YAKEEN NEET 2.0

2026

13.06.2025

STRUCTURAL ORGANISATION IN ANIMALS

ZOOLOGY | Lecture – 12

By- SAMAPTI MAM

Topics to be covered

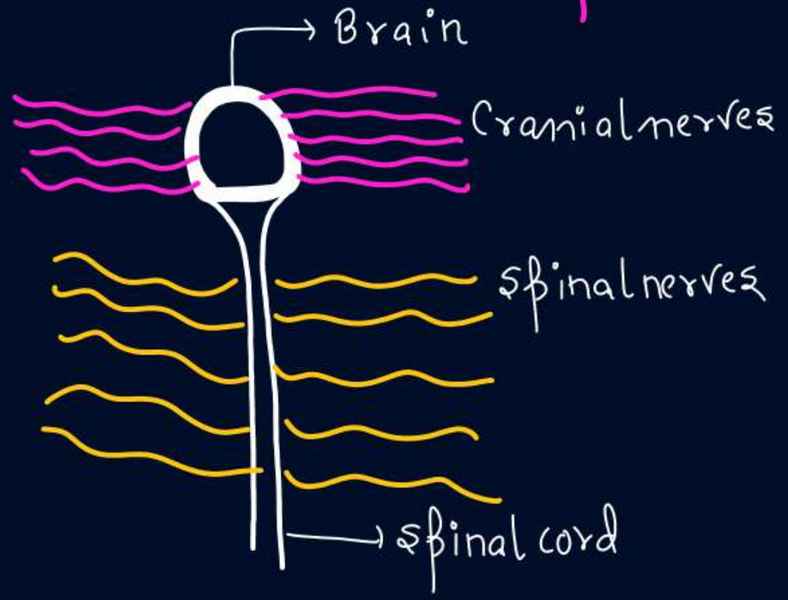
1. FROG Part-05
2. Cockroach Part-01
3.
4.

MY TELEGRAM

#Samaphexpress

Nervous system

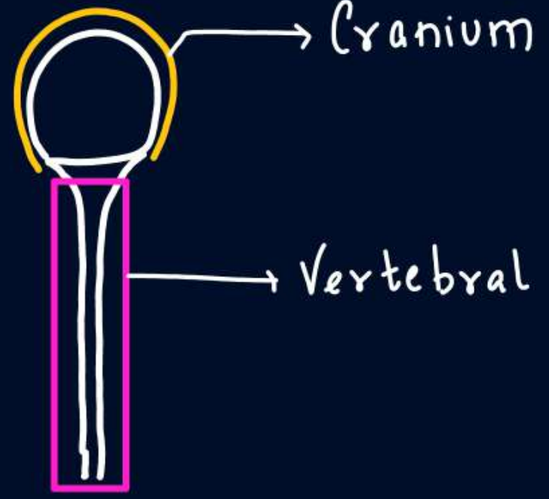
1. C.N.S (Central nervous system)
   - Brain
   - Spinal cord
2) P.N.S (Peripheral N.S)
   - Cranial Nerves (10 pair)
   - Spinal Nerves (10 pair)
3) A.N.S (Autonomic N.S)
   - Sympathetic
   - Parasympa-thetic



CNS

→ Brain : Is covered with hard Bony 'Cranium' → Brain Box

→ Spinal cord : Is protected in Vertebral column



Brain

Forebrain

It has:

- Paired cerebral hemisphere
- Paired olfactory lobes
- Unpaired Diencephalon

MidBrain

- One pair OPTIC LOBES

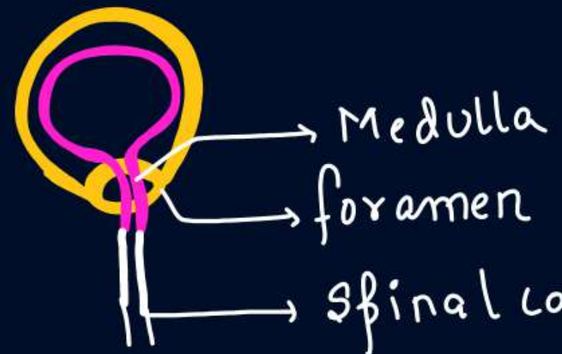
Hindbrain

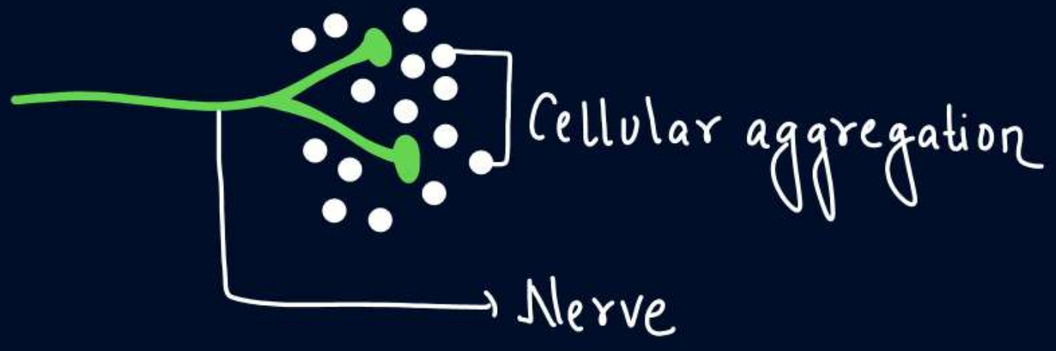
- Cerebellom
- Medulla

Note 'Foramen magnum' is a large opening at the base of SKULL from where Medulla of hindbrain passes & Connects with Spinal cord.

