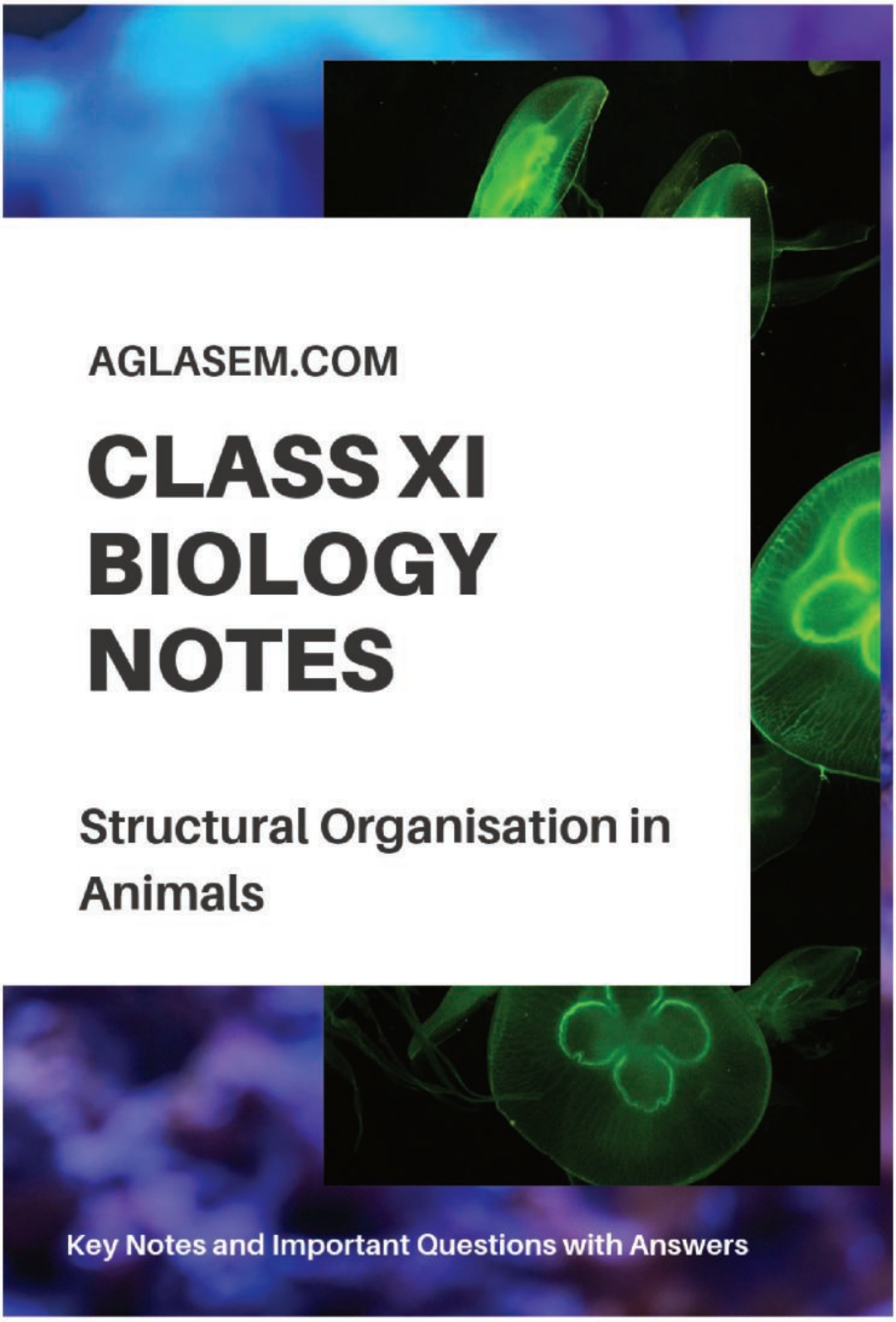
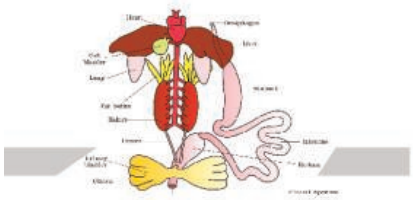


