

EXAM
DRILL

Tissues

ANSWERS

- One of the main functions of parenchymatous tissue is assimilation and storage of reserve food materials (*i.e.*, starch, fats, proteins, etc.).
- Simple squamous epithelium is also called pavement epithelium.

OR

Lymph is a colourless fluid connective tissue that mainly helps in exchange of materials between blood and tissue fluids.

- (b) : X is white blood cell, Y is granulocyte as neutrophils, eosinophils and basophils have irregular shaped nuclei and cytoplasmic granules. Z is agranulocyte as they do not have cytoplasmic granules.
- (b)
- (iii) Eosinophils show antiallergic responses and helps in dissolving blood clots.
- (iv) Immunocytes produce antibodies and are involved in immune response. Neutrophil engulfs and digest pathogens and dead cells, etc.
- (a)
- (ii) Intercalary meristem produces an increase in length of plant's internode.
- (c)
- (iv) Apical and intercalary meristem
- (a) : Axon is a single, long cylindrical process of uniform diameter. It takes impulses away from the cell body.
- (b) : Cardiac muscles have densely stained cross bands called intercalated discs.
- Blood is a fluid connective tissue, composed of blood corpuscles and plasma. Plasma is yellow coloured part of blood that does not contains protein fibres, but contains blood corpuscles. The blood corpuscles are of three types *viz.* erythrocyte, leucocytes and platelets.
- Collenchyma provide mechanical support and elasticity to plants.
- Parenchymatous cells that contain chloroplasts are termed as chlorenchyma.
- (b)
- (a) : Blood is fluid connective tissue. Fluid connective tissue links the different parts of body and maintain a continuity in the body.
- On the basis of the ability of division, plant tissues are of two types :
 - Meristematic tissues which consist of undifferentiated actively dividing cells and ;
 - Permanent tissues, consisting of differentiated cells which have lost the ability to divide.
- Characteristics of meristematic tissues are as follows :
 - The cells of these tissues are similar in structure and have thin and elastic primary cell walls made up of cellulose.
 - The cells are round, oval, polygonal or rectangular in appearance.
 - They have large and prominent nuclei.
- On the basis of location in the plant body, meristems are of three types :
 - Apical meristem
 - Lateral meristem
 - Intercalary meristem

Apical meristem brings about an increase in height of the plant.

Lateral meristem brings about an increase in the width or girth of roots and stems, also called secondary growth.

Intercalary meristem brings about elongation/growth of that part of the plant where they are present.

OR

- (b)
- (c) : The thick and dead cell of sclerenchyma forms the husk of coconut.
- (d) : Ligament is made up of fibrous connective tissue.
- (a) : Collenchyma is a mechanical tissue. It provides mechanical support and elasticity. Therefore, collenchyma provides tensile strength with flexibility.

OR

(d) : Collenchyma consists of living cells. It is characterised by the deposition of extra cellulose at the corners of the cells.

OR

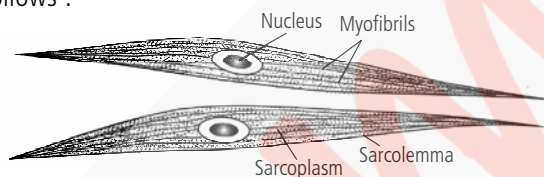
Differences between blood and lymph are as follows :

S. No.	Blood	Lymph
(i)	It consists of plasma, erythrocytes, leucocytes and platelets.	It consists of plasma and leucocytes (lymphocytes most abundant).

(ii)	It is red in colour due to the presence of haemoglobin in erythrocytes.	It is colourless as haemoglobin is absent.
(iii)	Its plasma has more proteins, calcium and phosphorus.	Its plasma has fewer proteins and less calcium and phosphorus.
(iv)	Glucose concentration is less in blood.	Glucose concentration is higher in lymph.
(v)	Amount of CO ₂ and other metabolic wastes is normal.	Amount of CO ₂ and other metabolic wastes is high.
(vi)	It carries materials towards and away from the tissue, therefore, it acts as a "Vehicle".	It transfers materials from the blood to the body cells and <i>vice-versa</i> , therefore, it acts as "middle man".

