

11.0 : Introduction :**Q.1. Write a note on habitat of cockroach.**

- Ans:** i. Cockroaches are omnipresent (seen throughout). They are usually seen in warm, dark damp places such as kitchens, store houses, manholes, etc.
- ii. They are nocturnal, i.e. they are active at night and come out for feeding.
- iii. During day time, they hide themselves in the cracks and crevices or under the objects in kitchen, cupboards, etc.
- iv. They are omnivorous (L. omnis - all; vorare - to devour) and cursorial in nature, i.e. they are fast runners.
- v. They have wings and can fly, but rarely they exhibit their ability to fly:

Q.2. Name the common species of cockroach found in India.

Ans: *Periplaneta americana* and *Blatta orientalis*.

Q.3. Classify cockroach giving reasons for its systematic position.

OR

Give the systematic position of cockroach with reasons.

Ans: Classification of cockroach:

Classification		Reasons
Kingdom	Animalia	These are heterotrophic organisms, locomotion is seen.
Phylum	Arthropoda	(Arthros – jointed; poda – legs) They have jointed appendages. Body is chitinous and segmented.
Class	Insecta	They possess two pairs of flight appendages as wings and three pairs of walking legs.
Genus	<i>Periplaneta</i>	Straight wings, nocturnal, chewing type of mouth parts.
Species	<i>americana</i>	Originated in Mexico, USA.

Q.4. Name the phylum and class to which cockroach belongs.

Ans: Cockroach belongs to phylum- Arthropoda and class - Insecta.

11.1 : External features of cockroach :**Q.5. Describe the external morphology of cockroach.**

Ans: External features of cockroach:

- Cockroach is triploblastic, bilaterally symmetrical, dorso-ventrally flattened, coelomate animal.
- The adult measures from 3 to 5 cm in length and 1.5 to 2 cm in breadth.
- Their colour is reddish brown.
- Hard, waxy, water proof chitinous exoskeleton protects the body of the cockroach.
- It is made up of polysaccharide called chitin.
- Each segment is divided into four plates namely dorsal tergum, ventral sternum and two lateral pleurons.
- Body divisions: The body is divided into three regions namely: head, thorax and abdomen.

a. Head:

The head is oval, dorso-ventrally flattened and is pear shaped, attached at the right angles to the thorax by a thin, narrow, movable neck or cervix.

Hence, the broad end is directed upwards and the narrow end is directed downwards.

Head is made up of six sclerites. These fuse in adults and forms head capsule.

Head bears four important parts: compound eyes, antennae, fenestrae and mouth parts.

Compound eyes:

Compound eyes are paired, dark, kidney shaped structures placed on the lateral sides of the head.

They are made up of large number of hexagonal facets called ommatidia (singular ommatidium).

Antennae:

Antennae are paired, long, slender, filamentous, many jointed structures present between the compound eyes.

They are lodged in the membranous pits called antennal sockets and are the tacto receptors or organs of olfaction (sense of smell).

Function: They are useful in localizing the food material in the vicinity.

Fenestrae:

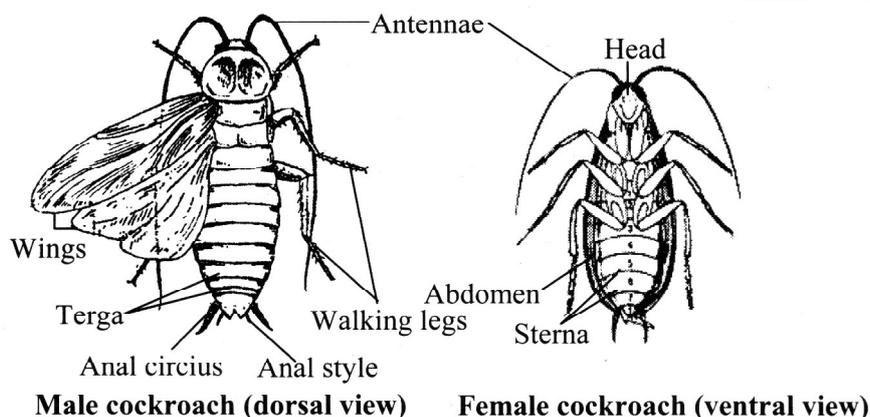
Fenestrae also called as oscillar spots are situated at the base of each antenna and appears as white spots.

Mouth parts or trophi:

Mouth parts of cockroaches are of chewing and biting type.

These are movable segmented appendages which assist in ingestion of food.

It includes labrum, mandibles, maxillae, labium and hypopharynx.



Male cockroach (dorsal view)

Female cockroach (ventral view)

b. Thorax:

Thorax is made up of three distinct segments as pro thorax, mesothorax and metathorax.

Dorsally, the thorax bears two pairs of membranous wings- fore wing and hind wings.

Fore wings are first pair of dark, opaque, thick wings which are protective in function.

Hind wings are thin, broad, membranous, delicate and transparent.

Hind wings are useful in flight and hence, are also called true wings.

Three pairs of thoracic legs are present on ventral side.

c. Abdomen:

The abdomen is the largest of the three regions.

Its segmentation is conspicuous both dorsally and ventrally.

The abdomen consists of 11 segments of which 11th is reduced and fused with the 10th, so that only ten segments are distinct and visible.

Dorsally, each segment is covered by a tergite and ventrally by a sternite.

Laterally, tergites and sternites are connected by unsclerotized flexible muscles.

Anal styles are present in segment 9 in males.

Segment 10 bears a pair of large, segmented cerci, which are visible in both dorsal and ventral views in both males and females

These are sensitive to air movements, including sound and perhaps to ground vibrations.

Eight pairs of spiracles are present in the abdomen.

Genital openings are present on different segments in both the sexes and are surrounded by chitinous plates in both, which are collectively called gonapophyses.

Q.6. Name different body divisions of cockroach.