SENSORY STRUCTURE :

1) SENSORY PAPILLAE : Touch → Cellular aggregation around nerve ending (Poorly developed)
2) TASTE BUDS : Taste
3) NASAL EPITHELIUM : Olfaction (Smell)
4) SIMPLE EYE : VISION
5) TYMPANUM with INTERNAL EAR : Hearing & Balancing → well developed





Importance of Frog to Mankind:

1. Muscular legs eaten in some countries
2. Eat insects hence protect our Crop.
3. Important link of our foodchain & foodweb (Ecological Balance)

oviduct open seperately in the cloaca. The thin-walled urinary bladder is present ventral to the rectum which also opens in the cloaca. The frog excretes urea and thus is a **ureotelic** animal. Excretory wastes are carried by blood into the kidney where it is separated and excreted.

The system for control and coordination is highly evolved in the frog. It includes both neural system and endocrine glands. The chemical coordination of various organs of the body is achieved by hormones which are secreted by the endocrine glands. The prominent endocrine glands found in frog are pituitary, thyroid, parathyroid, thymus, pineal body, pancreatic islets, adrenals and gonads. The nervous system is organised into a central nervous system (brain and spinal cord), a peripheral nervous system (cranial and spinal nerves) and an autonomic nervous system (sympathetic and parasympathetic). There are ten pairs of cranial nerves arising from the brain. Brain is enclosed in a bony structure called brain box (cranium). The brain is divided into fore-brain, mid-brain and hind-brain. Forebrain includes olfactory lobes, paired cerebral hemispheres and unpaired diencephalon. The midbrain is characterised by a pair of optic lobes. Hind-brain consists of cerebellum and medulla oblongata. The medulla oblongata passes out through the foramen magnum and continues into spinal cord, which is enclosed in the vertebral column.

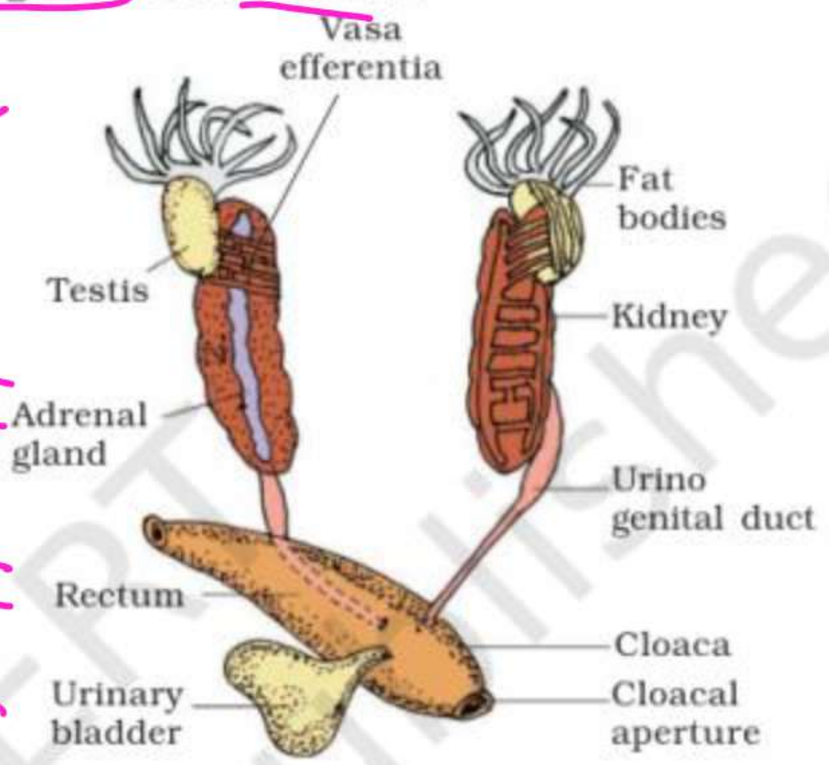


Figure 7.3 Male reproductive system

magnum and continues into spinal cord, which is enclosed in the vertebral column.

Frog has different types of sense organs, namely organs of touch (sensory papillae), taste (taste buds), smell (nasal epithelium), vision (eyes) and hearing (tympanum with internal ears). Out of these, eyes and internal ears are well-organised structures and the rest are cellular aggregations around nerve endings. Eyes in a frog are a pair of spherical structures situated in the orbit in skull. These are simple eyes (possessing only one unit). External ear is absent in frogs and only tympanum can be seen externally. The ear is an organ of hearing as well as balancing (equilibrium).

