UNIT-VI **PHYLUM - ANNELIDA (Pheretima - Earth worm)** Friends of farmers are - Earth worms Introduction • Earthworm common in Europe and north America - Lumbricus • The term 'Annelida' was introduced by The genus Pheretima was established by Kinberg -J.B. Lamarck in 1867 • First Eucoelomate phylum is - Annelida. The largest genus in earthworms is - Pheretima First Schizocoelomate phylum is • Number of indian species under the genus Pheretima - Annelida. Distinct cephalization first appeared in - 13 • Most common indian earthworm Phertima postima - Annelida. • Monograph on Phertima was given by Prof. KN Bristle worms belong to class - Polychaeta Bahl in 1947 Earth worms belong to class - Oligochaeta Leeches belong to class - Hirudinea **INTRODUCTION** The characterstic larva of Annelida Trochophore Level-I Worms like Nerilla and Polygordius belong to the 1. The term "Annelida" was introduced by class Archiannelida. 1) Linnaeus 2) Lamarck 3) Darwin 4) Cuvier Earthworms 2. Eucoelomate and schizocoelomate phylum is More than 50,000 earthworms bring 14 tonnes of 2)Echinodermata 1) Nemathelminthes soil to the surface in a year 3)Annelida 4) Chordata Earthworms keep soil - porous 3. Cephalization was first developed in Earthworms facilitate - aeration & drainage for the 1) Platyhelminthes 2) Porifera root growth 3) Arthropoda 4)Annelida Earthworms were called 'intestines' of the earth 4. Which of the following animal is studied in detail by by K.N. Bahl -Aristotle 1) Megascolex 2) Drawida Number of Australia's native species - 1000 3) Pheretima 4) Chaetogaster. The largest giant Gippsland earth worm is-5. Prominent character of Annelida Megascolides australis. 1) Mesoderm formation 2) Coelom formation This gaint earthworm grows- 80 cm long & 2 cm 3) Metamerism 4) Septa formation in diameter. 6. The following are the first developed in Annelids Relatively longer life span among invertebrates 1) Cephalization and Digestive system -Gippsland Earthworms 2) Cephalization and Circulatory system Gippsland earthworms attain maturity at - 5 years 3) Circulatory system and Respiratory system The length of these worms when they hatch - 20 4) Coelom and Excretory system cm 7. Number of species of Earth worms distributed world The smallest earth worm is- Chaetogaster over annandalei 1) 8,600 2) 2,600 3) 3,000 4) 13 **Different genera & species** 8. Largest genus with more number of species Number of species in all over the world more than 1) Pheretima 2) Lumbricus - 3000 3) Megascolides 4) Rhinodrillus Number of families of oligochaeta - 18 9. Number of species in Pheretima Number of speices in India - 350 1)9 2) 10 3) 12 4) 13 Indian species belong to -7 families 10. Polychaeta includes largest species in India - Megascolidae. 1) Flat worms 2) Earth worms The common species distributed in North India 3) Leeches 4) Bristle worms - Pheretima, Polypheretima, Eutyphaeus, 11. The longest Indian earth worm is Lampito and Perionyx 1) Megascolides 2) Pheretima South Indian earthworms - Drawida, Megascolex 4) Chaetogaster 3) Drawida The longest earth worm in India is

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- Drawida grandis.

12. The smallest earthworm is

1) Lumbricus	2) Chaetogaster
3)Tubifex	4) Megascolex

- Level II
- 13. Statement (S) : First formed eucoelomates are annelids

Reason (R): Annelids are the only triploblastic animals with a coelom lined by epithelial layers derived from mesoderm

1) Both S and R are true and R is the correct explanation of S

2) Both S and R are true and R is not the correct explanation of S $% \left({{{\mathbf{S}}_{\mathbf{S}}}_{\mathbf{S}}} \right)$

3) S is true but R is false

4) Both S and R are false

Habit & Habitat

- Habit of Pheretima Nocturnal and Detrivorus
- Pheretima posthuma has a

- long narrow cylindrical body

- Pheretima lives in Burrows (fossorial)
- Fossorial life helps in protection and respiration
- The burrows are internally lined by

-Slimy secretion

• Presence of earthworms in soil is detected by

- worm castings.

 Pheretima comes out of burrows during day time when it rains, to perform - Respiration

HABIT AND HABITAT

Level - I

- 14. The body of Pheretima is well suited for1)Arboreal life2)Fossorial life3)Aquatic life4)Aerial life
- 15. The burrows of earth worms are lined by the following secretion.

1) Keratin	2) Mucin
3) Calcareous	4) Chitinou

16. Burrows of earth worms reach up to depth of 2 to 3 meters in

1) Summer	2) Winter
3) Spring	4) Rainy season

17. Pheretima is1) Nocturnal herbivore 2) Nocturnal omnivore3) Nocturnal detritus feeder 4) Diurnal herbivore

18. Presence of earth worms can be identified by observing

	ooserving.	
	1) Deep burrows	2) Humus soil
	3) Moist soil	4) Worm castings
19.	Pheretima is a	
	1) Herbivore	2) Carnivore
	3) Detritivore	4) Saprobe

Level - II

20. Statement (S) :Pheretima is a detritivore.
Reason (R): It feeds on decaying organic matter present in the soil.
1)Both S and R are true and R is the correct explanation of S
2) Both S and R are true and R is not the correct explanation of S
3) S is true but R is false
4) Both S and R are false

ECONOMIC IMPORTANCE

- Earth worms are beneficial to man.
- They are considered as 'farmer's friends since they increase the fertility of the soil.
- They are used as food for fish in aquaria.
- They form the food for many animals like frogs. lizards, birds etc.,
- Earth worms are used in unani medicine to cure several diseases like stones in the urinary bladder and gout
- The worm castings serve as

- Good natural manure

- Vermicompost is prepared with agricultural waste, leaves, cattle dung etc by using Earthworms
- Vermicompost consists of 60% nitrogen, 5.04% phosphorus, 0.8% proteins & micronutrients
- The liquid fertilizer produced by passing water through the columns of vermiculture Vermiwash
- Vermiwash is used as Foliar spray
- Non burrowing earthworms are cultured in - Vermiculture
- Earthworms are Farmer's friends ECONOMIC IMPORTANCE

Level - I

- 21. To enrich the soil fertility worm castings of earthworm are helpful, because they consist 1) Phytoplanktonic sediment
 2) Nitrogenous wastes
 3) Zooplanktonic sediment
 4) Water
 22. Earthworms are used in this form of medicine to
- 22. Earthworms are used in this form of medicine to treat human diseases
 1) Allopathy
 2) Unani
 - 3) Homeopathy 4) Naturopathy
- 23. Percentage of nitrogen in vermicompost is 1) 10% 2) 60% 3) 5.04% 4) 0.8%
- 24. Percentage of phosphorous proteins and micronutrians in vermicompost respectively is 1) 5.04% and 60%
 2) 5.04% and 10%
 3) 0.8% and 5.04%
 4) 5.04% and 0.8%

Level - II

25. Arrange the following components of vermicompost in ascending order depending upon the pecentage

of their occurance	
A) Phosphorous	B) Nitrogen
C) Proteins and Micron	utrients
1) A - B - C	2) B - C - A
3) C - B - A	4) C - A - B

External features of Pheretima

The dark brown colour of the dorsal surface of the body is due to

- Porphyrin.

• Pheretima gets protection from U.V. rays by

- Porphyrin. Segmentation in Annelids - Homonomous metamerism
- If the successive segments and their appendages are essentially identical - Homonomous metamerism
- Ring like body parts of Pheretima are

- Segments (metameres)

- Shape of mouth in Pheretima Crescent shape
- First segment in Pheretima is also known as

- Buccal segment or peristomium.

- Fleshy lobe hanging from the peristomium is
- Prostomium The circular band of glandular tissue in Earth worm - Clitellum or Cingulum İS
 - Clitellum in Pheretima is present in the segments
 - 14 to 16
- Body divisions basing upon clitellum. Preclitellar region is between the segments - 1-13
- Clitellar region - 14 to 16
- Post clitellar region - 17 to last.

