YAKEEN NEET 2.0

2026

18.06.2025

STRUCTURAL ORGANISATION IN ANIMALS

ZOOLOGY | Lecture – 13

By- SAMAPTI MAM

Topics to be covered

1. COCKROACH- MORPHOLOGY, DIGESTIVE SYSTEM
2.
3.
4.

MY TELEGRAM

#Laxmiphiexpress

6 3 11 = 20

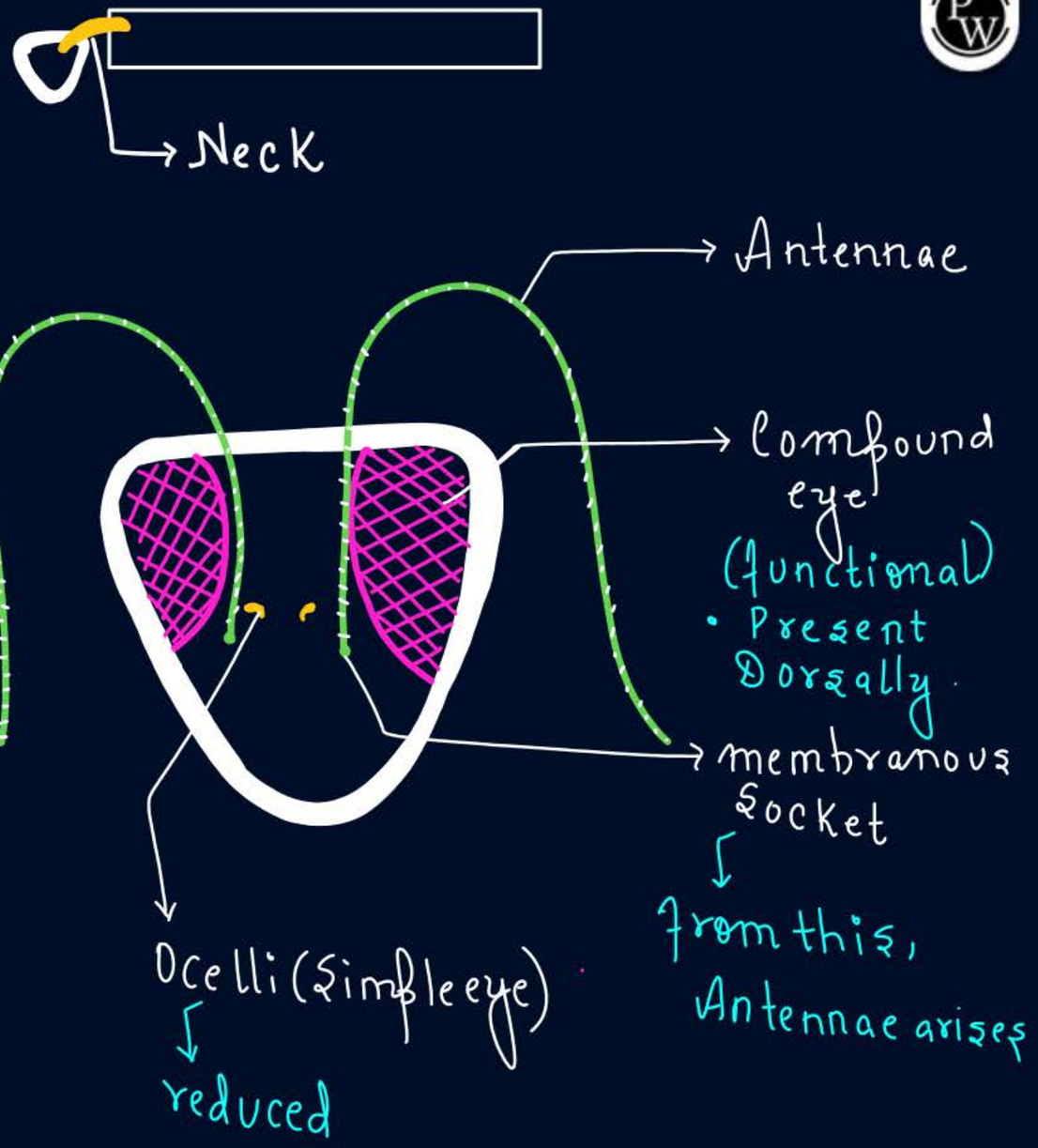
Head:

- Neck is the extension of prothorax & due to this Head is mobile in all direction