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CLASS XI BIOLOGY NOTES

Structural Organisation in Animals

Key Notes and Important Questions with Answers



Chapter - 7 Structural Organisation In Animals

Points to Remember

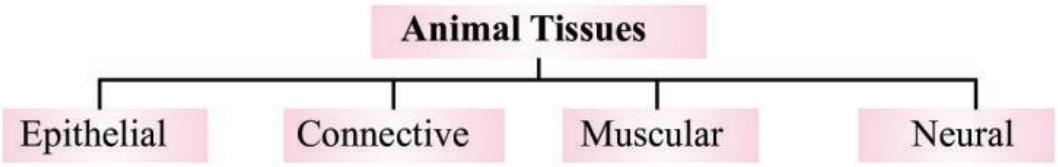
Cell junctions—In nearly all animal tissues, specialised junction provide structural and functional links between its individual cells.

Three Types of Cell junctions—

1. **Tight junctions :** Plasma membranes of adjacent cells are fused at intervals. They help to stop substances from leaking across a tissue.
2. **Adhering junctions :** Perform cementing function to keep neighbouring cells together.
3. **Gap junction :** Facilitate the cells to communicate with each other by connecting the cytoplasm of adjoining cells for rapid transfer of ions, small molecules and soometimes big molecules.

Types of Fundamental Animal Tissues

S.No.	Type	Location	Functions
1.	Epithelial Tissues	Free Surfaces	Protection, Secretion, Excretion, absorption, Sensory and reproduction
2.	Connective Tissues	Inside body, in organs other tissues and below skin	Holding or binding, support, transport and circulation, protection and storage.
3.	Muscular Tissues	Inside movable parts	Movements and locomotion
4.	Nervous Tissues	Central Nervous System & every organ Peripheral Nervous System.	Communication and control



Epithelial Tissue

(A) Simple :
- Composed of single layer of cells.
- Functions as lining for body cavities, ducts and tubes.

1. Squamous
   - single thin layer of flattened cells.
   - found in walls of blood vessels, air sacs of lungs.
2. Cuboidal
   - single layer of cube like cells.
   - found in ducts of glands and tubular parts of nephron.
3. Columnar
   - single layer of tall and slender cells.
   - free surface may have microvilli.
   - found in lining of stomach and intestine
4. Ciliated
   - columnar or cubolidal cells with cilia.
   - move particles or mucus in specific direction, in bronchioles, fallopian tubes.

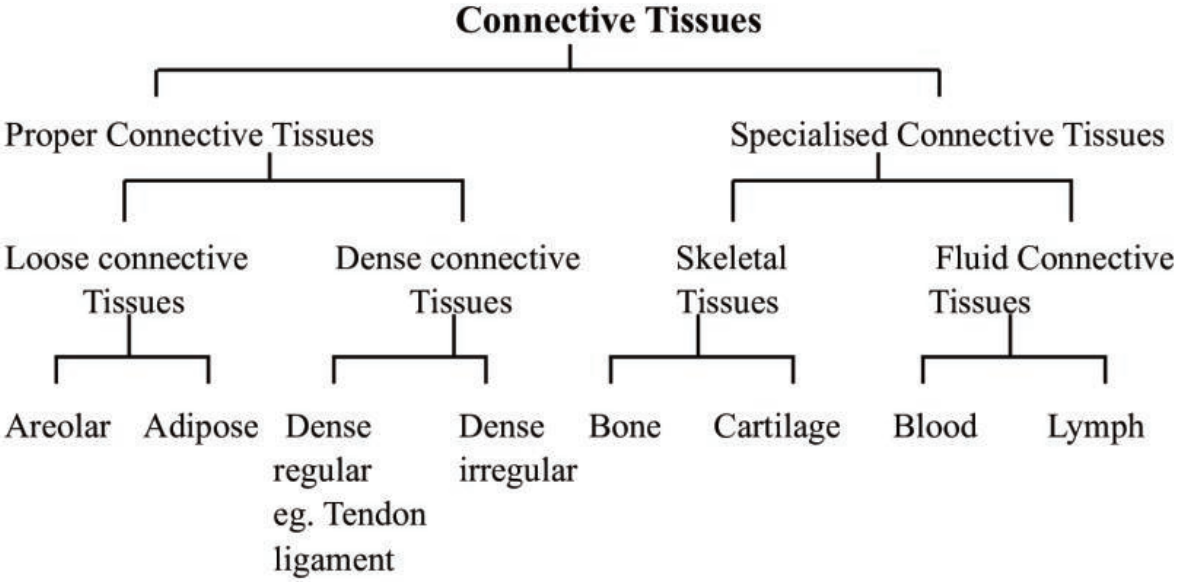
(B) Compound :

