NCERT Solutions for Class-XI Biology

Chapter-7

1. Answer in one word or one line.
(i) Give the common name of Periplaneta americana.
(ii) How many spermathecae are found in earthworm?
(iii) What is the position of ovaries in the cockroach?
(iv) How many segments are present in the abdomen of cockroach?
(v) Where do you find malphigian tubules?

1. (i) Cockroach.
(ii) Four pairs.
(iii) In cockroach two large ovaries, lie laterally in the 2nd – 6th abdominal segments'.
(iv) Abdomen of cockroach consists of 10 segments.
(v) Malpighian tubules are present at the junction of midgut and hindgut in cockroach.

2. Answer the following:
(i) What is the function of nephridia?
(ii) How many types of nephridia are found in earthworm based on their location?

2. (i) Nephridia are segmentally arranged excretory organs present in earthworms.
(ii) On the basis of their location, three types of nephridia are found in earthworms. They are:

- Septal nephridia: These are present on both sides of the inter-segmental septa behind the 15th segment. They open into the intestines.
- Integumentary nephridia: These lie attached to the body wall from the third segment to the last segment, which opens on the body surface.
- Pharyngeal nephridia: These are present as three paired tufts in fourth, fifth, and sixth segments.

3. Draw a labelled diagram of the reproductive organs of an earthworm.

3.

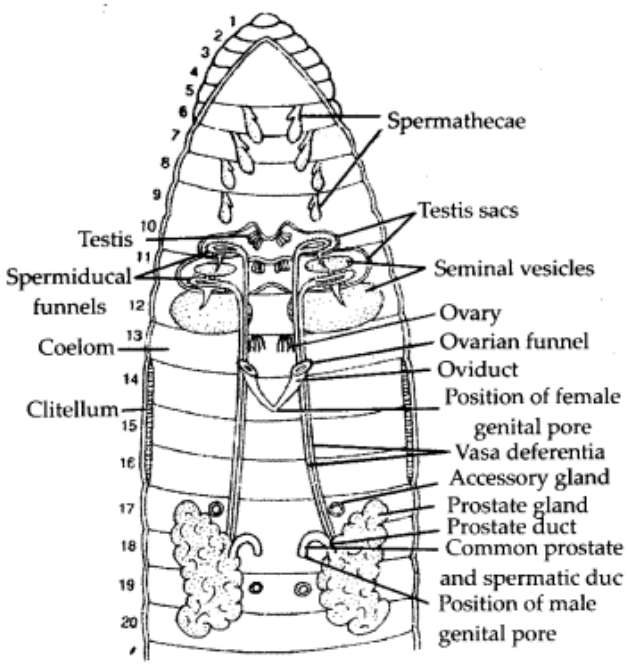
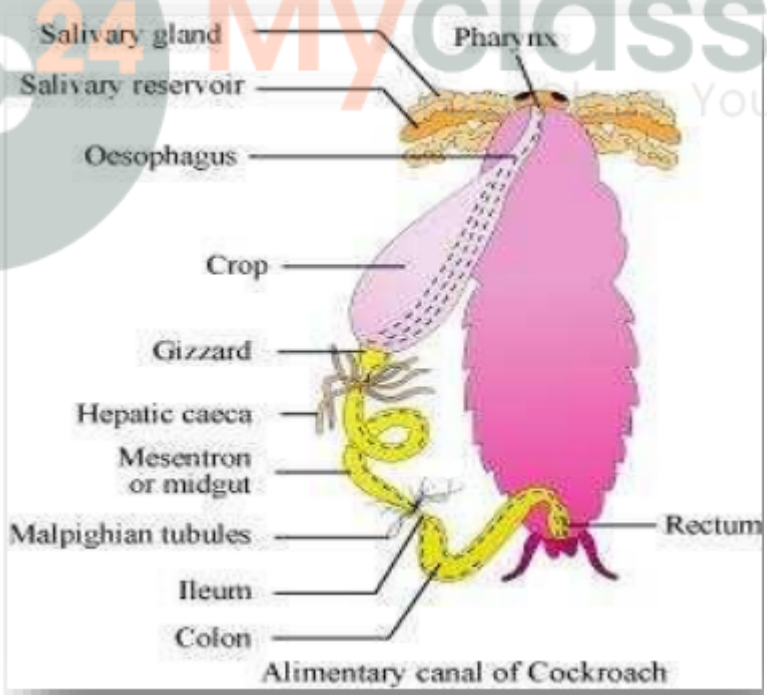


Fig.: Reproductive system of earthworm (Testis sacs are cut to show the internal structures of lodged organs).