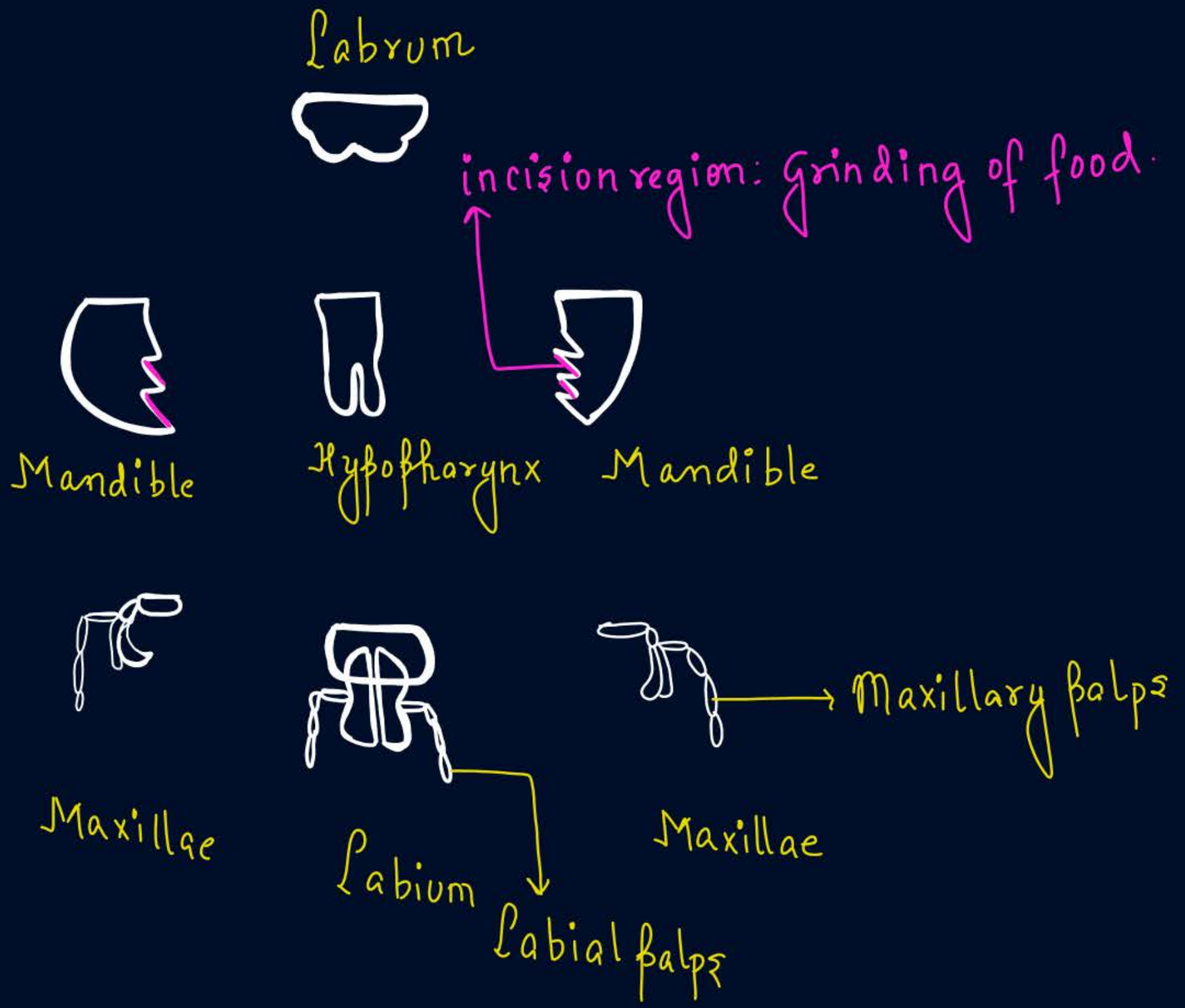
MOUTH PARTS:

- Towards / facing ground; this condition is Hypognathous condition.
  (hypo = below)

- BITING & CHEWING TYPE of mouth parts
  - Labrum (1): Upperlip
  - Labium (1): Lowerlip
  - Mandibles (2)
  - Maxillae (2)
  - Hypopharynx (1): Tongue



Mouth parts

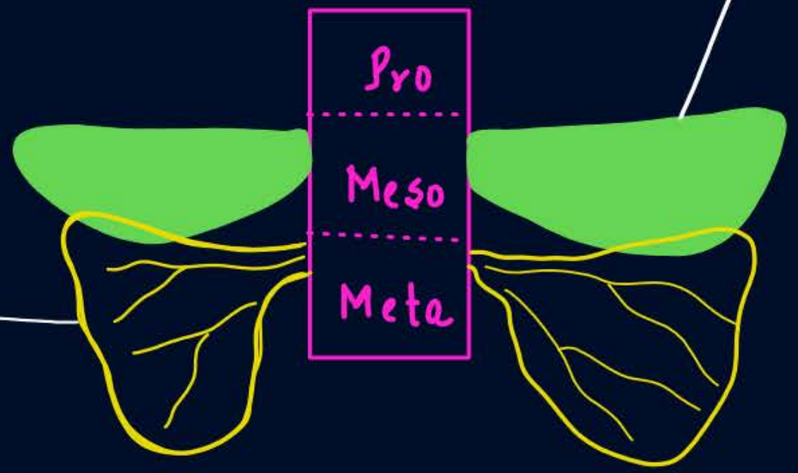

Labrum
incision region: Grinding of food.
Mandible
Hypopharynx
Mandible
Maxillary palps
Maxillae
Labium
Maxillae
Labial palps

