Earthworm

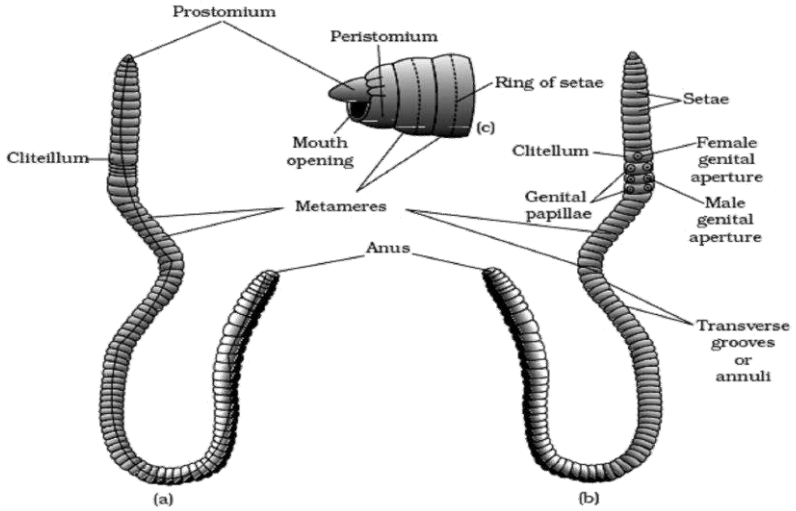
Classification

Kingdom	**=**	**Animalia**
Phylum	**=**	**Annelida**
Class	**=**	**Oligocheata**
Genus	**=**	**Pheretima**
Species	**=**	**posthuma**

- The common Indian earthworms are **Pheretima and Lumbricus.**
- Earthworm is a reddish brown terrestrial invertebrate that inhabits the upper layer of the moist soil.
- During day time, they live in burrows made by boring and swallowing the soil.
- In the gardens, they can be traced by their faecal deposits known as worm castings.

Morphology

- Earthworms have long cylindrical body.
- The body is divided into more than hundred short segments which are similar (metameres about **100-120** in number).
- The dorsal surface of the body is marked by a dark median mid dorsal line (dorsal blood vessel) along the longitudinal axis of the body.
- The ventral surface is distinguished by the presence of genital openings (pores).
- Anterior end consists of the mouth and the prostomium, a lobe which serves as a covering for the mouth and as a wedge to force open cracks in the soil into which the earthworm may crawl.
- The **prostomium is sensory in function.** The first body segment is called the **peristomium (buccal segment)** which contains the mouth.
- In a mature worm, **segments 14-16** are covered by a prominent dark band of glandular tissue called **clitellum.** Thus the body is divisible into three prominent regions – preclitellar, clitellar and postclitellar segments.



Body of earthworm : (a) dorsal view (b) ventral view (c) Lateral view showing mouth opening

- Four pairs of spermathecal apertures are situated on the ventro-lateral sides of the **5/6th, 6/7th, 7/8th & 8/9th intersegmental grooves, (from 5th to 9th segments).** A single female genital pore is present in the mid-ventral line of **14th segment.**
- A pair of **male genital pores** are present on the ventro-lateral sides of the **18th segment.** Numerous minute pores called nephridiopores open on the surface of the body.
- In each body segment, except the first, last and clitellum, there are rows of **S-shaped setae,** embedded in the **epidermal pits (setigerous sacs)** in the middle of each segment. Setae can be extended or retracted.
- **Their principal role is in locomotion.**

Body Wall

- The body wall of the earthworm is covered externally by a thin **non-cellular cuticle** below which is the epidermis, two muscle layers (circular and longitudinal) and an innermost coelomic epithelium.
- The epidermis is made up of a single layer of columnar epithelial cells which contain secretory gland cells.

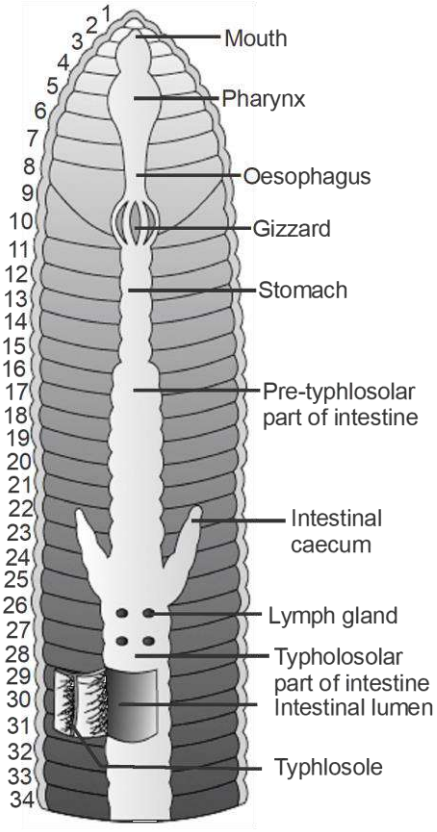
  The alimentary canal is a straight tube and runs between first to last segment of the body.

Body Coelome

- Eucoelome, schizocoelome
- Filled with coelomic fluid.
- Coelomic fluid consists of numerous cells like albumin cells, mucous cells, phagocytic cells and chloragogan cells.
- **Function of chloragogan cell : Deamination and urea formation.**
- **Chloragogan cell is analogous to vertebrates liver.**

Digestive System

- A terminal mouth opens into the **buccal cavity (1-3 segments)** which leads into muscular pharynx(4th segments).
- A small narrow tube, oesophagus (5-7 segments), continues into a muscular gizzard (8-9 segments).
- It helps in grinding the soil particles and decaying leaves, etc. The stomach extends from 9-14 segments.
- The food of the earthworm is decaying leaves and organic matter mixed with soil. Calciferous glands, present in the stomach, neutralise the humic acid present in humus.



