

Points to Remember

- Leech is metamerically segmented and has 33 segments.
- It has two suckers which are used to attach to the body of the host. It is also involved in locomotion.
- The salivary glands of leech produce an anticoagulating substance called hirudin.
- Leech is a hermaphrodite.
- Rabbits are warm blooded vertebrates.
- Canine teeth are absent in rabbit.
- Respiration takes place through a pair of lungs in rabbit.
- The heart is four chambered consisting of two auricles and two ventricles
- Urinogenital system comprises the urinary (or) excretory system and the genital (or) reproductive system
- Mammary glands are modified glands of the skin and help in nourishing the young ones

TEXT BOOK EVALUATION

I. Book Exercise – Choose the best answer

1. In leech locomotion is performed by

- a) Anterior sucker b) Posterior sucker c) Setae d) None of the above
Ans : (d) None of the above

2. The segments of leech are known as

- a) Metameres (somites) b) Proglottids c) Strobila d) All the above
Ans : (a) Metameres (somites)

3. Pharyngeal ganglion in leech is a part of

- a) Excretory system b) Nervous system c) Reproductive system d) Respiratory system
Ans : (b) Nervous system

4. The brain of leech lies above the

- a) Mouth b) Buccal Cavity c) Pharynx d) Crop
Ans : (c) Pharynx

5. The body of leech has

- a) 23 segments b) 33 segments c) 38 segments d) 30 segments
Ans : (b) 33 segments

6. Mammals are _____ animals.

- a) Cold blooded b) Warm blooded c) Poikilothermic d) All the above
Ans : (b) Warm blooded

7. The animals which give birth to young ones are

- a) Oviparous b) Viviparous c) Ovoviviparous d) All the above
Ans : (b) Viviparous

II. Book Exercise – Fill in the blanks

1. The posterior sucker is formed by the fusion of the _____ segments. **Ans :** last seven
2. The existence of two sets of teeth in the life of an animal is called _____ dentition. **Ans :** Diphyodont
3. The anterior end of leech has a lobe-like structure called _____. **Ans :** Anterior Sucker
4. The blood sucking habit of leech is known as _____. **Ans :** Sanguivorous
5. _____ separate nitrogenous waste from the blood in rabbit. **Ans :** Kidney
6. _____ spinal nerves are present in rabbit. **Ans :** 37 pairs

III. Book Exercise – True or false (If false give the correct statement)

1. **An anticoagulant present in saliva of leech is called heparin.**
Ans : False. An anticoagulant present in saliva of leech is called hirudin.
2. **The vas deferens serves to transport the ovum.**
Ans : False. The vas deferens serves to transport the sperms.
3. **The rabbit has a third eyelid called tympanic membrane which is movable.**
Ans : False. The rabbit has a third eyelid called Nictitating membrane which is movable.
4. **Diastema is a gap between premolar and molar teeth in rabbit.**
Ans : False. Diastema is a gap between the incisors and premolar teeth in rabbit.
5. **The cerebral hemispheres of rabbit are connected by band of nerve tissue called corpora quadrigemina.**
Ans : False. The cerebral hemispheres of rabbit are connected by band of nerve tissue called corpus callosum.

IV. Book Exercise – Match the following (match columns I, II, III correctly)

S.No.	ORGANS	MEMBRANOUS COVERING	LOCATION
1	Brain	Pleura	Abdominal cavity
2	Kidney	Capsule	Mediastinum
3	Heart	Meninges	Enclosed in thoracic cavity
4	Lungs	Pericardium	Cranial cavity

Ans :

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3	Heart	Pericardium	Mediastinum
4	Lungs	Pleura	Enclosed in thoracic cavity

V. Book Exercise – Answer in a sentence (1 mark)

1. **Give the common name of the *Hirudinaria granulosa*.**
The common name of the *Hirudinaria granulosa* is Indian Cattle Leech.
2. **How does leech respire?**
Leech respire through the skin.
3. **Write the dental formula of rabbit.**

Dental formula of rabbit is, $I \frac{2}{1}, C \frac{0}{0}, PM \frac{3}{2}, M \frac{3}{3}$, which can be written as $\frac{2033}{1023}$.

4. How many pairs of testes are present in leech?

Eleven pairs of testes are present in leech.

5. How is diastema formed in rabbit?

The gap between incisors and premolar forms the diastema. Diastema helps in mastication and chewing of food in rabbit.

6. What organs are attached to the two bronchi?

Lungs are attached to the two bronchi.

7. Which organ acts as suction pump in leech?

Pharynx acts as suction pump in leech.

8. What does CNS stand for?

CNS stands for Central Nervous System.

9. Why is the teeth of rabbit called heterodont?

As there are three different kinds of teeth (Incisors, Premolars and Molars) in rabbit, the dentition is called heterodont.

10. How does leech suck blood from the host?

Leech attaches itself to the body of the host by suckers. Jaws of mouth causes wound. Then the blood is sucked by pharynx.

VI. Book Exercise – Short answer question (2 mark)

1. Why are the rings of cartilages found in trachea of rabbit?

Tracheal walls are supported by rings of cartilage. Cartilage is flexible tissue. They help in the free passage of air.

2. List out the parasitic adaptations in leech.

- i) Blood is sucked by pharynx.
- ii) Anterior and posterior suckers help the leech attacks itself to the body of the host.
- iii) The three jaws inside the mouth, causes a painless Y-shaped wound in the skin of the host.
- iv) The salivary glands produce hirudin which does not allow the blood to coagulate. Thus, a continuous supply of the blood is maintained.
- v) Blood is stored in the crop. It gives nourishment to the leech for several months.

VII. Book Exercise – Long answer question (5 mark)

1. How is the circulatory system designed in leech to compensate the heart structure?

- i) In leech, circulation is brought about by haemocoelic system.
- ii) There are no true blood vessels. The blood vessels are replaced by channels called haemocoelic channels or canals filled with blood like fluid.
- iii) There are four longitudinal channels. One channel lies above (dorsal) the alimentary canal, one below (ventral) alimentary canal.
- iv) The other two channels lie on either (lateral) side of the alimentary canal which serve as heart and have inner valves.
- v) All four channels are connected together posteriorly in the 26th segment.

2. How does locomotion take place in leech?

Locomotion in leech takes place by (i) Looping or crawling movement and (ii) Swimming movement.

- i) **Looping or crawling movement** : This type of movement is brought about by the contraction and relaxation of muscles. The two suckers serve for attachment during movement on a substratum.
- ii) **Swimming movement** : Leeches swim very actively and perform undulating movements in water.

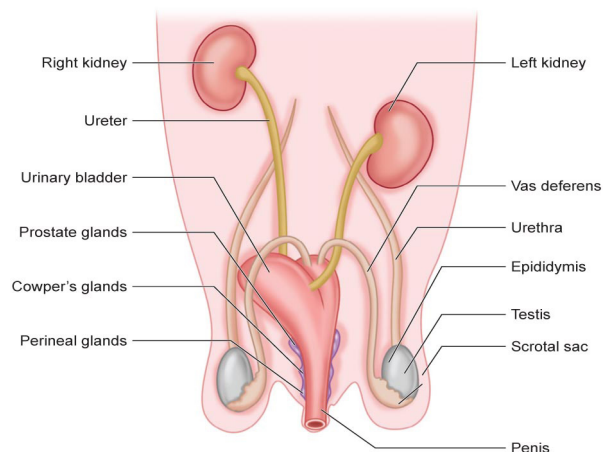
3. Explain the male reproductive system of rabbit with a labelled diagram.

