# Long Answer Type Question

# Q.1. Describe in detail (i) Loose connective tissue and (ii) Dense connective tissue. [KVS-2008]

**Ans. Connective tissue :** Connective tissue is a fundamental animal tissue that has scattered living cells embedded in matrix. The matrix and cells are different in different connective tissues.

# Based on the nature of matrix, connective tissue is divided into three types:

(i) Connective tissue proper : It is type of connective tissue that has jelly-like matrix and three types of fibers: white collagen, yellow elastin and reticular fibres. The living cells present may include fibroblasts, mast cells, plasma cells, Macrophages and lymphocytes. It is of two types :

(a) Loose connective tissue : In this, cells (fibroblasts, macrophages, mast cells etc) and fibres are loosely arranged in a semi-fluid matrix. It has fewer fibres and more of matrix. It is of two types: Areolar tissue and Adipose tissue.

**1. Areolar Tissue :** It is the most widely spread connective tissue in the body. The non-living intercellular matrix contains irregular shaped cells and two kinds of fibres.

**Location :** Areolar tissues are found inside organs, around blood vessels, muscles and nerve. It also occurs below sub-cutaneous tissue and structures like muscles and skin.

**2.** Adipose Tissue : It is a type of connective tissue that is specialized to store fat called adipose cells. The fats are stored inside cells called adipocytes. Adipocytes are large cells with one or more globules of fat and peripheral cytoplasm with nucleus at one end.

**Location :** The tissue is found below the skin, around internal organs and inside yellow bone marrow.

(b) Dense connective tissues: In this, fibres and fibroblasts are compactly packed. It has more of fibres and less amount of matrix. It is of two types:

**1. Dense regular connective tissues :** They show regular pattern of fibres. Collagen fibres are present in rows between many parallel bundles of fibres. e.g., tendons and ligaments.

• **Tendon :** Tendon is a tough, non-fibrous, dense. white fibrous connective tissue. It has great strength but limited flexibility.

**Function:** It joins a skeletal muscle to a bone, thereby helping the bone to move on contraction and relaxation of the muscle.

Ligament: Ligament is a dense yellow fibrous connective tissue. It has considerable strength and high elasticity.
Function: Ligament binds a bone with another bone.

**2. Dense irregular connective tissues :** They have irregular pattern of fibres. It has fibroblasts and many fibres (mostly collagen) that are oriented differently. This tissue is present in skin.

# Q.2. Describe the supportive connective tissue in detail.

(ii) Supportive connective tissues: It is a connective tissue in which matrix is rigid and the living cells occur in fluid filled spaces called lacunae.

# (a) Cartilage:

1. Cartilage is a non-porous, firm but flexible supportive tissue.

2. It has solid matrix which is composed of chondrin. Secreted by the chondrocytes. Chondrocytes lie in the matrix singly or in groups of two or four surrounded by fluid filled space called lacunae.

3. Cartilage is present in the tip of nose, outer ear, joints in the vertebral column, limbs and hands in adults.

4 It provides support and flexibility to various parts of the body.

# (b) Bones:

1. Bone is a strong, rigid and non- flexible tissue. Bone is the hardest tissue of the body.

2. It consists of solid matrix with fluid filled lacunae having osteocytes or bone cells.

3. Matrix is composed of collagenous protein complex called ossein and mineral matter like salts of calcium, phosphorus, and magnesium.

4. The hardness of bone is due to deposition of mineral matter (calcium salts and collagen fibres).

5. The matrix in mammalian bone like in thigh bone is arranged in concentric rings or lamellae around nutrient filled haversian canals.

6. The osteocytes lie on the lamellae and give out branched processes which join with those of the adjoining cells.

7. The soft connective tissue present in the bone cavity is known as bone marrow. Sheath of bone is called peri steum. A layer of osteoblasts or bone forming cells lie below it.

**Location :** Bones are found all around the body. It forms the supportive framework of the body.

(iii) Fluid connective tissue : It consists of cells and matrix without fibers. Plasma is the extra cellular fluid of matrix, the ground substance. Blood and Lymph are two types of fluid connective tissue.

## Q.3. Differentiate between striated, smooth and cardiac muscles.

Ans.

S.No.	Striated Muscles	Smooth Muscles	Cardiac Muscles
(i)	These are present in the	These are present in wall of	They form myocardium
	limbs, tongue, pharynx,	visceral organs and also in	of heart.
	beginning of oesophagus.	hair muscles.	
(ii)	These are arranged in	They act as sheets in visceral	They form continuous
	bundles.	organs.	network in the body.
(iii)	These are long cylindrical	They are short, spindle	They are short
	with blunt ends.	shaped with pointed ends.	cylindrical with flat
			ends.
(iv)	These are multinucleated.	They are uninucleated.	They are uninucleated.
	Nuclei are peripheral.	Nucleus is central.	Nucleus is central.
(v)	Presence of dark and light	No bands are present.	Bands present in
	bands.		them.
(vi)	These are unbranched.	They are unbranched.	They unbranched.
(vii)	Contract rapidly for short	They contract slowly for long	They contract rapidly,
	period as soon as get	period and do not get	rhythmically and never
	fatigued.	fatigued.	get fatigued.