18. (i) Areolar connective tissue
(ii) Ligaments
(iii) Adipose tissue
(iv) Connective tissue
(v) Epithelial tissue
(vi) Xylem and Phloem

19. The labelled diagram of smooth muscles fibres is as follows :



Occurrence : Smooth muscles are found in the walls of all tubular organs such as the stomach, intestine, blood vessels, breathing passages and the organs concerned with urination and reproduction.

Function : In some organs, the smooth muscles make the organs short and thick by its contraction or long and thin by its relaxation. They contract throughout the organ as a single unit and produce extrusive movements as in urinary bladder, gall bladder, ureters and uterus.

20. Striated muscles fibres are long, non-tapering, cylindrical and unbranched. These muscles are present in our limbs and are attached to bones. These are responsible for body movements, therefore called skeletal muscles. These are also called as voluntary muscles as we can move them by conscious will.

21. Differences between bone and cartilage are as follows:

S. No.	Bone	Cartilage
(i)	It is hard.	It is soft.
(ii)	Matrix has an inflexible material, the ossein.	Matrix has an inflexible material, the chondrin.

(iii)	Matrix always contains calcium salts.	Calcium salts may or may not be present in the matrix.
(iv)	Outer and inner layers of osteoblasts of a bone produce osteocytes.	Such layers of chondroblasts are not present.
(v)	Bones have rich blood supply.	Cartilages do not have rich blood supply.
(vi)	Bone marrow is present that produces blood corpuscles.	Bone marrow is absent.
(vii)	Growth in bone is bi-directional.	Growth in cartilage is unidirectional.

OR

- A – Permanent tissues
B – Apical / lateral meristem
C – Lateral / apical meristem
D – Complex permanent tissue
E – Collenchyma
F – Phloem

22. Functions of parenchyma are as follows :

- (i) The main function of parenchymatous tissue is storage of food, e.g., starch in the parenchyma of cortex of potato tuber.
(ii) In fleshy stems and leaves, parenchyma cells serve as water storage tissue, e.g., *Euphorbia*, *Opuntia*.
(iii) Parenchyma forms the framework of all the plant organs and tissues like cortex, pith, mesophyll of leaf and floral parts.
(iv) Parenchymatous tissue stores waste materials of plants, such as gum, crystals, resins, tannins, etc.
(v) The intercellular air spaces of parenchyma cells allow gaseous exchange.
(vi) If chloroplast is present in parenchyma cells (i.e., chlorenchyma), it performs photosynthesis, e.g., the mesophyll of leaves.

23. (i) The red blood corpuscles of mammals are small, biconcave discs and lack nuclei when mature.

Functions of RBCs : RBCs are packed with iron-rich, red-coloured, oxygen-carrying protein pigment, haemoglobin. It combines reversibly with oxygen to form oxyhaemoglobin (blood-red in colour). Red blood corpuscles also contain the enzyme carbonic anhydrase which regulates carbon dioxide transport.

- (ii) Lymph is the colourless fluid connective tissue that consists of plasma and mainly white blood cells. RBCs and platelets are absent in lymph.

Functions of lymph : It mainly helps in the exchange of materials between blood and tissue fluids. The lymph also protects the body against infection by destroying invading microorganisms.

(iii) Muscular tissue is a contractile tissue consisting of large elongated muscle cells or fibres. Contractility is the special property of this tissue.

Functions of muscular tissue : It brings about movements of the body parts and locomotion in the individual.

OR

(i) Parenchyma : Parenchyma cells are living cells and possess the power of division. It mainly consists of thin-walled cells which have intercellular spaces between them. Parenchyma forms the basic packing tissue of plant body. It is the most abundant tissue in plants.

Distribution : Parenchyma is widely distributed in various plant organs, viz., root, stem, leaves, flowers and fruits. They occur in epidermis, cortex, pith, pericycle, mesophyll of leaves, pulp of fruits and endosperm of seeds. Parenchymatous cells are also found in xylem and phloem.

(ii) Collenchyma : Collenchyma is a living tissue of primary body. The cells are thin-walled but possess thickenings of cellulose and pectic substances at the corners where number of cells join together. The tissue provides flexibility to soft aerial parts (e.g., leaves, young stems) of plant so that they can bend without breaking. The cells are compact and the intercellular spaces are absent.