② Thorax : 3 Segments : Prothorax, Mesothorax, Metathoracic

Wings & legs are associated

① WINGS

2 pair



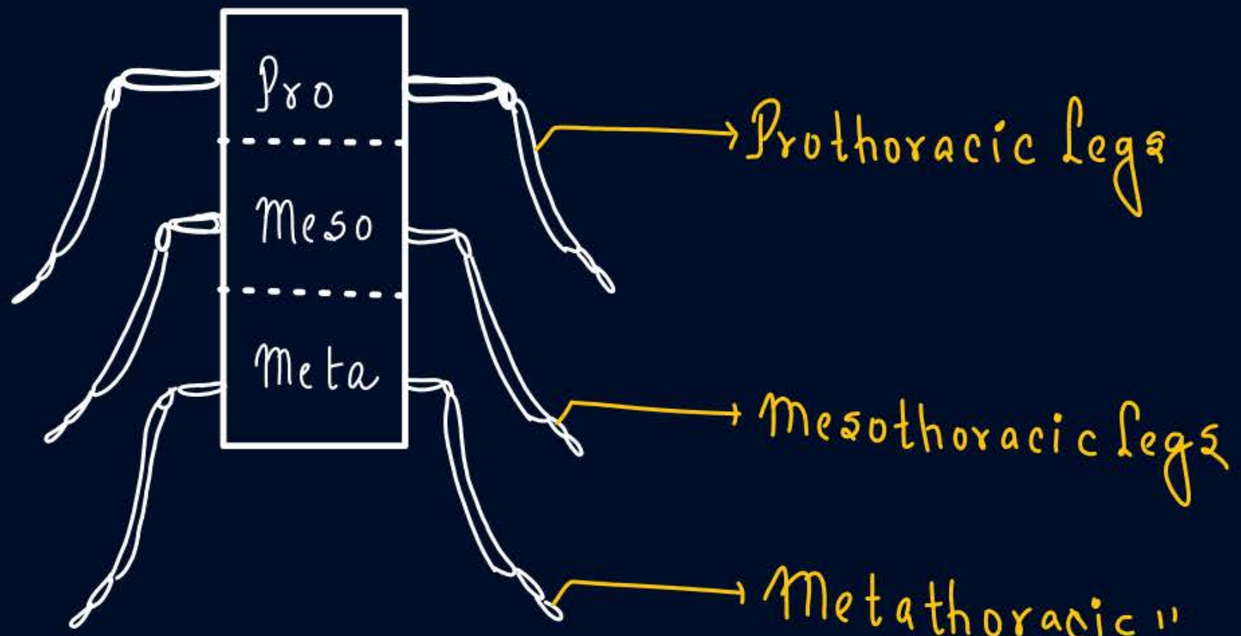
① MESOTHORACIC WINGS

- 1st pair: arises from Mesothor-ax
- Dark, opaque, leathery
- K/a forewings, protect hind-wing during Rest
- Not used for flight
- Also k/a 'TEGMINA or ELYTRA'

② METATHORACIC

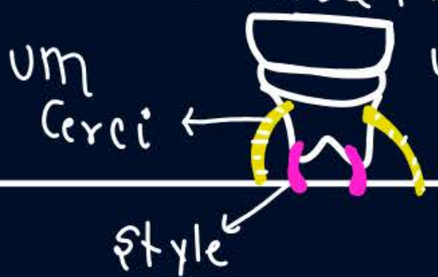
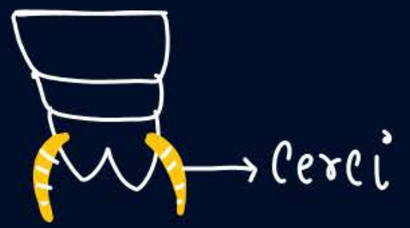
- 2nd pair: arises from Metathorax
- Membranous, Transparent
- K/a Hindwings
- Used for FLIGHT

