

CHAPTER. 4 ;ORGAN AND ORGAN SYSTEM IN ANIMALS

Evaluation

1. The clitellum is a distinct part in the body of earthworm *Lampito mauritii*, it is found in?
-b. Segments 14 - 17
2. Sexually, earthworms are - **b. Hermaphroditic but not self - fertilizing**
3. To sustain themselves, earthworms must guide their way through the soil using their powerful muscles. They gather nutrients by ingesting organic matter and soil, absorbing what they need into their bodies. True or False: The two ends of the earthworm can equally ingest soil.
- b. False
4. The head region of Cockroach pairs of and shaped eyes occur.
-a. One pair, sessile compound and kidney shaped
5. The location and numbers of malpighian tubules in *Periplaneta*.
-a. At the junction of midgut and hindgut, about 150.
6. The type of vision in Cockroach is - **c. Mosaic**
7. How many abdominal segments are present in male and female Cockroaches?
- a. 10, 10
8. Which of the following have an open circulatory system? **-d. Cockroach**
9. Buccopharyngeal respiration in frog **-d. stops when mouth is opened.**
10. Kidney of frog is **-b. Mesonephros**
11. Presence of gills in the tadpole of frog indicates that **-d. frogs evolved from gilled ancestor**
12. Choose the wrong statement among the following:
-c. Muscular layer in the body wall of earthworm is made up of only circular muscles.
13. Which of the following are the sense organs of Cockroach?
-a. Antennae, compound eyes, maxillary palps, anal cerci
14. **What characteristics are used to identify the earthworms?**
 -Light brown in colour, with purplish tinge at the anterior end, number of compartments called **segments** or **metameres**, 14 to 17 segments thickening **clitellum**.
15. **What are earthworm casts?**
 -The undigested particles along with earth are passed out through the anus of earthworm, as **worm castings** or **vermicasts**.
16. **How do earthworms breathe?**
 -Respiration takes place in earthworm through the body wall.
 -The outer surface of the skin is richly supplied with blood capillaries which aid in the diffusion of gases.
17. **Why do you call cockroach a pest?**
 -Cockroach carry with them harmful germs of various bacterial diseases like cholera, diarrhoea, tuberculosis, and typhoid and hence are known as "**Vectors**".
18. **Comment on the functions of alary muscles?**
 -The triangular muscles that are responsible for blood circulation in the cockroach are called **alary muscles** (13 pairs).
19. **Name the visual units of the compound eyes of cockroach.**
 -Cockroach consists of a pair of compound eyes at the dorsal surface of the head.

- Each eye is formed of about 2000 simple eyes called the **ommatidia** (singular: *ommatidium*).

20. **How does the male frog attracts the female for mating?**

-The male frog has a pair of **vocal sacs** and a copulatory or **nuptial pad** on the ventral side of the first digit of each forelimb .

- Vocal sacs assist in amplifying the croaking sound of frog.

21. **Write the types of respiration seen in frog.**

-Frog respire on land and in the water by two different methods.

-In water, **skin** acts as aquatic respiratory organ (**cutaneous respiration**).

-In land Respiration by lungs is called **pulmonary respiration & In buccal respiration .**

22. **Differentiate between peristomium and prostomium in earthworm.**

-The mouth is found in the centre of the first segment of the body, called the **peristomium**.

-Overhanging the mouth is a small flap called the upper lip or **prostomium**.

23. **Give the location of clitellum and spermathecal openings in *Lampito mauritii*.**

-14 to 17 segment with a glandular thickening of the skin called the **clitellum**.

-Spermathecal openings are three pairs of small ventrolateral apertures lying intersegmentally between the grooves of the segments 6/7, 7/8 and 8/9.

24. **Differentiate between tergum and a sternum.**

-The abdomen in both male and female consists of 10 segments. Each segment is covered by the dorsal tergum.

-The ventral sternum and between them a narrow membranous pleuron on each side.

25. **Head of cockroach is called hypognathous. Why?**

-The head of cockroach is small, triangular lies at right angle to the longitudinal body **axis**. the mouth parts are directed downwards so it is **hypognathous**.

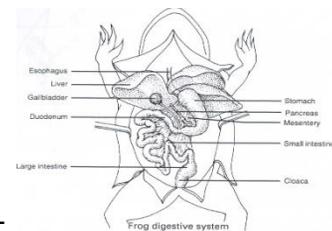
26. **How respiration takes place in cockroach?**

-The respiratory system of cockroach is well developed.

- Branched tubes known as **trachea** open through 10 pairs of small holes called **spiracles** or **stigmata**, present on the lateral side of the body.

