

Class: XI
Subject: Biology
Topic: Structural organization in animals
No. of Questions: 22

- Q1. What are the following and where do you find them in animal body?
- (a) Chondrocytes
 - (b) Axons
 - (c) Ciliated epithelium.

Sol.

- (a) Chondrocytes are the large, rounded, mature cells occurring in groups in the matrix (ground substance) of the cartilage. Cartilage is found in the pinna, tip of the nose, intervertebral discs, sternal ribs, tracheal and bronchial rings, nasal septum etc.
- (b) Each axon is a single very long, cylindrical process of the nerve cell (neuron). It arises from cyton and conducts nerve impulses away from the cell body. Axon in a group of branches called terminal arborizations. These are present in the entire body.
- (c) Ciliated epithelium. It consists of cells that have, versatile cytoplasmic processes, the cilia, on the free surface. It lines certain parts of urinary tubules of kidneys, nasal passages, oviducts (fallopian tubes), terminal bronchioles, ventricles of brain etc.

- Q2. (a) While studying the structure of a striated muscle, you come across following terms: Membrane of Krause (Z band), Henson's line (H zone), Sarcomere. Explain these terms.
(b) Name the proteins that comprise primary myofilaments and secondary myofilaments.

Sol.

- (a) (i) Membrane of Krause that comprise primary myofilaments and secondary myofilaments, the membrane of Krause or Z- band.
(ii) Henson's line (H Zone). Each a band has at its middle a light zone termed Henson's line or H zone.
(iii) Sarcomere. The part of the myofibril between two successive Z lines functions as a contractile unit termed the sarcomere.
- (b) Primary myofilaments are composed of myosin and bear cross – bridges of meromyosin. Secondary myofilaments are composed of actin, tropomyosin and troponin.

- Q3. (a) Name the protein which forms (i) white fibers and (ii) yellow fibers of the areolar tissue
(b) List different types of cells present in the areolar tissue. Also, mention their function(s).

Sol.

- (a) white fibers are formed of collagen protein while yellow fibers are formed of elastin protein.
- (b) Different types of cells of areolar tissue are: (i) Fibroblasts and fibrocytes. Fibroblasts secrete matrix and the material of which fibers are formed. Inactive fibroblasts are called fibrocytes. They are small and change into fibroblasts to secrete fibers. During wound healing. (ii) Macrophages or Histocytes. These engulf the microbes. Foreign bodies and damaged cells. (iii) Mast cells. They secrete heparin and histamine.

Q4. One day, Ravinder broke his leg while playing football and so he went to the doctor for treatment. Doctor

Read the above passage and answer the following questions:

- (a) What is a tissue ?
- (b) What is the function of skeletal tissue?
- (c) What value is reflected by doctor?

Sol.

- (a) Tissue is group of one or more types of physically linked cells having similar origin and specialized for specific function (s) ; Muscular tissue and Nervous tissue.
- (b) It forms a rigid framework which supports the body, protects vital organs, provides hard surfaces for attachment of the tendons of the muscles and also helps in locomotion.
- (c) Doctor wanted to disseminate the knowledge in a simple way and also diverted his attention from feel of pain

Q5. Hari was very fond of eating sweets. One day, his father brought a packet of sweets. On seeing sweets, his mouth started producing saliva and he requested his father to immediately give him some sweets, father was in a jolly mood and put a condition that he will hand over all the sweets to him if he tells the name of tissue involved in salivary glands formation.

Read the above passage and answer the following questions:

- (a) Which tissue is involved in salivary glands formation?
- (b) What are epithelial tissues?
- (c) Why did father put the condition?

Sol.

- (a) Epithelial tissues.
- (b) An epithelium is tissue composed of one or more layer of cells covering the external surface of the body and viscera, or lining the cavities in the body and viscera; protection and secretion.
- (c) Father wanted to teach his son about scientific knowledge in an easy way through 'Reinforcement' Principle.

Q6. Mohit used to like balanced food, whereas, his friend Anil was very fond of fried food and high calories junk food. Mohit remained always fit and active, whereas, Anil developed obesity and was not able to do his work swiftly. He, therefore, consulted a doctor.

Read the above passage and answer the following questions :

- (a) What type of tissue stores fat in the body "
- (b) What is connective tissue?
- (c) How can we maintain good health?

Sol.

- (a) Adipose tissue.
- (b) It consists of variously shaped cells lying wide apart in large amount of non-living intercellular or extracellular matrix.
- (c) We can maintain good health by having balanced diet and regular physical exercise.