Ans: Different body divisions of cockroach are as follows:

- i. Head
- ii. Thorax
- iii. Abdomen

Q.7. Which are the structural units of compound eye?

Ans: Ommatidia are the structural units of compound eye.

Q.8. Write about the compound eyes of cockroach.

- Ans:**
- i. Compound eyes of cockroach are paired, dark, kidney shaped and are made up of large number of hexagonal facets called ommatidia (singular - ommatidium).
 - ii. Each ommatidium acts as a single simple eye and forms a part of image of an object.
 - iii. All such images combine together in the brain and form a complete single but blur mosaic image.

Q.9. Explain the structure of antenna of cockroach.

- Ans:**
- i. Antennae of cockroach are paired, long, slender, filamentous, many jointed structures present between the compound eyes.
 - ii. They are lodged in the membranous pits called antennal sockets.
 - iii. These are the tacto receptors or organs of olfaction (sense of smell).
 - iv. Fenestrae also called the oscillar spots, are situated at the base of each antenna. They appear as white spots.

Function: They are useful in localizing the food material in the vicinity.

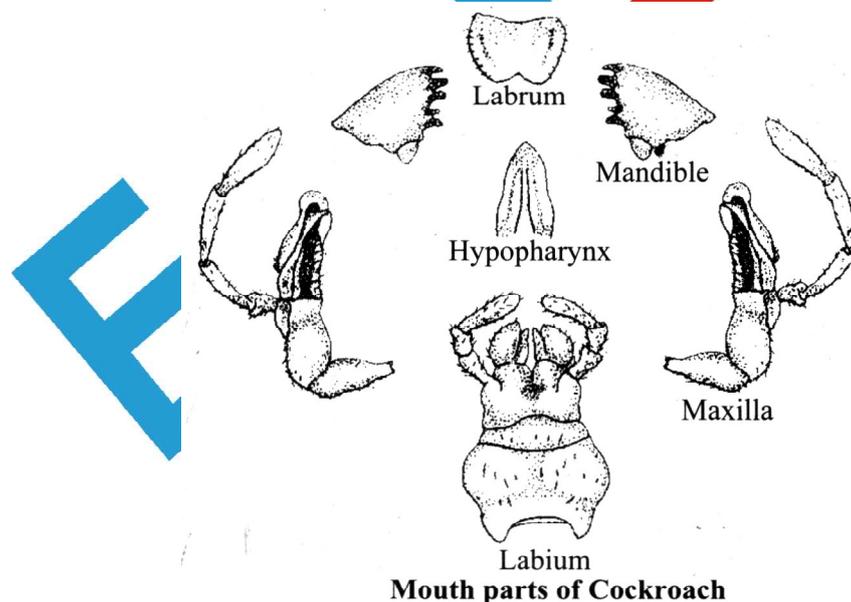
Q.10. Name the various mouth parts of cockroach.

Ans. Various mouth parts of cockroach are:

- i. Labrum
- ii. Mandibles
- iii. Maxillae
- iv. Labium
- v. Hypopharynx.

Q.11. Sketch and label the mouth parts of cockroach.

Ans:



Q.12. Describe the mouth parts of cockroach.

Ans: Mouth parts of cockroach:

Mouth parts of cockroaches are of chewing and biting type.

These are movable, segmented appendages which help in ingestion of food.

The mouth parts of cockroach consists of following parts: labrum, mandibles, maxillae, labium and hypopharynx.

i. Labrum:

- Labrum or upper lip is flap like or shield like movable structure which covers the mouth from the upper side.
- It forms the anterior wall of mouth cavity.
- Function: It holds the food during feeding.

ii. Mandible:

- Mandible or true jaws are two dark, hard chitinous structures with serrated margins which form the teeth and is placed below the labium on either side of the mouth.
- Function: These helps in cutting and crushing the food.

iii. Maxillae:

- Maxillae or accessory jaws are paired appendages situated on either side of the mouth behind the mandibles.
- Each maxilla has many jointed structures and shows maxillary palp.
- These are also called first pair of maxillae.
- Function: It brings 'the food to the mandibles for mastication.

iv. Labium:

- Labium or lower lip is also known as second maxillae which covers the mouth from the ventral side and is firmly attached to the posterior part of head.
- It has labial palp which is three jointed.
- Function: These are sensory in function. It is useful in pushing the chewed food in the preoral cavity and also prevents the loss of food falling from mandibles during chewing.

v. Hypopharynx:

- Hypopharynx or tongue, is a long, prominent medially placed appendage.
- It protrudes from the ventral wall of the head in the preoral cavity.
- It is a cylindrical structure called lingule.

Q.13. Write a short note on the wings of cockroach.

Ans: Wings of cockroach:

Thorax bears dorsally two pairs of membranous structures called wings.

Wings are of two types: fore-wings and hind-wings.

- Fore wings** are first pair of dark; opaque, thick wings.

Function: These are protective in function.

- Hind wings** are thin, broad, membranous, delicate and transparent second pair of wings attached to tergum of metathorax:.

Function: These are useful in flight and hence are also called true wings.

Q.14. Write a short note- on the legs of cockroach.

Ans: i. Thorax bears three pairs of legs on ventral side.

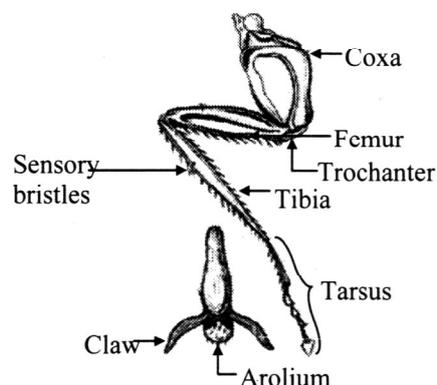
- Each leg is five jointed or segmented.

- It is covered with the sensory bristles and spines.

- Each leg has five podomeres namely Coxa, Trochanter, Femur, Tibia and Tarsus.