Distribution : Collenchyma occur chiefly below the epidermis in leaf stalks, leaf mid ribs and herbaceous dicotyledonous stems. They are usually absent in monocots and in roots.

(iii) Sclerenchyma : Sclerenchyma consists of thick-walled dead cells. These cells have hard and extremely thick secondary walls due to uniform deposition of lignin.

Distribution : Sclerenchymatous fibres mostly occur in hypodermis, pericycle, secondary xylem and secondary phloem. The fibres usually occur in clusters. The sclereids, on the other hand, occur singly scattered in cortex, pith, phloem, etc. They also occur in hard seed coats, hard endocarp of almond and coconut (husk of coconut), grit of apple, pear and guava.

24. (i) Xylem and phloem are called complex tissues because both of these are made up of different types of cells which coordinate to perform common function.
- (ii) Epidermis is important for plants because :
- It prevents the entry of pathogens and pests.
 - Its cuticle checks the rate of water loss from aerial parts of the plants.
 - Stomata present in it help in exchange of gases.
 - Epidermis of the root and root hairs absorb water and minerals.
- (iii) Animals of colder region have thicker layer of

subcutaneous fat as it provides insulating layer to prevent heat loss from their body in colder environment. It also serves as reserve food during period of scarcity.

25. (i) Differences between plant and animal tissues are as follows :

S.No.	Plant tissues	Animal tissues
(i)	Due to activity of meristematic tissue plants continue to grow throughout life.	Animal do not show growth after reaching maturity. Reparative growth is, however, present.
(ii)	Organisation of plant tissues is simple.	Organisation of animal tissues is complex with the development of more specialised and localised organs and organ systems.

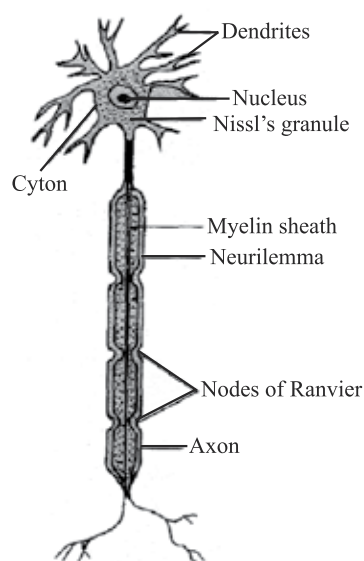
(ii) Xylem tissue consists of four types of cell-tracheids, vessels, xylem fibres and xylem parenchyma.

(iii) Cartilage performs the function of providing support and flexibility in the vertebrates.

(iv) Cuboidal epithelium helps in protection, secretion, absorption and excretion.

(v) Glandular epithelium cells are specialised for secretion and pour on the epithelial surface directly or through duct.

26. The labelled diagram of structure of a neuron is as follows :



Nerve cells or neurons form the most important elements of the neuron tissue. Each neuron consists of three parts;

- (i) the main body called the cell body or cyton,
 (ii) dendrons, and, (iii) axon.

(i) **Cyton or cell body:** The cell body contains the major concentration of the cytoplasm and the central nucleus of the neuron. The cell body also contains Nissl's granules, which are groups of ribosomes and rough endoplasmic reticulum.

(ii) **Dendrons:** The dendrons are one or more short processes arising from the cyton. Dendrons branch further into many thin dendrites. The dendrites receive impulses.

(iii) **Axon :** The axon is a single, long, cylindrical process arising from the cyton. The axon forms fine branches at its terminal end. Each branch ends in a swollen structure, called synaptic knob. The axons carry impulses away from the cell body to other neurons. The synaptic knobs of terminal branches of neuron are connected with dendrite branches of an adjacent neuron.

OR

As plants grow older with times, protective tissues at the periphery undergoes certain changes. In them a strip of secondary meristem replaces the epidermal layer of the stem forming a many layered thick bark of the tree called cork.

Characteristics of Cork : Cork is made up of dead, thick-walled cells. The cork cells are compactly arranged without any intercellular spaces. The walls of cork cells also contain suberin (a chemical substance) which is impervious to gases and water.