#### Q. 4. Write any four important functions of each :

#### (i) Epithelial tissue

# (ii) Connective tissue

#### (iii) Muscular tissue.

## Ans. (i) Functions of Epithelial Tissue:

(a) These protect the underlying tissues from mechanical and chemical injuries, dehydration and infection.

(b) It act as selective barriers.

(c) Surface epithelia produce skeletal structures like scales, feathers, hair, nails, claws, horns, hoofs etc.

(d) Ciliated epithelia moves mucus or other fluids in the ducts, they line.

#### (ii) Functions of Connective Tissues:

(a) They primarily join one tissue to another in the organs.

(b) Skeletal connective tissues like bone and cartilages, form a supporting framework for the body.

(c) Adipose tissues acts as shock absorber around some organs, such as eye balls and kidneys.

(d) Fluid connective tissue, like blood and lymph, carry materials from one part to another in the body.

#### (iii) Functions of Muscular Tissues:

(a) They are involved in the movements of the body parts and locomotion of the organism.

(b) They are responsible for the heart-beat, production of sound and peristalsis in tubular viscera.

(c) They support the bones and other structure.

(d) They play an important role in parturition (child birth).

# Q.5. Draw a labelled diagram of alimentary canal of cockroach. What is the function of crop and gizzard in the digestive system of cockroach ?

Ans. Labelled diagram of alimentary canal of cockroach : Refer to SAQ-IIQ 2.

## Functions :

**Crop**: The oesophagus dilates to form a large thin walled pear shaped crop. The crop is very large part of the alimentary canal of the cockroach where food is stored. It opens into gizzard.

**Gizzard :** It is a thick walled, rounded structure whose walls are muscular and greatly folded. It has six muscular folds which are covered by chitinous conical plates, the teeth, used for grinding the food. Its wall consists of strong circular muscles which are needed by the gizzard for grinding.

# Q. 6. Draw a labelled diagram of male reproductive system of cockroach. What is the function of testes in the reproductive system of cockroach.

Ans. Reproductive system of male cockroach.

**Function of testes :** There are two testes which occupy dorso-lateral position just beneath the 4<sup>th</sup> to 6th abdominal terga. The testes are prominent in young insects, but get reduced in adults. They are full of sperms. The sperms produced by the follicles of the testes are transferred to the vas deferent through the vasa efferentia.



Q. 7. (i) Name the three regions of alimentary canal of Cockroach.

(ii) Mention the role of gizzard, hepatic caeca and malpighian tubules in the alimentary canal of Cockroach.

(iii) How many segments are there in the thoracic region of Cockroach?

(iv) What does paurometabolous mean with reference to Cockroach?

(v) Why is the eye of cockroach called as compound eye?

Ans. (i) (a) Fore gut, Mid gut and Hind gut

(ii) Role of Gizzard, Hepatic caecae and Malpighian tubules are as follows:

(a) **Gizzard:** The crop opens posteriorly into a small thick walled, muscular gizzard. They help in grinding the food.

**(b) Hepatic caecae:** Hepatic caecae open at start of midgut and secrete many digestive enzymes-lipase, protease, peptidase, amylase, maltase, lactase, invertase and chitinase.

(c) Malpighian tubules: The malpighian tubules help in removal of excretory products from the haemolymph.

(iii) Three segments.

(iv) Paurometabolous with reference to cockroach means a simple, gradual direct metamorphosis in which immature forms resemble the adult except in size and referred to as nymph.

(v) Cockroach eyes are called compound eyes because they are made up of repeating units, the ommatidia, each of which function as a separate receptor.

## Q. 8. Describe the external morphology of cockroach.

**Ans.** Body of cockroach is elongated and dorsoventrally flattened. It is red brown in colour. Males are larger than females. Body is covered by brown chitinous exoskeleton. Cockroach is nocturnal and the body is segmented. It is divided into three distinct parts:

(i) Head: The head is triangular. It lies anteriorly at right angles to the longitudinal body axis. Head is formed by the fusion of six segments. The head is flexible and is covered by head capsule, The head bears two sessile compound eyes, one on each of its side. Two thread-like long antennae arise from membranous sockets. They are very sensitive, The anterior end of head bears mouth. Mouth part comprises labrum, a pair of mandibles, a pair of maxilla and labium. There is a medium lobe, hypopharynx which acts like tongue.

(ii) **Thorax:** It consists of 3 segments: (i) Prothorax, (ii) mesothorax, (iii) metathorax. Head is connected with the thorax by a short extension of the prothorax called the neck. Large sclerites covers the prothorax and shields the mesothorax Each thoracic segment bears two walking legs, each leg has 5 segments: (1) coxa, (ii) trochanter, (iii) femur, (iv) tibia, (v) tarsus. The first and second pairs of wings arises from mesothorax and metathorax respectively. The fore wings are called tegmina. Wings are used for flight.

(iii) Abdomen: In both mnale and female it consists of 10 segments. The seventh sternum is boat-shaped in females and together with eighth and ninth sterna makes a broad genital pouch. The tenth segment bears two jointed filamentous structures which are known as anal cerci. The 9<sup>th</sup> segment bears a pair of short, thread-like style which lies ventral to anal cirri. The anal styles are not found in female cockroach.