- Tarsus is the last segment and is made up of five movable segments or tarsomeres,

- Last segment of the tarsus bears a pair of claws and arolium which helps in clinging.



Structure of leg in cockroach

Q.15. Give another name for upper lip and lower lip of cockroach.

Ans: i. Upper lip - Labrum

- ii. Lower lip - Labium

Q.16. Which type of mouth parts are found in cockroach?

Ans: Biting and chewing type.

11.2 : Bigestive system of cockroach :

Q.17. Explain the digestive system of cockroach.

OR

Describe in detail the digestive system of cockroach.

Ans: Digestive system of cockroach consists of alimentary canal and salivary glands.

i. Alimentary canal:

It is long, coiled, tubular and complete.

It extends from mouth to anus.

The alimentary canal is divisible into three parts: fore gut or stomodaeum, mid gut or mesenteron and hind gut or proctodaeum. A narrow space called the mouth cavity lies in the front of the opening of the alimentary canal. It is surrounded by labrum anteriorly, labium on the posterior side and mandibles and maxillae laterally. The tongue or hypopharynx lies in this cavity.

a. Fore gut or stomodaeum:

It is the anteriormost part of the alimentary canal.

It consists of pharynx, oesophagus, crop and gizzard.

Pharynx:

It is dilated, narrow, short, muscular tube.

The mixed food enters the mouth and reaches the pharynx.

It joins with a narrow tubular passage called oesophagus.

Function: Conduction of food into the oesophagus.

Oesophagus:

It is short, narrow, straight and laterally compressed.

It passes through neck and opens into a sac like structure called crop.

Function: Conduction of food.

Crop:

It is large, highly distensible, pear shaped sac.

It is long, extending upto fourth or fifth abdominal segment.

Its internal epithelial and cuticular lining is very much folded.

Function: It stores the food. It conducts the food into gizzard.

Gizzard:

It is a small cone shaped muscular thick walled chamber.

It is provided with a circlet of six chitinous teeth and helps to crush the food.

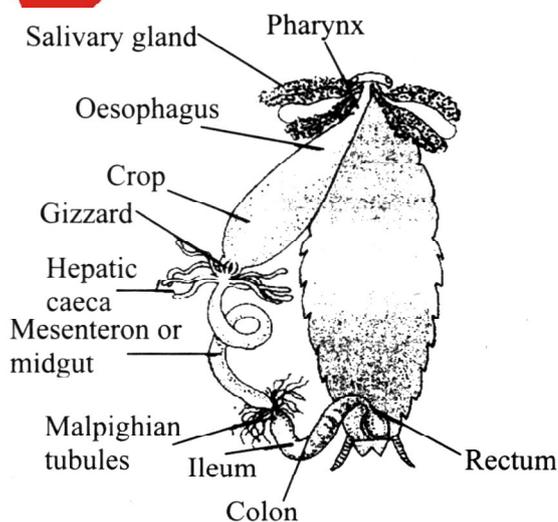
Behind chitinous teeth are, backwardly directed fine chitinous bristles present in the grooves of gizzard.

These are interconnected with each other and form filter.

Function: It acts as an efficient grinding and straining apparatus. It masticates the food.

Pharynx

b. Mid-gut (mesenteron):



Digestive system of Cockroach

The mid-gut is the major organ of digestion and absorption of food. It consists of ventriculus or stomach and eight hepatic caeca.

1. Hepatic caeca are thin, transparent, blind tubules arranged in a whorl or rosette fashion in the anterior part of the stomach.

Function: They secrete digestive enzymes.

2. **Ventriculus or stomach:**

It is short, narrow tube of uniform diameter.

Function: Digestion of food.

- c. **Hind gut:**

It consists of ileum, colon and rectum.

It is slightly broader than the mid-gut.

At the junction of mid-gut and hind-gut, there is a ring of upto 150 yellow thread like blind malpighian tubules. Malpighian tubules are excretory in nature.

Uric acid, the product of malpighian tubules is poured in the ileum.

Ileum: It is short and narrow.

Colon: It is coiled and wide tube.

Rectum: It is the last part of the hind-gut. Rectum opens to the outside by anus which lies below the 10th tergum.

- ii. **Salivary glands:**

Cockroach has two salivary glands, one on each side of the crop. Hypopharynx

Each gland has two glandular lobes and a Duct of glands receptacle or reservoir.

Glandular lobes consist of several irregular, glandular lobe white coloured lobules which are provided with collecting ducts.

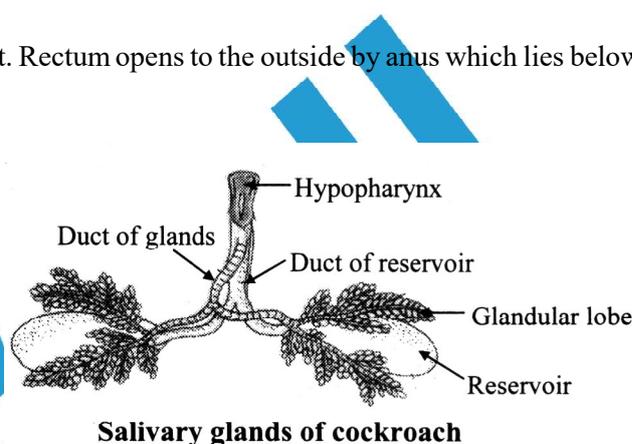
They secrete saliva. Salivary glands of cockroach

The two ducts of salivary glands unite and form a common salivary duct.

A thin-walled transparent bag like structure called salivary receptacles store saliva.

The common salivary receptacular duct runs below the oesophagus through the neck and opens at the base of the tongue or hypopharynx.

Function: They secrete saliva and are stored in receptacles.



Salivary glands of cockroach

Q.18. Enlist the different organs of foregut of cockroach.

Ans: Organs of foregut are pharynx, oesophagus, crop and gizzard.