Male Reproductive System in Rabbit : The male reproductive system of rabbit consists of,

- i) A pair of testes.
- ii) The associated ducts and
- iii) Three accessory glands.
- i) **Testes :**
 - a) The testes produce sperms.
 - b) Testes are located in a sac of skin called the scrotum hanging down from the abdomen.
- ii) **Ducts :**
 - a) Each testis consists of a numerous fine tubules called seminiferous tubules.
 - b) This network of tubules lead into a coiled tubules called epididymis, which lead into the sperm duct called vas deferens.
 - c) The urethra runs backward and passes into the penis.
- iii) **Accessory glands :**

Three accessory glands involve in reproduction. They are;

 - a) Prostate gland.
 - b) Cowper's gland and
 - c) Perineal gland.



VIII. Book Exercise – Higher Order Thinking Skills (HOTS)

- 1. Arjun is studying in tenth standard. He was down with fever and went to meet the doctor. As he went to the clinic he saw a patient undergoing treatment for severe leech bite. Being curious, Arjun asked the doctor why leech bite was not felt as soon as it attaches to the skin ? What would have been the reply given by the doctor?**

Leech bite could not be felt as soon as it attaches to the skin, because leech injects a substance, which works to be a local anesthetic and the person can't feel the bite.

- 2. Shylesh has some pet animals at his home. He has few rabbits too, one day while feeding them he observed something different with the teeth. He asked his grandfather, why is it so? What would have been the explanation of his grandfather?**

Shylesh's grandfather explained about the teeth of rabbit as follows :

- i) The rabbit has two sets of teeth (Diphyodont dentition).
- ii) The two types of teeth are;
 - a) Milk teeth (young ones) and
 - b) Permanent teeth (in adults).
- iii) In rabbit the teeth are of three different kinds (Heterodont). They are;
 - a) Incisors.

- b) Premolars and
- c) Molars.
- iv) Diastema is the gap between the incisors and premolar which helps in mastication and chewing of food.

IX. Book Exercise – Value based questions

1. Leeches do not have secretion of digestive juices and enzymes -Why ?

The leech feeds by sucking the blood of cattle and other domestic animals. Then the blood is stored in the crop. It gives nourishment to the leech for several months. Due to this reason there is no elaborate secretion of digestive juices and enzymes.

2. How is the digestive system of rabbit suited for herbivorous mode of feeding?

- i) The digestive system of rabbit is uniquely designed to consume large amounts of plant materials.
- ii) The teeth are of three types viz incisors, premolars and molars (Heterodont).
- iii) Diastema, a gap between incisors and premolar, helps in mastication and chewing of food in herbivorous animals.
- iv) The plants that rabbits eat are high in fibre, which is indigestible to mammalian digestive enzymes. So alimentary canal contains bacteria that helps in digestion of cellulose.

Additional – Choose the best answer

1. Metamerically segmented body is present in

- a) Earthworm b) Leech c) Nereis d) All of the above
- Ans : (d) All of the above**

2. Body is segmented in

- a) Coelenterate b) Annelida c) Porifera d) Mollusca
- Ans : (b) Annelida**

3. Botryoidal tissue is found in

- a) Rabbit b) Ascaris c) Leech d) Earthworm
- Ans : (c) Leech**

4. Leech is

- a) Carnivorous b) Sanguivorous c) Ectoparasite d) Both (b) and (c)
- Ans : (d) Both (b) and (c)**

5. The main function of clitellum is

- a) Cocoon formation b) Locomotion c) Excretion d) Copulation.
- Ans : (a) Cocoon formation**

6. A typical segment of leech is:

- a) Triannulate b) Biannulate c) Quadriannulate d) Quinquannulate
- Ans : (c) Quinquannulate**

7. A suctorial mouth is present in:

- a) Tapeworm b) Leech c) Roundworm d) Earthworm
- Ans : (b) Leech**

8. Suckers of leech are located at:

- a) Anterior and posterior ends of the body b) Anterior end of the body
 - c) Posterior end of the body d) All over the body
- Ans : (a) Anterior and posterior ends of the body**

9. Which one of the following is present in saliva of leech:

- a) Hirudin b) Histamine c) Heparin d) Haemoglobin
- Ans : (a) Hirudin**

10. Leech secretes which of the following anticoagulant?

- a) Hirudin b) Heparin c) Serotonin d) Histamine

Ans : (a) Hirudin

11. In leech, hirudin is secreted by:

- a) Crop b) Pharynx c) Haemocoel d) Salivary glands

Ans : (d) Salivary glands

12. Leech obtains continuous bloodstream from its victim by poring in it:

- a) Pepsin b) Heparin c) Insulin d) Hirudin

Ans : (d) Hirudin

13. The botryoidal tissue of leech is a/an:

- a) Epithelial tissue b) Mesodermal tissue c) Connective tissue d) Mesenchymatic tissue

Ans : (c) Connective tissue

14. 'Leeches' are included in class

- a) Oligochaete b) Hirudinea c) Polychaeta d) Gastropoda

Ans : (b) Hirudinea

15. A trait common in Leech and Mosquito is

- a) Anticoagulants b) Abundant asexual reproduction
c) Cellular level of organization d) Absence of sexual phase

Ans : (a) Anticoagulants

16. What is true of Hirudinaria

- a) It has a cephalic sucker b) Mouth is triradiate
c) Segments are superficially subdivided d) All the above

Ans : (d) All the above

17. Annelids are

- a) Flatworms b) Roundworms
c) 6-legged invertebrates d) Segmented worms

Ans : (d) Segmented worms

18. On the dorsal side of the leech there are _____ pairs of eyes on the first five segments.

- a) 2 b) 3 c) 4 d) 5

Ans : (d) 5

19. Leech has _____ suckers.

- a) 1 b) 2 c) 3 d) 6

Ans : (b) 2

20. The posterior sucker is formed by the fusion of the last _____ segments.

- a) Four b) Five c) Six d) Seven

Ans : (d) Seven

21. The anterior sucker helps in

- a) Attachment b) Locomotion c) Feeding d) All the above

Ans : (d) All the above

22. In leech, attachment and locomotion are performed by

- a) Anterior sucker b) Posterior sucker c) Oral sucker d) All the above

Ans : (d) All the above

23. The digested blood is then absorbed slowly by the _____.

- a) Intestine b) Crop c) Stomach d) Pharynx

Ans : (a) Intestine

24. In leech, fertilization is internal.

- a) External b) Internal. c) Absent d) None of the above

Ans : (b) Internal

25. The trunk of rabbit bears two pairs of _____ limbs.

- a) Tetradactyl b) Pentadactyl c) Hexadactyl d) None of the above

Ans : (b) Pentadactyl

26. _____ is used to give signals to other rabbits in the event of danger.

- a) Pinnae b) Limb c) Tail d) Mouth

Ans : (c) Tail

27. _____ teeth are absent rabbit.