EXTERNAL CHARACTERS

Level - I

- 26. The type of metamerism in Pheretima
 - 1) Homonomous metamerism
 - 2) Heteronomous metamerism
 - 3) Pseudometamerism
 - 4) Holometaboly
- 27. Number of metameres in Pheretima 1) 80-120 2) 60-120 3) 100-120 4) 180-220
- 28. Externally and internally the segments are separated respectively by
 - 1) Grooves and ridges 2) Ridges and furrows
 - 3) Furrows and grooves 4) Grooves and septa
- 29. The following is absent in Pheretima 1) Head 2) Metamerism 3)Clitellum 4)Anus
- 30. Prostomium is devoid of 1) Coelom and Bodywall 2) Body wall and Muscles 3) Coelom and organs 4) Muscles and organs

31.	Segments in Cingulum in Pheretima			
	1) 14 to 16 2) 14 to 15	3) 13 to 16 4) 16 to 19		
32.	Segment with mouth			
	1) Prostomium	2) Peristomium		
	3) Holostomium	4) Pseudostomium		
33.	The dark brown pigmen	t porphyrin protects the		
	animal from			
	1) Infra red rays	2) Gamma rays		
	3) Cosmic rays	4) UV rays		
Lev	el - II	· ·		
34.	Based on the number of	segments in the following		
	regions arrange the region	ons in a descending order		
	A) Preclitellar region	B) Clitellar region		
	C) Postclitellar region			
	1) A - B - C	2) C - A - B		
	3) B - A -C	4) B - C - A		
	Assertion / Reason	,		
	1)Both S and R are true	and R is the correct		
	explanation of S			
	2) Both S and R are true	and R is not the correct		
	explanation of S			
	3) S is true but R is false			
	4) Both S and R are fals	e		
35.	Statement (S) : In Phere	tement (S) : In Pheretima prostomium is		
	considered as a pseudo s	segment.		
	Reason(R): Prostomiur	n consists of		
	pseudocoelom.			
36.	Statement (S) : In earthworm the body surface is			
	deep brown in colour.			
	Reason (R): Body wall	l of earthworm is with a		
~ -	pigment called porphyrin	l.		
37.	Statement (S) : Earthwo	orm exhibits metamerism		
	both externally and inter	nally.		
	Reason (R): Body of E	arthworm divided by		
	series of circular grooves	s and internally with corre		
•	sponding septae			
38.	The following are the sta	tements about earthworm		
	1) The dorsal surface is d	eep brown and ventral sur		
	Tace is pale brown in col	our.		
	11) It has two pairs of eye	es.		
	111) The body size is abou	it 150 mm.		
	The correct combination	18		
	1) All are true	2) Only 1 & 111 are true		
	3) only 1 & 11 are true			
	4) Only 111 and 11 are true			
	External O	penings		
•	Single median aperture or	the ventral surface of 14th		
	segment - F	emale genital aperture		
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- Genital apertures present behind the cingulum - Male genital apertures.
- Male genital apertures are - 1 pair

- Circular papillae or genital papillae or copulatory papillae are two pairs.
- Gential papillae occur in the segments

- 17th & 19th.

- Spermathecal apertures are present in the segmental grooves between - 5/6, 6/7, 7/8, 8/9
- Inter segmental groove openings along mid dorsal line are **Dorsal pores.**
- Dorsal pores start from 12/13 segments.
- Dorsal pores extend upto
 - last but one segment.
- Dorsal pore is absent in Last segment.
- Segment with Anus- Last segment (or) Pygidium
- Nephridiopores are absent in
 - first two segments.
- Nephridiopores From 3rd to Last segment (Integumentary nephrediopores)

EXTERNAL OPENINGS

Level - I

- 39. Dorsal pores in Pheretima starts from the segment. 1) 12/13 2) 11/12 3) 10/11 4) 9/10
- 40. Dorsal intersegmental apertures are meant for the release of
 - 1) Excretory wastes 2) Saliva
 - 3) Mucous 4) Coelomic fluid
- 41. Dorsal pores are absent in Pheretima in the following segments
 - 1) Preanal segment and Clitellum
 - 2) Last segment and Clitellum
 - 3) First segment and post clitellar segments
 - 4) Pre anal segments and post clitellar segments
- 42. All pores in Pheretima are ventral except
 - 1) Mouth 2) Genitalpores
 - 3) Dorsal Pores 4) Nephridiopores
- 43. Spermathecal openings in Pheretima extends between segments
 - 1) 5-9 segments 2) 4-8 segments
 - 3) 6-10 segments 4) 6-9 segments
- 44. Unpaired gonopore in Pheretima
 - 1) Male genital aperture
 - 2) Female genital aperture
 - 3) Spermathecalpore 4) Cloaca
- 45. Pores meant for entry of sperms and expulsion of sperms in Pheretima
 - 1) Male gonopore 2) Female gonopore
 - 3) Spermathecal pores 4) Anus
- 46. Segments with genital papillae in Pheretima 1) 17 and 19 2) 17 and 18
 - 1) 17 and 19
 2) 17 and 18

 3) 16 and 17
 4) 15 and 16
- 47. Gateway of Coelomic fluid in Earthworm
 1) Anus
 2) Cloaca
 3) Dorsal pores
 4) Genital Papillae
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48. Pores confined to only preclitellar region 1) Mouth and Anus 2) Mouth and Spermathecal 3) Dorsal pores and Gonopores 4) Gonopores and anus 49. Which of the following external apertures communicate the body cavity with exterior in Pheretima 1)Anus 2) Mouth 4) Dorsal pores 3) Nephridiopores 50. The paired openings present in the preclitellar segments 1) Nephridio pores 2) Dorsal pores 3) Male genital pores 4) Spermathecal apertures Level - II 51. Arrange the occurance of the following pores in the antero-posteior sequence in the preclitellar region a) Dorsal pores b) Nephridio pores c) Spermathecal apertures 1) b - c - d2) c - d - b3) d - c - b4) b - d - c52. Match the following and choose the correct combination Structure **Functions** A) Mouth i) Ingestion B) Dorsal Pores ii) Excretion C) Nephridiopores iii) receiving sperms during copulation D) Spermathecal iv) Coelomic fluid openings comes out v) Circulation B С D Α iii 1) i iv ii 2) i ii iii iv 3) ii iii iv i 4) iii ii i iv 53. Match the following and choose the correct combination Apertures Location i) 14th segment A) Mouth ii) 26-29 segments B) Anus C) Male genital pores iii) 18th segment D) Female genital pore iv) peristomium v) Pygidium. Α B C D 1) iv iii i v 2) i iii iv \mathbf{v} 3) i iv v ii ii 4) i iv v 54. The following are the external apertures of Pheretima.

a) Dorsal pores b) Female genital pore

c) Male genital pores d) Anus

Arrange in the correct sequence of these pores from the anterior to the posterior.

	1) a -c - b -d	2) a - b - c - d
	3) b - a - c - d	4) d - a - c - b
55.	Arrange the external op numbers of Pheretima	benings and their segmental (EAM-2007)
	Set - I	Set - II
(a) N	Aale genital apertures	(1) Between 12/13 to last segment
(b) I	Dorsal pores	(2) Form 3rd to last segment
(c) S	permathecal apertures	(3) 18th segment
(d) N	Nephridiopores	(4) From 5/6 to 8/9
		segments
Tha	correct match is	

The **correct** match is

(1)	a-2	b-1	c-3	d-4
(2)	a-3	b-1	c-4	d-2
(3)	a-3	b-4	c- 2	d-1
(4)	a-2	b-3	c-1	d-4

SETAE

- Arrangement of Setae round the body - Perichaetine arrangement Ventrolateral arrangement of setae is octochaetine
- arrangement(8) •
- Octochaetine arrangement is exhibited by
 - Lumbricus or British earthworm.
- Colour of setae - Faint yellowish
- Shape of setae - Sigmoid or 'S' shaped
- Distal end of setae is - Pointed.
- Proximal end of seate is - blunt
- Central part of setae is nodulus - Swollen
- Fraction of setae exposed out is - 1/3 •
- Exposed part is - Neck
- Embeded part is present in -Setal sac.
- Embeded parts of setae are- Base and Nodulus.
- Setal sac is formed by

- invagination of epidermis of body wall.

- The muscles which move setae are
 - Protractor and Retractor muscles.
- Muscles associated with each setal sac

- One pair of protractor and retractor muscles

Segments without setae

- First & Last, clitellar region of mature earth worm.