Q.19. Mention the role of crop and gizzard in cockroach.

Ans: Crop: It stores food in it. It conducts the food into gizzard.

Gizzard: It helps to grind food particles.

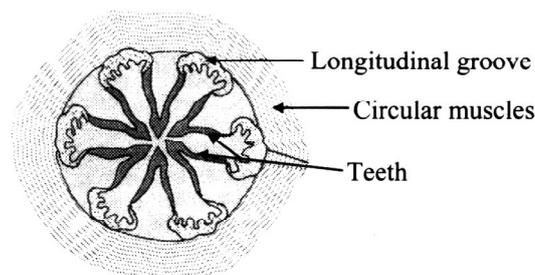
Q.20. What is cannibalism?

Ans: Tendency of an organism to eat its own kind in overcrowded condition is called as cannibalism.

Q.21. Write the structure and function of gizzard of cockroach

Ans: Structure: Gizzard is also known as proventriculus, a portion between the crop and midgut. It has six chitinous teeth. Behind these teeth, chitinous bristles are present and teeth are interconnected and forms filter.

Functions:



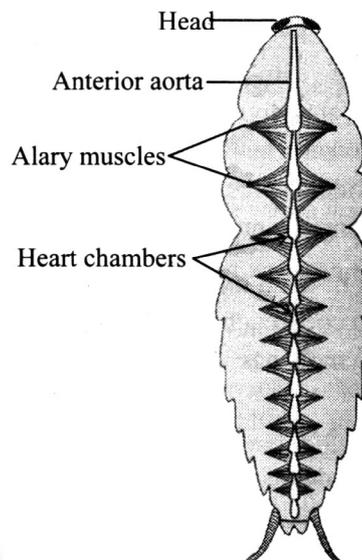
T. S of Gizzard in cockroach

- i. Gizzard helps in crushing the food.
- ii. It act as grinding and straining apparatus.

11.3 : Circulatory system of cockroach :

Q.22. Describe the heart in cockroach. Add a note on mechanism of circulation.

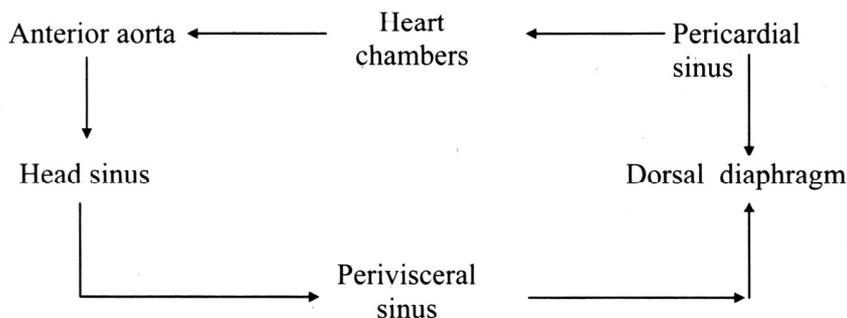
- Ans:** i. Blood vascular system of cockroach is of open type. Blood, i.e. haemolymph freely flows in sinuses or lacunae.
- ii. Body cavity of cockroach is called haemocoel. Haemocoel is filled with blood called haemolymph.
- a. Haemocoel can be divided into three compartments.
 1. **Dorsal sinus:** It is a pericardial sinus and shows presence of tubular heart.
 2. **Middle sinus:** It is a perivisceral sinus and contains visceral organs.
 3. **Ventral sinus:** It is a perineural sinus and shows presence of ventral nerve cord.
 - b. **Heart:** Circulatory system of cockroach
It is elongated muscular tube.
It is situated in pericardial sinus.
It is 13 chambered and extends along the mid-dorsal line of body.
Out of 13, three are thoracic and ten are abdominal. Pair of openings are present 10 posterolateral position in each chamber called ostia.
Ostia allows the blood to flow from posterior to anterior direction peristaltically.
Heart extends in head sinus as anterior aorta.
12 pairs of alary muscles are attached to dorsal diaphragm.



Circulatory system of cockroach

Mechanism of blood circulation:

- i. Muscular wall along with the alary muscles cause pulsation of heart.
- ii. During diastole [relaxation], the haemolymph from pericardial sinus enters into the heart through ostia.
- iii. The ostia' are closed during systole [contraction] as a result, haemolymph is propelled forward.
- iv. The heart chambers and the anterior aorta contract peristaltically in a forward direction. This drives the blood into the head sinus.
- v. The blood returns back to the perivisceral and perineural sinuses from the head sinus.
- vi. Mechanism of circulation can be represented by the following chart:



Q.23. Which muscles are associated with pulsation of heart of cockroach?

Ans: Alary muscles are associated with pulsation of heart of cockroach.

Q.24. Write a short note on haemocoel.

Ans: i. Body cavity of cockroach is called as haemocoel.

ii. Haemocoel is divided into three compartments by the perforated horizontal muscular septa called dorsal and ventral diaphragms.

iii. Haemocoel is divided into three compartments as follows:

a. Dorsal sinus

b. Middle sinus

c. Ventral sinus

Q.25. Write a short note on haemolymph,

Ans: i. Blood in cockroach is called as haemolymph.

ii. Haemolymph has no role in transport of respiratory gases, hence it does not contain respiratory pigment.

iii. Haemolymph is composed of plasma and cells called haemocytes.

iv. Plasma contains absorbed food and nitrogenous wastes.

v. Around 30000 haemocytes are present per cubic millimeter of haemolymph.

11.4 : Nervous system of cockroach :

Q.26. Give an account of the nervous system in cockroach.

OR

Explain the structure of nervous system in cockroach.

Ans: Nervous system in cockroach:

The nervous system of cockroach consists of central nervous system (CNS), peripheral nervous system (PNS) and autonomous nervous system (ANS).