- a) Canines b) Molar c) Premolar d) Incisors

Ans : (a) Canines

28. Indian cattle leech are

- a) Ectoparasitic b) Lives in fresh water c) Sanguivorous d) All of the above

Ans : (d) All of the above

29. Leech has _____ pairs of eyes.

- a) two b) three c) four d) five

Ans : (d) five

30. Male genital aperture in leech is present in _____ segment.

- a) 9th b) 10th c) 11th d) 12th

Ans : (b) 10th

31. Female genital aperture in leech is present in _____ segment.

- a) 9th b) 10th c) 11th d) 12th

Ans : (c) 11th

32. _____ is the largest portion of the alimentary canal in leech.

- a) Pharynx b) Oesophagus c) Crop d) Stomach

Ans : (c) Crop

33. Respiration takes place through _____ in leech.

- a) skin b) suckers c) mouth d) pharynx **Ans : (a) skin**

34. In leech, excretion takes place by _____.

- a) Kidney b) Excretory tubes c) Nephridia d) Anus

Ans : (c) Nephridia

35. Leech has _____ pair of Nephridia.

- a) 10 b) 12 c) 17 d) 20

Ans : (c) 17

36. Leech is _____.

- a) Unisexual b) Dioecious c) Hermaphrodite d) None of the above

Ans : (c) Hermaphrodite

37. There are _____ pair of testes in leech.

- a) 2 b) 8 c) 11 d) 13

Ans : (c) 11

38. _____ is the sperm vesicle to store spermatozoa or sperm in leech.

- a) Testes sac b) Vas efferens c) Genital atrium d) Epididymis

Ans : (d) Epididymis

39. A short duct arising from each testes in leech is _____.

- a) Vas efferens b) Vas deferens c) Ejaculatory duet d) Epididymis

Ans : (a) Vas efferens

16. In leech, circulation is brought about by _____ system. **Ans : Haemocoelic**
17. Nephridia open out by _____ to release excreta. **Ans : Nephridiopores**
18. In leech, after fertilization _____ is formed around the 9th, 10th and 11th segments. **Ans : Cocoon**
19. All the digits of rabbit bear _____. **Ans : Claws**
20. In male rabbit testes are enclosed by _____. **Ans : Scrotal sacs**
21. In rabbit, sweat glands and _____ glands regulate the body temperature. **Ans : Sebaceous**
22. The transverse partition between thoracic cavity and abdominal cavity is _____. **Ans : Diaphragm**
23. Breathing movements are brought by the movement of a dome shaped muscles known as _____. **Ans : Diaphragm**
24. In rabbit, the digestion of cellulose is brought about by the bacteria present in a sac called _____. **Ans : Caecum**
25. The outer covering of lungs of rabbit is _____. **Ans : Pleura**
26. The opening between pharynx and wind pipe is called _____. **Ans : glottis**
27. The double layered membranous covering of heart is _____. **Ans : Pericardium**
28. In rabbit, the nitrogenous wastes are excreted in the form of _____. **Ans : urea**
29. Exterior opening of female reproductive system of rabbit is _____. **Ans : Vulva**
30. _____ is the anterior part of the oviduct in rabbit. **Ans : Fallopian tube**
31. Excretory and reproductive system of rabbit together known as _____ system. **Ans : Urinogenital**
32. Whiskers of rabbit are otherwise known as _____. **Ans : Tactile hairs (or) Vibrissae**
33. The sperm producing tubules of testis of rabbit are known as _____. **Ans : Seminiferous tubules**
34. The _____ rabbit is an endangered species. **Ans : Pygmy**
35. Kingdom _____ is divided into two groups, Invertebrates and Chordates. **Ans : Animalia**
36. The scientific name of the Indian cattle leech is _____. **Ans : *Hirudinaria granulosa***
37. *Hirudinaria granulosa* belongs to Phylum _____. **Ans : Annelida**
38. Annelids are _____ segmented worms with well developed organ systems. **Ans : Metamerically**
39. The scientific name of the common rabbit is _____. **Ans : *Oryctolagus cuniculus***
40. *Oryctolagus cuniculus* belongs to Phylum _____. **Ans : Chordata**
41. *Oryctolagus cuniculus* belongs to Class _____. **Ans : Mammalia**
41. _____ in females is the most striking feature of a mammal. **Ans : Mammary gland**
42. Presence of hair and mammary gland are the most striking features of a class _____. **Ans : Mammal**
43. The segmentation of the body is known as _____. **Ans : Metamerism**
44. The body of leech is metamerically divided into _____ segments. **Ans : 33**
45. Each segment of leech is further superficially subdivided into _____. **Ans : Rings or annuli**
46. Segments 9-11 of leech consist of a temporary _____. **Ans : Clitellum**
47. In leech, during the breeding season cocoon is produced by _____. **Ans : Clitellum**
48. Each segment of leech bears a number of sensory projections called _____. **Ans : Receptors**
49. First five segments in leech are occupied by _____. **Ans : Anterior sucker or oral sucker**
50. Mouth is located in the middle of _____ sucker. **Ans : Anterior**
51. The aperture in 26th segment is _____. **Ans : Anus**
52. In leech, Nephridia open to the exterior by _____ pairs of nephridiopores. **Ans : 17**
53. In leech, the tissue lies beneath longitudinal muscles and fills the entire coelom around the gut is _____. **Ans : Botryoidal tissue**
54. In leech, The blood is sucked by muscular _____. **Ans : Pharynx**
55. Leech can sense vibrations through their _____. **Ans : Skin**
56. The leech makes a _____ or Y shaped incision in the skin of the host. **Ans : Tiradiate**

57. The ingested blood is stored in _____ chambers and its diverticulum. **Ans : Crop**
58. Leeches prevent blood clotting by secreting a protein called _____. **Ans : Hirudin**
59. Digestion takes place in stomach by the action of _____ enzyme. **Ans : Proteolytic**
60. Respiration takes place through the _____ in leech. **Ans : skin**
61. Oxygen dissolved in water diffuses through the skin of leech into _____ fluid. **Ans : Haemocoelic**
62. In leech, circulation is brought about by _____ system. **Ans : Haemocoelic**
63. The blood vessels are replaced by channels called _____. **Ans : Haemocoelic channels or canals**
64. The two channels lie on either (lateral) side of the alimentary canal serve as _____. **Ans : Heart**
65. In leech, the nerve ring surrounds the _____. **Ans : Pharynx**
66. In leech, excretion takes place by paired tubules called _____. **Ans : Nephridia**
67. Leech is _____ because both the male and female reproductive organs are present in the same animal. **Ans : Hermaphrodite**
68. Development of young leech takes place in _____. **Ans : Cocoon**
69. Blood is stored in the _____ which gives nourishment to the leech for several months. **Ans : Crop**
70. A technique of bleeding in a patient to remove toxic impurities from the body is called _____. **Ans : Blood letting**
71. In leech, blood is sucked by _____. **Ans : Pharynx**
72. The three _____ inside the mouth, causes a painless Y-shaped wound in the skin of the host. **Ans : Jaws**
73. The salivary glands of leech produce _____ which does not allow the blood to coagulate. **Ans : Hirudin**
74. As rabbits moving in groups , they are called as _____ animals. **Ans : Gregarious**
75. The _____ rabbit was listed as a threatened species because of decline in its population size and distribution due to habitat loss. **Ans : Pygmy**
76. The Columbia Basin _____ Rabbit is an endangered species. **Ans : Pygmy**
77. In rabbit, testes are enclosed by _____. **Ans : Scrotal sacs**
78. In rabbit, hairs, claws, nails and glands like sweat glands, sebaceous glands and mammary glands are the derivatives of _____. **Ans : Skin**
79. Mammary glands are modified glands of the _____. **Ans : Skin**
80. The sweat glands and _____ glands embedded in the skin regulate the body temperature in rabbit. **Ans : Sebaceous**
81. In rabbit, thoracic cavity and abdominal cavity separated by transverse partition called _____. **Ans : Diaphragm**
82. The thin walled sac present at the junction of small intestine and large intestine is known as _____. **Ans : Caecum**
83. Caecum contains bacteria that helps in digestion of _____. **Ans : Cellulose**
84. The existence of two sets of teeth in the life of an animal is called _____ dentition. **Ans : Diphyodont**
85. As there are four kinds of teeth in mammals, the dentition is called _____. **Ans : Heterodont**
86. The gap between the incisors and premolar is called _____. **Ans : Diastema**
87. _____ helps in mastication and chewing of food in herbivorous animals. **Ans : Diastema**
88. Each lung is enclosed by a double membranous _____. **Ans : Pleura.**
89. The anterior part of the wind pipe is enlarged to form the _____. **Ans : Larynx or voice box**
90. Inside the larynx lies the _____ and its vibrations result in the production of sound. **Ans : Vocal cord**
91. Tracheal walls are supported by rings of _____ which help in the free passage of air. **Ans : Cartilage**
92. The _____ prevents the entry of food into the trachea through the glottis. **Ans : Epiglottis**