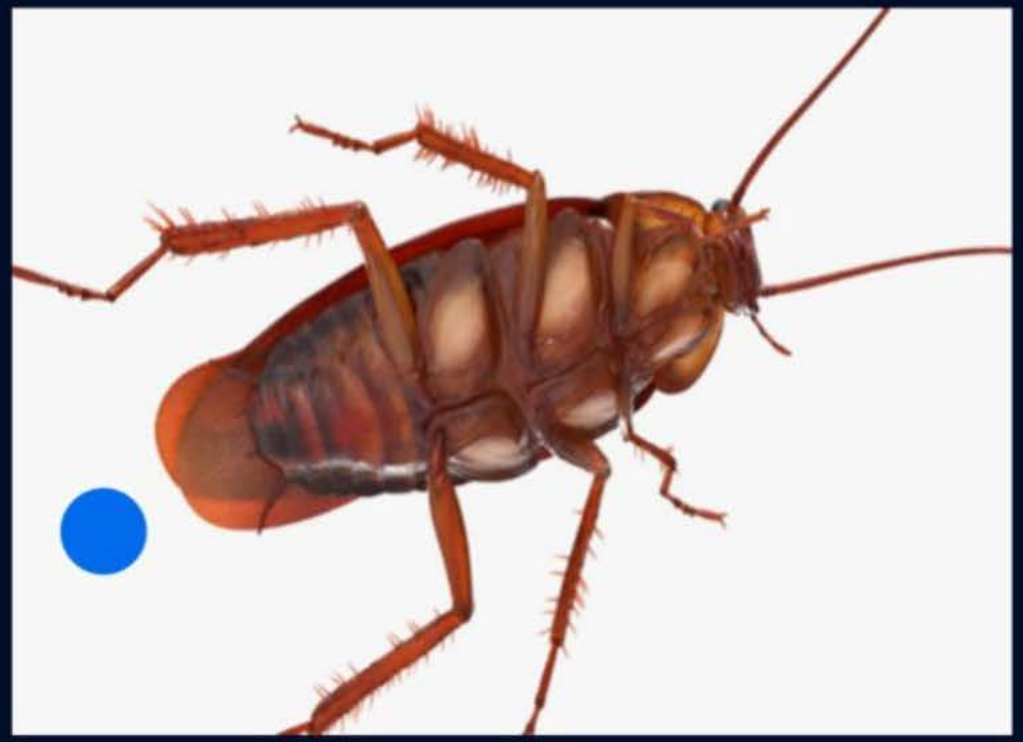
② Legs : 3 pair

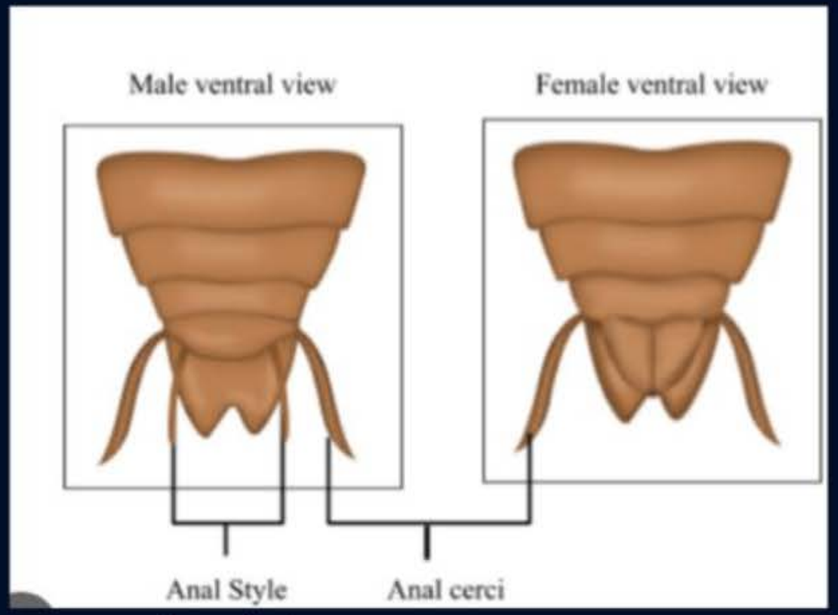

Pro
Meso
Meta
Prothoracic Legs
Mesothoracic Legs
Metathoracic "

③ Abdomen: 10 segments

- Sexual Dimorphism is present in Cockroach: Wings extend beyond Abdomen in ♂ & present of ANAL STYLES only in ♂.

♂	♀
① ♂ has GENITAL POUCH: formed by fusion of 9th, 10th Terga along with 9th Sternum	• ♀ has GENITAL POUCH (Brood Pouch) formed by fusion of 7, 8, 9 Sternum (7th Sternum is Boat shaped) 
② Here, opening of Male gonopore, dorsal anus & opening of Phallomere (gonapophysis)	② Here opening of ♀ gonopore, Collateral gland, Spermathecal pore.
③* Male has: ANAL CERCI on 10th Tergum, also ANAL STYLES on 9th Sternum 	③* ♀ only has ANAL CERCI on 10 TERGUM. 