Central nervous system (CNS):

Central nervous system of cockroach consists of:

- i. a pair of supra oesophageal ganglia
- ii. a pair of sub-oesophageal ganglia
- iii. a pair of circum-oesophageal connectives and nerve cord.

i. Supra oesophageal ganglia or cerebral ganglia:

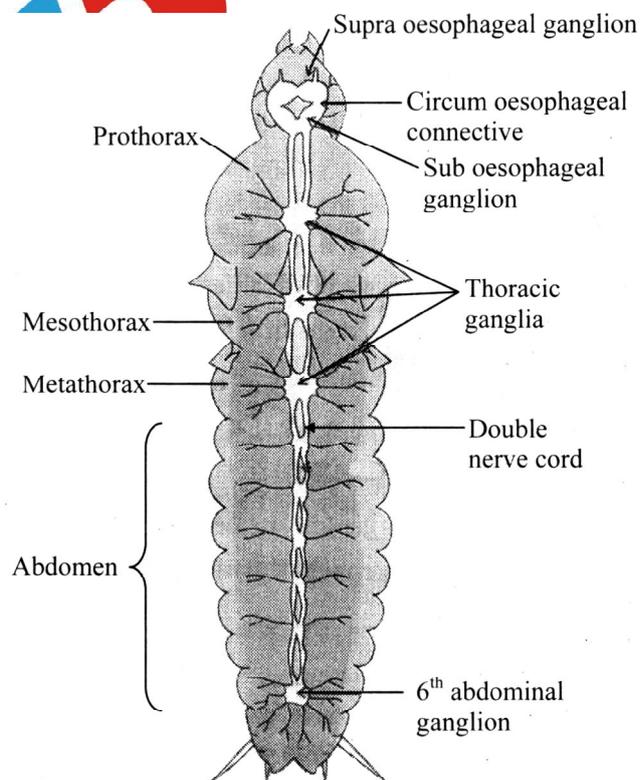
A pair of supra oesophageal ganglia is considered as the brain.

It is bilobed mass, situated in the head above the oesophagus between the base of the antennae. It is formed by the fusion of three pairs of ganglia named protocerebrum, deutocerebrum and tritocerebrum of the head region.

ii. Sub-oesophageal ganglia:

It is a bilobed mass, situated in the head below oesophagus.

It is also formed by the fusion of three pairs of ganglia of the head



Cockroach- Nervous system

region.

iii. Circum-oesophageal connectives:

Circum-oesophageal connectives arising from the supra oesophageal ganglia are a pair of nerves called circum-oesophageal connectives.

These connectives join the sub-oesophageal ganglia encircling the oesophagus.

All these three structures form the nerve ring.

iv. Nerve cord:

It is a solid, ganglionated, double ventral nerve cord.

It arises from the sub-oesophageal ganglia and extends throughout the length through the mid-ventral side of the body.

Along its length, the nerve cord enlarges to form the paired segmental ganglia.

Each thoracic segment contains a pair of ganglia.

There are three pairs of thoracic ganglia and six pairs of abdominal ganglia.

The first five pairs of abdominal ganglia lie in the first five abdominal segments.

The sixth abdominal ganglion is the largest and lies in the 7th segment.

Peripheral nervous system:

- i. The peripheral nervous system comprises of the nerves that arise from the supra-oesophageal ganglia, sub-oesophageal ganglia, circum-oesophageal connectives and the segmental ganglia.
- ii. From the supra oesophageal ganglia, six pairs of nerves arise.
- iii. They supply to the eyes, antenna and labrum.
- iv. Nerves arising from the sub-oesophageal ganglia supply to the mandible, maxilla and labium.
- v. Nerves arising from the thoracic ganglia supply to the thoracic muscles, wings, legs and other internal organs found in the thorax.

Autonomic nervous system:

- i. Nerves arising from the abdominal ganglia supply to the organs found in the abdomen to control respiration, circulation and movements of alimentary canal.

Q.27. Write a short note on ventral nerve cord of cockroach.

- Ans:**
- i. Ventral nerve cord is double, solid, ganglionated.
 - ii. It arises from posterior part of sub-oesophageal ganglion.
 - iii. Along its length, there are 9 ganglia in the ventral nerve cord. Out of that, 3 in thorax and 6 are abdominal ganglia.
 - iv. The first five pairs of abdominal ganglia are located in the first five abdominal segments, i.e. one in each segment, but 6th abdominal ganglion which is largest is present in 6th segment.
 - v. It is probably formed by the fusion of the ganglia of last few abdominal segments.

Q.28. Write a short note on brain of cockroach.

- Ans:**
- i. Pair of supra-oesophageal ganglia is called as brain of cockroach.
 - ii. It is a bilobed mass, situated in the head above the oesophagus between the bases of the antennae.
 - iii. It is formed by fusion of three pairs of ganglia namely protocerebrum, deutocerebrum and tritocerebrum.

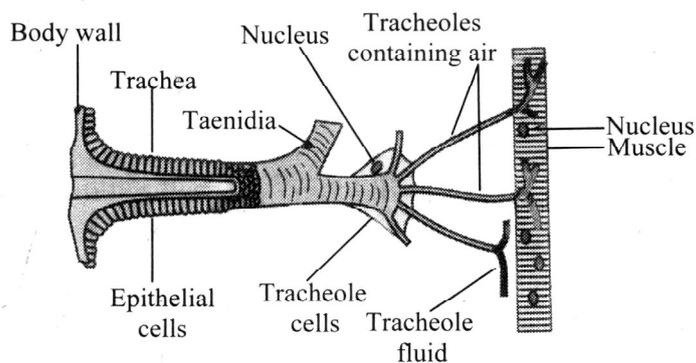
11.5 : Respiratory system of cockroach :

Q.29. Give an account of respiratory system of cockroach.