93. The trachea divides into two branches called the _____. **Ans : Bronchi**
94. Numerous fine tubules present in each testis of rabbit are called _____ tubules. **Ans : Seminiferous**
95. The network of seminiferous tubules lead into a coiled tubule called _____. **Ans : Epididymis**
96. Epididymis leads into the sperm duct called _____. **Ans : Vas deferens**
97. _____ separate the nitrogenous wastes urea from blood. **Ans : Nephrons**
98. A dome-shaped muscular partition separating the thorax from the abdomen and helps breathing movements in mammals is called _____. **Ans : Diaphragm**

Additional – True or false (If false give the correct statement)

1. **Mammals are cold blooded animals.**
Ans : False. Mammals are warm blooded animals.
2. **Looping or crawling movement in leech is brought about by the contraction and relaxation of muscles.**
Ans : True.
3. **Crop chambers and diverticulum (Caecae) store ingested blood in leech.**
Ans : True.
4. **Leeches have ear.**
Ans : False. Leeches do not have ear.
5. **The locomotory organs parapodia and setae are absent in leech.**
Ans : True.
6. **Fertilization in leech is external.**
Ans : False. Fertilization in leech is internal.
7. **Rabbits are homeothermic vertebrates.**
Ans : True.
8. **Rabbits are nongregarious animals.**
Ans : False. Rabbits are gregarious animals.
9. **The tail of rabbit is used to give signals to other rabbits in the event of danger.**
Ans : True.
10. **In rabbits, lungs and heart lie in the abdominal cavity.**
Ans : False. In rabbits, lungs and hearts lie in the thoracic cavity.
11. **Canine teeth are absent in rabbits.**
Ans : True.
12. **Precaval and postcaval veins bring oxygenated blood to right auricle.**
Ans : False. Precaval and postcaval veins bring deoxygenated blood to right auricle.
13. **Each kidney of rabbit is made up of several nephridia.**
Ans : False. Each kidney of rabbit is made up of several nephrons.
14. **Leeches may grow to a length of 35 cm.**
Ans : True.
15. **Dorsal surface of leech is olive green in colour and the ventral surface is orange yellow or orange red in colour.**
Ans : True.
16. **Female and male genital pores are situated in the 10th and 11th segments respectively.**
Ans : False. Male and female genital pores are situated in the 10th and 11th segments respectively.
17. **Leeches sense vibrations through their ear.**
Ans : False. Leeches sense vibrations through their skin.

18. Leeches have 2 to 10 tiny eyes, which helps them to locate their food.
Ans : True.
19. Leeches can suck blood five times more than their body weight. It may take more than a year for the complete digestion and absorption of a full meal.
Ans : True.
20. True blood vessels are present in leech.
Ans : False. True blood vessels are **absent** in leech.
21. Leech is hermaphrodite because both the male and female reproductive organs are present in the separate animal.
Ans : False. Leech is hermaphrodite because both the male and female reproductive organs are present in the **same** animal.
22. Development is direct and young leech resembling the adult emerges.
Ans : True.
23. Parapodia and setae are completely absent in leech .
Ans : True.
24. Rabbit is a coelomate animal.
Ans : True.
25. The presence of diaphragm is one of the characteristic features of Annelids.
Ans : False. The presence of diaphragm is one of the characteristic features of **mammals**.
26. All the digits bear claws in rabbits.
Ans : True.

Additional – Match the following

- | | |
|--------------------------------|-------------------------|
| 1. 1. Clitellum | (a) Segmentation |
| 2. 2. Metamerism | (b) Segments 1 – 5 |
| 3. 3. Crop | (c) Brain |
| 4. 4. Cephalic region | (d) 10 chambers |
| 5. 5. Haemocoelic fluid | (e) Segments 9 – 10 |
| 6. 6. Epididymis | (f) Egg case |
| 7. 7. Cocoon | (g) Sensory projections |
| 8. 8. Receptors | (h) Sperm vesicle |
| 9. 9. Suprapharyngeal ganglion | (i) Anticoagulant |
| 10. 10. Hirudin | (j) Blood |

Ans :

1	Clitellum	e	Segments 9 – 10
2	Metamerism	a	Segmentation
3	Crop	d	10 chambers
4	Cephalic region	b	Segments 1 – 5
5	Haemocoelic fluid	j	Blood
6	Epididymis	h	Sperm vesicle
7	Cocoon	f	Egg case
8	Receptors	g	Sensory projections
9	Suprapharyngeal ganglion	c	Brain
10	Hirudin	i	Anticoagulant

- 2.
- | | |
|-----------------|-------------------------|
| 1. Lagomorpha | (a) moving in groups |
| 2. Gregarious | (b) nipples |
| 3. Teats | (c) 5 digits |
| 4. Pentadactyle | (d) whiskers |
| 5. Vibrissae | (e) order of rabbit |
| 6. Caecum | (f) passive process |
| 7. Inspiration | (g) voice box |
| 8. Expiration | (h) olfactory lobes |
| 9. Larynx | (i) urinogenital canal |
| 10. Midbrain | (j) cellulose digestion |
| 11. Forebrain | (k) optic lobes |
| 12. Vestibule | (l) active process |

Ans :

1	Lagomorpha	e	order of rabbit
2	Gregarious	a	moving in groups
3	Teats	b	nipples
4	Pentadactyle	c	5 digits
5	Vibrissae	d	whiskers
6	Caecum	j	cellulose digestion
7	Inspiration	l	active process
8	Expiration	f	passive process
9	Larynx	g	voice box
10	Midbrain	k	optic lobes
11	Forebrain	h	olfactory lobes
12	Vestibule	i	urinogenital canal