SETAE

Level - I

- 56. Colour and position of setae in each segment re spectively is
 - 1) Yellow and Anterior end
 - 2) Pale yellow and middle
 - 3) Pale yellow posterior end
 - 4) Yellowish and through out

- 57. 2/3 part of setae which remains in setigerous sac is 1) Base 2) Root 3) Nodulus 4) Theca 58. Nodulus and neck of setae are respectively the fol lowing parts 1) Middle and exposed 2) Exposed and embedded 3) Middle and embedded 4) 2/3 and 1/3 parts 59. Earthworm loses body setae usually during 1) Summer 2) Winter 3) Breeding season 4)Autumn 60. Setae are numerous all over the middle of segment in a single row. This type of arrangement is 1) Octochaetine 2) Perichaetine 4) Lophochaetine 3) Amphichaetine 61. In Lumbricine arrangement setae are 1) Eight, ventral and lateral 2) Four pairs Dorsal and lateral 3) Eight pairs ventral and lateral 4) Four pairs Dorsal 62. The segment in Pheretima with neither Perichaetine nor Octochaetine arrangement. 1) Pre anal segment 2) Pre clitellar segments 3) Post clitellar segments 4) Pygidium 63. Wrong combination
 - 1) Megascolex Perichaetine
 - 2) Pheretima Lumbricine
 - 3) Eutyphaeus-Octochaetine
 - 4) Lumbricus Octochaetine
- 64. Muscles meant for movement of setae 1) Dorso ventral muscles
 - 2) Protractor and Retractor muscles
 - 3) Abductor and Adductor muscles
 - 4) Longitudinal muscles

BODY WALL

• Body wall in Pheretima is

- Dermomuscular body wall.

- Thin non-celluar layer of body wall - Cuticle
- Cuticle is made up of - Collagen, Gelatin, mucopolysaccharides.
- Number of kinds of cells present in Epidermis - Four kinds.
- The four kinds of cells of epidermis are
 - 1) Large gland cells 2) Supporting cells
 - 4) Receptor cells 3) Basal cells
- The largest cells of body wall of Pheretima are -**Mucous cells**
- In mucous cells the distal end contains mucous granules, while the proximal end contains cytoplasm & nucleus.
- The columnar cells, which are few in number are -Albumin cells.

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•	The tall, narrow cells with oval nucleus in the centre	68.	Constantly replacing layer in	earthworm
	- Supporting cells.		1) Dermis	2) Epidermis
•	The smallest cells with round nucleus - Basal cells		3) Cuticle	4) Tegument
•	The elongated cells with a nucleus at one end and	69.	Cuticle is secreted by	
	expanded fan like process at the other end are -		1) Epidermis	2)Dermis
	Mucocytes		3) Tegument	4) Mesenchyme
•	Epidermal cells which secrete mucus & albumin	70.	The type of epithelium in epi	dermis
	- Large gland cells		1) squamous	2) Columnar
•	Ovoid, rounded distally & narrow proximally &		3) Cuboidal	4) Ciliated
	largest gland cells are - Mucous cells	71.	Which of the following are a	bsent in epidermis of
•	Columnar gland cells - Albumin cells		earthworm	_
•	Nucleus lie at proximal end in - Mucous cells		1) Supporting cells	2) Sensory cells
•	Nucleus lie at basal end - Albumin cells		3) Basal cells	4) Yellowcells
•	Totipotent cells of Epidermis - Basal cells	72.	Origin of body wall in Earth	worm
•	Basal cells are the -smallest cells		1) Ectodermal	2) Endodermal
•	Cells which are involved in receiving external stimuli		3) Ecto-mesodermal	4) Mesodermal
	- Receptor cells	73.	Basement membrane in Eart	hworm
•	Supporting cell is with oval shaped nucleus	,	1) Thick and cellular	
•	Laver of connective tissue beneath the epidermis is		2) Thick and Chitinised	
	- Dermis		3) Thin and non-living	
•	Dermis is also known as basement membrane		4) Thin and connective tissue	2
	- in Pheretima	74	The type of muscles in earth	worm
•	Outer muscles in the body wall of Pheretima	, 1.	1) Striated	2) Smooth
	- Circular muscles		3) Voluntary	4) Striped
•	Muscles which form a continuous layer - circular	75	The muscles which are prese	nt in the body wall and
•	Protractor and retractor muscles are connected to	75.	absent in alimentary canal in	nheretima
	circular muscles		1) Circular muscles	phereuma
•	Muscles of the body well which are arranged in		2) Longitudinal muscles	
	bundles		2) Protractor and retractor m	nusalas
•	Inner most layer of body wall		4) Dorsoventral muscles	luscies
	Outer coolomic on the line	76	4) Dorsovenuar muscles	in the form of hundles
•	- Outer coelomic epithelium is also known as	70.	in Dharatima ara	in the form of buildies
	Pariotal layor		1) Circular muscles	
•	- 1 al letal layer		2) Longitudinal muscles	
	Inter segmental sente primerdial garm calls		2) Maganahumal muscles	
•	- Inter segmental septa, primordial germ cens		4) A division muscles	
•	The layer of body wan which plays a vital fole in		4) Adductor muscles.	wall in Dhanating a
	protecting from foreign organisms is	//.	1) Salan shais layer	2) Vige and lawar
Ded	- Mucous layer.		2) Damaia	2) Visceral layer
Б00 Т	ywaii 	70	5) Dermis	4) Parietal layer
	ei - I	/ð.	1) S and a second	2) C - home and
63.			1) Squamous $2 \times C = 1 \times 1 \times 1$	2) Columnar (1) (1)
	1) Pre clitellar region 2) Clitellar region	70	3) Cuboidal	4) Flagellated
	3) Post clitellar region 4) Youngest segments	/9.	Inter segmental septa and the	e primary germ cells
66.	Cuticle is made up of		are derived from	
	1) Proteins and Fats		1) Inner Coelomic epithelium	1
	2) Proteins and Carbohydrates		2) Outer Coelomic epitheliur	n N.D
	3) Carbohydrates and lipids		3) Visceral layers	4) Dermis
<u> </u>	4) Lipids and Polysaccharides	80.	I otipotent cells in the epide	rmis of Pheretima
67.	Chemically cuticle in Pheretima		1) Supporting cells	2) Basal cells
	1) Collagen, gelatin and Polysaccharides		3) Receptor cells	4) Gland cells
	2) Collagen, Elastin and Keratin			
	3) Keratin Elastin and Polysaccharides			
	4) Gelatin, Keratin and Elastin	l		

Level - II

81.	Arrange the following cells	in epidermis based on		Pher
	their number in a descendin	g order		a) Ej
	A) Mucous cells	B)Albumin cells		c)Lo
	C) Supporting cells			Arra
	1) A - B - C	2) A - C - B		outs
	3) C - A - B	4) B - C - A		1) a
82.	Arrange the following cells	in epidermis based on		3) b
	their size in a descending or	der		
	A) Supporting cells	B) Mucous cells	CO	ELO
	C) Basal cells	,	٠	The
	1) B - A - C	2) B - C - A		nal is
	3) C - B - A	4) A - C - B	•	Coe
83.	Statement (S) : The body	wall of Pheretima is	•	Flui
	dermo - muscular		•	Coe
	Reason (R): Outer layer	of body wall is	•	Coe
	cuticle which is made up of	polysaccharides and	٠	The
	proteins.	1 2		wall
	1)Both S and R are true and	d R is the correct		
	explanation of S		•	Sept
	2) Both S and R are true an	d R is not the correct		- in
	explanation of S			segr
	3) S is true but R is false		•	First
	4) Both S and R are false		•	Thic
84.	Statement (S) : Basal cells	in the body wall of		
	Pheretima are totipotent.		•	Con
	Reason (R): Basal cells c	an give only columnar		
	cells of the body wall	6 5	•	Api
	1)Both S and R are true and	d R is the correct		ware
	explanation of S		٠	Sept
	2) Both S and R are true an	d R is not the correct		
	explanation of S		•	Tran
	3) S is true but R is false			
	4) Both S and R are false		٠	First
85.	The following are the staten	nents about body wall		
	of earthworm.	5	•	Sept
	i) Dermo - muscular		•	Shaj
	ii) Contains totipotent cells		•	Sept
	iii) Contraction of circular n	nuscles make the body	•	Coe
	thick and short.	·		othe
	The correct combination is		•	Coe
	1) All are true	2) Only i & ii are true	•	Nun
	3) only i & iii are true	, .		Pher
	4) Only iii and ii are true		•	Larg
86.	The following layers are not	iced in the body wall of		are
	Pheretima	-	•	Fund
	a) Cuticle b) Dermis			- Ing
	c) Epidermis d) Circular m	nuscles	•	Sma
	Arrange the correct sequen	ce of those layers from		
	outside to inside		•	Yell
	1) a - c - b - d	2) a - b - d - c		
	3) d - a - b - c	4) a - b - c - d	•	Yell

- 87. The following are the layers of body wall of etima pidermis b) Cuticle ongitudinal muscle layer d) Circular muscle layer inge in the correct sequence of these layers from ide to inside. - b - c -d 2) c - a - b - d
 - a d c 4) a - c - b - d

M:

- space between body wall and alimentary ca-- Coelom S
- lom is also known as **perivisceral cavity**
- d present in perivisceral cavity is Coelomic fluid
- lomic fluid is alkaline with Ph 7.9
- lom is earthworm is schizocoelom
- transverse partitions which stretch from body to alimentary canal are

- Inter segmental septa.

