

Chapter: Structural Organisation in animals

Exercise Question

Question 1: Answer in one word or one line.

- (i) Give the common name of *Periplaneta americana*.
- (ii) How many spermathecae are found in earthworms?
- (iii) What is the position of ovaries in the cockroach?
- (iv) How many segments are present in the abdomen of the cockroach?
- (v) Where do you find Malpighian tubules?

Answer:

- (i) The American cockroach is the common name for *Periplaneta americana*.
- (ii) earthworms, there are four pairs of spermathecae. They're found halfway between the sixth and ninth parts. During copulation, they assist in accepting and storing spermatozoa.
- (iii) The pair of ovaries in a cockroach is placed between the 12th and 13th abdominal segments.
- (iv) A cockroach's abdomen is divided into ten segments in both sexes.
- (v) Cockroaches' principal excretory organs are Malpighian tubules. They are a component of the gastrointestinal tract.

Question 2: Answer the following:

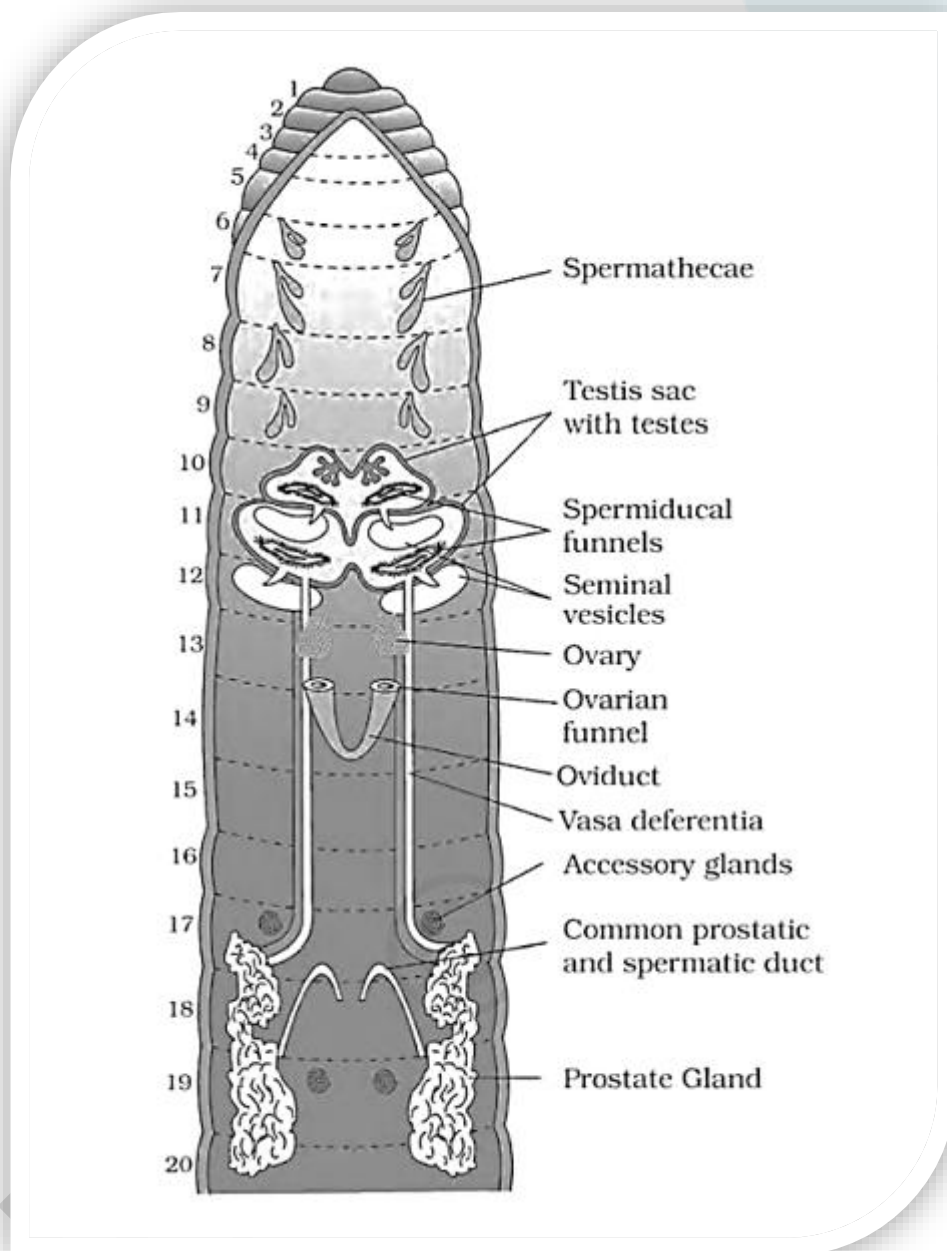
- (i) What is the function of nephridia?
- (ii) How many types of nephridia are found in earthworms based on their location?