- 3.
- | | |
|-----------------------------|--|
| 1. Sanguivorous | (a) Egg case |
| 2. Mammals | (b) Triradiate |
| 3. Anterior sucker | (c) Brain of leech |
| 4. The Indian cattle leech | (d) 27 th – 33 rd segments |
| 5. Cephalic region | (e) Anticoagulant |
| 6. Posterior sucker | (f) <i>Hirudinaria granulosa</i> |
| 7. Suprapharyngeal ganglion | (g) Oral sucker |
| 8. Cocoon | (h) Blood sucking |
| 9. Hirudin | (i) 1 st – 5 th segments |
| 10. Mouth of leech | (j) Warm blooded |

Ans :

1	Sanguivorous	h	Blood sucking
2	Mammals	j	Warm blooded
3	Anterior sucker	g	Oral sucker
4	The Indian cattle leech	f	<i>Hirudinaria granulosa</i>
5	Cephalic region	i	1 st – 5 th segments
6	Posterior sucker	d	27 th – 33 rd segments
7	Suprapharyngeal ganglion	c	Brain of leech
8	Cocoon	a	Egg case
9	Hirudin	e	Anticoagulant
10	Mouth of leech	b	Triradiate

4. 1. Tactile hairs of vibrissae (a) Pinnae
 2. Hindbrain (b) Nipples
 3. External ear (c) Prosencephalon
 4. Teats (d) Mesencephalon
 5. Lungs and heart (e) Active process
 6. Urinogenital system (f) Whiskers
 7. Inspiration (g) Thoracic cavity
 8. Expiration (h) Abdominal cavity
 9. Forebrain (i) Rhombencephalon
 10. Midbrain (j) Passive process

Ans :

1	Tactile hairs of vibrissae	f	Whiskers
2	Hindbrain	i	Rhombencephalon
3	External ear	a	Pinnae
4	Teats	b	Nipples
5	Lungs and heart	g	Thoracic cavity
6	Urinogenital system	h	Abdominal cavity
7	Inspiration	e	Active process
8	Expiration	j	Passive process
9	Forebrain	c	Prosencephalon
10	Midbrain	d	Mesencephalon

Additional – Answer in a sentence (1 mark)

1. What are receptors? Mention the types.

Receptors are sensory projections of leech. They are 2 types.

- ✦ Annular receptors and
- ✦ Segmental receptors.

2. What are the functions of suckers?

- ✦ Anterior suckers helps in feeding.
- ✦ Both suckes (anterior and posterior) helps in attachment and locomotion.

3. How many eyes do leaches have?

Leaches have 2 to 10 tiny eyes.

4. What is blood leting?

Blood letting is a technique of bleeding in a patient to remove toxic impurities from the body.

5. What are the two types of teeth of diphyodont dentition?

- ✦ **Milk teeth** : Present in young ones.
- ✦ **Permanent teeth** : Present in adults.

6. What does ANS stand for?

ANS stands for AUTONOMIC NERVOUS SYSTEM.

7. What does PNS stand for?

PNS stands for PERIPHERAL NERVOUS SYSTEM.

8. How many pairs of cranial and spinal nerves form PSN?

PNS is formed of,

- ✦ 12 pairs of cranial nerves and
- ✦ 37 pairs of spinal nerves.

9. Name the three membranes covering of the brain of rabbit.

- ✦ Duramater : Outer membrane.
- ✦ Piamater : Inner membrane.
- ✦ Arachnoid : Middle membrane.

10. Name the accessory glands of female reproductive system of rabbit.

- ✦ Cowper's gland and
- ✦ Perineal gland.

11. What are the two types of nerves of ANS?

ANS comprises,

- ✦ Sympathetic nerves and
- ✦ Parasympathetic nerves.

12. Name the band of nerve tissue which connects right and left cerebral hemisphere.

The right and left cerebral hemisphere are connected by transverse band of nerve tissue called Corpus Callosum.

13. What are advanced characteristic features of mammals?

- ✦ Presence of epidermal hairs and
- ✦ Presence of mammary glands in females.

14. What are the two parts of the central nervous system of leech?

- ✦ A nerve ring and
- ✦ A paired ventral nerve cord.

15. What are the two types of teeth in rabbit ?

The two types of teeth are

- ✦ Milk teeth (young ones) and
- ✦ Permanent teeth (in adults).

16. What are the components of Circulatory System rabbit?

The circulatory system is formed of

- ✦ Blood,
- ✦ Blood vessels and
- ✦ Heart.

17. What make up the peripheral nervous system (PNS)?

PNS is formed of 12 pairs of cranial nerves and 37 pairs of spinal nerves.

18. What are the two divisions of Autonomic nervous system (ANS)?

ANS comprises

- ✦ Sympathetic and
- ✦ Parasympathetic nerves.

19. What are the two parts of the central nervous system (CNS)?

The central nervous system (CNS) consists of brain and spinal cord.

20. What two systems make up the urinogenital system?

It comprises

- ✦ The urinary or excretory system and
- ✦ The genital or reproductive system.

Additional – Short answer questions (2 mark)

1. Write the Taxonomic position of the Indian Cattle Leech.

- ✦ Phylum – Annelida.
- ✦ Class – Hirudinea.
- ✦ Order – Gnathobdellida.
- ✦ Genus – Hirudinaria.
- ✦ Species – granulosa.

2. How is the body of leech divided?

The body of leech is divided into six regions.

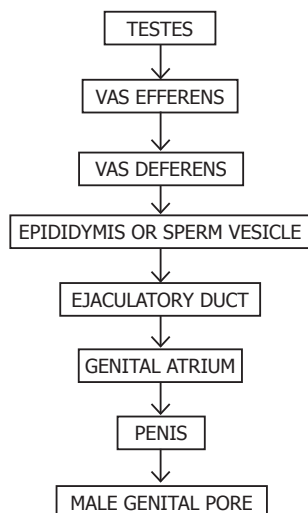
S.No.	Region	Segments
1	Cephalic region	1 st to 5 th
2	Pre-clitellar region	6 th , 7 th and 8 th
3	Clitellar region	9 th , 10 th and 11 th
4	Middle region	12 th to 22 nd
5	Caudal region	23 rd to 26 th
6	Posterior sucker	27 th to 33 rd

3. What are the five layers of body wall of leech?

Body wall of leech includes five layers.

- ✦ Cuticle : Outermost layer.
- ✦ Epidermis : Lies below the cuticle.
- ✦ Dermis : Lies below epidermis formed of connective tissue.
- ✦ Muscular layer : Formed of circular and longitudinal muscles.
- ✦ Botryoidal tissue : Lies beneath longitudinal muscles and fills the entire coelom around the gut.

4. Write the path of sperm from testes to male genital pore of leech.



5. What are the three parts of nerve ring which surrounds the pharynx?

- ✦ Suprapharyngeal ganglion.
- ✦ Circumpharyngeal connective and
- ✦ Subpharyngeal ganglion.

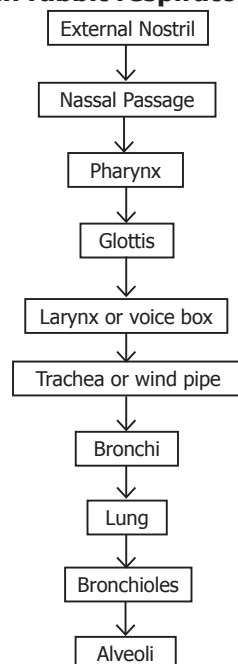
6. Write about the medicinal value of leech.