27. **What are the components of blood in frog?**

-The **blood** consists of **plasma** [60%] and **blood cells** [40 %], red blood cells, white blood cells, and platelets.



28. Draw a neat labeled diagram of the digestives system of frog.-

29. **Explain the reproductive system of frog**

-**The male frog** has a pair of testes which are attached to the kidney and the dorsal body wall by folds of peritonium called mesorchium.

-Vasa efferentia arise from each **testis**. They enter the kidneys on both side and open into the bladder canal. Finally, it communicates with the urinogenital duct that comes out of kidneys and opens into the cloaca.

-**Female** reproductive system consists of paired **ovaries**, attached to the kidneys, and dorsal body wall by folds of peritoneum called mesovarium.

-There is a pair of coiled **oviducts** lying on the sides of the kidney. Each oviduct opens into the body-cavity at the anterior end by a funnel like opening called ostia.

- Unlike the male frog, the female frog has separate genital ducts distinct from ureters. Posteriorly the oviducts dilated to form **ovisacs** before they open into cloaca.
- Ovisacs store the eggs temporarily before they are sent out through the cloaca. Fertilization is external.

Extra points

- **Earthworm** last segment has the anus called the **pygidium**.
- The common Indian earthworms** are 1.*Lampito mauritii* (Syn. *Megascolex mauritii*), 2. *Perioynx excavatus* and 3. *Metaphire posthuma* (Syn. *Pheretima posthuma*).
- Earthworm Classification**, Phylum : Annelida, Class : Oligochaeta, Order : Haplotaxida, Genus : *Lampito*, Species : *mauritii*.
- S – shaped Setae can be protruded or retracted and their principal role is in locomotion.
- The coelom of earthworm contains the coelomic fluid and serves as a **hydrostatic skeleton**, in which the coelomocytes are known to play a major role in regeneration, immunity and wound healing.
- The coelom of earthworm consists of granulocyte or eleocyte, amoebocytes, mucocytes and leucocytes.
- In Earthworm the dorsal wall of the intestine is folded into the cavity as the **typhlosole**.
- In Earthworm, in the anterior part of the body the dorsal vessel is connected with the ventral vessel by eight pairs of **commissural vessels** or the **lateral hearts** lying in the 6th to 13th segments.
- The **Photoreceptors** (sense of light) - dorsal surface of the body.
- Gustatory** (sense of taste) and **olfactory receptors** (sense of smell) are found in the buccal cavity.
- Tactile receptors** (sense of touch), **chemoreceptors** (detect chemical changes) and **thermoreceptors** (changes in temperature) are present in the prostomium and the body wall.

-Cockroach Classification

- Phylum : Arthropoda, Class : Insecta, Order : Orthoptera, Genus : *Periplaneta*, Species : *americana*.
- Cockroach leg consists of five segments – **coxa** (large), **trochanter** (small), **femur** (long and broad), **tibia** (long and thick) and **tarsus**.
 - The last segment of the leg - tarsus has five movable joints or **podomeres** or **tarsomeres**.
 - 150 yellow coloured thin filamentous **malpighian** tubules which are helpful in removal of the excretory products from the haemolymph.

-Frog Classification

- Phylum : Chordata, Class : Amphibia, Order : Anura, Genus : *Rana*, Species : *hexadactyla*
- Truncus arteriosus** is a thick walled and cylindrical structure which is obliquely placed on the **ventral surface** of the heart.
 - During **aestivation** and **hibernation** gaseous exchange takes place through skin.
 - Economic importance of Frog**
 - Frog is an important animal in the **food chain**; it helps to maintain our ecosystem. So '**frogs should be protected**'.
 - Frogs are beneficial to man, since they feed on insects and helps in reducing insect pest population.
 - Frogs are used in traditional medicine for controlling **blood pressure** and for its **anti aging** properties.
 - In USA, Japan, China and North East of India, frogs are **consumed** as delicious food as they have high nutritive value.

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CHAPTER ; 5 DIGESTION AND ABSORPTION

Evaluation

1. Choose the incorrect sentence from the following:

-d. Enterokinase stimulates the secretion of pancreatic juice.

2. What is chyme....?-

-c. The process of preparation of incompletely digested acidic food through gastric juice.