Answer:

- (i) In earthworms, nephridia are segmentally constructed excretory organs.
- (ii) Nephridia has three effects on earthworms, depending on where they live. The specifics are as follows:
 - Septal nephridia (septal nephridia) is a condition in which These can be seen behind the 15th segment on both sides of the intersegmental septa. They facilitate access to the intestines.
 - Integumentary nephridia are joined to the body wall from the third to the last segment, which opens onto the body surface.
 - From the third to the last segment, which opens onto the body surface, integumentary nephridia are attached to the body wall.

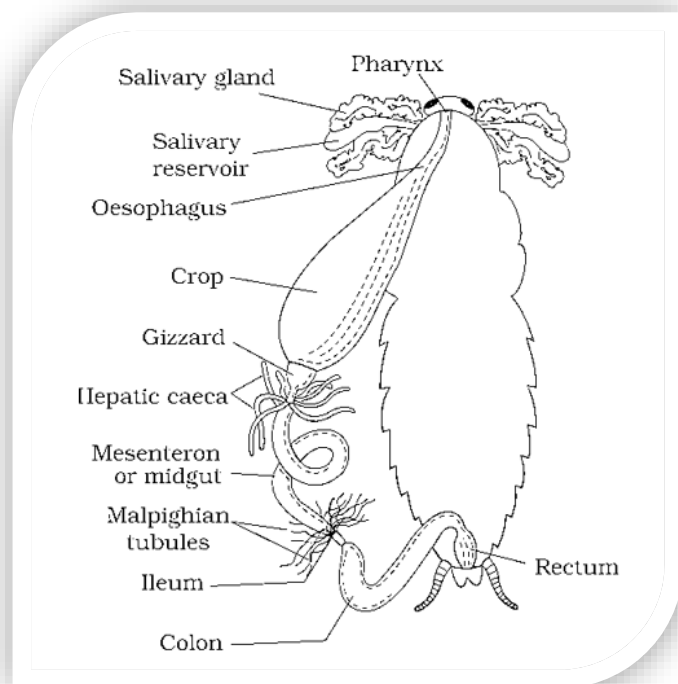
Question 3: Draw a labeled diagram of the reproductive organs of an earthworm.

Answer:



4: Draw a labeled diagram of the alimentary canal of a cockroach.

Answer:



Question 5: Distinguish between the following

(a) Prostomium and peristomium

(b) Septal nephridium and pharyngeal nephridium

Answer:

Prostomium	peristomium
An earthworm's prostomium is a little fleshy lobe that hangs over its mouth. It acts as a sensing organ that helps the organism push into the soil.	The peristomium is the earthworm's initial body portion. It completely encircles the mouth's opening.

Septal nephridium	pharyngeal nephridium
Behind the 15th segment, they can be found on both sides of intersegmental septa. They allow access to the intestines.	In the fourth, fifth, and sixth segments, they appear as three paired tufts.

Question 6: What are the cellular components of blood?

Answer:

Erythrocytes (RBCs), leucocytes (WBCs), and thrombocytes are all components of blood (platelets). Blood is made up of 45 percent of these components. They float in the residual fluid, which is known as plasma.

Mammalian erythrocytes are colored, biconcave cells without a nucleus. They assist with the transportation of respiratory gases. White blood cells, or leukocytes, are nucleated cells. Granulocytes (neutrophils, eosinophils, and basophils) and agranulocytes (lymphocytes and monocytes) are the two categories. They aid in the battle against disease-causing microorganisms that enter the body. Bone megakaryocytes create thrombocytes, which are cell fragments. They play a crucial role in the process.

Question 7: What are the following and where do you find them in an animal body

(a) Chondrocytes

(b) Axons

(c) Ciliated epithelium

Answer:

(a) Chondrocytes

They are cartilage cells that live in little spaces within the matrix that they secrete.