- ✦ Leeches are effective in increasing blood circulation and breaking up blood clots.
- ✦ They can be used to treat cardiovascular diseases.
- ✦ Biochemical substances derived from leech saliva are used for preparation of pharmaceutical drugs that can treat hypertension.

7. Write the taxonomic position of rabbit.

- ✦ Phylum : Chordata.
- ✦ Sub-phylum : Vertebrate.
- ✦ Class : Mammalia.
- ✦ Order : Lagomorpha.
- ✦ Genus : *Oryctolagus*.
- ✦ Species : *cuniculus*.

8. What is the proper sequence of air flow in rabbit respiratory system?



9. What are the three divisions of brain of rabbit?

- ✦ Prosencephalon : Forebrain.
- ✦ Mesencephalon : Midbrain and
- ✦ Rhombencephalon : Hindbrain.

10. Name the three accessory glands of male reproductive system of rabbit.

The three accessory glands of male reproductive system of rabbit are,

- ✦ Prostate gland.
- ✦ Cowper's gland and
- ✦ Perineal gland.

11. Write about the valves present in heart of rabbit.

S.No.	Name of the valve	Location
1	Tricuspid valve	Between right auricle and right ventricle
2	Bicuspid or Mitral valve	Between left auricle and left ventricle
3	Semilunar valve	At the opening of pulmonary artery and aorta.

12. Write about the habitat of leech.

Leech lives in freshwater ponds, lakes, swamps and slow streams. They are ectoparasitic and feed on the blood of fishes, frogs, cattle and human. It is sanguivorous (blood sucking) in nature.

13. What are the two types of receptor present in leech?

- ✦ Annular receptors are located in each annulus and
- ✦ Segmental receptors are located on the first annulus of each segment.

14. Write about the development of young leech.

- ✦ Internal fertilization takes place. This is followed by cocoon formation. Cocoon is also known as egg case which is formed around the 9th, 10th and 11th segments.
- ✦ Development is direct and proceeds in cocoon which contain one to 24 embryos.
- ✦ Young leech resembling the adult emerges.

15. What are the three divisions of nervous system of rabbit?

The nervous system in rabbit is formed of

- ✦ The central nervous system (CNS),
- ✦ Peripheral nervous system (PNS) and
- ✦ Autonomic nervous system (ANS).

16. Why are the excretory and reproductive systems studied together as urinogenital system?

The Urinogenital system is comprised to two systems, the excretory system and the reproductive system. These two systems are often studied together because they share some common ducts.

Additional – Long answer questions

1. Explain the structure of alimentary canal of leech.

Alimentary Canal : Alimentary canal of leech is straight tube running from the mouth to the anus.

✦ **Mouth :**

It is a triradiate aperture situated in the middle of the anterior sucker.

✦ **Buccal cavity :**

Mouth leads to buccal cavity. The wall of the buccal cavity bears three jaws with single row of minute teeth.

✦ **Pharynx :**

The buccal cavity leads into muscular pharynx. It is surrounded by salivary glands.

✦ **Oesophagus :**

A short and narrow oesophagus connects the pharynx and crop.

✦ **Crop :**

It is the largest portion of alimentary canal. It is divided into a series of 10 chambers. Each chamber consists of blind outgrowths known as Cacca or diverticula. Crop and diverticula can store large amount of blood.

✦ **Stomach :**

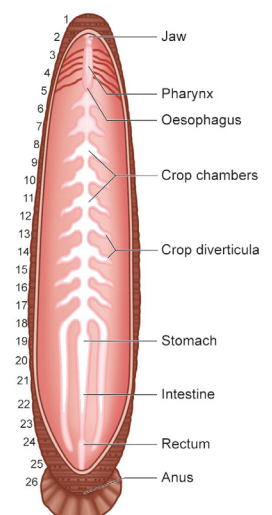
The last chamber of crop opens into stomach.

✦ **Intestine :**

The stomach leads into intestine which is small straight tube that opens into rectum.

✦ **Anus :**

Undigested food is egested through exterior opening anus.



2. Explain the male reproduction system of leech with labelled diagram.

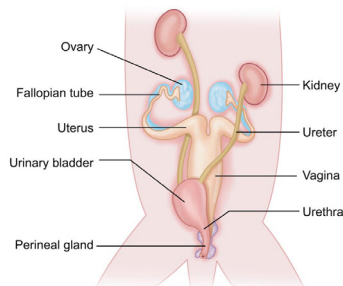
- ✦ There are eleven pairs of testes, one pair in each segment from 12 to 22 segments.
- ✦ From each testis arises a short duct called vas efferens which join with the vas deprens.
- ✦ The vas deferens becomes convoluted to form the epididymis or sperm vesicla, to store spermatozoa.
- ✦ The epididymis leads to a short duct called ejaculatory duct.

- ✦ The ejaculatory ducts on both sides join to form the genital atrium.
- ✦ The atrium consists of two regions,
 - i) Prostate glands and
 - ii) Penial sac.
- ✦ Penial sac consists penis.
- ✦ Penis opens through the male genital pore.

3. Explain the development of young leech in cocoon.

- ✦ Leeches have internal fertilization.
- ✦ Fertilization is followed by cocoon formation.
- ✦ Cocoon is also known as egg case.
- ✦ Cocoon is formed around the 9th, 10th and 11th segments.
- ✦ Cocoon contains one to 24 embryos.
- ✦ Development of young one is direct.
- ✦ Young leech resembling the adult emerges.

4. Explain the female reproductive system of rabbit with labelled diagram.



- ✦ The female reproductive system of rabbit consists of a pair of ovaries.
- ✦ Ovaries are small ovoid structure located behind the kidney in the abdominal cavity.
- ✦ A pair of oviducts opens into the body cavity by a funnel shaped opening from each side of the ovary.
- ✦ The anterior part of the oviduct is the fallopian tube.
- ✦ Fallopian tube leads into a wider tube called the uterus.
- ✦ The uterus join together to form a median tube called vagina.
- ✦ The common tube is formed by the union of urinary bladder and the vagina and is called urinogenital canal or vestibula.
- ✦ urinogenital canal runs backwards and opens to the exterior by a slit-like aperture called Vulva.
- ✦ A pair of Cowper's gland and perineal gland are the accessory glands present in the female reproductive system of rabbits.

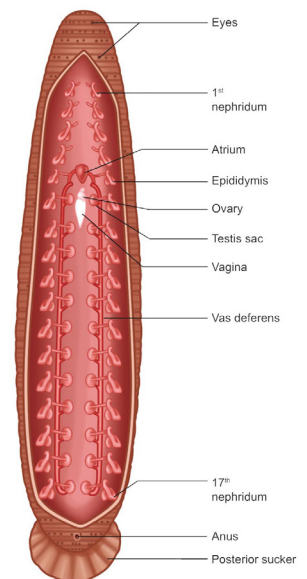
5. Write about the location and name of external apertures present in leech.

- ✦ **Mouth** : It is located in the middle of anterior sucker.
- ✦ **Anus** : Anus is a small aperture that opens on the mid-dorsal side of 26th segment.
- ✦ **Nephridiopores** : Nephridia open to the exterior by 17 pairs of nephridiopores. They lie ventrally on the last annulus of each segment from 6 to 22.
- ✦ **Male genital pore** : It is a mid-ventral opening, situated between second and third annuli of 10th segment.
- ✦ **Female genital pore** : It lies mid-ventrally between second and third annuli of 11th segment.