(Caudal Style)

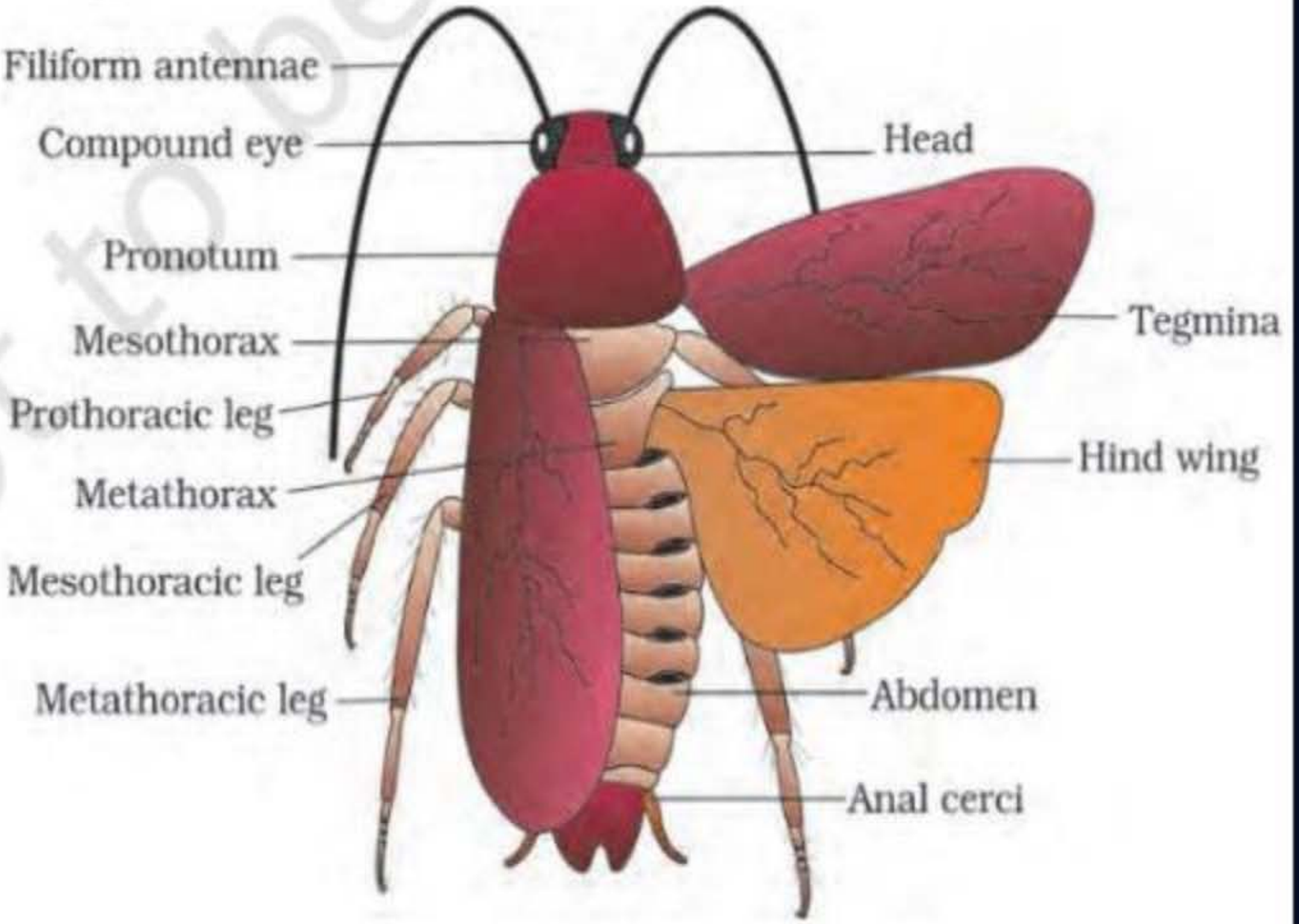


Figure 7.14 External features of cockroach

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.