(b) Axons

Long, slender extensions of neurons that assist in the transmission of nerve impulses from the neuron body. Axons clump together in bundles to form nerves.

c) Epithelium ciliated

Simple columnar or cuboidal epithelium with cilia on their free surfaces make up this type of epithelium. It can be found on the inside of oviducts and bronchioles. It aids the migration of eggs or mucus in particular directions.

Question 8. Describe various types of epithelial tissues with the help of labeled diagrams.

Answer:

Epithelial tissue forms a protective layer on the body's surface. The cells of the epithelium are packed close together with little intercellular material. There are two forms of epithelial tissue in the human body.

(a) Simple epithelium: This type of epithelium is made up of a single layer of cells in direct contact with the basement membrane. It's further broken down into the following categories:

(i) Simple squamous epithelium: A single layer of flat cells with uneven borders makes up the simple squamous epithelium. It's present in the lining of alveoli and the walls of blood vessels.

(ii) Simple cuboidal epithelium: A single layer of cube-like cells makes up this epithelium. It's found in places where there's a lot of secretion and absorption of substances takes place.

(iii) Simple columnar epithelium: This type of epithelium is made up of a single layer of tall, slender cells with their nuclei at the base. On the free surfaces, they may have microvilli. The lining of the stomach and intestines is formed of columnar epithelium, which is involved in secretion and absorption.

(iv) **Ciliated epithelium:** This type of epithelium is made up of columnar or cuboidal cells that have cilia on their free surfaces. They are found in bronchioles and oviducts, where mucus and eggs are sent in specific locations.

(v) **Glandular epithelium:** The glandular epithelium is made up of columnar or cuboidal cells that secrete chemicals. There are two types of glands: unicellular glands and multicellular glands.

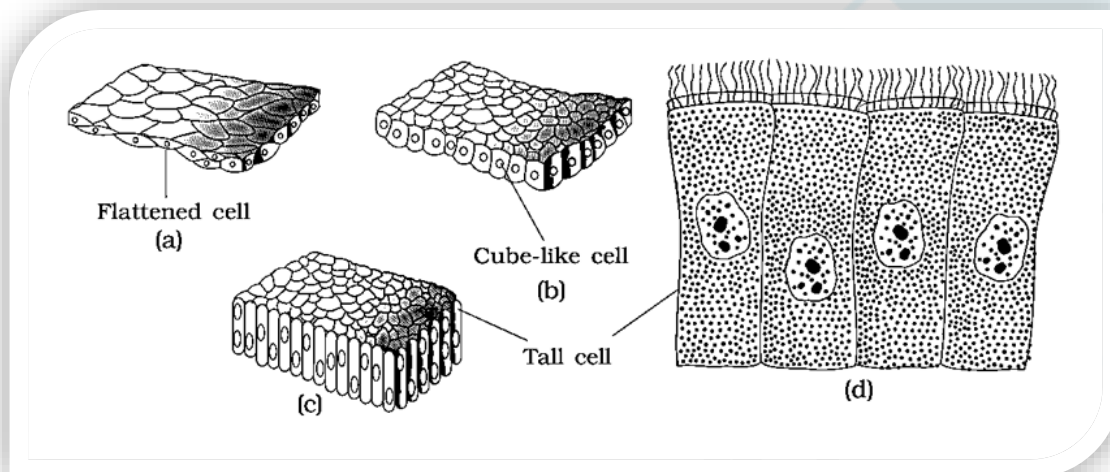
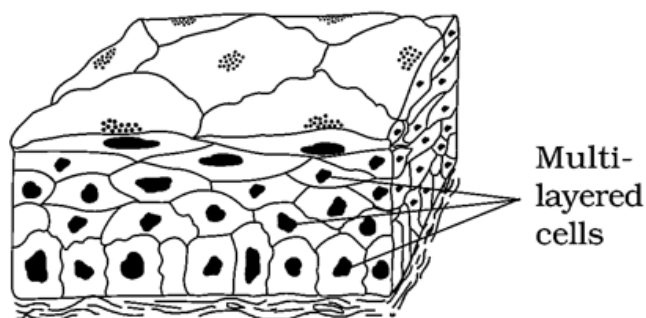


Fig. Simple epithelium: (a) Squamous (b) Cuboidal (c) Columnar (d) Columnar cells bearing cilia

(b) **Compound epithelium:** This type of epithelium is made up of multiple layers of cells. It is mostly responsible for providing protection and plays a minor part in secretion and absorption.