Alimentary canal of earthworm

- **Intestine starts from the 15th segment** onwards and continues till the last segment.
- A pair of short and conical **intestinal caecae** project from the intestine on the 26th segment.
- The characteristic feature of the intestine is the presence of internal median fold of dorsal wall from 26th to last segments (except last 25 segments) called **typhlosole.**
- This increases the effective area of absorption in the intestine. The alimentary canal opens to the exterior by a small rounded aperture called anus.
- The ingested organic rich soil passes through the digestive tract where digestive enzymes breakdown complex food into smaller absorbable units.
- These simpler molecules are absorbed through intestinal membranes and are utilised.

Circulatory System

- Pheretima exhibits a closed type of blood vascular system,
- It is consiste of blood vessels, capillaries, heart, blood and blood glands.
- Blood vessels of first 13 segment are specific and are as follow.

  (a) Longitudinal blood vessels (b) Transvers blood vessels

  (a) Longitudinal blood vessels :

  (i) Dorsal blood vessel – 1

  (ii) Ventral blood vessel – 1

  (iii) Supraoesophageal blood vessel – 1

  (iv) Lateral oesophageal blood vessel – 1 pair

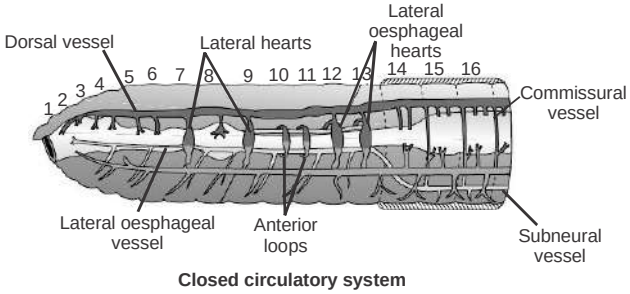
  Both lateral oesophageal blood vessel at the level of 13th segments move down below nerve cord and fused together to form **Subneural blood vessel**.

  (b) Transvers blood vessels : 6 pair

  (i) Lateral heart – 2 pair, in 7th and 9th segments.

  (ii) Anterior loop – 2 pair, in 10th and 11th segments.

  (iii) Lateral oesophageal heart – 2 pair, in 12th and 13th segments.
- Due to closed circulatory system, blood is confined to the heart and blood vessels. Contractions keep blood circulating in one direction.
- Smaller blood vessels supply the gut, nerve cord, and the body wall.
- **Blood glands** are present on the **4th, 5th and 6th segments. They produce blood cells and haemoglobin which is dissolved in blood plasma.**
- Blood cells are **phagocytic** in nature.



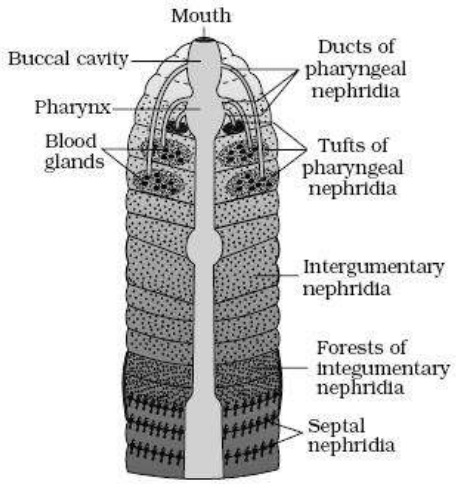
Closed circulatory system

Respiratory System

- Earthworms lack specialised breathing devices.
- Respiratory exchange occurs through moist body surface into their blood stream.
- In dry condition earthworm will die due to **asphyxia**.

Excretory System

- The excretory organs occur as segmentally arranged coiled tubules called nephridia (sing.: nephridium). They are of three types:
  - **(i) Septal nephridia :** Largest nephridia, present on both the sides of intersegmental septa of segment 15 to the last that open into intestine.
    Open into alimentary canal so it is **entero-nephric nephridia**.
  - **(ii) Pharyngeal nephridia :** It present as three paired tufts in the 4th, 5th and 6th segments.
    Also open into alimentary canal so it is **entero-nephric nephridia**.
  - **(iii) Integumentary nephridia :** It attached to lining of the body wall of segment 3 to the last that open on the body surface.
    Open out side the body so it is **exo-nephric nephridia**.
- These different types of nephridia are basically similar in structure.
- Nephridia regulate the volume and composition of the body fluids.
- A nephridium starts out as a funnel that collects excess fluid from coelomic chamber.
- The funnel connects with a tubular part of the nephridium which delivers the wastes through a pore to the surface in the body wall **(exonephric)** or into the digestive tube (**entero-nephric nephridia**).