Frogs have well organised male and female reproductive systems. Male reproductive organs consist of a pair of yellowish ovoid testes (Figure 7.3), which are found adhered to the upper part of kidneys by a double fold of peritoneum called mesorchium. Vasa efferentia are 10-12 in number that arise from testes. They enter the kidneys on their side and open into Bidder's

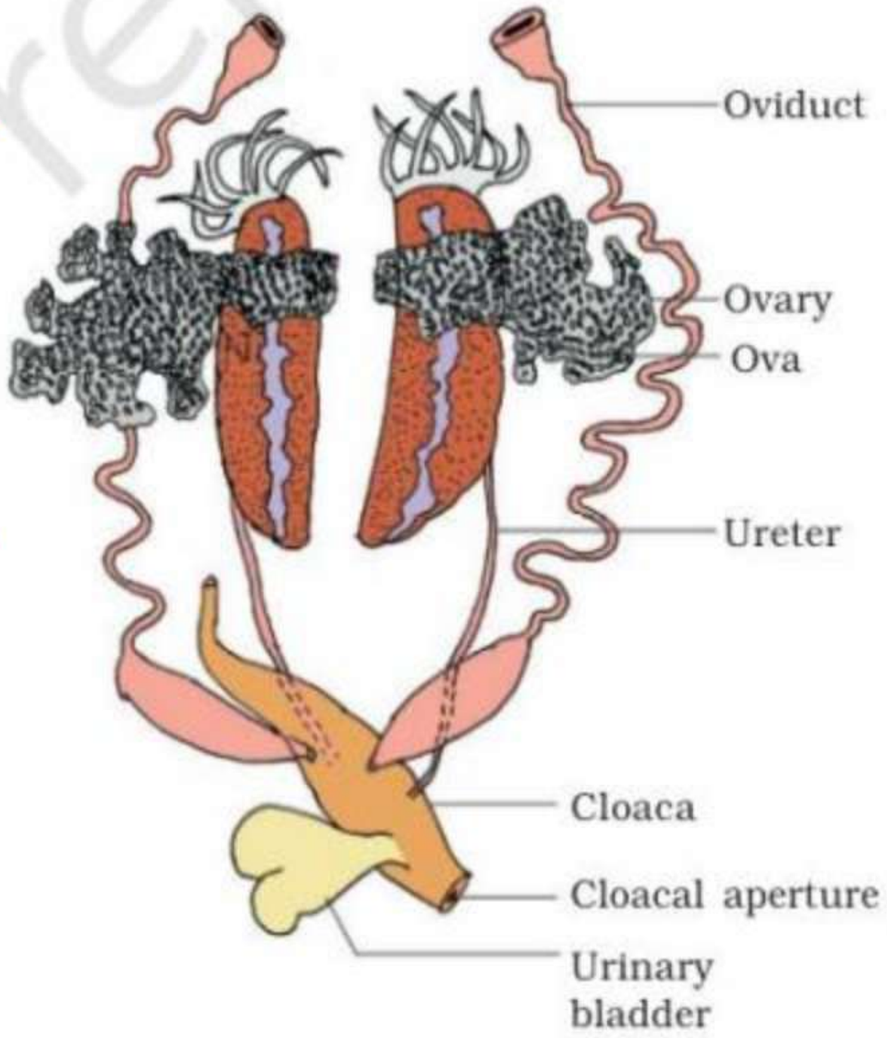


Figure 7.4 Female reproductive system

Cockroach: The most common species of cockroach found in India is **Periplaneta americana**

→ **Classification:**

Kingdom	Animalia
Phylum	Arthropoda
Class	Insecta
Genus	Periplaneta
Species	americana

General Characteristics

- P. americana: Blackish, brownish, Length: 34–53 mm Long
- In some tropical region (near the equator), Bright red, yellow & green cockroaches can also be seen. ($\frac{1}{4}$ - 3 inch: 0.6 - 7.6 cm)
- Are Nocturnal: active during Night
- Are Omnivores: eat everything (Plant, Animal)
- Are Cursorial: fast runners
- Are Serious PEST (contaminate the food) & also VECTOR (carry disease causing agents)

- Their body is covered with hard 'CHITINOUS EXOSKELETON'
  - 'Chitin' deposition

7.4 Cockroach

Cockroaches are brown or black bodied animals that are included in class Insecta of Phylum Arthropoda. Bright yellow, red and green coloured cockroaches have also been reported in tropical regions. Their size ranges from ¼ inches to 3 inches (0.6-7.6 cm) and have long antenna, legs and flat extension of the upper body wall that conceals head. They are nocturnal omnivores that live in damp places throughout the world. They have become residents of human homes and thus are serious pests and vectors of several diseases.

7.4.1 Morphology

The adults of the common species of cockroach, *Periplaneta americana* are about 34-53 mm long with wings that extend beyond the tip of the abdomen in males. The body of the cockroach is segmented and divisible into three distinct regions – head, thorax and abdomen (Figure 7.14). The entire body is covered by a hard chitinous exoskeleton (brown in colour). In each segment, exoskeleton has hardened plates called sclerites (tergites dorsally and sternites ventrally) that are joined to each other by a thin and flexible articular membrane (arthrodial membrane).

Morphology:

- Body is divisible into 3 parts: Head, thorax, Abdomen.
- Body has HARD CHITINOUS EXOSKELETON.
- Their Body is divided into segments c/a METAMERE & segmentation is K/a METAMERIC SEGMENTATION.