- ta are absent -first four segments and between 9 & 10 ments.
- septum thin and membranous 4/5 septum
- k and muscular septa are present between - 5/6/, 6/7, 7/8, 8/9, 10/11 segments.
- ical septa are-First six septa between

- 4/5 to 10/11 segments.

- ces of the cone like septa are directed- Backd
- ta without septal pores are first nine septa - 4/5 to 13/14
- svers septa without septal pores is - 11/12, 12/13 & 13/14
 - perforated and typical septum is

- 14/15 septum

- tal pores are guarded by - sphincter
- pe of septal pores - oval
- al pores are also known as- sphinctered pores
- lomic fluid movement from one segment to anr is controlled by - sphinctered pores lomic fluid acts like - Hydraulic skeleton nber of kinds of cells in the coelomic fluid of etima - four ge sized, more numbered cells of coelomic fluid - phagocytic cells (Amoebocytes) ction of phagocytic cells

gestion of foreign organisms like bacteria

- Ill sized, more numbered cells of coelomic fluid - yellow cells or chlorogogen cells
- ow coloured granules of yellow cells are - chloragosomes
- ow cells loaded with wastes Eleocytes

•	Chlrorgogen cells are functionally smilar to liver of	9
	higher animals	
٠	Cells concerned with glycogen synthesis and stor-	
	age - Chlorogogen cells	9
•	Functions performed by yellow cells	
	- Storage of reserve food materials, Deamina-	
	tion and Excretion.	
٠	The cells of coelomic fluid with characteristic mark-	
	ing is - Circular cells	9
•	The percentage of circular cells among the co-	
	elomic cells is - 10%	
•	Elongate cells of coelomic fluid - Mucocytes	
٠	Coelomic cells involved in mucous secretion	
	Mucocvtes.	
٠	Coelomic fluid which oozes out of the body helps	
	in two ways -1) Kills bacteria	
	2) Keeps skin moist and helps in Respiration	
	COELOM	1
Lev	vel - I]
88.	Most of the intersegmental septa in the body of	(
	Pheretima are	1
	1) Thick, cone like, complete]
	2) Thin vertical, complete	6
	3) Thin, cone like, perforated	
	4) Thick vertical perforated	
89.	Definite shape to the body of Earth worm is due to	
	1) Exoskeleton 2) Endoskeleton	
	3) Dermomuscular bodywall	
	4) Straight nervecord	
90.	In Pheretima, septa are absent in	
	1) First five segments 2) 8/9 segment	
	3) First four and 9-10 segments	
	4) 4/5, 5/6 and 6/7 segments	
		1

- 91. Number of conical septa in Pheretima 1) 3 2) 4 3) 5 4) 6 02. The difference of the second september of the second s
- 92. The thinnest septum in Pheretima 1) 7/8 2) 6/7 3) 5/6 4) 4/5
- 93. Number of thick conical and muscular septa in Pheretima are
- 1) 32) 43) 54) 694. In Pheretima, sphincter muscles are guarding
 - 1) Septal pore2) Mouth3) Anus4) Cloaca
- 95. The septa without septal pores in Pheretima
 1) First four
 2) First six
 3) First Eight
 4) First Nine
- 96. Function of cells in coelomic fluid with membranous folds1) Excretion 2) Cleaning
 - 3) Phagocytosis 4) Respiration

97.	Cells of co	elomic f	luid,	with unkn	own function		
	1)Yellow	cells		2) Circula	r cells		
	3) Mucocy	ytes		4) Phagoo	cytes		
98.	The nature	ofCoel	omi	fluid	•		
	1) Acidic a	und whit	e				
	2) Alkaline	e and wł	nite				
	3) Alkalin	e and co	lour	less			
	A A cidic s	and colo	10ui 11r 10	1055 66			
00	Hydroulio	akalator	n in E	ss Dharatima i	s formed by		
<i>.</i>	1) Decended	oolomi	a flui	d	s formed by		
	2) Mesono	huma	c nui	u 3) Urdrol	umph		
	4) Coelom	io fluid		JIIyuloi	ympn		
100	Doroontogo	ofoirou	lorm	uploated op	lls in acalom fluid		
100	. Percentage	orclicu	larn	ucleated ce	iis in coelom nuid		
	I) 100/	2) 50/		2) 200/	4) 150/		
r .	1) 10%	2) 5%		3) 20%	4) 15%		
		C 11 ·					
101.	. Match the	followin	ng	.) C .	1 11		
A)n	umerous ai	nd the		1) Circi	ilar cells		
arge	est nucleate	d cells					
3) n	umerous ar	ld small	cells	ii) Phag	gocytes		
C)c	ells with ch	aracters	stic	iii) Muc	ocytes		
narl	kings on the	eir surfa	ce				
D)e	longated ce	lls with		iv) Chloi	agogen cells		
a far	n like proce	SS					
		А	В	С	D		
	1)	i	ü	i	iv		
	2)	i	ï	iv	iii		
	3)	i	iv	i	ü		
	4)	i	ï	ü	iv		
102	. Arrange th	e transf	erma	tion of inn	er coelomic		
	epithelial c	ell into	an ex	cretory ce	ll from the		
	following	cells in a	a pro	per sequer	ice		
	A) Chlorag	gogen ce	ell	B) Specia	lized cell		
	C) Eleocy	te		, <u>-</u>			
	1) B - C -	А		2) B - A -	- C		
	3) C - B -	А		4) C - A -	·B		
103	. Statement	(S): Ch	lora	gogen cell	s are functionally		
	similar to t	he liver	cells	of vertebi	rates		
	Reason (R): The	sece	ells play an	important role in		
	the interm	ediary m	netab	olism of Pl	heretima		
	1) Both S	and R a	re tr	ue and R i	is the correct ex-		
	planation	ofS					
	2) Both S	and R a	re tr	ue and R	is not the correct		
	explanatio	nofS					
	3) S is true	but R i	s fals	se			
	4) Both S	and R a	re fa	lse			
104	T Doui S and K at laist						
	rior siv int	erseam	ental	senta are	cone like and ob		
	lique in dia	nosition	cinal	septa ale	conc nice and 00-		
	Reson (POSILIOI D) • 1~4	orec	amental a	ento present he		
		$t_0 = 10/1$		ginenta a	opia present de-		
	iween 4/J	10/1	1 26	gineins ar	e perioraleu allu		

their apertures are guarded by sphincters.