Nephridial system in earthworm

Nervous System

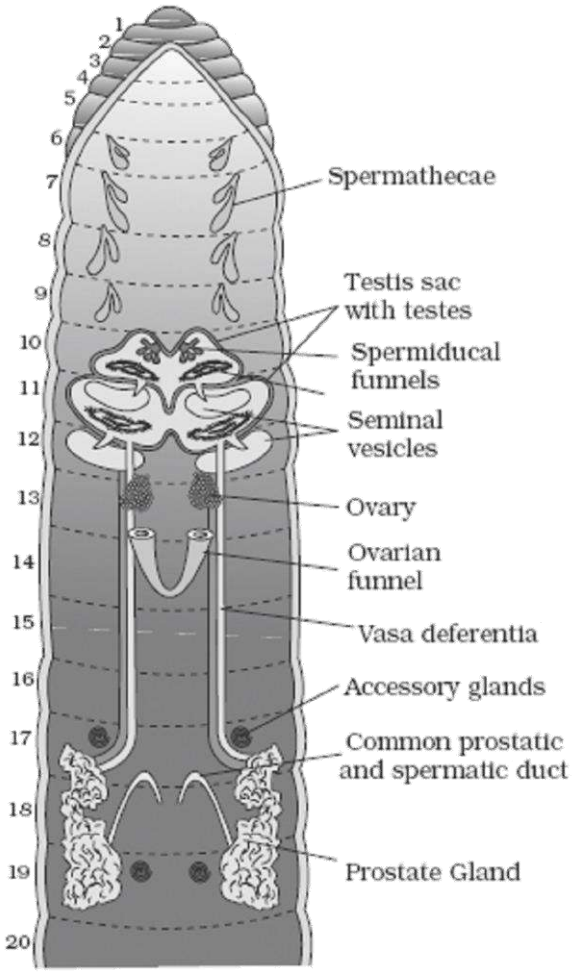
- Nervous system is consist of nerve ring and ganglionated ventral paired, solid nerve cord.
- Nerve ring consist of two ganglia.
  (i) Cerebral (Supra pharyngeal) ganglion - present above and anterior to pharynx in 3rd segment.
  (ii) Sub pharyngeal ganglion - Present below pharynx in 4thsegment.
  Both are connected together by circum pharyngeal connectives and forms nerve ring.
- The **nerve cord** in the anterior region **(3rd and 4th segments)** bifurcates, laterally encircling the pharynx and joins the cerebral ganglia dorsally to form a nerve ring.
- The cerebral ganglia alongwith other nerves in the ring integrate sensory input as well as command muscular responses of the body.

Sensory Organs

- Sensory system does not have eyes but does possess light and touch sensitive organs (receptor cells) to distinguish the light intensities and to feel the vibrations in the ground.
- Worms have specialised chemoreceptors (taste receptors) which react to chemical stimuli. These sense organs are located on the anterior part of the worm.

Reproductive System

- Earthworm is hermaphrodite (bisexual), i.e., testes and ovaries are present in the same individual. There are two pairs of testes present in the 10th and 11th segments.
- Their **vasa deferentia** run up to the **18th segment** where they join the prostatic duct.
- Two pairs of **accessory glands** are present one pair each in the **17th and 19th** segments.
- The common prostrate and spermatic duct (vary differential) opens to the exterior by a pair of male genital pores on the ventro-lateral side of the 18th segment.
- Four pairs of spermathecae are located in 6th-9th segments (one pair in each segment). They receive and store spermatozoa during copulation.
- One pair of ovaries is attached at the inter-segmental septum of the **12th and 13th segments.**
- Ovarian funnels are present beneath the ovaries which continue into oviduct, join together and open on the ventral side as a single median female genital pore on the **14th segment.**



Reproductive system

- A mutual exchange of sperm occurs between two worms during mating. One worm has to find another worm and they mate **juxtaposing opposite gonadal openings exchanging packets of sperms called spermatophores.** Mature sperm and egg cells and nutritive fluid are deposited in cocoons produced by the gland cells of clitellum.

Fertilisation and Development

- Fertilisation and development occur within the cocoons which are deposited in soil.
- The ova (eggs) are fertilised by the sperm cells within the cocoon which then slips off the worm and is deposited in or on the soil. The cocoon holds the worm embryos.
- **After about 3 weeks,** each cocoon produces two to **twenty baby** worms with an average of four.

Economic Importance

- Earthworms are known as 'friends of farmers' because they make burrows in the soil and make it porous which helps in respiration and penetration of the developing plant roots.
- The process of increasing fertility of soil by the earthworms is called **vermicomposting.**
- They are also used as bait in game fishing.

Exercise - I

1. Earthworm is placed in the group :
(1) Polychaeta (2) Oligochaeta
(3) Hirudinea (4) Crustacea

2. 'Tube within a tube' plan exists in :
(1) Earthworm (2) *Ctenoplana*
(3) *Fasciola* (4) *Cliona*

3. Body is segmented in :
(1) Porifera (2) Coelenterata
(3) Annelida (4) Mollusca

4. Segment of earthworm bearing mouth is :
(1) Prostomium
(2) Peristomium
(3) Clitellar
(4) Deuterostomium

5. Total number of body segments in *Pheretima* is about :
(1) 50 – 75 (2) 300 – 325
(3) 150 – 200 (4) 100 – 120

6. Bodywall of earthworm is without :
(1) Appendage (2) Epidermis
(3) Setae (4) Cuticle

7. *Pheretima posthuma* lives within a burrow mainly to :
(1) Procure food (2) Copulate
(3) Avoid enemies (4) Get moisture

8. The epidermis of earthworm is mainly made up of :
(1) Basal cells (2) Albumin cells
(3) Goblet cells (4) Supportive cells

9. The brown skin colour of *Pheretima* is due to :
(1) Haemoglobin (2) Haemoerythrin
(3) Porphyrin (4) Chromophils

10. *Pheretima* exhibits :
(1) External segmentation
(2) Internal segmentation
(3) Both of above
(4) None of above

11. Earthworm lacks :
(1) Excretory organs
(2) Alimentary canal
(3) Distinct head
(4) Reproductive system

12. The function of porphyrin which imparts colour to earthworm is to :
(1) Help in respiration
(2) Help in reproduction
(3) Protect against harmful light rays
(4) Protect against harmful germs