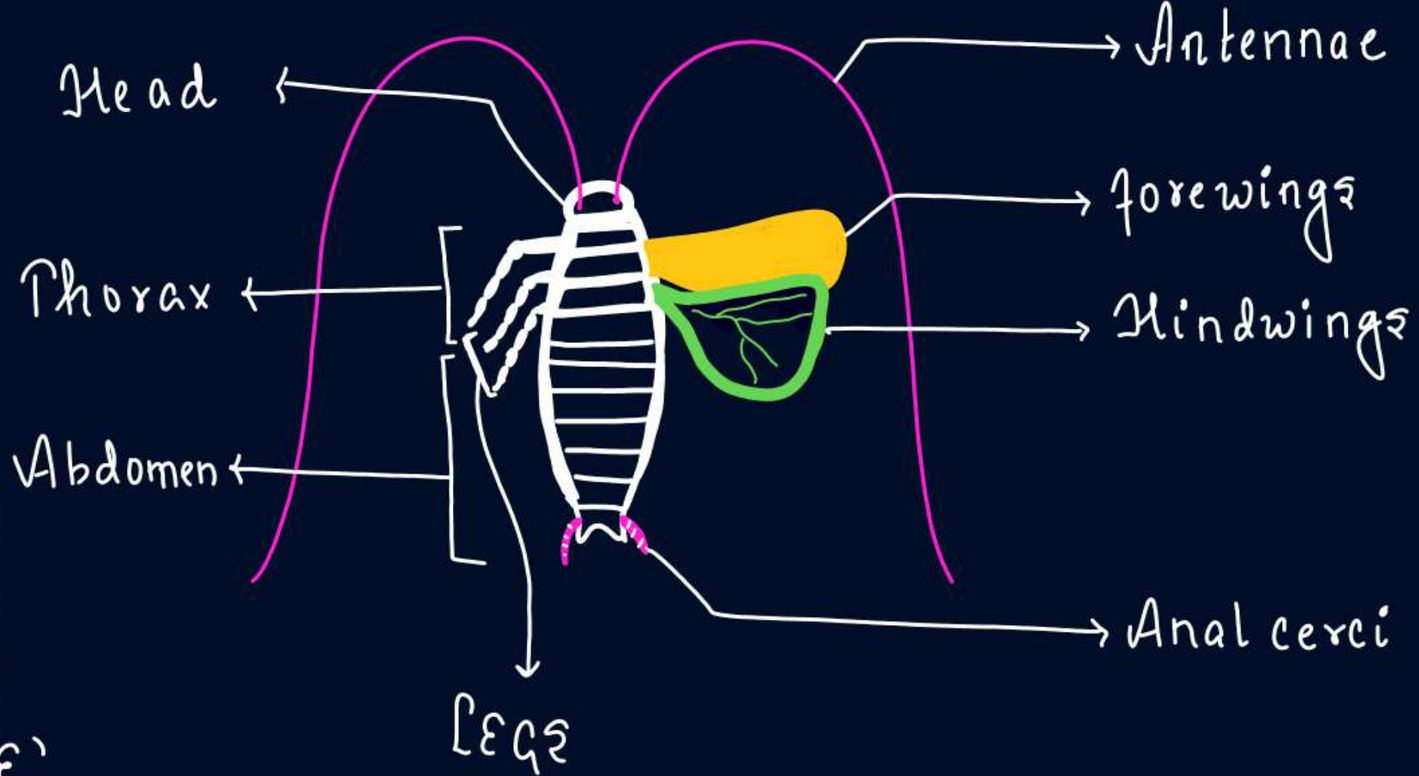
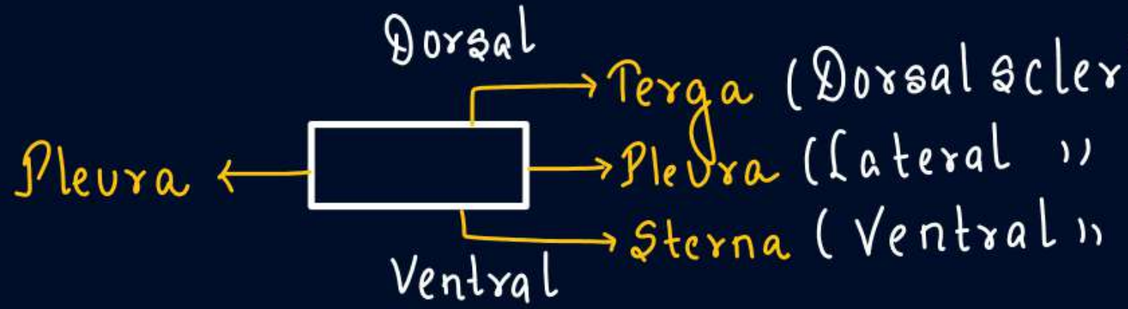


fig: Cockroach

→ Each metamere has Chitinous exoskeleton c/a 'SCLERITE'