4. Draw a labelled diagram of alimentary canal of a cockroach.

4.



5. Distinguish between the following

(a) Prostomium and peristomium

(b) Septal nephridium and pharyngeal nephridium

5. (a) Differences between prostomium and peristomium are

Prostomium	Peristomium

It is a fleshy lobe which projects from peristomium.	It is the first body segment in earthworm.
It does not contain mouth	It contains mouth.
It serves as wedge to force open cracks in the soil in which the earth worm lives.	It does not happen in peristomium.
It is sensory in function.	It is not sensory.

(b) Differences between septal and pharyngeal nephridia are:

Septal nephridia	Pharyngeal nephridia
Occur in segment 15 onward.	Occur is segments 4, 5 and 6
Attached to the septa.	Lie on the sides of the gut.
Their number varies from 80 to 100 per segment.	

6. What are the cellular components of blood?

6. Components of blood include erythrocytes (RBCs), leucocytes (WBCs), and thrombocytes (platelets). These components form 45% of blood. They are suspended in the remaining fluid portion, called plasma.

Mammalian erythrocytes are biconcave, coloured cells devoid of a nucleus. They help in transporting respiratory gases.

Leucocytes or white blood cells are nucleated cells. They can be divided into two types, granulocytes (neutrophils, eosinophils, and basophils) and agranulocytes (lymphocytes and monocytes). They help fight against various disease-causing germs entering the body.

Thrombocytes are cell fragments produced from megarkaryocytes of the bone. They play a major role during blood coagulation.

7. What are the following and where do you find them in animal body

(a) Chondriocytes

(b) Axons

(c) Ciliated epithelium

7. (a) Chondriocytes: The intercellular material of cartilage is solid and pliable and resists compression. Cells of this tissue (Chondriocytes) are enclosed in small cavities within the matrix secreted by them. Most of the cartilages in vertebrate embryos are replaced by bones in adults. Cartilage is present in the tip of the nose, outer ear joints, between adjacent bones of the. vertebral column, limbs, and hands in adults.

(b) Axons: It is found in the nervous system neuron. It is a long fiber, the distal end of which is branched. The main function of axons is the transmission of impulses by means of neurotransmitters.

(c) Ciliated epithelium: If the columnar or cuboidal cells bear cilia on their free surface they are called the ciliated epithelium. They are found in the lining of the stomach and intestine and help in secretion and absorption, their function is to move particles or mucus in a specific direction over the epithelium. They are mainly present in the inner surface of hollow organs like bronchioles and fallopian tubes.

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

8. Epithelial tissue lines the surface of a body and forms a protective covering. Epithelium cells are packed tightly together with little intercellular matrix. Epithelial tissue in the body is of two types.

(a) Simple epithelium: It consists of a single layer of cells where cells are in direct contact with the basement membrane. It is further sub-divided into the following types:

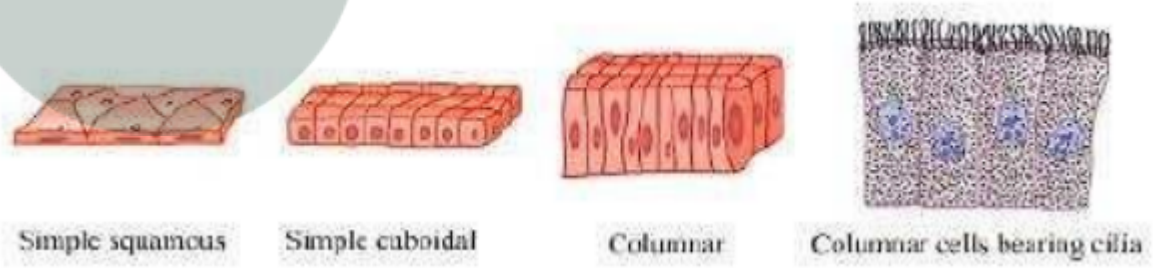
(i) Simple squamous epithelium: It consists of a single layer of flat cells with irregular boundaries. It is found in the walls of the blood vessels and in the lining of alveoli.