- Ans:**
- i. Cockroach shows tracheal respiration as respiratory structures are branching air tubes called tracheae. External opening of these air tubes are called spiracles.
 - ii. Spiracles are present in each of the segment.
 - iii. Tracheae are found close to the heart and dorsal vessel.
 - iv. Trachea branches into smaller tracheoles.
 - v. Tracheoles surrounds all the organs of insects and tissues.
 - vi. Air enters through spiracles inside the body and passes into the trachea and moves into tracheoles.

From tracheoles, it finally goes to body tissues.

- vii. Oxygen in the air diffuses into cells that forms tissues and carbon dioxide leaves the cells and moves into tracheal system.
- viii. Air leaves the body of cockroach through spiracles.



Cockroach-Respiratory Organs

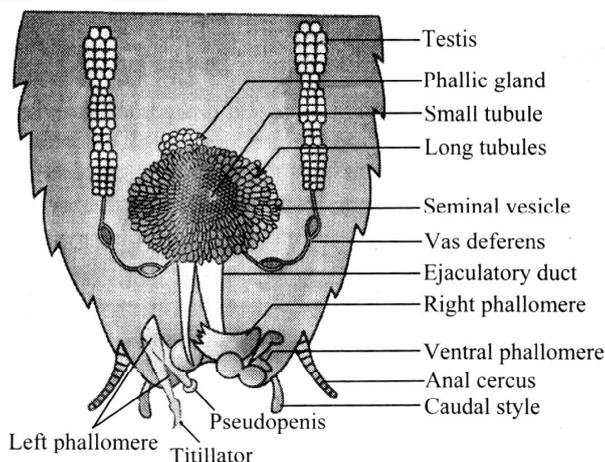
Q.30. Write in short about spiracles in cockroach.

Ans: Spiracles are the openings of tracheae on the body surface: Air enters the body of cockroach through the spiracles and is carried to all tissue cells through tracheae and tracheoles. Cells take in oxygen and give out carbon dioxide. This carbon dioxide travels through tracheoles, tracheae and leaves the body through spiracles. Thus, spiracles play an important role in respiration.

11.6 : Reproductive system of cockroach :

Q.31.Explain in detail the male reproductive system of cockroach.

- Ans:**
- i. Male reproductive system includes a pair of testes, a pair of vasa deferentia and a single ejaculatory duct.
 - ii. Testes lies on lateral side of 4th to 6th segments.
 - iii. Vas deferens arises from each testis and opens into ejaculatory duct through seminal vesicle.
 - iv. Ejaculatory duct opens into male gonopore.
 - v. Sperms generated by testis are stored in seminal vesicles in the form of bundles called spermatophores.
 - vi. Mushroom shaped accessory glands are present in the 6th and 7th abdominal segments. Besides this, there are number of glands which secrete the substance. These substances helps spermi to fertilize the egg.
 - vii. Number of glands along with the ejaculatory duct are also present. These secrete substances that help sperms to fertilize the egg.



Cockroach- Male Reproductive System

Q.32. Explain the female reproductive system of cockroach with the help of neat labelled diagram.

OR

With a suitable diagram, describe reproductive system in female cockroach. Write the functions of different parts in it.

Ans: i. Female reproductive system of cockroach includes a pair of ovaries, a pair of oviducts, vagina and spermatheca.

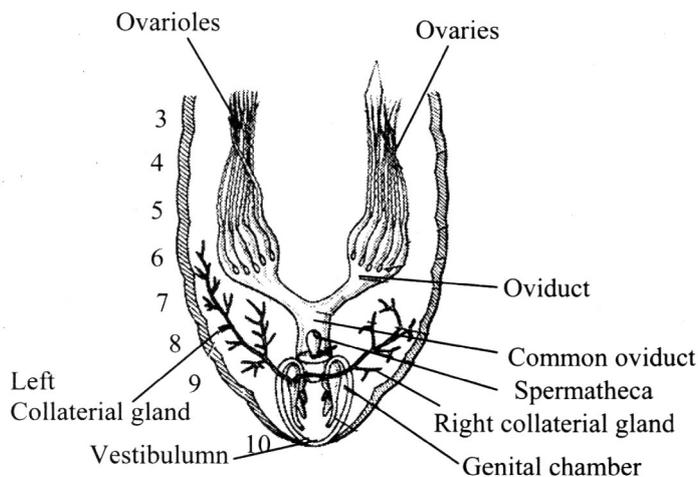
ii. Ovary: Each contains 8 ovarioles which contains a chain of developing ova.

iii. Oviducts of each ovary unite to make single median oviduct also called vagina.

iv. Vagina: It opens into the genital chamber.

v. Spermatheca: Two spermatheca lie in the 6th abdominal segment. It receives sperm during copulation.

vi. Accessory glands: Collateral glands are accessory glands. Secretion of these glands helps in formation of leathery, dark reddish to blackish brown egg called as ootheca.



Cockroach- Female reproductive system

Q.33. What is the function of ootheca?

Ans: Ootheca protects the developing fertilized eggs in cockroach.

Q.34. Write a short note on spermathecae.

Ans: i. There is a pair of spermathecae in female cockroach.

ii. Each spermatheca is a bag-like structure which stores spermatozoa.

iii. A small duct arises from each spermatheca. The ducts of both the sides unite together before opening into genital chamber.

iv. Spermatheca is present in the 6th abdominal segment.

Q.35. Differentiate between male cockroach and female cockroach.

Ans:

No	Male cockroach	Female cockroach
i.	Abdomen is relatively long and narrow.	Abdomen is short and broad.
ii.	7 th tergum covers 8 th tergum.	7 th tergum covers 8 th and 9 th terga.
iii.	Antennae are longer in size.	Antennae are shorter in size.
iv.	Anal styles are present.	Anal styles are absent.
v.	Brood pouch is absent.	Brood pouch is present.
vi.	All nine sterna visible.	Only seven sterna visible.