Function of Cork : Cork performs protective functions in the following ways :

- (i) Cork cells being highly suberised and thick walled protect the inner tissues.
- (ii) It provides insulation from freezing temperatures.
- (iii) It protects the inner tissues from the attacks of microorganisms and prevents water loss also.

27. (A) Squamous epithelium : The cells in this epithelium are extremely thin and flat and are arranged edge to edge forming a delicate lining or covering.

It forms the lining of cavities of ducts and blood vessels, lines the chambers of the heart, covers the skin, and lining of the mouth. It also lines pharynx, oesophagus, anal canal, vagina and lower part of urethra. It provides protection to the underlying parts against abrasion (mechanical injury) and entry of germs or chemicals.

(B) **Columnar epithelium :** This epithelium consists of cells which are much longer than broad; looks like a column. It forms the lining of stomach and intestine; also found in salivary glands in the mouth, sweat glands and oil glands of the skin. It also lines mammary gland ducts and parts of urethra. It helps in protection, absorption and secretion. Columnar epithelium of intestine is specialised for the absorption of water and digested food.

(C) **Cuboidal epithelium :** Cells are as long as broad and appear cube-like; a centrally located nucleus is

present. The cuboidal epithelium lines the pancreatic ducts, sweat glands, salivary glands and thyroid glands. It also covers the ovaries and lines the sperm-producing tubules. It helps in protection, secretion, absorption, excretion and gamete formation.

(D) **Ciliated epithelium :** This epithelium, usually consisting of cuboidal or columnar cells, has numerous, thin, delicate, hair-like projections called cilia arising from the outer free surface of the cells. It is found lining the wind-pipe (trachea), kidney tubules, oviduct (Fallopian tubes) and ventricles of the brain. This epithelium helps in the movement of mucus, urine, eggs, sperms and cerebrospinal fluid in a particular direction.

28. (i) The tendons connect the skeletal muscles with bones. These are cord-like, very tough, inelastic bundles of white collagen fibres bound together by areolar tissue. The cells present in the tendons are elongated fibroblasts which lie in almost continuous rows here and there.

(ii) **Bones form the endoskeleton of vertebrates.** Bone is a very strong, rigid and porous tissue, consisting of osteoblasts, embedded in a firm, calcified matrix. The osteoblasts are contained in lacunae (spaces) which are arranged in concentric circles present throughout the matrix. The lacunae are also traversed by nerves and blood vessels. The blood vessels passing through them provide nutrients to osteoblasts and help exchange of materials. The matrix is composed of about 30% organic materials (chiefly collagen fibres and glycoproteins) and 70% inorganic bone salts (mainly phosphates and carbonates of calcium and magnesium, hydroxyapatite, etc.). These inorganic salts are responsible for hardness of the bone. They provide levers for movement and support for soft parts of the body. Bones also protect many delicate tissues and organs.

(iii) **Xylem transports water and minerals in plants.** It is the chief conducting tissues of vascular plants, responsible for the transportation of water and inorganic solutes to the various parts of the plant body. Xylem is complex permanent tissue consisting of four types of cells— tracheids, vessels, xylem fibres and xylem parenchyma.

OR

(i) Differences between xylem and phloem are as follows :

S.No.	Xylem	Phloem
(i)	It conducts water and inorganic solutes in vascular plants.	It conducts organic solutes in vascular plants.
(ii)	Conduction mostly occurs in one direction (i.e., upward).	Conduction may occur in both directions, i.e., upward or downward.

(ii) Phloem tissue is regarded as living conducting tissue which is concerned with the translocation of food in the plants. The phloem is composed of four elements: sieve tubes, companion cells, phloem parenchyma and phloem fibres.

(a) Sieve tubes are the main conducting part of the phloem which is formed of elongated cylindrical cells arranged in vertical rows. The terminal walls of each sieve tube have many minute pores (perforated walls) through which food material passes very easily. The entire porous plate is termed as sieve plate.

