocytes : Fluid connective Tissue
Osteocytes : Supportive connective tissue

8. You are now familiarised with various plant and animal tissues. Point out any five differences between these tissues.

Plant Tissue	Animal Tissue
They have stationary phase.	They have locamative phase
They do not require lot of energy.	They require lot of energy.
They have more dead cells.	They have more living cells.
They are able to make their own food.	They cannot make their own food and depend on other organism.
They are two major types of tissues- meristematic and permanent tissue.	They are four types of tissues- epithelial,connective,muscular, and nervous tissue.