13. Goblet cells on the epidermis of earthworm secrete :
(1) Mucus (2) Sweat
(3) Hormones (4) Enzymes

14. Body cavity of earthworm is :
(1) Pseudocoel (2) Hydrocoel
(3) Schizocoel (4) Enterocoel

15. Dorsal median line in earthworm is due to :
(1) Supraoesophageal blood vessel
(2) Dorsal blood vessel
(3) Dorsal nerve cord
(4) Supraintestinal duct

16. The earthworm moves with the help of :
(1) Setae and muscles
(2) Parapodia
(3) Setae alone
(4) Muscles alone

17. Setae of earthworm is made up of :
(1) Chitin (2) Cartilage
(3) Pectin (4) Cuticle

18. The middle part of setae of earthworm is called as :
(1) Setal cell
(2) Setigerous sac
(3) Nodulus
(4) Basal part

19. Cuticle of earthworm is secreted by :
(1) Epidermis (2) Hypodermis
(3) Peritoneum (4) Muscular layer

20. Locomotion of earthworm involves :
(1) Contraction of the body
(2) Anchorage of the body
(3) Extension of the body
(4) All of the above

21. The coelomic fluid in earthworm is :
(1) Neutral (2) Alkaline
(3) Acidic (4) None

22. Of the cells present in the coelomic fluid of earthworm, the most numerous and largest are :
(1) Phagocytes (2) Mucocytes
(3) Chloragogen cells (4) RBCs

23. Earthworm has no skeleton but during burrowing the anterior end becomes turgid and act as a hydraulic skeleton. It is due to :
(1) Setae
(2) Circular muscles
(3) Longitudinal muscles
(4) Coelomic fluid

24. Chloragogen cells of earthworm are called :
(1) Green cells
(2) Chromophil cells
(3) Purple cells
(4) Yellow cells

25. The unique characteristic of annelida is :
(1) Hermaprodite
(2) Nephridia
(3) Coelom
(4) Alimentary canal is complete

26. If the skin of pheretima dries, it will die because of :
(1) Starvation (2) Dehydration
(3) Asphyxia (4) Noise

27. The most common earthworm of India is :
(1) Eutyphaeus
(2) *Pheretima* communissima
(3) Lumbricus
(4) *Pheretima posthuma*

28. According to Darwin one acre of land may contain:
(1) About 50,000 earthworms
(2) About 20,000 earthworms
(3) About 100, 000 earthworm
(4) None of the above

29. Excretory organs of an earthworm are :
(1) Nephridia
(2) Malpighian tubules
(3) Green glands
(4) Flame cells

30. Blood pigment of annelida is :
(1) Haemocyanin (2) Haemanin
(3) Haemoglobin (4) Cyanin

31. Function of ampulla of spermatheca is :
(1) To store sperms
(2) To secretes sticky material during copulation
(3) To nourish sperms
(4) None of the above

32. In Earthworm, setae do not occur in the region of:
(1) Prostomium (presegmental region) and peristomium (first segment)
(2) Clitellum (14-16) segments)
(3) Anal segmental
(4) All the above

33. Circulatory system of *Pheretima* is of :
(1) Open type (2) Closed type
(3) Both (4) None

34. Earthworms have :
(1) 4 pairs of hearts (2) Blue blood
(3) 2 pairs of hearts (4) No heart

35. *Pheretima posthuma* is :
(1) Possessed with a gizzard in the 10th segment
(2) An active swimmer
(3) Devoid of blood gland
(4) A protandrous hermaphrodite

36. Setigerous sacs of *Pheretima* contain :
(1) Testes
(2) Nephridia
(3) Setae
(4) Ovary

37. Chromophil cells are found around the *Pheretima* gut. They occur in the region of :
(1) Stomach (2) Gizzard
(3) Intestine (4) Pharynx

38. Which of these is correct about the heart of *Pheretima* ?
(1) They are devoid of valves
(2) They have two chambers
(3) Hearts are 4 pairs and present laterally
(4) They are found in 8-12 segments

39. In earthworm the blood is red because :
(1) Haemerythrin is dissolved in plasma
(2) Plasma contains haemoglobin
(3) Haemoglobin is present in the corpuscle
(4) Haemoglobin has iron in ferric form

40. What is correct about nephridia of *Pheretima* ?
(1) All are exonephric
(2) They excrete uric acid
(3) They occur in greater numbers in the clitellar region
(4) They occur in one pair/segment

41. What is typhlosole of earthworm ?
(1) A defence mechanism
(2) A fold of the intestine
(3) An excretory organ
(4) A part of the circulatory system

42. Segmental arrangement in earthworm includes :
(1) Only internal segmentation
(2) Only external segmentation
(3) Both external and internal structures such as muscles, blood vessels, ganglia and setae
(4) None of the above

43. Blood glands in pheretima are concerned with :
(1) Blood formation
(2) Blood formation and excretion
(3) Digestion
(4) Excretion

44. The clitellum of *Pheretima posthuma* is primarily concerned with :
(1) Difference between two sexes
(2) Production of cocoons
(3) Copulation
(4) Excretion

45. Earthworm live in the burrows which are made :
(1) Due to habit of swallowing soil
(2) In the compact soil by the thin tapering anterior end assisted by hydrostatic pressure of coelomic fluid compartments
(3) In soft soil rich in humus by mere pushing in of the body
(4) All of the above

46. Blood is red but there are no red blood cells in :
(1) Birds (2) Reptiles
(3) Cockroach (4) Earthworms

47. Typhlosole in earthworm starts from segment number :
(1) Twenty seven
(2) Seven
(3) Seventeen
(4) Fourteen

48. Flow of blood in dorsal vessel of earthworm is :
(1) Backward
(2) Backward in half of it and forward in another half
(3) Forward
(4) None of these