 Both S and R are true and R is the correct explanation of S Both S and R are true and R is not the correct 				is the correct ex- is not the correct	 Lymph glands : Lymph glands are found in - 26th to last segment at the rate of 1 pair in each segment. 		
explanation of S					• I	Lymph glands produce	- phagocytes.
3) S is 4 Pot	3) S is true but R is false					і умрн сі а	NDS
105 The fe	11 S allu	r are th	11SC	ata about conta of	Love		NDS
105. The IC	nowing	g are the	e statemer	nis about septa of		I - I Dhaacaarta mucducina alanda	in Dhanatinaa
	ont in ha	trucon)th and $10i$	the	109.1	Diagocyte producing gianus	2) I smark alanda
i) Auso		to oro o	onical	ui segments		Calaifarana alanda	2) Lympii gianus
	the cont		onical			1) Dreastrate alanda	
III) All The ee	the sept	a are pe	riorated.			t) Prostrate grands	acomenta
		nomau	$\frac{101118}{2}$	Prii ana trata	110.1	Lymph glands extends in the	2) 25th lost
1)Alla 2) anl			2) Only 1 4) Only 1	i & ii are true		$20 \ln - \ln st$	$\frac{2}{20} \frac{25 \text{th} - 1 \text{ast}}{1 \text{ ast}}$
5) Only 106 Motob	$y 1 \propto 111 a$	ire true	4) Uniy 1	a the correct corre	111 T	0) 25ru - Iasi Dogition of Lymph glondgin	4) 20th - tast
100. Match	n une ione	owinga	and choose	e the correct com-	111.1	Position of Lymph glands in	each segment
	41		Function	ns		A pair below ventral bloc	ou vessel
A) Ye	llow Cel	ls	i) Unknc	own function		2) A pair on entire side of do	
B) Cir	cular Ce	ells	ii) Protec	tion		1) A pair balowe sub neurar v	vessel
C) Mu	ucocytes	5	iii) Mucc	ous Secretion		Tymph glands in Dhorotime	ana
D) Ph	agocyte	s	iv) Excre	tion	112.1	= 2911011 grands in 1 hereunia	are present in
,			v) Food	Collection		$\frac{1}{1} = 10$	2) 15 26
	Α	В	С	D		2) 26th to last segment	2) 13-20
1)	ii	i	iii	V	-) 20th to fast segment	4) 15
2)	i	iv	ii	iii	Wall	of Alimontory Conol	
3)	11 ·	1	1V 	V ···	• •	Alimentary canal is held in n	osition by
4) 107 Matab	1V	1	111 	11 a tha a ama at a ama		Sinnentary canaris neicini p	osition by
10/. Match	the ioli	owinga	and choose	e the correct com-	• T	nter segmental senta arise f	rom
Λ Dh	n naoayta	a	i) Despir	ation		nier segmentar septa arise i Outor	coolomic onitholium
A) Th B) Ch	loragog	s m cells	i) Everet	zion	•	-Outer Outer most layer of aliments	cocionne epithenum
C) Cir	cular ce		iii) Unkn	own function		Inner coalomic anithali	ury canar um ar viscoral lavar
D) M		3	iv) Protec	ction	•	Tells which arise from	visceral laver are
D (11)	acceptes	,	v) Moist	t and soft skin.		blorggogen cells	viscerar rayer are
	Α	В	C	D	•	Duter muscle laver of alimer	ntarry canal
1)	iv	v	iii	i			nary canar ongitudinal muscles
2)	i	iii	iv	V	• T	nner muscle laver of alimen	tary canal
3)	iv	ii	iii	V		finer musele layer of animen	- circular muscles
4)	i	ii	iv	V	• T	nner most laver of alimenta	- circular muscles
108. Match	the follo	owing ((EAM-20	08)	• 7	The muscle layers of alignent	ary canal are meant for
Set - I			List - II			neristalitic movement	ary canar are meant for
(Pheretima))		(Cell feat	tures)		nner folding present middo	sally in Pheretima
A. Phagocy	vtes		1. small c	cells having		finer fording present finddor	- Typhlosole
			yellowisł	n granules	• 7	Fyphlosole extends from	- Typinosoic.
B. Chlorage	ogen cell	S	2. elonga	ated cells		. 26th segment to last exclu	ıding 23-25 segment
C. Circular cells 3. largest cells with				20th segment to last exer	iung 25-25 segment.		
mambranous folds				WALL OF ALIMENTA	ARVCANAL		
D. Mucocy	tes		4. cells w	vith characteristic	Leve		
			marking	s on the surface	113 N	Nature of alimentary canal w	va11
The correct	t set is		5		1) Ecto mesodermal	vu11
1) A - 3	В-	4	C - 1	D - 2) Ectoendodermal	
2) A - 2	В-	1	C - 4	D - 3		3) Endo mesodermal	
3) A - 4	В-	3	C - 2	D - 1		1) Mesodermal only	
4) A - 3	В-	1	C - 4	D - 2		, mesodermaromy	

114. The alimentary canal is a straight tube and is held in position by

- 1) Dorso ventral muscle
- 2) Protractor and retractor muscles
- 3) Visceral peritoneum
- 4) Intersegmental septa
- 115. Typhlosole is

1) Mesodermal	2) Ectodermal
3) Endodermal	4) Endomesodermal

Level - II

116. Arrange the three types of a	endodermal cells which		
form the inner most layer o	f the alimentary		
canal from anterior to the ir	ntestine region		
A)Glandular B)Ciliated			
C) Absorptive and glandula	ar		
1) A - C - B	2) B - A - C		
3) C - A - B	4) C - B - A		

Locomotion

- Locomotion in Pheretima is done by the contraction & relaxation of longitudinal & circular muscles.
- The structures which assist in locomotion in Pheretima are - setae and coelomic fluid and mouth.
- During locomotion body exhibits
 - extensions, anchoring and contractions.
- Setae help the earth worm to have a firm grip on soil.
- Setae cannot give firm grip on smooth surface.
- When the anterior part extends - setae at the anterior end retract and setae at the posterior end protrude and take grip on soil.
- When longitudinal muscles of anterior end are re-- circular muscle contract. laxed
- The contractions and relaxations of muslces pass like a wave.
- The wave passes from the anterior end to the pos-• terior end.
- Setae which are used while moving on flat surface - ventral setae.
- While burrowing it uses

- ventral setae and also the lateral setae.

- Turgidity and stiffness of the body are provided by - Coelomic fluid.
- Coelomic fluid acts like a -hydrostatic skeleton
- While moving on smooth surface setae cannot be used for gripping.
- While moving on smooth surface •

- mouth acts as a sucker.

• Mucus substance helps for easy gliding of body on - substratum.

- Co-ordination among the muscular movements during locomotion is brought by nerve cord.
- Earthworm speed - 25 cm / minute

LOCOMOTION

Level - I

- 117. Contraction of circular muscles make the animal 1) Thin and Long 2) Short 3) Thick 4) Stumpy 118. Contraction of longitudinal muscles makes the body 1) Short 2) Thick 4) Long 3) 1 & 2 119. Chitinous structures which are present in the body wall, absent in wall of alimentary canal of Pheretima. 1) Terga 2) Sterna 4) Tentacles 3) Setae 120. Hold fast structures during locomotion on rough surface in Pheretima 2) Suckers 1) Mouth 3) Setae 4) Hooks 121. Locomotion in earthworm is controlled by 1) Coelomic fluid quanity 2) Number of Setae 3) Protractor and Retractor muscles 4) Nervecord 122. To move on smooth surfaces, earthworm uses. 1) Suckers 2) Setae 3) Mouth 4) Arolium Level - II 123. Statement (S) Pheretima uses its mouth as sucker on smooth surfaces Reason (R) In Pheretima body setae can not anchor the body to smooth substratum 1)Both S and R are true and R is the correct explanation of S 2) Both S and R are true and R is not the correct explanation of S 3) S is true but R is false 4) Both S and R are false 124. Statement (S) In Pheretima setae emerge out and anchor to the substratum when body becomes short and stout. **Reason (R):** Protractor and retractor muscles of setae arise from longitudinal muscles. 1) Both S and R are true and R is the correct explanation of S 2) Both S and R are true and R is not the correct explanation of S 3) S is true but R is false
 - 4) Both S and R are false

DIGESTIVE SYSTEM

Alimentary Canal

- Digestive system consists of alimentary canal and the associated glands.
- Alimentary canal is a straight tube extending from mouth to anus.
- The segment containing the mouth is Peristomium.
- Position of mouth in the first segment - Ventral.
- Hanging part from the first segment is

- Prostomium

٠

- Mouth opens into -Buccal chamber.
 - Buccal chamber extends upto

- middle of third segment.

- Part of the alimentary canal which protrudes and - Buccal chamber. retracts is
- Buccal chamber leads into •
- Pharynx. Shape of the pharynx - Pear shaped. .
- Pharynx extends between - middle of third segments to fourth segment.
- Pharynx is compressed dorsoventrally because of the presence of
 - Pharyngeal mass or bulb on dorsal side.
- Pharyngeal cavity is divided due to the presence of - Lateral pharyngeal shelves.
- Dorsal chamber of phyarynx is Salivary cham-٠ ber.
- The ventral chamber of pharynx is

-Conducting chamber.

- The pharyngeal bulb is considered as salivary • gland.
- Regions of salivary gland in Pheretima are.
 - 1) Ciliated pharyngeal epithelium
 - 2) Thick mass of musculo vascular tissue. 3) Pharyngeal gland cells (or chromophilic cells)
- Chromophilic cells produce
 - mucus and proteolytic enzyme.
- Saliva storing part in the pharynx

- Salivary chamber.

- Food reaches oesophagus passing through ٠
 - Ventral conducting chamber.
- Oesophagus extends from the •
 - fifth to eighth segment.
- Oesophagus in 8th segement modifies into
- Gizzard. Shape of - Gizzard is - Oval.
- The highly muscular organ in alimentary canal is - gizzard
- Gizzard acts like a - Grinding mill.
- Muscles well developed in the wall of gizzard - circular muscle

- Gizzard is internally lined by Chitinous cuticle.
- Highly glandular, vascular and folded part of alimentary canal is - stomach.
- Stomach extends between-9th to 14th segments.
- Type of enzyme secreted by glandular cells of stomach in Pheretima - proteolytic enzyme. •
 - Stomach leads into - Intestine.
- Intestine in Pheretima extends between

- 15th to last segment.

- Division of intestine is based upon -Typhlosole.
- The first part of intestine is - pretyphlosolar region.
- ٠ Pretyphlosolar region extends between 15th to 26th segments.
- Second part of intestine is - Typhlosolar region.
- Typhlosolar region extends from 26 segment to last, excluding the last 23 to 25 segments
 - The longest region of intestine is

-Typhlosolar region.