(ii) Simple cuboidal epithelium: It consists of a single layer of cube-like cells. It is present in regions where secretion and absorption of substances takes place such as the proximal convoluted tubule region of the nephron.

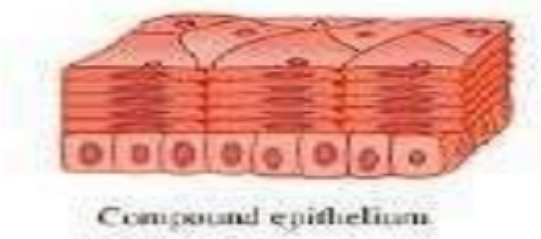
(iii) Simple columnar epithelium: It consists of a single layer of tall, slender cells with their nuclei present at the base of the cells. They may bear micro-villi on the free surfaces. Columnar epithelium forms the lining of the stomach and intestines, and is involved in the function of secretion and absorption.

(iv) Ciliated epithelium: It consists of columnar or cuboidal cells with cilia on their free surfaces. They are present in bronchioles and oviducts from where they direct mucus and eggs in specific directions.

(v) Glandular epithelium:It consists of columnar or cuboidal cells involved in the secretion of substances. Glands are of two types, unicellular glands (goblet cells of the alimentary canal) and multicellular glands (salivary glands). They can be classified as exocrine (ductless glands) and endocrine glands (duct glands) by the method through which they release enzymes.



(b) Compound epithelium: It consists of many layers of cells. It is involved mainly in the function of providing protection and has a limited role in secretion and absorption. Examples of compound epithelium include the dry surface of the skin or moist inner lining of the buccal cavity, pharynx, pancreatic ducts, and the inner lining of ducts of salivary glands.



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

9. (a) Differences between simple and compound epithelium are as follows:

Simple epithelium	Compound epithelium
It is composed of a single layer of cells.	It is composed of two or more layers of cells
All the cells rest on the basement membrane.	Only cells of the deepest layer rest on the basement membrane.
It functions as lining of body cavities, ducts and tubules. Main functions are secretion and absorption.	It provides protection against mechanical and chemical stresses.

(b) Differences between cardiac and striated muscles are as follows:

Cardiac muscle	Striated muscle
It is present in the wall of the heart, pulmonary veins and superior vena cava.	It is present in the limbs, body walls, tongue, phrynx and beginning of oesophagus.
Fibres are branched and uninucleate.	Fibres are unbranched and multinucleate.
Oblique bridges and intercalated discs present.	Bo oblique bridges and intercalated discs.
Nerve supply form the brain and autonomic nervous system.	Nerve supply from central nervous system.
They never get fatigued.	They soon get fatigued.
These are involuntary.	These are voluntary.

(c) Differences between dense regular and dense irregular connective tissues are as follows:

Dense regular connective tissue	Dense irregular connective tissue
In this tissue, the collagen fibres are present in rows between many parallel bud les of fibres.	This tissue has fibroblasts and many fibres (mostly collagen) that are oriented differently
It occurs in dermis of skin, walls of blood vessels, lungs, bronchioles. E.g., Tendon and ligament	This tissue is present in the skin.

(d) Differences between adipose tissue and blood tissue are as follows:

Adipose tissue	Blood tissue
Adipose tissue is a type of loose connective tissue located mainly beneath the skin.	Blood is a fluid connective tissue containing plasma, red blood cells (RBCs), white blood cells (WBCs) and platelets.
The cells of this tissue are specialised to store fats. The excess of nutrients which are not used immediately are converted into fats and are stored in this tissue.	It is the main circulating fluid that he.ps in the transport of various substances.