Q7. One day, Sanjeev asked his doctor uncle, "we can control the movement of external organs such as hands and legs but we are not able to control movement of internal organs such as alimentary canal, blood vessels etc. "Why? His uncle explained that they are composed of different types of muscles and the latter have different functions.

- (a) List different types of muscular tissues.
- (b) Give any two differences between striated and non-striated muscles.
- (c) What value is reflected by Sanjeev ?

Sol.

- (a) Striated (Striped) muscles, nonstriated (unstriped or smooth) muscles and cardiac muscles.
- (b)

Striated	Unstriated
These are long, narrow, cylindrical and unbranched fibers.	These are long, narrow, spindle shaped fibers.
The myofibrils show alternating dark and light bands.	The cross striations are absent.

- (c) His curiosity to know the scientific reason of the phenomenon.

Q8. Answer in one word or one line.

- (a) Give the common name of *Periplaneta Americana*.
- (b) How many spermathecae are found in earthworm ?
- (c) What is the position of ovaries in cockroach ?
- (d) How many segments are present in the abdomen of cockroach ?
- (e) Where do you find Malpighian tubules ?

Sol.

- (a) American cockroach (b) 4 pairs of spermathecae (c) Under the 4th to 6th abdominal terga (d) 10 segments in the adult. (e) in insects (e.g., cockroach) at the beginning of ileum.

Q9. Distinguish between the following :

- (a) Prostomium and peristomium. (b) Septal nephridium and pharyngeal nephridium.

Sol.

- (a) Prostomium is a small, fleshy lobe representing the dorsal edge of the peristomium that projects forward above the mouth whereas peristomium is a crescentic aperture at the anterior end of the first segment of earthworm.

(b)

Septal Nephridium	Pharyngeal Nephridium
<ol style="list-style-type: none"> 1. These occur on the anterior and posterior surfaces of all the septa behind the segment 15 in earthworm. 2. They discharge waste matter into gut via septal excretory ducts and suprainestinal ducts. Hence, they are enteronephric. 	<ol style="list-style-type: none"> 1. These are attached to the inner surface of body wall in all segments, except the first two in earthworm. 2. They discharge waste matter to the exterior by nephridiopores. Hence, they are ectonephric or exonephric.

Q10. Mention the function of the following:

(a) Ureter of frog. (b) Malpighian tubules. (c) body wall in earthworm.

Sol.

- In male frog, ureter conducts both urine and spermatozoa to the cloaca. Hence, it is also called urinogenital duct in male frog. In female frog, ureter conducts only urine from kidneys to the cloaca.
- Malpighian tubules are the organs of excretion and osmoregulation in insects.
- Body wall in earthworm protects the delicate internal organs (viscera) from injury. It also produces setae.

Q11. Give the functions of setae in earthworm.

Sol.

- Setae help in locomotion.
- They aid earthworm in climbing out of the burrow.
- When pulled by an enemy from the burrow, these are extended by the animal into the walls of the burrow for firm attachment.
- They keep the two copulating worms together during reproduction.

Q12. What is the function of the following in earthworm?

(a) gizzard (b) typhlosole (c) nephridia

Sol.

- Gizzard serves to grind the decaying organic matter during digestion.
- Typhlosole increases the absorptive surface in the intestine.
- Nephridia are the organs of excretion and osmoregulation.

- Q13. (a) Name the hard plates (exoskeleton) that cover the entire body of cockroach. What is their composition and function?
(b) List various mouth parts of cockroach.

Sol.

- (a) The hard plates are called sclerites. These are formed of chitin which is a polysaccharide of acetyl glucosamine molecules. These plates protect the body and provide space for the attachment of muscles.
(b) The mouth parts of cockroach include labrum, mandibles, first maxillae, labium or second maxillae and hypopharynx.

- Q14. (a) How many sclerites cover each abdominal segment in cockroach ? Name them.
(b) How many terga and sterna are there in abdomen of cockroach?
(c) How many sterna are visible in the male and female abdomen of cockroach ?what is the role of 7th, 8th and 9th abdominal sterna in female cockroach?

Sol.

- (a) Each abdominal segment is covered with 4 sclerites : dorsal tergum, ventral sternum and two lateral pleura.
(b) There are 10 terga and nine sterna in the abdomen of cockroach. Tenth sternum is absent.
(c) In the male , all the nine sterna in visible. However, in the female only first seven sterna are visible. 7th 8th and 9th sterna together form a blood pouch.

- Q15. What are the respiratory organs in cockroach ?by how many apertures they open out ? Name these apertures and mention their position in the body.