Pronotum

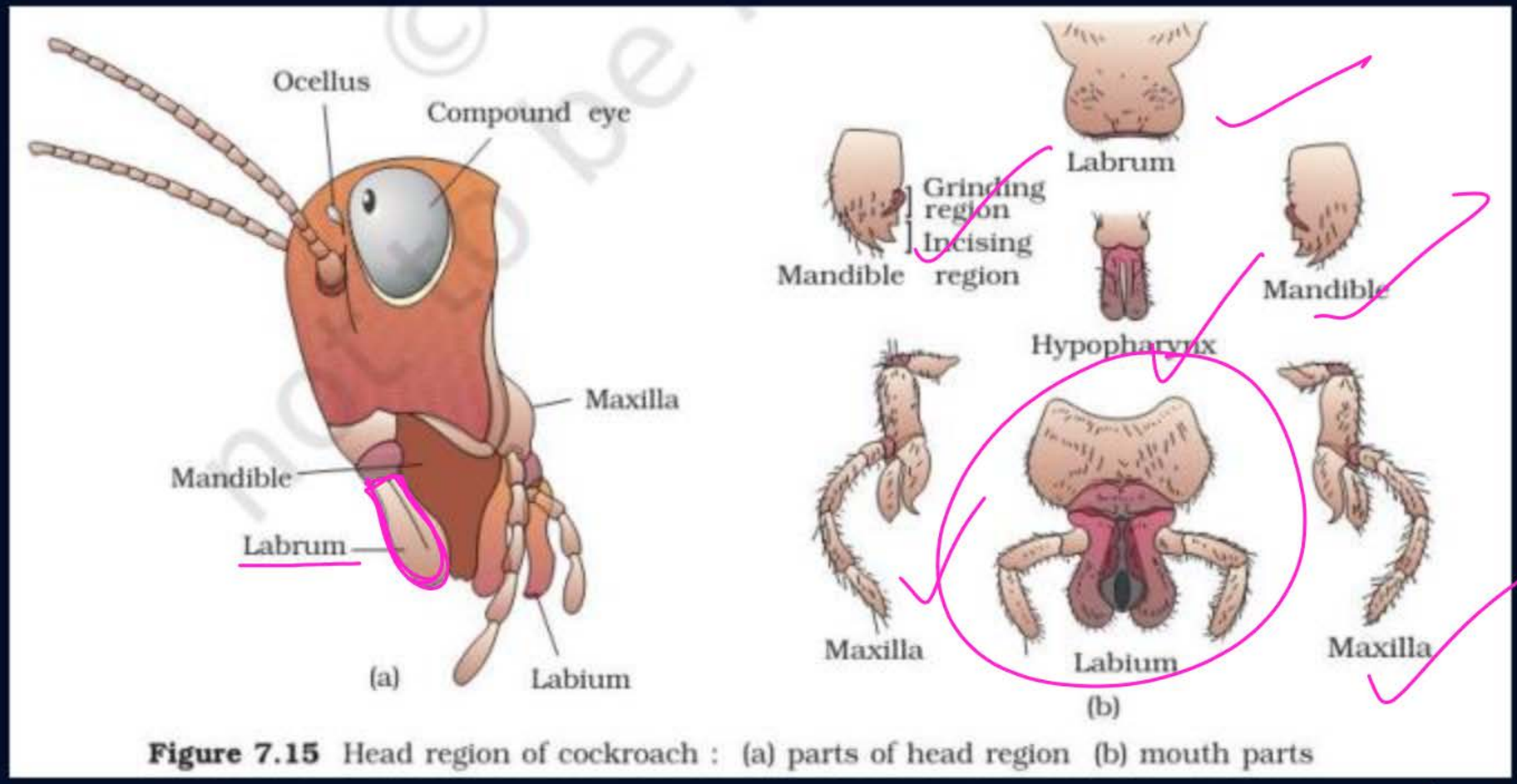
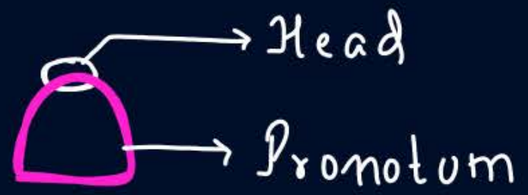


Figure 7.15 Head region of cockroach : (a) parts of head region (b) mouth parts

Note **PRONOTUM**: Hard Chitinous plate present on Prothorax & conceals some part of Head