6. What are the five layers of body wall of leech?

Body wall of leech includes five layers:

- ✦ Cuticle (outermost layer)
- ✦ Epidermis which lies below the cuticle
- ✦ Dermis which lies below the epidermis formed of connective tissue



- ✦ Muscular layer formed of circular and longitudinal muscles and
- ✦ Botryoidal tissue lies beneath longitudinal muscles and fills the entire coelom around the gut.

7. Explain the Nervous System of leech.

- ✦ The central nervous system of leech consists of a nerve ring and a paired ventral nerve cord.
- ✦ The nerve ring surrounds the pharynx.
- ✦ The nerve ring is formed of
 - Suprapharyngeal ganglion (brain),
 - Circumpharyngeal connective and
 - Subpharyngeal ganglion
- ✦ The subpharyngeal ganglion lies below the pharynx and is formed by the fusion of four pairs of ganglia.

8. Describe the female reproductive system of leech.

- ✦ Leech is hermaphrodite because both the male and female reproductive organs are present in the same animal.
- ✦ It consists of ovaries, oviducts and vagina.
- ✦ There is a single pair of ovary in the 11th segment on the ventral side.
- ✦ Each ovary is a coiled ribbon-shaped structure.
- ✦ The ova are budded off from the ovary.
- ✦ From each ovary runs a short oviduct.
- ✦ The oviducts of the two sides join together, to form a common oviduct.
- ✦ The common oviduct opens into a pear-shaped vagina which lies mid-ventrally in the posterior part of the 11th segment.

9. Describe the digestive system of rabbit.

The digestive system includes

- The alimentary canal and
 - The associated digestive glands.
- The alimentary canal :** The alimentary canal consists of mouth, buccal cavity, pharynx, oesophagus, stomach, small intestine, caecum, large intestine and anus.
 - ✦ Mouth is a transverse slit bounded by upper and lower lips. It leads into the buccal cavity.
 - ✦ The floor of the buccal cavity is occupied by a muscular tongue. Jaws bear teeth.
 - ✦ The buccal cavity leads into the oesophagus through the pharynx.
 - ✦ Oesophagus opens into the stomach followed by small intestine.
 - ✦ Caecum is a thin walled sac present at the junction of small intestine and large intestine. It contains bacteria that helps in digestion of cellulose.
 - ✦ The small intestine opens into the large intestine which has colon and rectum.
 - ✦ The rectum finally opens outside by the anus.
 - Digestive glands :** The digestive glands are salivary glands, gastric glands, liver, pancreas and intestinal glands. The secretions of digestive glands help in digestion of food in the alimentary canal.

10. Describe the structure of heart of rabbit.

- ✦ The heart is pear shaped and lies in the thoracic cavity in between the lungs.
- ✦ It is enclosed by pericardium, a double layered membrane.
- ✦ The heart is four chambered with two auricles and two ventricles.
- ✦ The right and left auricles are separated by interauricular septum, similarly right and left ventricles are separated by interventricular septum.
- ✦ The right auricle opens into the right ventricle by right auriculoventricular aperture, guarded by a tricuspid valve. The left auricle opens into the left ventricle by left auriculoventricular aperture guarded by a bicuspid valve or mitral valve.
- ✦ The opening of the pulmonary artery and aorta are guarded by three semilunar valves.
- ✦ The right auricle receives deoxygenated blood through two precaval (superior vena cava) and one postcaval (inferior vena cava) veins from all parts of the body.
- ✦ The left auricle receives oxygenated blood from the pulmonary veins from the lungs.

- ✦ From the right ventricle arises pulmonary trunk which carries the deoxygenated blood to the lungs and from the left ventricle arises the systemic arch (aorta) which supplies oxygenated blood to all parts of the body.

11. Describe the structure of the brain of rabbit.

Brain is situated in the cranial cavity and covered by three membranes called,

- Outer duramater,
- Inner piamater and
- Middle arachnoid membrane.

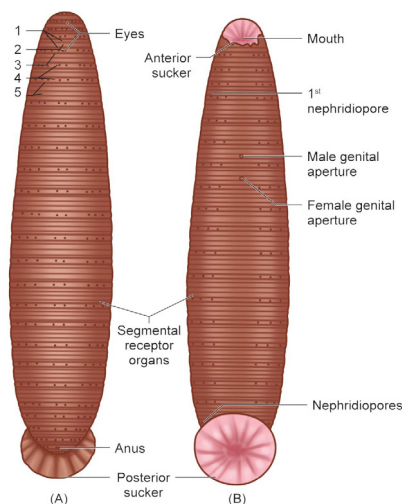
The brain is divided into forebrain (prosencephalon), midbrain (mesencephalon) and hindbrain (rhombencephalon).

- ✦ **Forebrain** : Forebrain consists of a pair of olfactory lobes, cerebral hemispheres and diencephalon. The right and left cerebral hemispheres are connected by transverse band of nerve tissue called corpus callosum.
- ✦ **Midbrain** : The midbrain includes the optic lobes.
- ✦ **Hindbrain** : The hindbrain consists of the cerebellum, pons varolii and medulla oblongata.

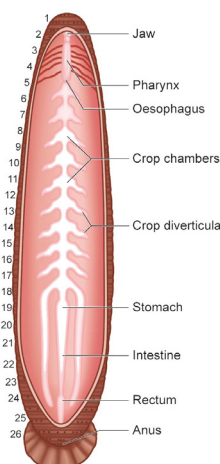
Additional – Draw and label the diagrams

1. External morphology of Leech.

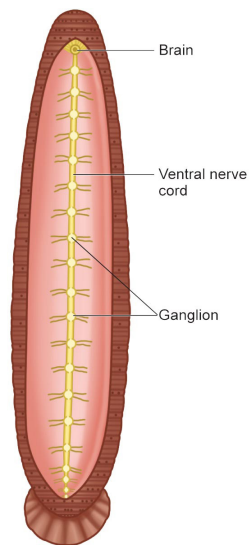
- Dorsal view and
- Vental view.



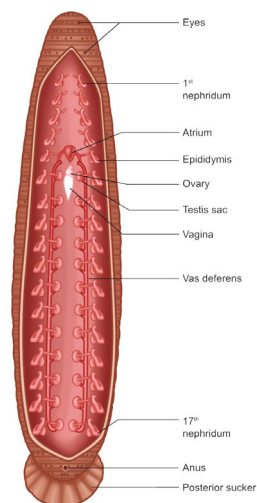
2. Digestive system of Leech.



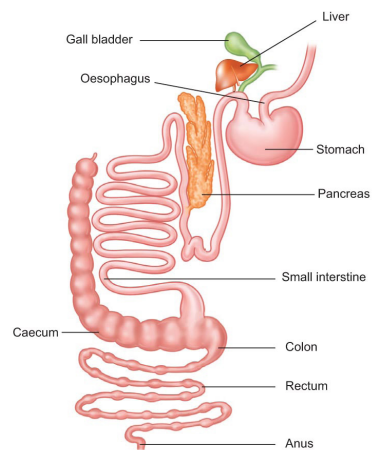
3. Nervous system of Leech.