(e) Differences between simple gland and compound gland are as follows:

Simple gland	Compound gland
In simple glands duct is unbranched. They are further differentiated into unbranched and	In compound gland both the duct and secretory part are branched. Further differentiation is made on the

branched depending upon the condition of secretory part.	basis of shape of secretory part.

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

10. (a) Areolar tissue, blood, and tendons are examples of connective tissues. Neuron is an example of neural tissue.
(b) RBCs, WBCs, and platelets are the three most important components of blood. Cartilage is therefore, the odd one out.
(c) Exocrine, endocrine, and salivary glands are examples of simple glandular epithelium. Ligament is a connective tissue.
(d) Maxilla, mandible, and labrum are mouthparts of a cockroach. Antennae, on the other hand, are present in the head region of cockroaches.
(e) Protonema forms the developmental stage in the life cycle of a moss. Mesothorax, metathorax, and coxa are parts or segments present in the legs of a cockroach.

11. Match the terms in column I with those in column II:

Column I	Column II
(a) Compound epithelium	(i) Alimentry 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

11. (a) – (iii), (b) – (iv), (c) – (v), (d) – (ii), (e) – (i), (f) – (vii), (g) – (vi)

12. Mention briefly about the circulatory system of earthworm

12. Earthworms (Pheretima) have closed blood vascular systems, which consists of the heart, blood vessels, and capillaries. The heart pumps blood for circulating it in one direction. Blood is supplied by smaller blood cells to the gut nerve cord and the body wall. Blood glands are present in the 4th, 5th, and 6th segments, which produce blood cells and haemoglobin dissolved in blood plasma. Blood cells in earthworms are phagocytic in nature.

13. Draw a neat diagram of digestive system of frog.

13.

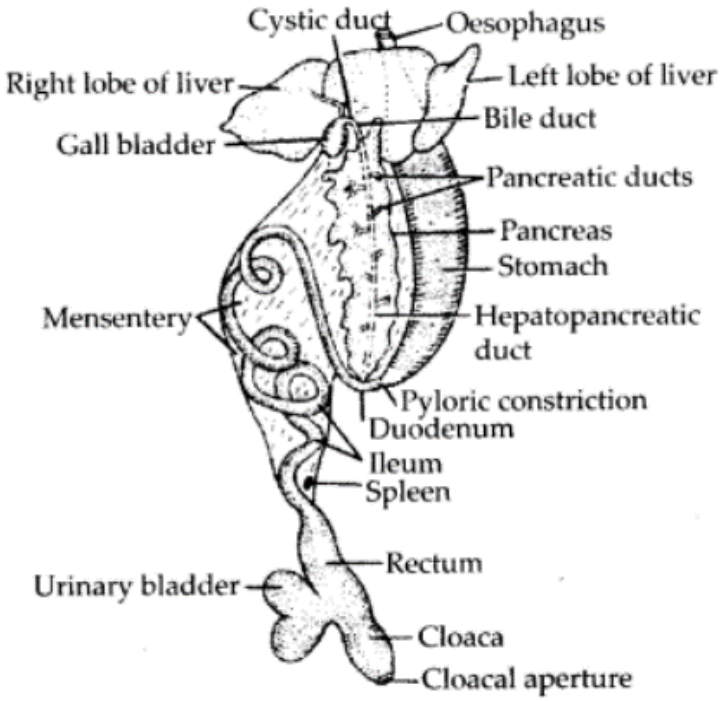


Fig.: Alimentary canal of frog.

14. Mention the function of the following
(a) Ureters in frog
(b)Malpighian tubules
(c) Body wall in earthworm

14. (a) Ureters in frogs: A ureter acts as a urinogenital duct, which carries sperms along with urine in male frogs.
(b) Malphigian tubules: Malphigian tubules are excretory organs in cockroaches.
(c) Body wall in earthworms: In earthworms, the body wall consists of muscle layers. It helps in movement and burrowing.