- Function of Typhlosole is -increases the surface area of absorption.
- Pheretima contains poorly developed typhlosole.
- Typhlosole in Pheretima is represented by
 - slight fold of intestinal epithelium and a blood capillary.
- Post typhlosolar region extends in the

- last 23/25 segments.

- ٠ Post typhlosolar region is also known as rectum.
- Post typhlosolar region or the rectum opens out by anus.
- Functions performed by intestine are digestion and absorption.
- The conical out growths of 26th segment are intestinal caecae.
- Intestinal caecae extend forward over three to four segments.
- Intestinal caecae secrete an -amylytic enzyme.

ALIMENTARY CANAL

Level-I

- 125. Segments with buccal cavity in Pheretima
 - 1) First to middle of 3rd segment
 - 2) First and second segments
 - 3) Second and third segment
 - 4) Third segment only
- 126. Pharynx comes out of mouth due to
 - 1) Large mouth 2) Crescentic mouth
 - 3) Invagination of walls of buccal cavity
 - 4) Evagination of walls of buccal cavity
- 127. Digging organ in earthworm
 - 1) Oesophagus 2) Pharynx
 - 3) Buccal cavity 4) Mouth

128. Highly muscular and vascul	arised structure
1) Buccal cavity	2) Pharynx
3) Oesophagus	4) Gizzard
129. Dorsal chamber of Pharynx	
1) Conducting chamber	2) Ingesting chamber
3) Saliyary chamber	4) Chitinous chamber
130 Ventral chamber of Pharyny	
1) Conducting chamber	2) Ingesting chamber
3) Saliyary chamber	4) Chitinous chamber
121 Enzyma in solivo of Dharati	
1) Druglin	$\frac{11a}{2}$ Sucress
2) Protoclutic	2) Sucrase
122 Dulle like structure associate	4) Lipase
1) Deceed associate	2) Discussion
1) Buccal cavity	2) Pharynx
3) Oesophagus	4) Prostomium
133. Segments with oesophagus	in Pheretima
1) 2,3	2) 3,4
3) 5,6	4) 5, 6, 7 & 8
134. Shape of gizzard in Pheretin	na
1) Oval	2) Spherical
3) Hexagonal	4) Rectangular
135. The type of epithelium in th	e Gizzard
1) Squamous	2) Cuboidal
3) Columnar	4) Ciliated
136. The type of muscles associa	ted with Grinding mill
1) Circular	2) Longitudial
3) Dorso ventral	4) Protractor
137. The part of the alimentary ca	nal with inner chitinous
lining	
1) Oesophagus	2) Stomach
3) Pharvnx	4) Gizzard
138 Physical changes of food ta	kes place in the follow-
ing region of the alimentary	canal in Pheretima
1) Gizzard	2) Stomach
3) Buccal cavity	4) Oesophagus
130 Segment with Gizzard in Ph	4) Ocsophagus
1) 5th 2) 6th	$2) 7th \qquad 1) 8th$
140 Stomach in Dharatima avt	3)/11 $4)011$
140. Stolliach in Pheretinia ext	ends between the seg-
	(1)
1) $7(11 - 9(11))$	$2) 9 \ln - 14 \ln 14 \ln 14$
3) /th - 14th	4) 10th - 14th
141. Vascular and glandular tube	extends into 6 segments
in Pheretima	
1) Stomach	2) Gizzard
3) Oesophagus	4) Pharynx
142. Double sphinctered zone in	the alimentary canal in
Pheretima	
1)Pharynx	
	2) Oesophagus
3) Stomach	2) Oesophagus4) Intestine
3) Stomach 143. Pretypholosolar region in P	2) Oesophagus4) Intestineheretima extends
3) Stomach 143. Pretypholosolar region in P 1) 10 - 14 segments	 2) Oesophagus 4) Intestine heretima extends 2) 15 - 26 th

144. Mid dorsal folding in the instestine is absent in the following segments in Pheretima 1) 27, 23 - 25 segments infront of anus 2) First 15 segments of Intestine 3) 15 th - 26 th segments and last 23 - 25 segments 4) First 23 - 25 segments 145. Typhlosole hanging into the intestine in 1) Lumen of 15 th - 26 th segment 2) Lumen of last 23 - 25 segment 3) Lumen of 15 th - 35 th segment 4) Lumen of 27 th segment to last 23 - 25 segtments infront of anus 146. Intestinal caecae extends in the segments 1) 26 th to 23 rd 2) 26 th to 28 th 3) 23 rd to 18 th 4) 18 th to 21 st Level - II 147. Arrange the following regions of the intestine according to the number of segment they occupy in descending order A) Typhlosolar region B) Post-typhlosolar region C) Pre-typhlosolar region 1) C - A - B 2) B - C - A 3) A - C - B 4) A - B - C 148. The following are the statements about intestinal caeca in Pheretima i) Originate in 26th segment ii) they secrete digestive juices iii) Help in locomotion The correct combination is 1) All are true 2) Only i & ii are true 3) only i & iii are true 4) Only iii and ii are true 149. Match the following and choose the correct combination Structures Location A) Gizzard i) 9 to 14 segments B) Intestinal caecae ii) 26th segment C) Pre-typhlosolar region iii) 15 to 26 th segments of intestine D) Stomach iv)8th v) 5th to 7th segments. B С D А 1) iii ii v i 2) iii i iv ii 3) ii iii iv i 4) ii iv i iii 150. Match the following and choose the correct combination A) Buccal cavity i) Eighth segment B) Pharynx ii) Middle of third to fourth segment.