49. Structures present only in 7^{th} and 9^{th} segments of pheretima posthuma are :
(1) Lateral hearts
(2) Spermathecae
(3) Ganglia
(4) Pharyngeal nephridia

50. Necessary enzymes for the digestion of food in earthworm are secreted by the glandular cells of :
(1) Pharynx, stomach, intestine and intestinal caecae
(2) Buccal chamber, pharynx and gizzard
(3) Oesophagus, stomach and intestine
(4) All of the above

51. The alimentary canal of earthworm is a straight tube between mouth and anus and is divided into:
(1) Buccal chamber, pharynx,
(2) Oesophagus, gizzard, stomach
(3) Intestine and rectum
(4) All of the above

52. Earthworm increases the soil :
(1) Salinity (2) Fertility
(3) Acidity (4) Alkalinity

53. If spirit is sprinkled over a living earthworm, a white milky fluid comes out. It is :
(1) Blood plasma
(2) Blood of earthworm
(3) Lymph of earthworm
(4) Coelomic fluid of earthworm

54. Part of alimentary canal of *Pheretima* internally lined by cuticle :
(1) Gizzard (2) Pharynx
(3) Intestine (4) Stomach

55. Mode of nutrition in earthworm is :
(1) Coprozoic (2) Autotrophic
(3) Saprozoic (4) Holophytic

56. The important organ of earthworm in the 8th body segment is :
(1) Buccal mass (2) Stomach
(3) Oesophagus (4) Gizzard

57. Vessel in which is paired in earthworm is :
(1) Dorsal vessel
(2) Ventral vessel
(3) Subneural
(4) Lateral oesophageal

58. The function of chromophil cells found in earthworm is to produce :
(1) Toxins
(2) Mucus and proteases
(3) Protein and pigments
(4) Pigments

59. The calciferous gland in earthworm are found in :
(1) Buccal chamber (2) Stomach
(3) Intestine (4) Gizzard

60. The oesophagus of earthworm extends upto the segment :
(1) Nineth (2) Fourteen
(3) Seventh (4) Fifth

61. Dorsal blood vessel in pheretima is :
(1) Distributing in whole body
(2) Collecting in first 13 segments
(3) Distributing in first 13 segments
(4) Collecting in whole body

62. Which blood vessels in *Pheretima* have valves ?
(1) Lateral (2) Dorsal
(3) Integumentary (4) Ventral

63. Oxygen is circulated to various tissues of the earthworm by :
(1) Plasma
(2) Blood corpuscles and Plasma
(3) Blood corpuscles
(4) None of the above

64. Circulatory system of earthworm is very well developed and consists of :
(1) Open blood vessels without walls
(2) Open blood vessels with definite walls
(3) Closed blood vessels without walls
(4) Closed blood vessel with definite walls

65. In which of the following blood vessels, blood flows from anterior to posterior direction :
(1) Ventral vessel
(2) Supraoesophageal vessel
(3) Lateral oesophageal vessel
(4) All of the above

66. The main distributive blood vessel of earthworm is :
(1) Dorsal (2) Ventral
(3) Supraoesophageal (4) Subneural

67. The smallest longitudinal blood vessel in earthworm is :
(1) Supraoesophageal vessel
(2) Subneural vessel
(3) Dorsal vessel
(4) Ventral vessel

68. In *Pheretima* valves are absent in :
(1) Lateral oesophageal heart
(2) Dorsal blood vessel
(3) Anterior loop
(4) Lateral heart

69. In *Pheretima*, lymph gland lie in the segments :
(1) 14, 15 and 16 (2) 7, 8 and 9
(3) 4, 5 and 6 (4) 26^{th} and behind

70. Earthworm obtain oxygen for respiration through moist skin. They do not have respiratory organs because :
(1) They are burrowing
(2) There is no sufficient space for such organ
(3) They do not need them
(4) Absorptive area of earthworm is more than its volume

71. Blood glands in earthworm are associated with :
(1) Excretion
(2) Digestion
(3) Production of blood corpuscles and haemoglobin
(4) None

72. Animal which respires, but has no respiratory organs :
(1) Earthworm (2) Cockroach
(3) Frog (4) Fish

73. The respiratory organ of Pheretima is :
(1) Green glands (2) Nephridium
(3) Booklungs (4) Integument

74. Septal nephridia of earthworm pour into :
(1) Body surface (2) Buccal cavity
(3) Coelom (4) Intestine

75. Nephridia are present in all the segments of the earthworm except :
(1) First 2 segments
(2) First 3 segments
(3) First and last segments
(4) Last segments

76. The terminal ducts of septal nephridia of *Pheretima posthuma* open :
(1) Directly in the intestine
(2) In paired septal excretory canals
(3) In paired supraintestinal excretory duct
(4) In dorsal blood vessel

77. Septal nephridia of earthworm are :
(1) Present in all segments
(2) Keep surface moist
(3) Responsible for excretion
(4) None

78. Earthworm has :
(1) One eye (2) Many eyes
(3) No eye (4) Two eyes

79. The largest nephridia in earthworm are :
(1) Integumentary nephridia
(2) Pharyngeal nephridia
(3) Septal nephridia
(4) All of equal size

80. Most numerous nephridia in earthworm are :
(1) Pharyngeal nephridia
(2) Integumentary nephridia
(3) Septal nephridia
(4) All of the above