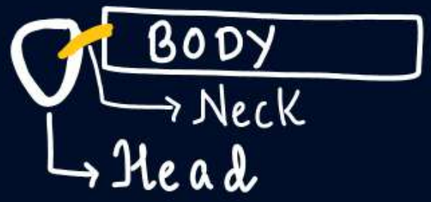
1 SCLERITE (Metamere)
↳ 1 Tergа, 1 Sterna & 2 Pleura

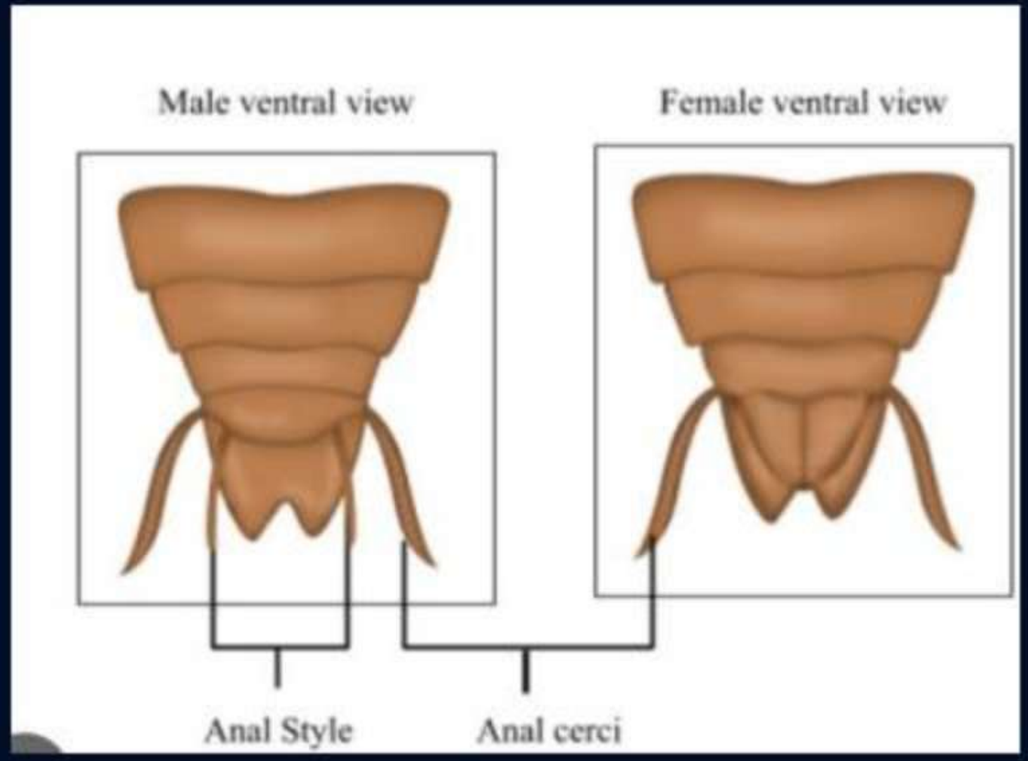
→ Sclerites are connected with a flexible articular membrane c/a 'ARTHRODIAL MEMBRANE'

→ SEGMENTS:

	Head	Thorax	Abdomen	
Nymph (Baby cockroach)	6	3	11	20
Adult	1	3	10	14

1. **HEAD**: Head is triangular & formed by the fusion of 6 segments & perpendicular to the Body.