Additional Theory Questions :

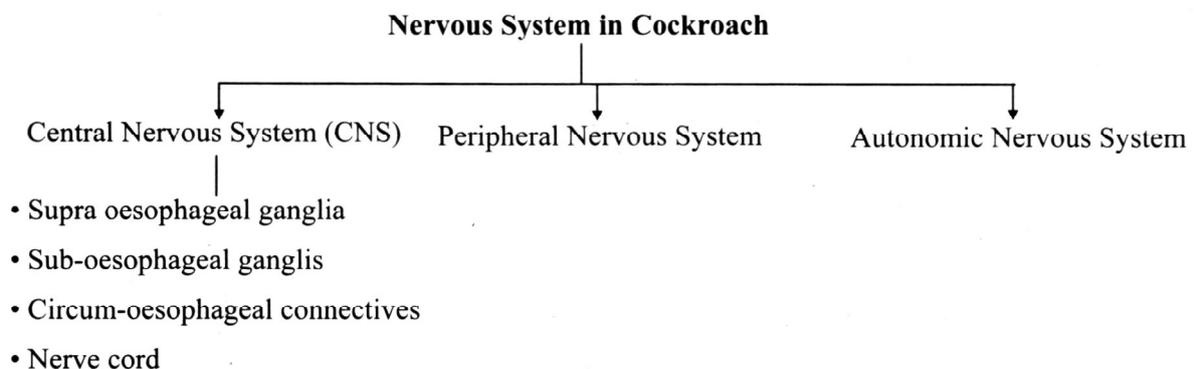
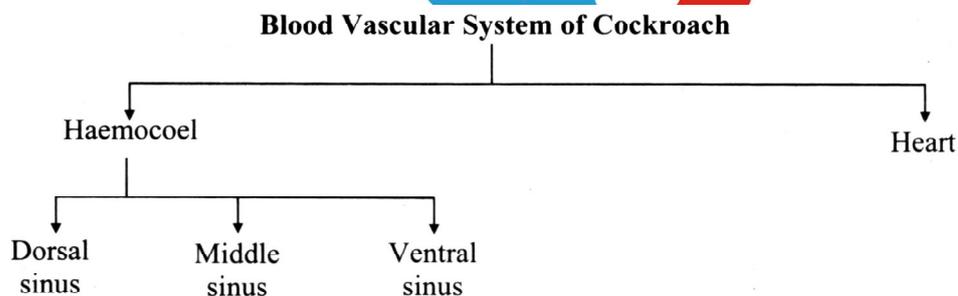
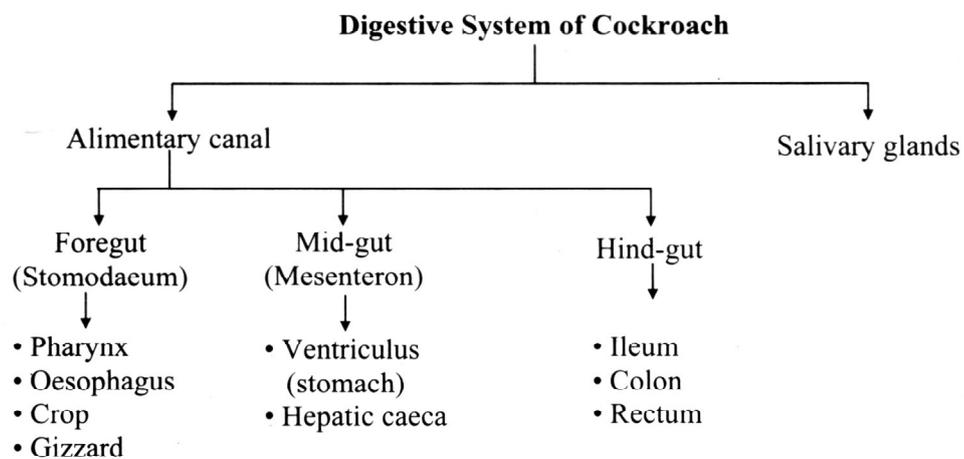
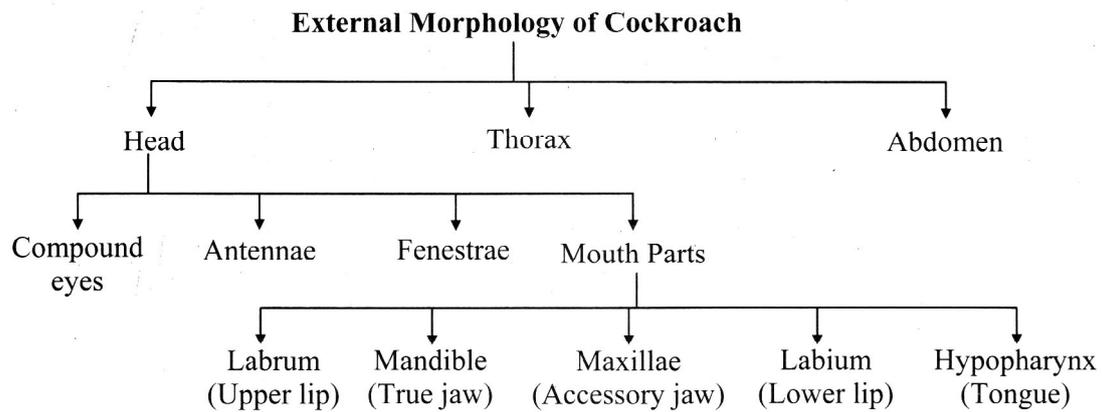
Q.1. Describe the mouth parts of cockroach with the help of neat labelled diagram. Refer Q.11. and Q.12.

Q.2. Draw a labelled diagram of alimentary canal of a cockroach. Refer Q.17.

Q.3. Write a short note on Salivary glands of cockroach. Refer Q.17. (ii)

Q.4. With the help of neat labelled diagram, explain circulatory system of cockroach. Refer Q.22.

Q.5. Explain blood vascular system of cockroach. Refer Q.22.