81. Earthworm possesses :
(1) Buccal receptors
(2) Photoreceptors
(3) Epidermal receptors
(4) All of these

82. Nephridia develop from :
(1) Endoderm (2) Mesoderm
(3) Ectoderm (4) None

83. Earthworms have no special sense organs, still they are sensitive to :
(1) Touch and sound
(2) Touch, taste and light
(3) Touch, taste and sound
(4) Light and sound

84. Brain of earthworm is situated in segment :
(1) Third (2) Second
(3) First (4) None of above

85. In earthworm, the nephridia collect nitrogenous waste from :
(1) Blood vessels
(2) Skin
(3) Coelomic fluid
(4) Blood and coelomic fluid

86. Nerve ring of earthworm is formed encircling :
(1) Gizzard (2) Pharynx
(3) Stomach (4) All of these

87. What is true for earthworm ?
(1) It has no locomotory organs
(2) It has brain but no head
(3) It can crawl on smooth surface easily
(4) It secretes cocoon around unfertilized eggs

88. A ventral nerve cord is found in :
(1) Frog (2) Fish
(3) Earthworm (4) *Hydra*

89. Spermathecae in earthworm are used for :
(1) Generation of sperms
(2) Stimulation of ovum
(3) Storing of spermatozoa
(4) Protection of sperms

90. The female genital aperature in earthworm is present :
(1) In the 15^{th} segment
(2) In the 16^{th} segment
(3) In the 13^{th} segment
(4) In none of the above

91. The intestinal caecae in *Pheretima* arise from the intestine in segment :
(1) 26^{th} and extend forward
(2) 24^{th} and extend backward
(3) 26^{th} and extend backward
(4) 24^{th} and extend forward

92. Spermathecae in earthworm represent :
(1) Structure for storing sperms
(2) Male copulatory organ
(3) Female copulatory organ
(4) Coating over sperms

93. *Pheretima* is :
(1) Unisexual
(2) Sterile
(3) Radially symmetrical
(4) Hermaphrodite

94. Inside each cocoon :
(1) One male and one female earthworm develop
(2) Sixteen earthworm develop
(3) Numerous earthworms develop
(4) Only one earthworm develops

95. Copulation in earthworm occurs during :
(1) Day in rainy season
(2) Night in rainy season
(3) Night in water
(4) Night in summer season

96. In a copulating pair of earthworm which of the two process take place :
(1) Reciprocal fertilization and internal fertilization
(2) External fertilization and internal fertilization
(3) Cross fertilization and reciprocal fertilization
(4) Internal fertilization and cross fertilization

97. In Annelida if a larva is present, it is called :
(1) Glochidium (2) Tornaria
(3) Nauplius (4) Trochophore

98. A cocoon of earthworm contains :
(1) Many fertilized eggs
(2) Two fertilized eggs
(3) One fertilized eggs
(4) None of above

99. In earthworm, testes occur in segments :
(1) 10 and 11 (2) 17 and 18
(3) 12 and 13 (4) 14 and 15

100. The number of testes in *Pheretima* is :
(1) One paird (2) Two paired
(3) Three paired (4) Many pairs

101. In earthworm, ovary is situated in segment :
(1) 9 (2) 13 (3) 10 (4) 26

102. The oviducts of earthworm penetrate the septum:
(1) 13/14 (2) 14/15 (3) 10/11 (4) 12/13

103. The structures found in 18th segment of earthworm are :
(1) Prostate glands (2) Lymph glands
(3) Blood glands (4) All of these

104. Sperms in earthworm are matured in :
(1) Testis
(2) Seminal vesicle
(3) Testis sac
(4) All

105. Seminal vesicles in earthworm are present in :
(1) 5^{th} and 6^{th} segments
(2) 9^{th} and 10^{th} segments
(3) 11^{th} and 12^{th} segments
(4) 10^{th} and 11^{th} segments

106. Sperms are stored in spermatheca in :
(1) Ampulla (2) Diverticula
(3) Both (4) None

107. Indian giant earthworm is :
(1) *lumbricus*
(2) *Daravida*
(3) *Megascolex mauriti*
(4) *Pheretima posthuma*

108. In spermatheca of earthworm sperms are stored which are of :
(1) Another earthworm
(2) Same earthworm
(3) Both
(4) None of these

109. Vas deferens in earthworm open :
(1) Open with prostatic duct in 14th segment
(2) Open with prostatic duct in 18th segment
(3) Separately outside
(4) Do not open out side

110. Cocoon laying season of earthworm is :
(1) January to March
(2) February to April
(3) August to October
(4) July to August

111. Brain ring of earthworm is formed by :
(1) Suprapharyngeal ganglia
(2) Circum pharyngeal connections
(3) Sub pharyngeal ganglia
(4) All the above

112. In cocoon of earthworm embryo develops within:
(1) Six months (2) One year
(3) 2-3 months (4) 3 to 4 weeks

113. Within the common spermatic and prostatic duct of earthworm :
(1) Mixing of the spermatic and prostatic fluids does not occur
(2) Mixing takes place in few species of Earthworm
(3) Mixing of spermatic and prostatic fluids occurs
(4) None of these

114. The function of seminal vesicles of earthworm is:
(1) To store the sperm of other individual for copulation
(2) Provide site for feritlization
(3) To store sperm of the same individual for maturation
(4) None of the above

115. During heavy rains earthworm come outside the burrow for :
(1) Food (2) Oxygen
(3) Protection (4) All the above

116. Embryo during development in cocoon of earthworm get nourishment from :
(1) Glycogen
(2) Degenerating eggs
(3) Yolk
(4) Albumen