	C) Oesophagus			iii) I sixta	iii) Fourteen to sixteenth segments.		
	D) Gizzard			iv) I third	First to middle of d segment		
				v) 5	5-7 th segment.		
		Α	В	C	D		
	1)	iv	\mathbf{V}	iii	i		
	2)	i	iii	iv	v		
	3)	iv	ii	V	i		
	4)	i	ii	iv	V		
151	. The follo	owing p	arts are	noticed	in the alimentary		
	canal of I	Pheretin	na				
	a) Gizzar	d		b) B	uccal cavity		
	c) Stoma	ich		d) P	harynx		
	Arrange	the corr	rect seq	uence o	f these structures		
	antero-p	osterier	ly	•	1		
	1) a - b -	- c -d		2) d	- b - c - a		
150	3) d - c -	- b - a	.1	4) b	d - d - a - c		
152	. The follo	owing ai	re the pa	irts of al	imentary canal of		
	earthwor	m. 1		1) (1		
	a) Gizzar	a		b)C	esophagus		
	c) Bucca	I cavity		d) P	harynx.		
	Arrange	in the co	orrect se	quence o	of these parts from		
	the anter	ior to th	e poster	rior.			
	1) a - b -	- c -d		2) c	- d - b - a		
	3) c - d -	- a - b		4) c	- a - b - d		
	PHYS	[OLO	GY O	F DIC	GESTION		
•	PHYSI Digestion	IOLO n in Pher	GY O retima is	F DIC s extra ce	GESTION ellular.		
•	PHYSI Digestion Food of I	IOLO n in Pher Pheretin	GY O retima is na is	F DIC	GESTION ellular.		
•	PHYSI Digestion Food of I	IOLO n in Pher Pheretin	GY O retima is na is organi	F DIC extra ce	GESTION Ellular. s present in soil.		
•	PHYSI Digestion Food of I Pharynx	IOLO n in Pher Pheretin - at the ti	GY O retima is na is organi me of f	F DIC s extra ce c debri eeding a	GESTION Ellular. s present in soil. acts like a suction		
•	PHYSI Digestion Food of I Pharynx pump by	IOLO n in Pher Pheretin - at the ti	GY O retima is na is organi me of f	F DIC s extra ce c debri c eding a - radial	GESTION ellular. s present in soil. acts like a suction dilator muscles.		
•	PHYSI Digestion Food of I Pharynx pump by Easy pass	IOLO n in Pher Pheretin - at the ti sage of f	GY O retima is na is organi me of f	F DIC s extra ce de debri eeding a - radial ough pha	GESTION Ellular. s present in soil. acts like a suction dilator muscles. arynx is facilitated		
•	PHYSI Digestion Food of I Pharynx pump by Easy pass by-mucin	IOLO n in Pher Pheretin at the ti sage of f n and sal	GY O retima is na is organi me of f cood, thr	F DIC extra ce c debri eeding a - radial ough ph	GESTION Ellular. s present in soil. Acts like a suction dilator muscles. Arynx is facilitated		
•	PHYSI Digestion Food of I Pharynx pump by Easy pass by-mucin Mucin &	IOLO n in Pher Pheretin at the ti sage of f n and sal saliva a	GY O retima is organi me of f cood, thr liva. lso help	F DIC s extra ce c debri eeding a - radial ough ph in the fo	GESTION ellular. s present in soil. acts like a suction dilator muscles. arynx is facilitated ormation of Bolus.		
•	PHYSI Digestion Food of I Pharynx pump by Easy pass by-mucin Mucin & The food	IOLO n in Pher Pheretin at the ti sage of f n and sal saliva a l is made	GY O retima is na is organi me of f cood, thr liva. lso help e into fir	F DIC sextra ce ic debri eeding a - radial ough pha in the for ne pieces	GESTION Ellular. s present in soil. acts like a suction dilator muscles. arynx is facilitated ormation of Bolus. s in - Gizzard		
• • • •	PHYSI Digestion Food of I Pharynx pump by Easy pass by-mucin Mucin & The food Proteolyt	IOLO n in Pher Pheretin at the ti sage of f n and sal saliva a l is made tic enzyr	GY O retima is na is organi me of f cood, thr liva. lso help e into fir mes act	F DIC s extra ce c debri eeding a - radial ough ph in the fo ne pieces on the fo	GESTION Ellular. s present in soil. Acts like a suction dilator muscles. Arynx is facilitated formation of Bolus. s in - Gizzard bod first in		
•	PHYSI Digestion Food of I Pharynx pump by Easy pass by-mucin Mucin & The food Proteolyt	IOLO n in Pher Pheretin at the ti sage of f n and sal saliva a l is made tic enzyn	GY O retima is na is organi me of f cood, thr liva. lso help e into fir mes act	F DIC s extra ce c debri eeding a - radial ough ph in the fo ne pieces on the fo	GESTION ellular. s present in soil. acts like a suction dilator muscles. arynx is facilitated ormation of Bolus. s in - Gizzard ood first in - pharynx.		
•	PHYSI Digestion Food of I Pharynx pump by Easy pass by-mucin Mucin & The food Proteolyt	IOLO n in Pher Pheretin - at the ti sage of f n and sal saliva a l is made tic enzyr	GY O retima is na is organi me of f cood, thr liva. lso help e into fir mes act	F DIC s extra ce c debri eeding a - radial ough pha in the fo ne pieces on the fo	GESTION ellular. s present in soil. acts like a suction dilator muscles. arynx is facilitated ormation of Bolus. s in - Gizzard bod first in - pharynx. s in pharynx and		
•	PHYSI Digestion Food of I Pharynx pump by Easy pass by-mucin Mucin & The food Proteolyt Partial d stomach.	IOLO n in Pher Pheretin at the ti sage of f n and sal saliva a l is made tic enzyr ligestion	GY O retima is na is organi me of f Cood, thr liva. lso help e into fir mes act n of foo	F DIC s extra ce ic debri eeding a - radial ough ph in the fo ne pieces on the fo d occur	GESTION Ellular. s present in soil. acts like a suction dilator muscles. arynx is facilitated ormation of Bolus. s in - Gizzard bod first in - pharynx. s in pharynx and		
• • • • • • • •	PHYSI Digestion Food of I Pharynx pump by Easy pass by-mucin Mucin & The food Proteolyn Partial d stomach. Complet	IOLO n in Pher Pheretin at the ti sage of f n and sal saliva a l is made tic enzyn igestior	GY O retima is na is organi me of f cood, thr liva. lso help e into fir mes act n of foo	F DIC s extra ce ic debri deeding a - radial ough ph in the fo ne pieces on the fo d occur takes pla	GESTION ellular. s present in soil. acts like a suction dilator muscles. arynx is facilitated ormation of Bolus. s in - Gizzard ood first in - pharynx. s in pharynx and acce in the intestine		
• • • • • • • •	PHYSI Digestion Food of I Pharynx pump by Easy pass by-mucin Mucin & The food Proteolyn Partial d stomach. Complet Enzymes	IOLO n in Pher Pheretin - at the ti sage of f n and sal saliva a l is made tic enzyn igestior ion of di s which r	GY O retima is na is organi me of f cood, thr liva. lso help e into fir mes act n of foo gestion make the	F DIC s extra ce c debri eeding a - radial ough ph in the fo ne pieces on the fo d occur takes pla e food co	GESTION ellular. s present in soil. acts like a suction dilator muscles. arynx is facilitated ormation of Bolus. s in - Gizzard bod first in - pharynx. s in pharynx and ace in the intestine ompletely digested historinal caeses		
• • • • • • • • • •	PHYSI Digestion Food of I Pharynx pump by Easy pass by-mucin Mucin & The food Proteolyt Partial d stomach. Complet Enzymes are secret Proteins	IOLO n in Pher Pheretin - at the ti sage of f n and sal saliva a l is made tic enzyr ligestion ion of di s which n ted by in Protes	GY O retima is na is organi me of f food, thr liva. lso help e into fir mes act n of foo gestion make the itestinal	F DIC s extra ce ic debri eeding a - radial ough ph in the fo ne pieces on the fo od occur takes pla e food co wall and	GESTION Ellular. s present in soil. acts like a suction dilator muscles. arynx is facilitated ormation of Bolus. s in - Gizzard bod first in - pharynx. s in pharynx and ace in the intestine ompletely digested intestinal caecae.		
• • • • •	PHYSI Digestion Food of I Pharynx pump by Easy pase by-mucin Mucin & The food Proteolyt Partial d stomach. Complet Enzymes are secret Proteins	IOLO n in Pheretin Pheretin at the ti sage of f n and sal saliva a l is made tic enzyr ligestior ion of di s which r ted by in <u>Protea</u>	GY O retima is na is organi me of f cood, thr liva. lso help e into fir mes act n of foo gestion make the itestinal $\frac{se}{}$ Am	F DIC s extra ce c debri deeding a - radial ough ph in the fo ne pieces on the fo d occur takes pla e food cc wall and innoacid	GESTION ellular. s present in soil. acts like a suction dilator muscles. arynx is facilitated ormation of Bolus. s in - Gizzard ood first in - pharynx. s in pharynx and ace in the intestine ompletely digested d intestinal caecae. s.		
• • • • • • • • •	PHYSI Digestion Food of I Pharynx pump by Easy pass by-mucin Mucin & The food Proteolyn Partial d stomach. Complet Enzymes are secret Proteins Carbohy	IOLO n in Pheretin Pheretin at the ti sage of f n and sal saliva a lis made tic enzyn ligestior ion of di s which r ted by in <u>Protea</u> drates _ <i>Lipase</i>	GY O retima is na is organi me of f food, thr liva. lso help e into fir mes act n of foo gestion make the ttestinal se Am Amylase	F DIC s extra ce ic debri eeding a - radial ough pha- in the for ne pieces on the for d occur takes pla e food cc wall and inoacid \rightarrow Gluc	GESTION ellular. s present in soil. acts like a suction dilator muscles. arynx is facilitated ormation of Bolus. s in - Gizzard bod first in - pharynx. s in pharynx and ace in the intestine ompletely digested l intestinal caecae. s. cose		
• • • • • • • • •	PHYSI Digestion Food of I Pharynx pump by Easy pass by-mucin Mucin & The food Proteolyn Partial d stomach. Complet Enzymes are secret Proteins Carbohy Lipids _	IOLO n in Pheretin Pheretin at the ti sage of f n and sal saliva a l is made tic enzyr ligestion ion of di which r ted by in <u>Protea</u> drates _ Lipase	GY O retima is na is organi me of f food, thr liva. lso help e into fir mes act n of foo gestion make the itestinal $\frac{se}{}$ Am <u>Amylase</u>	F DIC s extra ce a debri eeding a - radial ough ph in the fo ne pieces on the fo of occur takes pla e food cc wall and inoacid \rightarrow Gluc cids and	GESTION ellular. s present in soil. acts like a suction dilator muscles. arynx is facilitated ormation of Bolus. s in - Gizzard bod first in - pharynx. s in pharynx and ace in the intestine ompletely digested intestinal caecae. s. bose I Glycerol		
• • • • • • • • •	PHYSI Digestion Food of I Pharynx pump by Easy pase by-mucin Mucin & The food Proteolyn Partial d stomach. Complet Enzymes are secret Proteins Carbohy Lipids _ Digested	IOLO n in Pheretin Pheretin at the ti sage of f n and sal saliva a l is made tic enzyn ligestion ion of di s which r ted by in <u>Protea</u> l foods i	GY O retima is na is organi me of f cood, thr liva. lso help e into fir mes act n of foo gestion make the ttestinal se Am Amylase s absort	F DIC s extra ce c debri deeding a - radial ough ph in the fo ne pieces on the fo d occur takes pla e food cc wall and innoacid \rightarrow Gluc icids and bed by	GESTION ellular. s present in soil. acts like a suction dilator muscles. arynx is facilitated ormation of Bolus. s in - Gizzard ood first in - pharynx. s in pharynx and ace in the intestine ompletely digested l intestinal caecae. s. sose I Glycerol		
• • • • • • • • •	PHYSI Digestion Food of I Pharynx pump by Easy pass by-mucin Mucin & The food Proteolyt Partial d stomach. Complet Enzymes are secret Proteins Carbohy Lipids _ Digested	IOLO n in Pheretin Pheretin at the ti sage of f n and sal saliva a l is made tic enzyn igestion ion of di s which r ted by in <u>Protea</u> drates _ Lipase _ l foods i	GY O retima is na is organi me of f food, thr liva. lso help e into fir mes act n of foo gestion make the testinal se Am Amylase S absort	F DIC s extra ce ic debri eeding a - radial ough ph in the fo ne pieces on the fo d occur takes pla e food cc wall and inoacid \rightarrow Gluc icids and bed by - intes	GESTION ellular. s present in soil. acts like a suction dilator muscles. arynx is facilitated ormation of Bolus. s in - Gizzard bod first in - pharynx. is in pharynx and ace in the intestine ompletely digested d intestinal caecae. s. osse I Glycerol tinal epithelium.		
• • • • • • • • • • •	PHYSI Digestion Food of I Pharynx pump by Easy pass by-mucin Mucin & The food Proteolyn Partial d stomach. Complet Enzymes are secret Proteins Carbohy Lipids _ Digested	IOLO n in Pheretin Pheretin at the ti sage of f n and sal saliva a l is made tic enzyr ligestion ion of di s which r ted by in <u>Protea</u> l foods i ted food	GY O retima is na is organi me of f food, thr liva. lso help e into fir mes act n of foo gestion make the ttestinal se Am Amylase s absort	F DIC s extra ce a c debri deeding a - radial ough pha- in the for ne pieces on the for of occur takes pla e food occur takes pla e food coc wall and binoacid \rightarrow Gluc bicd by - intest s the rec	GESTION ellular. s present in soil. acts like a suction dilator muscles. arynx is facilitated ormation of Bolus. s in - Gizzard bod first in - pharynx. s in pharynx and ace in the intestine ompletely digested d intestinal caecae. s. osse I Glycerol tinal epithelium. tum. e form of		
· · · · · · · · · · · · · · · · · · ·	PHYSI Digestion Food of I Pharynx pump by Easy pass by-mucin Mucin & The food Proteolyt Partial d stomach. Complet Enzymes are secret Proteins Carbohy Lipids _ Digested Undigest	IOLO n in Pheretin Pheretin at the ti sage of f n and sal saliva a l is made tic enzyr ligestion ion of di s which r ted by in <u>Protea</u> l foods i ted food	GY O retima is na is organi me of f f cood, thr liva. lso help e into fir mes act n of foo gestion make the testinal s Am Amylase Fattya s absort	F DIC s extra ce ic debri deeding a - radial ough pho- in the foo ne pieces on the foo on the foo d occur takes pla e food cc wall and ininoacid \rightarrow Gluc icids and bed by - intes s the recourt in the	GESTION ellular. s present in soil. acts like a suction dilator muscles. arynx is facilitated ormation of Bolus. s in - Gizzard ood first in - pharynx. s in pharynx and ace in the intestine ompletely digested d intestinal caecae. s. sose I Glycerol tinal epithelium. tum. e form of worm castings		