- Made of more than one layer of cells.
- Provide protection against chemical and mechanical stresses.
- Cover dry surface of skin, moist cavity, pharynx, inner lining of ducts of salivary glands and pancreatic ducts.

Glandular epithelium

Exocrine glands	Endocrine glands
• secrete mucus, saliva,oil, milk digestive enzymes	• secrete hormones.
• products released through ducts.	• secrete directly into the fluid bathing the gland.

Connective tissue : Link and support other tissues/organs of the body.



Loose Connective Tissue

(has cells and fibres loosely arranged in semi-fluid ground substance)

(i) Areolar Tissue :

- present beneath the skin.
- contains fibroblasts, macrophages and mast cells.
- serves as a support framework for epithelium

(ii) Adipose Tissue :

- located beneath the skin.
- cells are specialised to store fats.

Dense Connective Tissue

Fibres and fibroblasts are compactly packed.

(i) Dense Regular

- Collagen fibres present in rows.
- Tendons attach skeletal muscle to bone.
- Ligaments attach bone to bone.

(ii) Dense Irregular

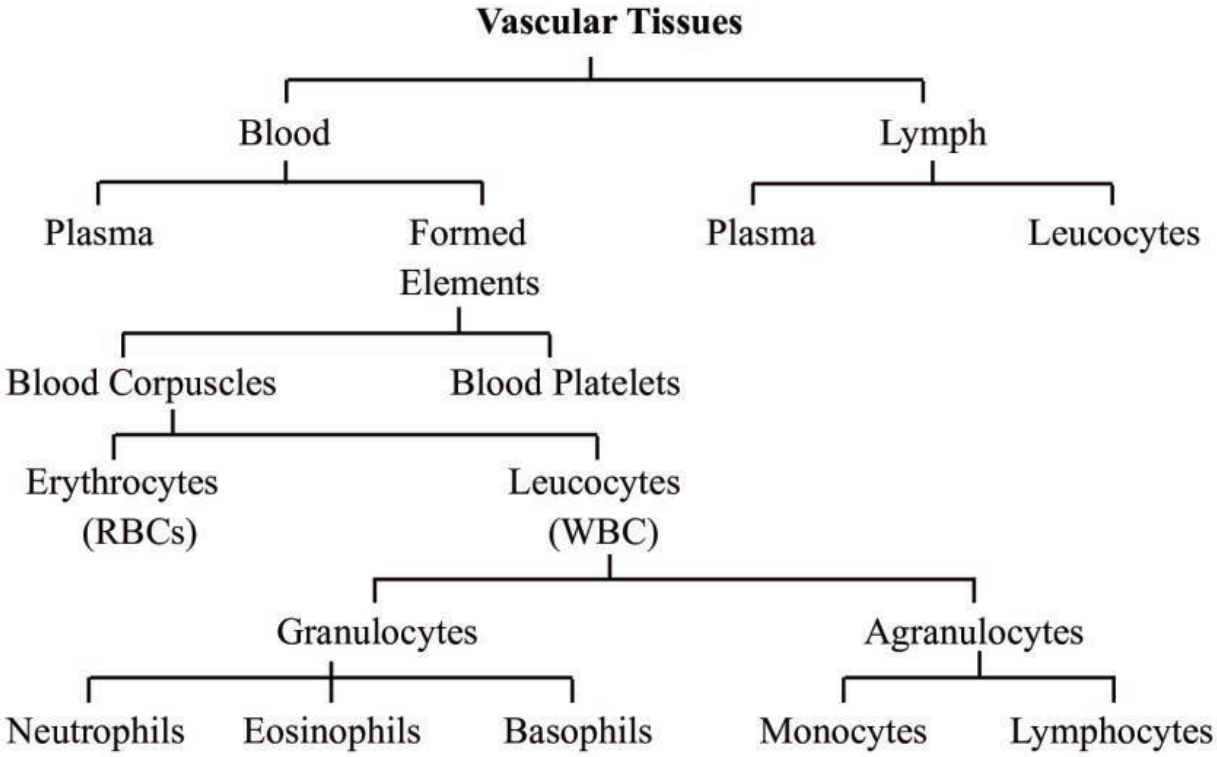
- Has collagen fibres and fibroblasts oriented differently.
- This tissue is present in the skin.