Male ventral view
Female ventral view
Anal Style
Anal cerci

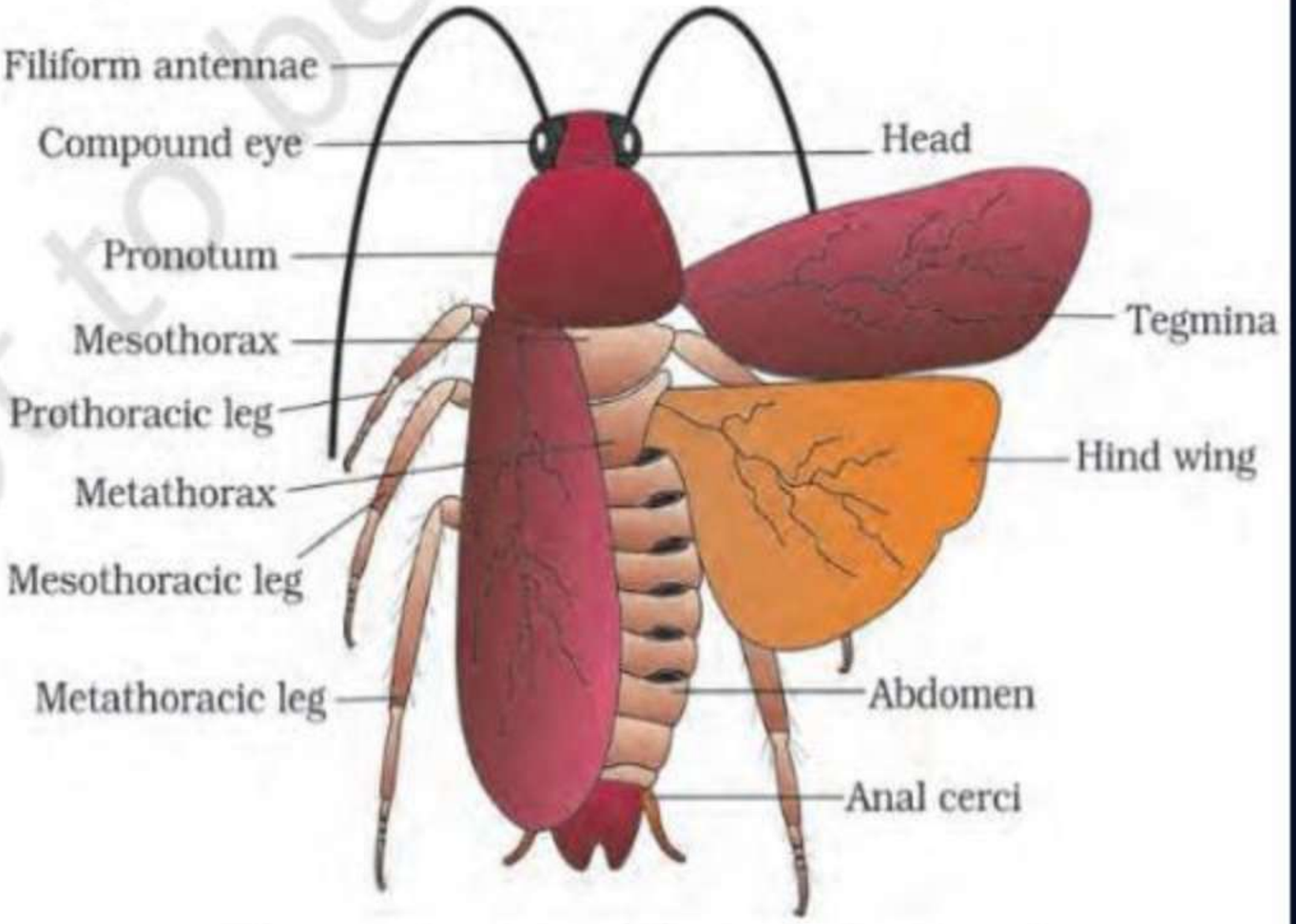


Figure 7.14 External features of cockroach

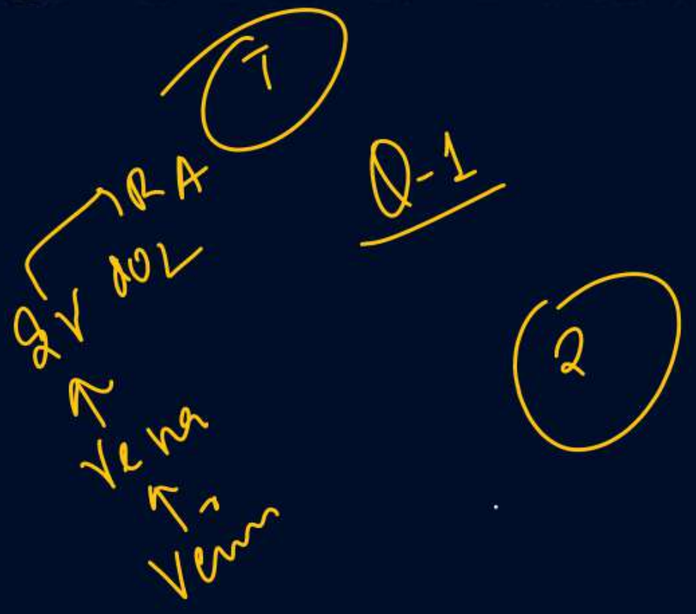
Head is triangular in shape and lies anteriorly at right angles to the longitudinal body axis. It is formed by the fusion of six segments and shows great mobility in all directions due to flexible neck (Figure 7.15). The head capsule bears a pair of compound eyes. A pair of thread like antennae arise from membranous sockets lying in front of eyes. Antennae have sensory receptors that help in monitoring the environment. Anterior end of the head bears appendages forming biting and chewing type of mouth parts. The mouthparts consisting of a labrum (upper lip), a pair of mandibles, a pair of maxillae and a labium (lower lip). A median flexible lobe, acting as tongue (hypopharynx), lies within the cavity enclosed by the mouthparts (Figure 7.15b). Thorax consists of three parts – prothorax, mesothorax and metathorax. The head is connected with thorax by a short extension of the prothorax known as the neck. Each thoracic segment bears a pair of walking legs. The first pair of wings arises from mesothorax and the second pair from metathorax. Forewings (mesothoracic) called tegmina are opaque dark and leathery and cover the hind wings when at rest. The hind wings are transparent, membranous and are used in flight.

The abdomen in both males and females consists of 10 segments. In females, the 7th sternum is boat shaped and together with the 8th and 9th sterna forms a brood or genital pouch whose anterior part contains female gonopore, spermathecal pores and collateral glands. In males, genital pouch or chamber lies at the hind end of abdomen bounded dorsally by 9th and 10th terga and ventrally by the 9th sternum. It contains dorsal anus, ventral male genital pore and gonapophysis. Males bear a pair of short, thread-like anal styles which are absent in females. In both sexes, the 10th segment bears a pair of jointed filamentous structures called anal cerci.