117. Statement that male earthworm is smaller than female is :
(1) Wrong
(2) Right
(3) Correct in embryo
(4) None

118. Anus in earthworm is :
(1) Lateral (2) Terminal
(3) Ventral(4) Dorsal

119. The parasite found in the seminal vesicle of earthworm :
(1) Monocystis (2) Nosema
(3) Sarcocystis Body (4) Nyctotherus

120. In Pheretima nepheridia occur in :
(1) All segment except 1–4 and 10 – 14
(2) 1 – 2, 4 – 6, 15 to last segments
(3) Meganephridia in pre-clitellar and micronephridia in post-clitellar segments
(4) Micronephridia in all segments meganephridia from clitellar region to end

121. The septal and pharyngeal nephridia open into alimentary canal and are of enteronephric type. It is an adaptation for :
(1) Conservation of water
(2) Conservation of heat
(3) Regulation of temperature
(4) Regulation of amino acids

122. Breeding season of earthworm is :
(1) January and March
(2) July to October
(3) April to June
(4) October to December

123. Last segment of the body is called :
(1) Prostomium (2) Pygidium
(3) Clitellum (4) Setae

124. Match the column :

	Column-I		Column-II
P.	Pheretima megascolex	**A.**	Found in South Indian
Q.	Pheretima eutyphaeus	**B.**	Found in North India
R.	Pheretima lumbricus	**C.**	Found in Europe

(1) PQR/ABC (2) PQR/BCA
(3) PQR/ACB (4) PQR/BAC

125. Dorsal pore of earthworm communicates exterior with :
(1) Buccal chamber (2) Heart
(3) Coelom (4) Enteron

126. Which of the following is absent in the coelomic fluid of earthworm ?
(1) Haemoglobin (2) Corpuscles
(3) Salts (4) Proteins

127. A skeleton-like function during locomotion is performed in earthworm by :
(1) Blood
(2) Ventral nerve cord
(3) Typhlosole
(4) Coelomic fluid

128. Porphyrin is found in :
(1) Cuticle
(2) Epidermis
(3) Circular muscles
(4) Longitudinal muscles

129. In earthworm, the typhlosole is a part of :
(1) Pharynx (2) Rectum
(3) Intestine (4) Gizzard

130. In earthworm, septa are absent in segments:
(1) 1-4 (2) 14-26
(3) 17-21 (4) 8-12

131. The stomach of *Pheretima* is located in the segments :
(1) 15-26 (2) 27-40
(3) 7-12 (4) 9-14

132. One pair of heart in earthworm occur in segment:
(1) 6, 7, 9, 10 (2) 9, 10, 14, 15
(3) 7, 9, 12, 13 (4) None of these

133. Earthworms are friends of farmers, because :
(1) They produce humus
(2) They increase the fertility of soil
(3) They eat bacteria
(4) None of these

134. In earthworm, pharyngeal nephridia occur :
(1) 4, 5 and 6 (2) 6, 7 and 8
(3) 3, 4 and 5 (4) 5, 6 and 7

135. Earthworm has :
(1) Venous hearts (2) No hearts
(3) Lateral hearts (4) Beaded hearts

136. Segment having male genital pores in earthworm is :
(1) 10^{th} and 1^{th} (2) 14^{th}
(3) 18^{th} (4) 13^{th}

137. In earthworm, the prostatic secretion is useful for :
(1) Formation of eggs
(2) Formation of spermatophore
(3) Activation of sperms
(4) Formation of sperms

138. Sub-pharyngeal ganglia is found in :
(1) 2^{nd} segment (2) 18^{th} segment
(3) 4^{th} segment (4) 6^{th} segment

139. *Pheretima* is :
(1) Uricotelic (2) Ureotelic
(3) Ammonotelic (4) None of these

140. Nephrostomes are found in :
(1) Pharyngeal nephridia
(2) Septal nephridia
(3) Integumentary nephridia
(4) None of the above

141. Prostate glands in *Pheretima* are present in the segments :
(1) 7-10 (2) 23-26
(3) 9-13 (4) 17-20

142. Which one of the following structure in pheretima is correctly matched with its function ?
(1) Typhlosole-storage of extra nutrients
(2) Clitellum-secretes cocoon
(3) Gizzard-absorbs digested food
(4) Setae-defence against predators

143. Pheretima and its close relatives derive nourishment from :
(1) Soil insects
(2) Small pieces of fresh fallen leaves of maize, etc
(3) Sugarcane roots
(4) Decaying fallen leaves and soil organic matter

144. Annelids possess both longitudinal and circular muscles, which help in locomotion. What happens to a segment in earthworm when the circular muscles in that segment contract ?
(1) It elongates and the anterior end becomes turgid
(2) It increases in diameter and anterior end becomes turgid
(3) It shortens and anterior end becomes turgid
(4) It bends to one side

145. Choose correct statements about earthworm :
(1) Three pair of Pharyngeal nephridia present in 14^{th}, 15^{th} and 16^{th} segment
(2) Respiratory exchange occurs through moist body surface and gills
(3) Nerve cord bifurcates at anterior region (3^{rd} and 4^{th} segments)
(4) Blood glands are present in clitellar region

146. Forest of integumentary nephridia is _____ :
(1) 14^{th} - 16^{th} segment
(2) 18^{th}-20^{th} segment
(3) Clitellar segments
(4) Both (1) & (3)

147. Select correct statement about blood circulating system of earthworm :
(A) Closed circulation is present
(B) Haemoglobin dissolved in blood plasma
(C) Blood cells are phagocytic in nature
(D) Blood glands produces blood cells and haemoglobin
(1) A and C (2) A, C and D
(3) A, B and C (4) A, B, C and D