Specialised Connective Tissues

(i) Cartilage : made up of chondrocytes and collagen fibres; inter cellular material is solid and resists compression. Present in tip of nose outer ear joints, etc.

(ii) Bones : Ground substance is rich in calcium salts and collagen fibres Osteocyt es are present in launae. Bones support and protect softer tissues and organs. They interact with skeletal muscles to bring about movements. Bone marrow in some bones is the site of blood cell formation.

(iii) Blood : Fluid coonective tissue, consists of plasma and blood cells.



MUSCULAR TISSUES

(long, contractile cells called fibres, bring about movement and locomotion)

Skeletal Muscle	Smooth Muscle	Cordiac Muscle
• Striated	• Non-striated	• Striatedwithintercalated disc for communication
• Closely attached to sekeletal bones.	• Forms wall of • Internal Organs like blood vessels stomach, intestine	• Occurs in heart wall • Short cyclindrical uninucleated fibres
• long cylindrical multinucleated fibres	• Spindle like uninucleated fibres.	

Neural Tissues

- Neurons are the functional unit and are excitable cells.
- Neurogila cells make up more than half the volume of neural tissue.

They protect and support neurons.

Cockroach— *Periplaneta americana* (Phylum-Arthropoda, Class-Insecta)

Habitat : Cockroach is a terrestrial, nocturnal, ominivorous,unisexual, oviparous insect. Body convered by a chitinous, hard exoskeleton of hard plates called sclerities.

Morphology :

Head : Triangular, formed by fusion of 6 segments. Bears a pair of antennae, compound eyes. Mouth parts consists of labrum (upper lip), a pair of mandibles, a pair of maxillae,labium (lower lip), hypharynx (acts as tongue).

Thorax : 3 segments; prothorax, measothorax and metathorax.

Bears 2 pairs of wings :

Forewings : tegmina (mesothoracic).

Hindwings : transparent, membranous (metathoracic)

3 pairs of legs in thoracic segments. (one pair in each thoracic segment.)

Abdomen : 10 segments. Bears a pair of long, segmented **anal cerci** in both sexes and a pair of short, unjoined **anal styles** in males only 7th segment is boat shaped.