Quick Review :

Multipal Choice Question's

- Cockroach shows _____ adaptations.
 - Cursorial
 - Arboreal
 - Fossorial
 - Aquatic
- Cockroach belongs to class _____ of phylum Arthropoda.
 - Arachnida
 - Insecta
 - Crustacea
 - Gastropoda
- Cockroach is a _____ animal.
 - diploblastic and acoelomate
 - triploblastic and acoelomate
 - triploblastic and coelomate
 - diploblastic and coelomate
- The exoskeleton of cockroach is made up of a polysaccharide called
 - Glycogen
 - Leptin
 - Chitin
 - Keratin
- Dorsal exoskeletal plates of cockroach are called
 - terga
 - sterna
 - pleura
 - epi-sclerites
- Head of cockroach is formed of six
 - scales
 - sclerites
 - spiracles
 - mandibles
- Each compound eye in cockroach is made up of numerous hexagonal facets called
 - Malpighian bodies
 - Ommatidia
 - Fenestrae
 - Labrum
- Vision in cockroach is
 - monocular
 - binocular
 - ultrasonic
 - mosarc
- Antennae of cockroach function as
 - tactile and olfactory receptor
 - gustato receptor
 - auditory receptor
 - olfactory receptor
- Mouth parts in cockroach are of
 - chewing and biting type
 - mandibulate type
 - sucking type
 - siphoning type
- Maxillae are also called as
 - Accessory jaws
 - True jaws
 - Tongue
 - Lips
- Labium is also called as
 - upper lip
 - lower lip
 - second maxilla
 - both b) and c)
- In cockroach, second pair of wings is attached to the tergum of
 - Prothorax
 - Mesothorax
 - Metathorax
 - Abdomen
- Which one does not occur in Cockroach leg?
 - Tibia
 - Femur
 - Fibula
 - Coxa
- In cockroach, tarsus bears a pair of claws and
 - alary muscles
 - arolium
 - spiracles
 - fenestrae
- _____ consists of pharynx, oesophagus, crop and gizzard.
 - Fore gut
 - Mid gut
 - Hepatic caeca
 - Hind gut
- Fore gut is also known as In cockroach.
 - receptacle
 - stomodaeum
 - proctodaeum
 - mesenteron
- Hepatic caeca are _____ in number.
 - six
 - four
 - eight
 - ten
- Hepatic caeca in cockroach is useful in
 - excretion
 - secretion of enzymes
 - respiration
 - sensation
- Hepatic caeca are a part of
 - Stomadaeum
 - Mesenteron
 - Proctodaeum
 - Proventriculus
- In cockroach, Malpighian tubules are present at junction of
 - foregut and midgut
 - midgut and hindgut
 - hindgut and foregut
 - foregut and hindgut
- _____ is the excretory product produced by Malpighian bodies in cockroach.
 - Ammonia
 - Urea
 - Uric acid
 - Creatinine
- In cockroach, stores the saliva.
 - duct of glands
 - salivary receptacles
 - duct of reservoir
 - hypopharynx
- Blood filled cavity in cockroach is called
 - haemocoel
 - Paracoel
 - .spongocoel
 - Metacoel
- In cockroach, ventral nerve cord is present in the
 - pericardial sinus
 - perineural sinus
 - head sinus
 - perivisceral sinus

26. Heart of cockroach is chambered _____
 a) 12 b) 13
 c) 14 d) 15
27. About haemocytes are present per cubic millimeter of blood in cockroach.
 a) 30000 b) 5000
 c) 10000 d) 40000
28. _____ pairs of alary muscles are present in cockroach.
 a) 12 b) 13
 c) 14 d) 15
29. During diastole, haemolymph from _____ enters into heart.
 a) perivisceral sinus b) pericardial sinus
 c) perineural sinus d) Head sinus
30. _____ abdominal ganglion in cockroach is largest.
 a) First b) Last
 c) Second d) fourth
31. The nerve cord of cockroach is
 a) single and above alimentary canal
 b) double and above alimentary canal
 c) double and below alimentary canal
 d) single and below alimentary canal
32. Protocerebrum, deutocerebrum tritocerebrum fuse to form _____ in cockroach.
 a) cerebral ganglia
 b) sub -oesophageal ganglia
 c) circum oesophageal connectives
 d) nerve cord
33. In Cockroach, the number of ganglia in the nerve cord are
 a) Two pairs of thoracic and four pairs of abdominal
 b) Three pairs of thoracic and six pairs of abdominal
34. Tracheae open on the body surface through openings called as
 a) tracheoles b) spiracles
 c) ossicles d) ostia
35. In female cockroaches, spermatheca is present
 a) 10th segment b) 8th segment
 c) 6th segment d) 3rd segment
36. Each ootheca contains _____ eggs.
 a) 20-25 b) 10-12
 c) 30-25 d) 14-16
37. Male cockroach can be identified by the presence of
 a) collateral gland b) green glands
 c) broad abdomen d) anal styles
38. Which of the following is not the part of male reproductive system?
 a) Seminal vesicles b) Phallic gland
 c) Vas deferens d) Spermatheca
39. In cockroach, testes lie in the
 a) 8th to 10th segment
 b) 4th to 6th segment
 c) 3rd to 5th segment
 d) 1st to 3rd segment
40. In male cockroach, the sperms produced by testes are stored in seminal vesicles in the form of bundles called
 a) Spermatheca b) Spermatophores
 c) Ootheca d) Gonopore

Answer Keys

1. a)	2. b)	3. c)	4. c)	5. a)	6. b)	7. b)	8. d)	9. a)	10. a)
11. a)	12. d)	13. c)	14. c)	15. b)	16. a)	17. b)	18. c)	19. b)	20. b)
21. b)	22. c)	23. b)	24. a)	25. b)	26. b)	27. a)	28. a)	29. b)	30. b)
31. c)	32. a)	33. b)	34. b)	35. c)	36. d)	37. d)	38. d)	39. b)	40. b)