The dry surface of the skin or the moist inner lining of the buccal cavity, throat, pancreatic ducts, and the inner lining of salivary gland ducts are all examples of compound epithelium.



Question 9: Distinguish between

- (a) Simple epithelium and compound epithelium.
- (b) Cardiac muscle and striated muscle
- (c) Dense regular and dense irregular connective tissues
- (d) Adipose and blood tissue

(e) Simple gland and compound gland

Answer:

a.

Simple epithelium	compound epithelium
<ol style="list-style-type: none"> 1. There is only one layer of cells in it. 2. It is primarily responsible for absorption and secretion. 3. It can be found in the stomach and intestine linings. 	<ol style="list-style-type: none"> 1. It is made up of many layers of cells. 2. It is primarily responsible for the protection and plays a minor role in absorption and secretion. 3. It can be found in the pharyngeal and buccal cavity linings.

b.

Cardiac muscle	striated muscle
<ol style="list-style-type: none"> 1. Their function is involuntary. 2. They have several nuclei and are branched. 3. They can only be found in the heart. 	<ol style="list-style-type: none"> 1. Their participation is entirely optional. 2. They are unbranched and multi-nucleate. 3. They're exclusively found in the triceps, biceps, and limbs.

c.

Dense regular connective tissues	dense irregular connective tissues
<ol style="list-style-type: none"> 1. Collagen fibers are seen in rows between parallel limitless fibers in dense regular connective tissues. 2. They can be found in the tendons and ligaments of the body. 	<ol style="list-style-type: none"> 1. Fibres are organized irregularly in thick irregular connective tissues. 2. They can be found in the skin.

d.

Adipose tissue	blood tissue
<ol style="list-style-type: none"> 1. Collagen fibers, elastin fibers, fibroblasts, macrophages, and adipocytes make up the structure. 2. It assists in fat production, storage, and metabolism. 3. It can be found below the surface of the skin. 	<ol style="list-style-type: none"> 1. RBCs, WBCs, platelets, and plasma make up the blood. 2. It facilitates the movement of food, waste, gases, and hormones. 3. It can be found in blood vessels.

e.

Simple gland	compound gland
1. They contain glandular cells that have been isolated. 2. They have only one cell. 3. The alimentary canal's goblet cells are an example.	1. They have a clump of secretory cells in them. 2. They have several cells. 3. Salivary glands are an example.

Question 10: Mark the odd one in each series:

- (a) Areolar tissue; blood; neuron; tendon
- (b) RBC; WBC; platelets; cartilage
- (c) Exocrine; endocrine; salivary gland; ligament
- (d) Maxilla; mandible; labrum; antennae
- (e) Protonema; mesothorax; metathorax; coxa

Answer:

- (a) Connective tissues include areolar tissue, blood, and tendons. An example of neural tissue is a neuron.
- (b) The three most significant components of blood are RBCs, WBCs, and platelets. As a result, cartilage is the odd man out.
- (c) Simple glandular epithelium includes exocrine, endocrine, and salivary glands. The ligament is a type of connective tissue that connects two bones together.
- (d) A cockroach's mouthparts are the maxilla, mandible, and labrum. Cockroaches, on the other hand, have antennae in the head region.
- (e) In the life cycle of a moss, protonema is the developmental stage. The components or segments of a cockroach's legs are the mesothoraxes, metathorax, and coxa.

Question 11: Match the terms in Column I with those in column II:

Column I	Column II
(a) Compound epithelium	(i) Alimentary canal
(b) Compound eye	(ii) Cockroach
(c) Septal nephridia	(iii) Skin
(d) Open circulatory system	(iv) Mosaic vision
(e) Typhlosole	(v) Earthworm
(f) Osteocytes	(vi) Phallomere
(g) Genitalia	(vii) Bone

Answer:

Column I	Column II
(a) Compound epithelium	(iii) Skin
(b) Compound eye	(iv) Mosaic vision
(c) Septal nephridia	(v) Earthworm
(d) Open circulatory system	(ii) Cockroach
(e) Typhlosole	(i) Alimentary canal
(f) Osteocytes	(vii) Bone
(g) Genitalia	(vi) Phallomere

Question 12: Mention briefly about the circulatory system of earthworm.