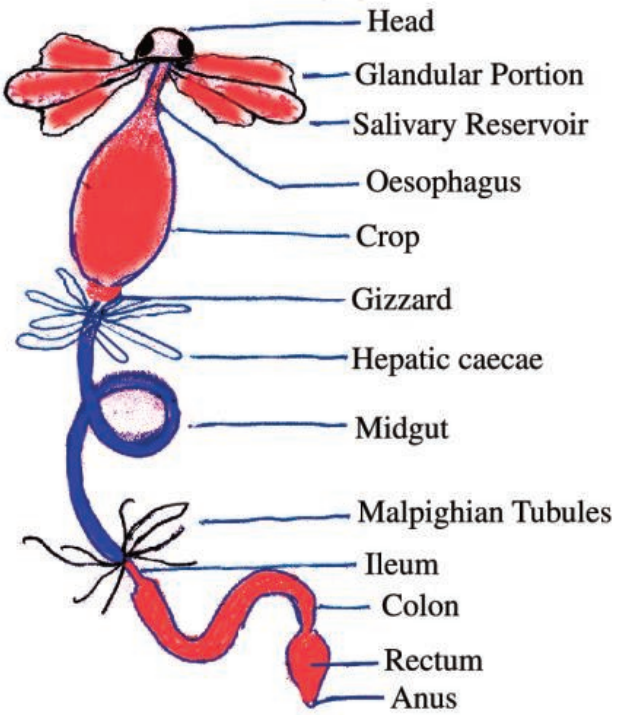
Also has anus and genital aperture at the hind end. Genital aperture surrouonded by external genitalia called **gonapophysis or phallomere.**

Male Cockroach	Female Cockroach
1. Abdomen long and narrow	1. Abdomen short and broad
2. All nine sterna visible	2. Seven sterna visible. (7th sternum fused with 8th and 9th sterna)
3. Anal style present	3. Anal style absent

Anatomy : Study of the morphology of internal organs.

Alimentary canal : Divided into foregut, midgut and hindgut.

Mouth → Pharynx → Oesophagus → Crop (stores food) → Gizzard (grinding of food) → Hepatic caecae (at junction of fore and midgut; secretes digestive juice) → Hindgut (ileum, colon, rectum) → Anus.



Alimentary Canal of Cockroach

Blood vascular system : Open type, visceral organs bathed in haemolymph (colourless plasma and haemocytes).

Heart consists of enlongated muscular tube and differentiated into funnel shaped chambers with ostia on either side. Blood from sinuses enters heart through ostia and is pumped anteriorly to sinuses again. Blood is colourless (haemolymph).

Repiratory system : Network of trachea which open through 10 pairs of spiracles. Spiracles regulated by sphincters. Oxygen delivered directly to cells.

Excretion and osmoregulation : by malpighian tubules; uricotelic (Uric acid as excretory proudct).

Nervous system : Consists of series of fused segmentally arranged ganglia joined by paired longitudinally connectives on the ventral side, three ganglia in thorax, six in abdomen. Brain represented by supraoesophageal ganglion. Each eye consist s of 200 hexagonal ommatidia.

Reproductive system :

Male reproductive system : Pair of testes (4th-6th segments) → vas deferens → ejaculatory duct → male gonophore.

Glands–Seminal vesicle (stores sperms), mushroom shaped gland (6th-7th segment).

Female reproductive system :

A pair of ovaries (with 8 ovarian tubules) → Oviduct → Genital chamber. Sperms transferred through spermatophores female produces 9–10 Ootheca. Fertilised eggs encased in capsules called oothecae (contains 14-16 eggs on an average) development of *P. americana* paurometabolous incompleted metamorphosis). Nymph grows by moulting 13 times to reach adult form.

Interaction with man

- Pests as destroy food and contaminate it.
- Can transmit a variety of bacterial diseases (Vector).