Ncert catalyst

STATEMENT- **A triangular structure called Conus arteriosus joins the right atrium**

STATEMENT 2- **Sinus venosus receives blood through the major veins called vena cava.**



1. Statement I is correct but Statement II is incorrect.
2. Statement I is incorrect but Statement II is correct.
3. Both Statement I and Statement II are correct.
4. Both Statement I and Statement II are incorrect.

QUESTION

The number of vasa efferentia that arises from testes in frog's male reproductive system is;

1. 9 – 12
2. 10 – 12
3. 13 – 16
4. 16 - 19

Q-2

Q

QUESTION

Assertion(A): In frogs, a triangular structure called sinus venosus joins the right atrium.
Reason(R): The ventricle opens into a sac-like conus arteriosus on the dorsal side of the heart.

1. Both Assertion (A) and Reason (R) are true, and Reason (R) is a correct explanation of Assertion (A).
2. Both Assertion (A) and Reason (R) are true, but Reason (R) is not a correct explanation of Assertion (A).
3. Assertion (A) is true, and Reason (R) is false.
4. Assertion (A) is false, and Reason (R) is true.

Read the following statements and choose the **correct** option.

i. Frog respires in water by skin (cutaneous respiration).

ii. In frog, lymphatic system consists of lymph, lymph channels and lymph nodes.

iii. In frogs, during aestivation and hibernation gaseous exchange takes place through lungs only.

iv. Female frogs can be distinguished by the presence of sound producing vocal sacs and also a copulatory pad on the first digit of the fore limbs which are absent in male frogs.

(A) i and ii correct only

(B) iii and iv correct only

(C) i and iii incorrect

(D) i, ii, iii, iv correct

Q-4

1

Fully grown larva of frog respire through:

(A) moist skin

(B) buccal cavity

(C) gills

(D) all of the above

Q-5

3

In frogs, food is captured by the __i__ . Digestion of food takes place by the action of ___ii___ and gastric juices secreted from the walls of the stomach. Partially digested food called ___iii__ is passed from stomach to the ____iv___.

(A) i- bilobed tongue, ii-HCl, iii- chyme, iv-duodenum.

(B) i- forelimbs, ii-HCl, iii- chyme, iv-duodenum.

(C) i- bilobed tongue, ii-HCl, iii- chyme, iv-middle part of small intestine.

(D) i- sharp tongue, ii-HCl, iii- chyle, iv-jejunum.

Bilobed tongue

HCl

Chyme

Q-6

D

Q-12. READ THE FOLLOWING STATEMENT AND CHOOSE THE CORRECT ANSWER

STATEMENT 1- in frog, Male reproductive organs consist of a pair of yellowish ovoid testes, which are found adhered to the upper part of kidneys

STATEMENT 2- 10-12 pair vasa efferentia arises from each testes.

1. Statement I is correct but Statement II is incorrect.
2. Statement I is incorrect but Statement II is correct.
3. Both Statement I and Statement II are correct.
4. Both Statement I and Statement II are incorrect.

Q-15. READ THE FOLLOWING STATEMENT AND CHOOSE THE CORRECT ANSWER

STATEMENT 1- Each kidney is composed of only a very few structural and functional units called uriniferous tubules or nephrons.

STATEMENT 2- one pair of ureters is presnt in frogs

1. Statement I is correct but Statement II is incorrect.
2. Statement I is incorrect but Statement II is correct.
3. Both Statement I and Statement II are correct.
4. Both Statement I and Statement II are incorrect.

QUESTION

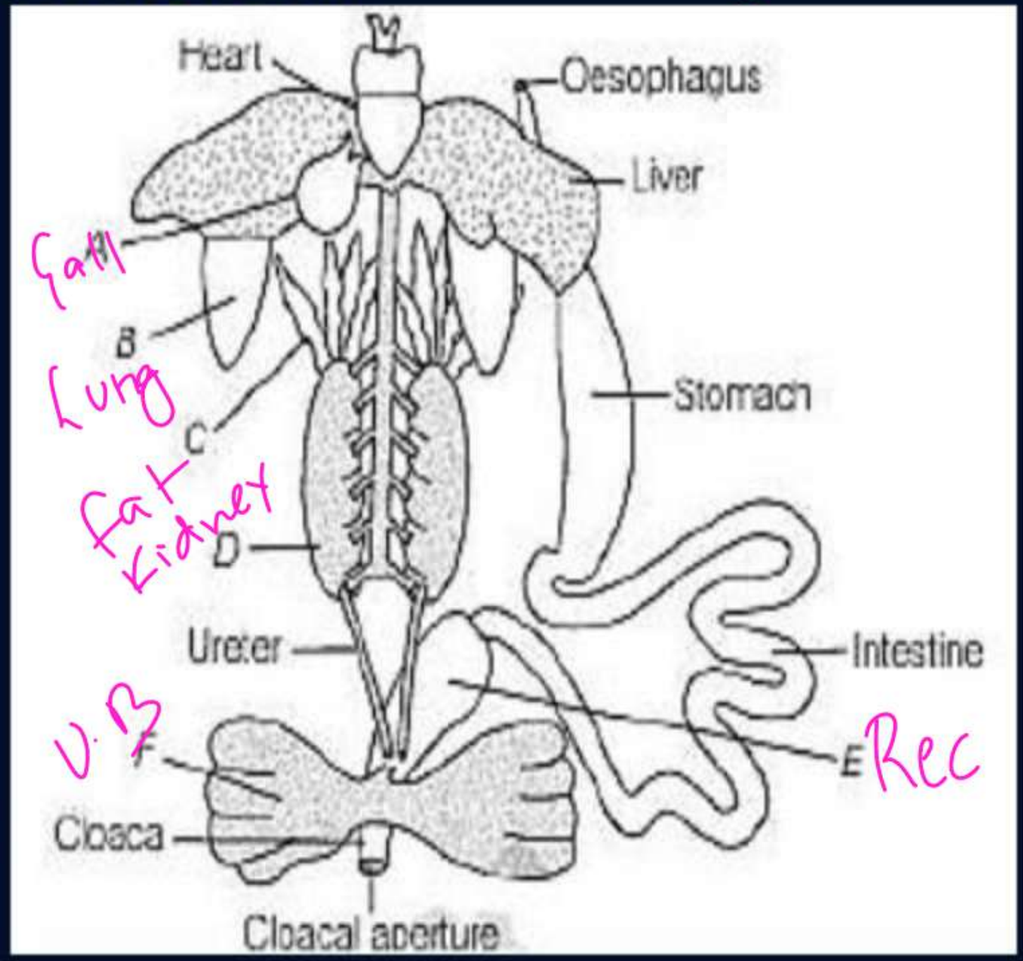
Given below is the diagram of internal organs of frog. Identify A to F.