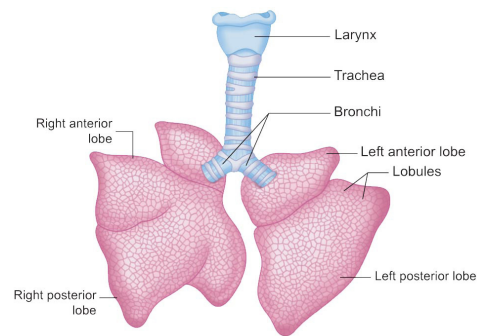
4. Reproductive system of Leech.



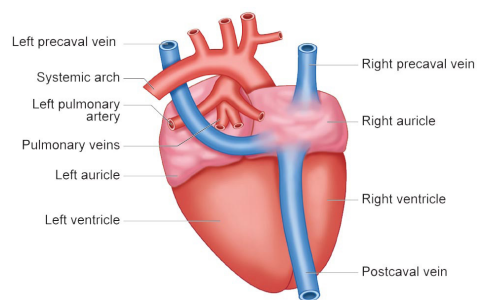
5. Digestive system of Rabbit.



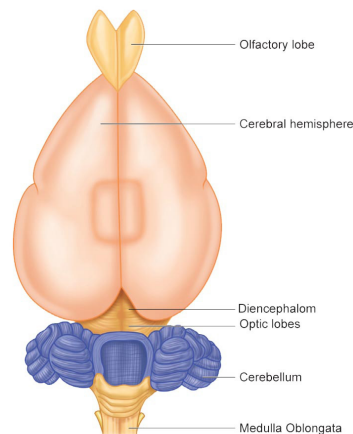
6. Lungs of Rabbit.



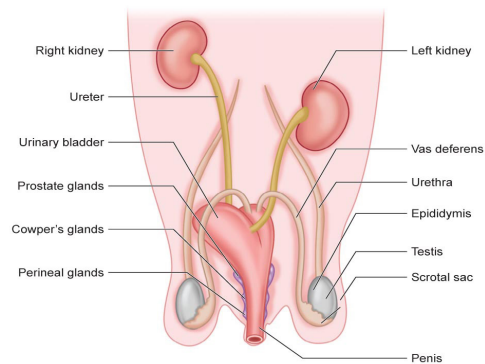
7. Heart of Rabbit.



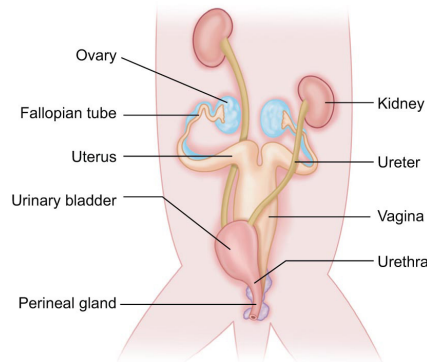
8. Brain of Rabbit.



9. Male reproductive system of Rabbit.



10. Female reproductive system of Rabbit.



Additional – Assertion and Reasoning

Direction : In each of the following questions a statement of Assertion (A) is given and a corresponding statement of Reason (R) is given just below it. Mark the correct statement as

- i) If both A and R are true and R is correct explanation of A.
- ii) If both A and R true but R does not the correct explanation of A.
- iii) A is true but R is false.
- iv) Both A and R are false.

1. **Assertion:** Leach is sanguivorous in nature.

Reason: Leeches feeds on blood.

Ans : (i) Both A and R are true and R is correct explanation of A

2. **Assertion:** In leech, circulation is brought about by haemocoelic system.

Reason: The blood vessels are replaced by channels called haemocoelic channels.

Ans : (i) Both A and R are true and R is correct explanation of A

3. **Assertion:** Leech is hermaphrodite.

Reason: In leech, male and female reproductive organs are present in different animal.

Ans : (iii) A is true but R is false

4. **Assertion:** Rabbits limbs are hexadactyl.

Reason: Each limb has six digits.

Ans : (iv) Both A and R are false

5. **Assertion:** The dentition in rabbit is called heterodont.

Reason: The rabbit has two sets of teeth.

Ans : (ii) Both A and R are true and R does not the correct explanation of A

UNIT TEST - 13

Time : 1.15 Hrs.

Marks : 50

I. Choose the best answer

(5 × 1 = 5)

1. The segments of leech are known as _____.

- a) Metameres (somites) b) Proglottids c) Strobila d) All the above

2. Mammals are _____ animals

- a) Cold blooded b) Warm blooded c) Poikilothermic d) All the above

3. **The animals which give birth to young ones are _____.**
 a) Oviparous b) Viviparous c) Ovoviviparous d) All the above
4. **'Leeches' are included in class _____.**
 a) Oligochaete b) Hirudinea c) Polychaeta d) Gastropoda
5. **_____ teeth are absent rabbit.**
 a) Canines b) Molar c) Premolar d) Gastropoda

II. Fill in the blanks

(5 × 1 = 5)

6. The posterior sucker is formed by the fusion of the _____ segments.
7. The blood sucking habit of leech is known as _____.
8. _____ spinal nerves are present in rabbit.
9. The scientific name of the common rabbit is _____.
10. Each segment of leech is further superficially subdivided into _____.

III. State whether the statements are true or false. Correct the false statement

(5 × 1 = 5)

11. An anticoagulant present in saliva of leech is called heparin.
12. The rabbit has a third eyelid called tympanic membrane which is movable.
13. The cerebral hemispheres of rabbit are connected by band of nerve tissue called corpora quadrigemina.
14. Leeches have one pair of ear.
15. Rabbit is a coelomate animal.

IV. Match the following

(5 × 1 = 5)

- | | |
|------------|-----------------|
| 16. Brain | (a) Pleura |
| 17. Kidney | (b) Egg case |
| 18. Heart | (c) Meninges |
| 19. Lungs | (d) Pericardium |
| 20. Cocoon | (e) Capsule |

V. Write the answer for the following questions in word or sentence

(8 × 1 = 8)

21. Give the common name of the Hirudinaria granulosa.
22. Write the dental formula of rabbit.
23. How many pairs of testes are present in leech?
24. Which organ acts as suction pump in leech?
25. What does CNS stand for?
26. What are the two parts of the central nervous system of leech?
27. What are the two types of teeth in rabbit?
28. What are the two parts of the central nervous system (CNS)?

VI. Write the short answer for ANY 6 of the following questions

(6 × 2 = 12)

29. Why are the rings of cartilages found in trachea of rabbit?
30. List out the parasitic adaptations in leech.
31. Leeches do not have secretion of digestive juices and enzymes -Why?

32. How is the digestive system of rabbit suited for herbivorous mode of feeding?
33. Arjun is studying in tenth standard. He was down with fever and went to meet the doctor. As he went to the clinic he saw a patient undergoing treatment for severe leech bite. Being curious, Arjun asked the doctor why leech bite was not felt as soon as it attaches to the skin ? What would have been the reply given by the doctor?
34. Write the taxonomic position of leech.
35. Name the three accessory glands present in the male reproductive system of rabbit.
36. Why are the excretory and reproductive systems studied together as urinogenital system?

VII. Write long answer for the following questions

(2 × 5 = 10)

37. How does locomotion take place in leech?

or

How is the circulatory system designed in leech to compensate the heart structure.

38. Describe the structure of the brain of rabbit with labelled diagram.

or

Describe the digestive system of rabbit.