Questions

Very Short Answer Questions (1 mark each)

1. Name the tissue which contains Haversian canals.
2. Mention two special properties of nervous tissues.
3. Name the large cells present in adipose tissue.
4. Name the cells responsible for clotting of blood.
5. What are exocrine glands ?
6. Differentiate between tendon and ligament.
7. Where are RBC's formed ?
8. A muscular fiber having no striations and tapers at both ends. Name it.
9. Mention the site,where sclerite is present in cockroach.
10. Name the mouth part of cockroach which is comparable to our tongue.
11. "Sexual dimorphism is found in cockroach". Explain the statement.

Short Answer Questions–I (2 marks each)

11. What is the function of ciliated epithelium ? Where do we find this epithelium ?
12. What are the two types of fibres of connective tissues ? Distinguish between the two.
13. To which tissue do the following belong to :
    (a) Osteocytes (b) Chondrocytes
    (c) Neuroglia (d) Intercalated discs
14. Give the location of hepatic caecae in cockroach ? What is their function ?
15. Name the locomotory appendages of cockroach on the basis of external morphology.

Short Answer Questions–II (3 marks each)

16. Differnetiate between skeletal and smooth muscles.
17. Differntiate between male and female cockroach on the basis of external morphology.
18. (a) What is open circulatory system ?
    (b) Explain the respiratory system of cockroach.
19. (a) Give the common name of *Periplaneta americana.*
    (b) How many spermathecae found in cockroach ?
    (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 ?
    (f) What is mosaic vision ?
20. Name the different cell junctions found in tissues.
21. Mention the special features of eye in cockroach.
22. Write the appropriate type of tissue in column B accounting to the functions mentioned is column A.

	Column A	Column B
a.	Linking and supporting frame work	.....
b.	Protective covering	.....
c.	Secretion and absorption	.....

Long Answer Questions (5 marks each)

23. (a) What is compound epithelium ? What are their main function ?
    (b) Where do we find areolar tissue ?
    (c) How is adhering junction different from gap junction ?
24. Make a neat and well labelled diagram showing alimentary canal of cockroach.

Answers

Very Short Answers (1 mark each)

1. Mammalian bone.
2. Excitability and conductivity.
3. Adipocytes.
4. Blood platelets.
5. Glands which discharge their secretions into ducts.

6. **Tendon** — Attach skeletal muscles to bones
   Ligament — Attach bone to bone
7. Bone narrow
8. Smooth or non striated muscle fibre.
9. In the exoskeleton all over the body.
10. Hypopharynx = lingua
11. Male and female cockroaches show morphological differences.

Short Answers–I (2 marks each)

11. Refer 'Points to Remember'.
12. White and yellow fibres. White fibres are thin, unbranched, inelastic, occur in bundles and formed of protein collagen. Yellow fibres are thick, straight, elastic, branched, occuring singly, formed of protein elastin.
13. (a) Bone tissue (b) Cartilage
    (c) Neural tissue (d) Cardiac muscle
14. Refer 'Points to Remember'.
15. Three pairs of legs and two pairs of wings.

Short Answers-II (3 marks each)

16. Refer 'Points to Remember'.
17. Refer 'Points to Remember'.
18. Refer 'Points to Remember'.
19. (a) American Cockroach.
    (b) One pair, present in 6th segment.
    (c) Between 2nd and 6th abdominal terga.
    (d) 10 segments.
    (e) At the beginning of ileum in cockroach.
    (f) Vision where several images of an object are formed by compound eye. Helps to detect movement of objects very efficiently.
20. (i) Gap junctions (ii) Tight junctions
    (iii) Adhering junctions

21. See text in NCERT at page No. 114.
    (i) Situated at dorsal surface of head.
    (ii) Each eye consists of about 2000 hexagon ommatidia.
    (iii) It can receive several images of an object.
    (iv) This kind of vision is known as mosaic vision.
    (v) It is more sensitivity but less resolution.
22. (a) Connective tissues
    (b) Stratified epithelium
    (c) Columnar epithelium

Long Answers (5 marks each)

23. Refer 'Points to Remember'.
24. Refer Fig. 7. 16 NCERT Text Book of Biology class-XI.