3. Which of the following hormones stimulate the production of pancreatic juice and bicarbonate?

-c. Cholecystokin and secretin

4. The sphincter of Oddi guards **-a. Hepatopancreatic duct**

5. In small intestine, active absorption occurs in case of **-d. All the above**

6. Which one is incorrectly matched? **-b. Renin - liver**

7. Absorption of glycerol, fatty acids and monoglycerides takes place by

-a. Lymph vessels within villi

8. First step in digestion of fat is **-a. Emulsification**

9. Enterokinase takes part in the conversion of **-b. Trypsinogen into trypsin**

10. **a. Bilirubin & biliverdin-**

i) intestinal juice

11. **a. P-iv, Q-iii, R-I, S-ii.**

12. **b. P-ii, Q-iv, R-I, S-iii.**

13. **c. P-iv, Q-iii, R-ii, S-i.**

14. **a. Production of Insulin**

15. Assertion : (A) Large intestine also shows the presence of villi like small intestine.

Reason: (B) Absorption of water takes place in large intestine.

- d. A is false but B is true

16. Which of the following is not true regarding intestinal villi?

- d. They only participate in digestion of fats.

17. **Why are villi present in the intestine and not in the stomach?**

- There is no villi in stomach because absorption and assimilation takes place only in Intestine.

18. **Bile juice contains no digestive enzymes, yet it is important for digestion. Why?**

- The liver secrete bile. Bile helps the small intestine by breaking downs fats and making them easier to absorb

19. List the chemical changes that starch molecule undergoes from the time it reaches the small intestine.

1. Maltose.....Maltase....> Glucose+Glucose
2. Sucrose....Sucrase....>Glucose+Fructose
3. Lactose....Lactase....>Glucose+Galactose

20. How do proteins differ from fats in their energy value and their role in the body?

- Fat has a caloric value of 9.45 Kcal and a physiological fuel value of 9 Kcal per gram.
- The caloric value and physiological fuel value of one gram of protein are 5.65 Kcal and 4 Kcal respectively.

21. Digestive secretions are secreted only when needed. Discuss.

- The smell, sight and taste as well as the mechanical stimulation of food in the mouth, triggers a reflex action which results in the secretion of saliva.
- The mechanical digestion starts in the mouth by grinding and chewing of food. It is called mastication.

- The saliva contain water, electrolytes (Na⁺, K⁺, Cl⁻, HCO₃⁻), salivary amylase (ptyalin)
- polysaccharides.....ptyaline...> disaccharides.

Stomach;

- pepsinogen.....Hcl....> pepsin,
- protein....pepsin....> protease+peptones,
- casinogen....Renin....> casin

Intestine;

Pancreas

- Trypsinogen....enterokinase....> Trypsin,
- Chymotrypsinogen....trypsin....> chymotrypsin.
- Starch....amylase....> maltose.
- Glycerides....Lipase....>fatty acids+glycerols

Bile;

- Fat.....>chillomicron

22. Label the given diagram.

- A.Right hepatic duct of liver
- B.Common hepatic duct
- C.Pancreatic duct (duct of wirsung)
- D.Heapatopancreatic duct
- E.Cystic duct.

Extra points

- Each tooth is embedded in a socket in the jaw bone; this type of attachment is called **thecodont**.
- I, C, PM and M can be represented by a dental formula, in human the dental formula is 2123/2123.

- Mineral salts like calcium and magnesium are deposited on the teeth and form a hard layer of '**tartar**' or **calculus** called plaque.
- The wall of the duodenum has Brunner's glands which secrete mucus and enzymes.
- Ileal mucosa also contain mucus secreting goblet cells and lymphoid tissue known as **Peyer's patches** which produce lymphocytes.
- The wall of the small intestine bears crypts between the base of villi called **crypts of Leiberkuhn**.
- The daily secretion of saliva from salivary glands ranges from 1000 to 1500mL.
- Largest parotids gland in the cheeks- **Stenson's duct**,
- The sub-maxillary/ sub-mandibular in the lower jaw- **Wharton's duct**,
- The sublingual beneath the tongue-**Bartholin's duct or duct of Rivinis**.
- In stomach Chief cells or **peptic cells or zymogen cells** in the gastric glands secrete gastric enzymes and **Goblet cells** secrete mucus.
- In human liver Each lobe has many hepatic lobules (functional unit of liver) and is covered by a thin connective tissue sheath called the **Glisson's capsule**.
- The opening of the hepato-pancreatic duct into the duodenum is guarded by a sphincter called the **sphincter of Oddi**

- The saliva contain water, electrolytes (Na⁺, K⁺, Cl⁻, HCO₃⁻), salivary amylase (ptyalin), antibacterial agent lysozyme and a lubricating agent mucus (a glycoprotein).
- Protein deficient diet during early stage of children may lead to protein energy malnutrition such as **Marasmus and Kwashiorkor**.
- Degree of obesity is assessed by body mass index (**BMI**). A normal BMI range for adult is 19-25; above 25 is considered as obese.
- Nobel Prize for the year 2005 was awarded to Robin Warren and Barry Marshall for the discovery of *Helicobacter pylori* which causes peptic ulcer.

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