1. A–Gall bladder, B–Lungs, C–Testis, D–Kidney, E–Urethra, F–Urinary bladder

2. A–Gall bladder, B–Lungs, C–Fat bodies, D–Kidney, E–Rectum, F–Urinary bladder

3. A–Gall bladder, B–Lungs, C–Ovary, D–Kidney, E–Ileum, F–Urinary bladder

4. A–Gall bladder, B–Lungs, C–Fat bodies, D–Kidney, E–Colon, F–Urinary bladder



QUESTION

In male frogs, cloaca is a small median chamber that is used to pass;

1. sperms
2. urine
3. faecal matter
4. All of these

0-10

4

1: Identify the incorrect statement amongst the following:

1. There is no functional connection of ovaries with kidneys in female frog.
2. In male frog, the ureter arises as urogenital duct and opens into the cloaca.
3. The fertilization in frog is external.
4. Development in frogs is direct.

Q-11

4

In frog, all are cellular aggregations around nerve endings except—

(A) Sensory papillae

(B) Taste buds

(C) Nasal epithelium

(D) Eyes and internal ear

Frog has sense organs like sensory papillae (for touch), taste buds, nasal epithelium (smell), eyes, tympanum with internal ear (for hearing) out of these, which of the following is well-organised structure?

(A) Eyes and internal ears

(B) Eyes and sensory papillae

(C) Internal ears and taste buds

(D) Taste buds and sensory papillae

QUESTION

Find out the pair in reference to the frog, which is incorrectly paired.

1. Hearing - Tympanum with external ears
2. Touch - Sensory papillae
3. Smell - Nasal epithelium
4. Vision - Simple eyes

QUESTION

STATEMENT-1): In frogs, the brain is enclosed in a bony structure called the brain box (cranium).
STATEMENT-2): In frogs, forebrain includes olfactory lobes, paired cerebral hemispheres and paired diencephalon.

1. Statement I is correct but Statement II is incorrect.

2. Statement I is incorrect but Statement II is correct.

3.Both Statement I and Statement II are correct.

4. Both Statement I and Statement II are incorrect.

Given below are two statements.

Statement I: Head of cockroach, is formed by the fusion of six segments.

Statement II: Head of cockroach, is not flexible due to its stiff neck.

In the light of the above statements, choose the most appropriate answer from the options given below.

1. Statement I is correct but Statement II is incorrect.

2. Statement I is incorrect but Statement II is correct.

3.Both Statement I and Statement II are correct.

4. Both Statement I and Statement II are incorrect.

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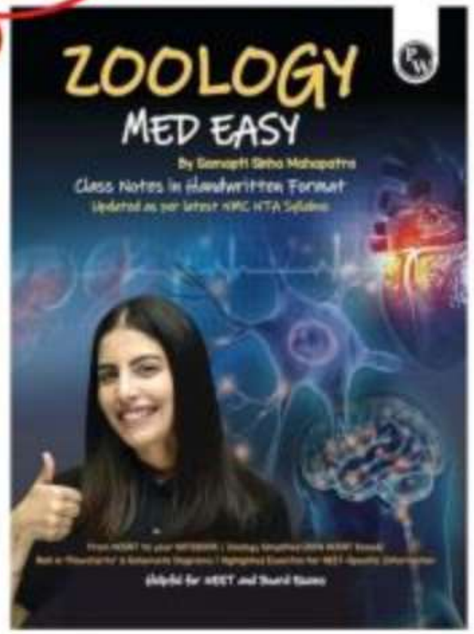

Homework

- REVISE CLAASNOTES / ZOOLOGY MED EASY

MODULE HW
Module -2
AARAMBH-1,2,8
Prarambh exercise 1- 1-7

THANK YOU