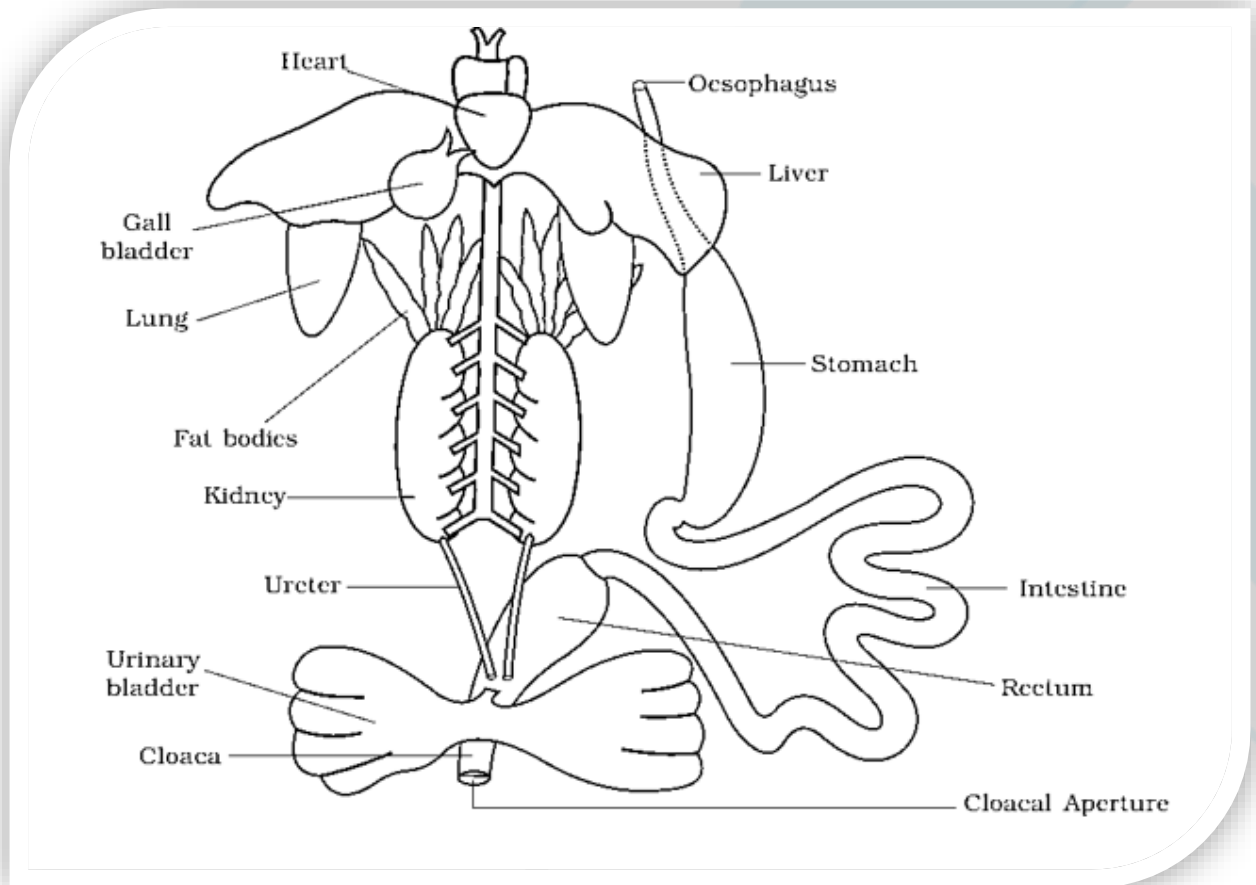
Answer:

The heart, blood arteries, and capillaries make up the closed blood vascular system of earthworms (Pheretima). Blood is pumped by the heart and circulated in one direction.

The gut nerve cord and the body wall are supplied with blood by smaller blood cells. The 4th, 5th, and 6th segments include blood glands that create blood cells and hemoglobin dissolved in blood plasma. Earthworm blood cells are phagocytic in nature.

Question 13: Draw a neat diagram of the digestive system of the frog.

Answer:



Question 14: Mention the function of the following

- (a) Ureters in frog
- (b) Malpighian tubules
- (c) Body wall in earthworm

Answer:

- (a) In male frogs, the ureter serves as a urinogenital channel, which transports sperms along with urine.
- (b) Malpighian tubules: Malpighian tubules are cockroach excretory organs.
- (c) Earthworm body wall: The body wall of earthworms is made up of muscular layers. It aids in burrowing and mobility.