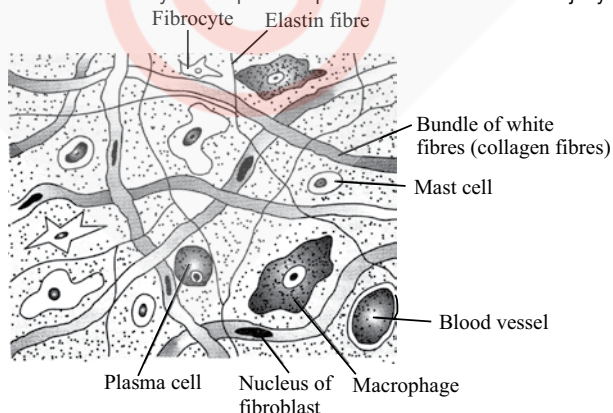
(b) Companion cells : Each sieve tube member is supported by a long parenchymatous cell called the companion cell which helps the sieve tube in the conduction of food material. Companion cells are living cells usually always associated with the sieve tubes. The sieve tube elements and companion cells arise from the same initial cell and therefore, form a single functional unit. Each companion cell is living cell with thin cellulose wall and active protoplast. The common wall between sieve tube and companion cell shows presence of fine pits which are traversed by plasmodesmata.

(c) Phloem parenchyma are ordinary living parenchyma cells associated with phloem. They store food.

(d) Phloem fibres are dead sclerenchymatous fibres. They provide mechanical strength. The textile fibres of flax, hemp and jute are phloem fibres.

- 29.** Areolar connective tissue is the most widely distributed connective tissue in the body having jelly-like sticky matrix, irregular-shaped cells and two kinds of fibres—white fibres (made of collagen) and yellow fibres (made of elastin).

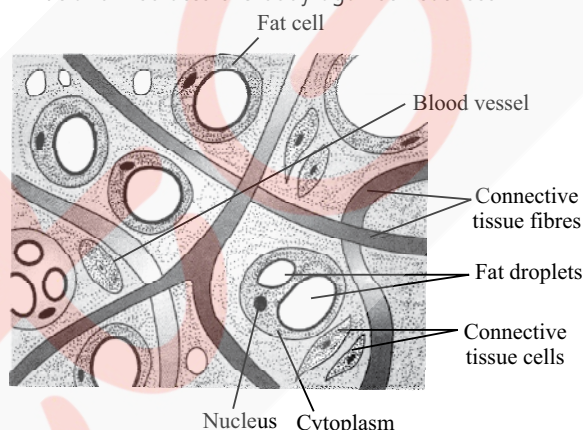
The areolar tissues is connective in function. It fixes the skin with the muscles, fills the spaces inside the organs, attaches the blood vessels and nerves with the surrounding tissues, fastens the peritoneum to the body wall and viscera. It is commonly called 'packaging tissue' of the body. It helps in repair of tissue after an injury.



OR

(ii) Adipose connective tissue is basically an aggregation of fat cells or adipocytes. Each fat cell is rounded or oval shaped and contains a large droplet of fat that almost fills it. It occurs below the skin, around internal organs and yellow bone marrow. Cells are modified to store fat; each cell consists of a large vacuole filled with fat which is surrounded by a small amount of cytoplasm containing a nucleus towards the periphery.

The adipose tissue is found beneath the skin, in the covering of the heart, around the blood vessels and kidneys and in yellow bone marrow. This tissue stores fat and insulates the body against heat loss.



- 30.** Xylem is the water conducting tissue. It is the chief conducting tissues of vascular plants, responsible for the transportation of water and inorganic solutes to the various parts of the plant body. These consist of four types of cells—tracheids, vessels, xylem fibres and xylem parenchyma.

(i) Tracheids : A tracheid is an elongated hollow cell with its both ends tapering. The walls of these cells are thick due to the deposition of lignin. At certain spots, lignin is not present. These spots are termed as pits. These cells are arranged in such a fashion that they form a system of long tubes and channels through which water can move easily. The tracheids are dead cells.

(ii) Xylem vessels (or tracheae) : The cells of vessels are placed one upon the other and their end walls are either absent or possess perforations. They form long tubes or channels for conduction of water and minerals.

(iii) Xylem fibres are supportive in nature and provide mechanical strength to the plant body.

(iv) Xylem parenchyma are the only living components of xylem. These are concerned with the storage of food and sideways conduction of water.