Sol. Tracheae; these open out by 10 pairs of lateral apertures called spiracles (2 pairs in the thorax and 8 pairs in the abdomen).

- Q16. (a) What type of circulatory system is there in cockroach?
(b) How many, chambered heart helps in the circulation of blood in cockroach's body?

Sol.

- (a) Circulatory system of cockroach is of open type.
(b) 13-chambered heart.

- Q17. (a)Why do frogs croak in the rainy season?
(b) what is the term used for the sexual embrace of male female frogs in which eggs and sperms are discharged in water?
(c) what is meant by 'metachrosis'?

Sol.

- (a) Croaking by frogs in the rainy season is a call for mating
- (b) Amplexus
- (c) The colour of the frog slowly changes with the change in the back ground and atmospheric conditions. this change in body colour is termed metacrosis.

- Q18. (a) What is the significance of brow spot in the median line between the eyes?
(b) Cloacal aperture in frog is an outlet for what?

Sol.

- (a) Brow spot represents a reduced third eye .it is sensitive to light of longer wavelengths producing color changes in the skin.
- (b) Cloacal aperture in frog is an outlet for the elimination of feces, urine and sex cells (eggs or sperms).

- Q19. Ater a rainy day, earthworms were crawling on the moist soil of the fields. Father cautioned Rakesh to be careful so that earthworms are not crushed under his feet. Rakesh asked the reason and father replied that earthworms are farmer's friends.

Read the above passage and answer the following questions:

- (a) Why are earthworms regarded are farmer's friend ? Give two reasons.
- (b) Which habit of the earthworm helps in increasing the soil fertility?
- (c) Name the term used for increase in soil fertility by earthworms.

Sol.

- (a) Earthworms make the soil porous by burrowing into it. Porous soil allows better aeration and quick absorption of seeds. Worms bring the fresh subsoil to the surface in a finely divided form. It provides ideal medium for the germination of seeds.
- (b) Burrowing habit.
- (c) Vermicomposting.

- Q20. Anil, a science student, told his younger brother that he came to know from his teacher that earthworms are farmer's friend. He wanted to show the earthworms to his younger brother and so, on a sunny day, they went to the fields to locate the earthworms. To their surprise, no earthworm was seen on the ground. He asked the reason form his biology teacher, the next day who explained the cause of their absence on a sunny day.

Read the above passage and answer the following questions:

- (a) Why are earthworms not seen on sunny days?
- (b) Where can you locate eathworms?
- (c) What was the reason of Anil's curiosity about earthworms?

Sol.

- (a) Earthworms keep their skin moist by secreting mucous to remain alive. On sunny days, earthworms are unable to secrete mucous fast enough to make up for the lost evaporation and hence remain in burrows in the soil.
- (b) In moist soil which is rich in humus.
- (c) Anil, being a science student, wanted to gain scientific knowledge about earthworms and also to share this knowledge with youngsters.

Q21. Whenever Ravi switched on the light of kitchen store at night, he saw a number of cockroaches roaming and few even got crushed under his feet. He noticed a soft whitish substance that came out of the body of crushed cockroaches. He shared this observation with his biology teacher who explained that the whitish substance was fat bodies.

Read the above passage and answer the following questions:

- (a) Why are cockroaches seen at night only?
- (b) Where are fat bodies present in them? What is the role of these fat bodies?
- (c) What value is displayed by Ravi?

Sol.

- (a) Cockroaches are nocturnal animals.
- (b) Fat bodies surround the viscera of the cockroaches. These act as reserve food.
- (c) As a student of biology. He observed the things critically and was curious to find out the answers.

Q22. Biology teacher told in the class that cockroaches are of ancient lineage and resembled to those insects who flourished in carboniferous period. Ramesh discussed this with his uncle who was a professor of zoology. His uncle explained that due to their remarkable adaptability, they are still surviving.

Read the above passage and answer the following questions:

- (a) How old is the evolutionary history of cockroach?
- (b) Which adaptations in cockroach help them in their survival? List few of them.
- (c) What value is reflected in the discussion between Ramesh and his uncle?

Sol.

- (a) It is about 350 million years.
- (b) Flattened body to slip into narrow spaces; arrangement and shape of legs for swift running, Omnivorous diet, nocturnal habit, removal of nitrogenous waste through alimentary canal, good degree of sensitivity, laying of eggs in oothecae are major adaptations of cockroaches.
- (c) Ramesh's desire to have clear understanding about animals and their adaptations.