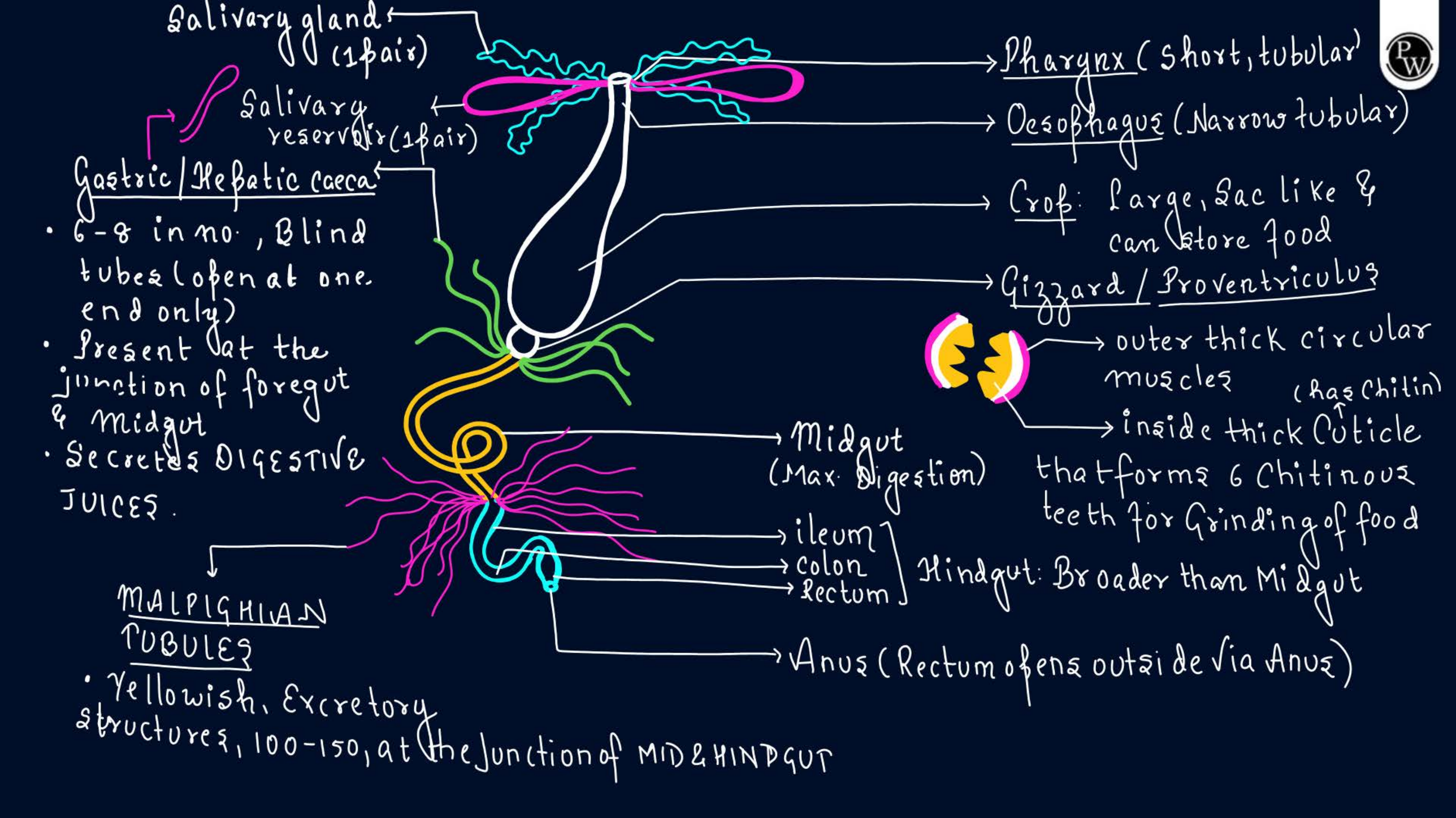
Anatomy: Digestive system

→ Their Alimentary canal is divided into 3 parts:

① Foregut: Mouth → Buccal cavity → Pharynx → Oesophagus → Crop → Gizzard
(lined by Cuticle)

② Midgut / Mesenteron

③ Hindgut: ileum → colon → Rectum
(lined by Cuticle)


Salivary gland (1 pair)
Salivary reservoir (1 pair)
Gastric / Hepatic caeca
• 6-8 in no., Blind tubes (open at one end only)
• Present at the junction of foregut & Midgut
• Secretes DIGESTIVE JUICES.
MALPIGHIAN TUBULES
• Yellowish, Excretory structures, 100-150, at the junction of MID & HINDGUT
Pharynx (Short, tubular)
Oesophagus (Narrow tubular)
Crop: Large, Sac like & can store food
Gizzard / Proventriculus
outer thick circular muscles
inside thick Cuticle (Has Chitin) that forms 6 Chitinous teeth for Grinding of food
Midgut (Max. Digestion)
ileum
colon
Rectum
Hindgut: Broader than Midgut
Anus (Rectum opens outside via Anus)

7.4.2 Anatomy

The alimentary canal present in the body cavity is divided into three regions: foregut, midgut and hindgut (Figure 7.16). The mouth opens into a short tubular pharynx, leading to a narrow tubular passage called oesophagus. This in turn opens into a sac like structure called crop used for storing of food. The crop is followed by gizzard or proventriculus. It has an outer layer of thick circular muscles and thick inner cuticle forming six highly chitinous plate called teeth. Gizzard helps in grinding the food particles. The entire foregut is lined by cuticle. A ring of 6-8 blind tubules called hepatic or gastric caeca is present at the junction of foregut and midgut, which secrete digestive juice. At the junction of midgut and hindgut is present another ring of 100-150 yellow coloured thin filamentous **Malpighian tubules**. They help in removal of excretory products from haemolymph. The hindgut is broader than midgut and is differentiated into ileum, colon and rectum. The rectum opens out through anus.