148. Neutralisation of humic acid of humus occurs in stomach of earthworm because stomach have :
(1) 6 Chitinous teeth
(2) Calciferous gland
(3) Typhosolar gland
(4) Hepatic caeca

149. In earthworm spermatheca are :
(1) 4 pairs and present in 6^{th}, 7^{th}, 8^{th}, 9^{th} segment
(2) 4 pairs and present in 5^{th}, 6^{th}, 7^{th}, 8^{th} segment
(3) 4 pairs and present in clitellar region
(4) 4 pairs and present in post clitellar region

150. Which of the following statement is incorrect w.r.t. reproductive system of earthworm ?
(1) There are two pairs of testes present in 10^{th} and 11^{th} segments
(2) There is one pair of ovaries attached at the inter segmental septum of the 12^{th} and 13^{th} segments
(3) Two pairs of accessory glands are present one pair in 18^{th} and one in 19^{th} segments
(4) Four pairs of spermathecal apertures are situated on the ventro-lateral sides of the intersegmental grooves of 5^{th} to 9^{th} segments

151. Mark the set of structures in earthworm which are found in 4^{th}, 5^{th} and 6^{th} segments ?
(1) Pharyngeal nephridia, spermathecae, blood glands
(2) Blood glands, setae, pharyngeal nephridia
(3) Dorsal pores, seminal vesicles, spermathecae
(4) Setae, nephridiopore, dorsal pore

152. Choose the correct option for the location of the given strctures in earthworm body :
(1) Lymph glands - 4^{th}, 5^{th}, 6^{th} segments
(2) Blood glands - From 26th segment to the last segment
(3) Lateral oesophageal hearts - 12^{th}, 13^{th} segments
(4) Testes - 11^{th}, 12^{th} segments

153. Find out the **incorrect** match w.r.t part of alimentary canal and its location in earthworm :

(1) Gizzard – 8^{th} - 9^{th} segment
(2) Pretyphlosolar region – 15^{th} - 26^{th} segments of intestine
(3) Pharynx – 4^{th} segment
(4) Stomach – 5^{th} - 7^{th} segments

154. Dorsal blood vessel in the body of earthworm is :

(1) Distributing behind 13^{th} segment
(2) Carrying blood from anterior to posterior end of body
(3) Main distributing blood vessel
(4) Carrying blood from posterior to anterior end of body

[AIPMT-2008]

155. Earthworm have no skeleton but during burrowing, the anterion end becomes turgid and acts as a hydraulic skeleton. It is due to ?

(1) Gut Peristalsis
(2) Setae
(3) Coelomic fluid
(4) Blood

[AIPMT-2009]

156. Which one of the following correctly describes the location of some body parts in the earthworm Pheretima?

(1) Two pairs of testes in 10^{th} and 11^{th} segments
(2) Two pairs of accessory glands in 16-18 segments
(3) Four pairs of spermathecae in 4-segments
(4) One pair of ovaries attached at intersegmental septum of 14^{th} and 15^{th} segments

157. If a live earthworm is pricked with a needle on its outer surface without damaging its gut the fluid that comes out is:-

(1) slimy mucus (2) exvretory fluid
(3) coelomic fluid (4) haemolymph

[AIPMT-2011]

158. One very special feature in the earthworm (Pheretima) is that:-

(1) Fertilisation of eggs occurs inside the body
(2) The typhlosole greatly increases the effective absorption area of the digested food in the intestine
(3) The S-shaped setae embeded in the integument are the defensive weapons used against the enemies.
(4) It has a long dorsal tubular heart

[AIPMT-2018]

159. Which of the following animals does not undergo metamorphosis?

(1) Earthworm (2) Tunicate
(3) Moth (4) Starfish

[NEET-2021]

160. Following are the statements about prostomium of earthworm:-

(a) It serves as a covering for mouth.
(b) It helps to open cracks in the soil into which it can crawl.
(c) It is one of the sensory structures.
(d) It is the first body segment.

Choose the correct answer from the options given below.

(1) (a), (b) and (c) are correct
(2) (a), (b) and (d) are correct
(3) (a), (b, (c) and (d) are correct
(4) (b) and (c) are correct

ANSWER-KEY																										
Que.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Ans.	2	1	3	2	4	1	4	4	3	3	3	3	1	3	2	1	1	3	1	4	2	1	4	4	2
Que.	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**
Ans.	3	4	1	1	3	3	4	2	1	4	3	4	3	2	3	2	3	1	2	4	4	1	3	1	1
Que.	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**
Ans.	4	2	4	1	3	4	4	2	2	3	3	2	1	4	4	2	1	3	4	4	3	1	4	4	2
Que.	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**100**
Ans.	2	3	3	3	2	4	3	2	1	4	2	2	3	3	4	1	1	4	3	2	3	4	1	1	2
Que.	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**	**109**	**110**	**111**	**112**	**113**	**114**	**115**	**116**	**117**	**118**	**119**	**120**	**121**	**122**	**123**	**124**	**125**
Ans.	2	1	1	2	3	2	2	1	2	3	4	3	1	3	2	3	1	2	1	4	1	2	2	1	3
Que.	**126**	**127**	**128**	**129**	**130**	**131**	**132**	**133**	**134**	**135**	**136**	**137**	**138**	**139**	**140**	**141**	**142**	**143**	**144**	**145**	**146**	**147**	**148**	**149**	**150**
Ans.	1	4	3	3	1	4	3	2	1	3	3	3	3	2	2	4	2	4	1	3	4	4	2	1	3
Que.	**151**	**152**	**153**	**154**	**155**	**156**	**157**	**158**	**159**	**160**															
Ans.	2	3	4	4	3	1	3	2	1	1															