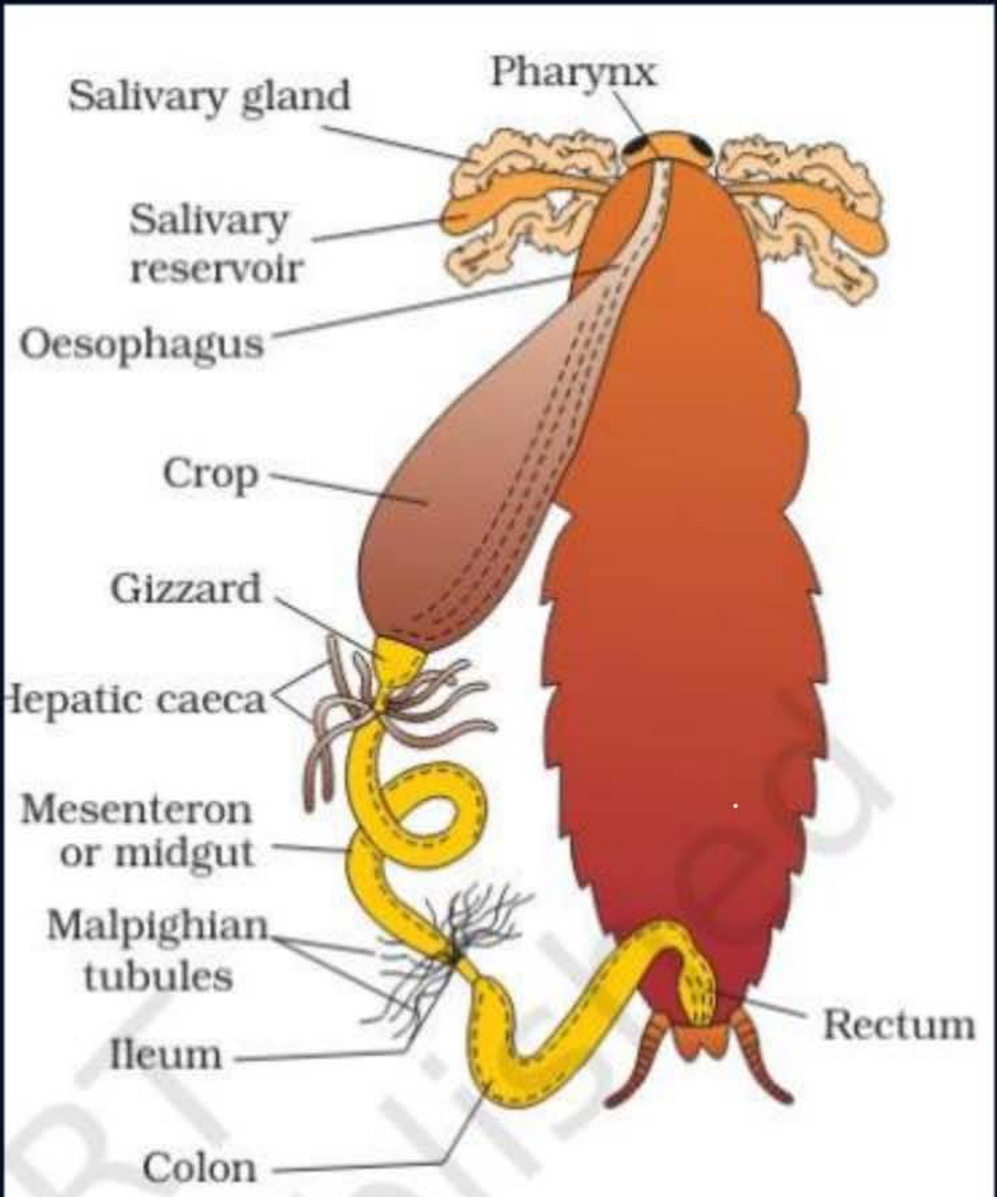


Figure 7.16 Alimentary canal of cockroach

Homework

- REVISE CLAASNOTES / ZOOLOGY MED EASY

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

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

(A) Sensory papillae

(B) Taste buds

(C) Nasal epithelium

(D) Eyes and internal ear

Ncert Catalyst

4

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

Assertion(A): The first pair of wings arises from mesothorax and the second pair from metathorax.

Reason(R): Forewings (mesothoracic) called tegmina are opaque, dark, and leathery, covering hind wings and are used for flight

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.

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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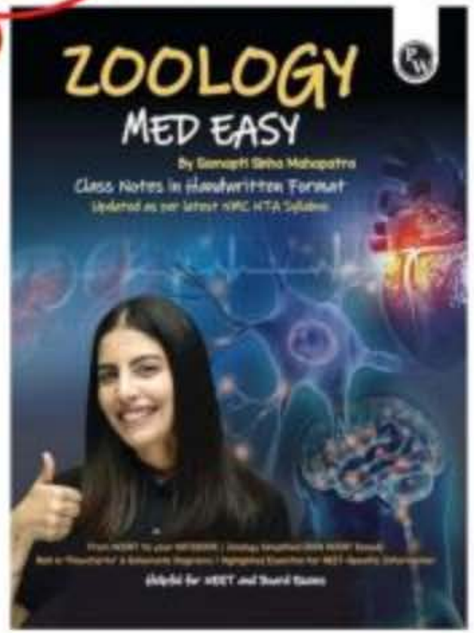

THANK YOU