PROCESS OFDIGESTION

Leve	el-I		
153.	Enzymes in gas	tric juice of Phe	retima
	1) Lipolytic	2) Carbohydra	ses
	3) Proteolytic	4) Cellulase	
154.	The part of food	l subjected for d	ligestion in stomach
	in Pheretima	5	6
	1) Proteins	2) Carbohydra	tes
	3) Lipids	4) Cellulose	
155.	Maximum amo	ount of food abs	orption takes place
	in		1 1
	1) Pretyphlosol	ar region	
	2) Typhlosolar	region	
	3) Post typhlos	olar region 4) S	Stomach
156.	Solidification	of undigested f	food takes place in
	Pheretima in	e	1
	1) Pretyphlosol	ar region	
	2) Typhlosolar	region	
	3) Post-typhlos	olar region	4) Colon
157.	'Rectum' in phe	retima extends i	in segements
	1) last 23 - 25 s	egments	C
	2) last 25-80 se	egments	
	3) last 10 - 15 s	egments	
	3) last 5 - 10 se	gments	
158.	Gate way for w	orm castings in	Pheretima
	1) Excretory po	ore	2)Anus
	3) Cloaca		4) Gonopore
159.	An enzyme pro	duced by Intest	inal caecae.
	1) Proteolytic		2) Starch splitting
	3) Lipases		4) Cellulase
160.	Food is conver	ted into bolus b	by the secretions of
	1) Gastric gland	ls	2) Salivary glands
	3) Liver		4) Stromach
161.	Pulverisation o	f food takes pla	ace in following re-
	gion in Pheretin	na	
	1) Buccal cavity	y	2) Pharynx
	3) Oesophagus		4) Gizzard
162.	In the alimenta	ry canal the stru	ucture that acts as a
	suction-pump is	3	
	1) Buccal cavit	У	2) Oesophagus
	3) Pharynx		4) Stomach
163.	Pharynx acts as	a suction-pum	p with the help of
	1) Circular mus	cles 2)Radial	-dilator muscles
	3) Longitudinal	muscles 4)Ad	ductor muscles
164.	Food bolus is fo	ormed in the	
	1) Buccal cavit	У	2) Oesophagus
	3) Pharynx		4) Mouth
165.	The intestinal ju	uice of earthwor	rm is comparable to
	theoft	he higher anima	ls
	1) Bile juice		2) Gastric juice
	3) Pancreatic ju	lice	4) Duodenal juice

Level - II

1) Both S and R are true and R is the correct explanation of S

2) Both S and R are true and R is not the correct explanation of S

- 3) S is true but R is false
- 4) Both S and R are false
- 166. Statement (S): In the pharynx of Pheretima only proteins are partially digested.

Reason (R): Enzymes in saliva of Pheretima are only proteolytic enzyme.

167. Statement (S): In earthworm gizzard is commonly called grinding mill.

Reason (R): In earthworm gizzard has thick wall of circular muscles and an inner lining of chitinous cuticle.

168. Statement (S): Typhlosolar region is useful for the absorption of digested food material. Reason (R): In earthworm typhlosole is meant to

increase the surface area of absorption.

169. Statement (S): In Pheretima pharynx works as a suction pump, in feeding

Reason (R): Pharynx is provided with well developed circular muscles for grinding the food.

170. Statement (S): The intestinal caecae in Pheretima are digestive glands.

Reason (R): Intestinal caecae secrete proteolytic enzyme

- 171. The following are the statements about earthworm i) Intestinal caecae are useful in carbohydrate digestion
 - ii) Typhlosole is helpful in protein metabolism.
 - iii) Gizzard is useful in grinding the food material. The correct combination is
 - 1) All are true
 - 2) Only i & ii are true
 - 3) only i & iii are true 4) Only iii and ii are true
- 172. Match the following and choose the correct combination

Substr	ate]	Enzyme	
A) Ma	ltose	i) Amyla	se	
B) Lip	ids	i	i) Trypsii	1	
C) Ca	rbohydra	i	ii) Lipase	2	
D) Proteins			i	v) Malta	se
			,	v) Renni	n
	Α	В	С	D	
1)	iv	iii	ii	i	
2)	i	ii	iv	iii	
3)	iv	iii	i	ii	
4)	i	ii	iii	iv	

173. Match the following and choose the correct comŀ

bination					
Gut par	·t	Fu	nctions		
A) Gizzard		i)]	i) Reabsoption of water		
B) Typh	losolar	ii)]	Mechan	ical diges	stion
intest	ine				
C) Pre-	typhlos	olar iii)	Compl	ete absor	ption of
intestine		foc	od		
D) Post	-typhlos	solar iv)	Comple	ete digest	ion
intest	ine	(of food		
		v)	Formati	on food l	oolus
	A	В	С	D	
1)	ii	iii	i	iv	
2)	i	ii	iv	iii	
3)	iv	\mathbf{v}	iii	ii	
4)	ii	iii	iv	i	

RESPIRATION

- Thin and Moist.

- Skin of earthworm is • Respiration can take place effectively when the skin is moist.
- Skin is kept always in a moist condition due to 1) Dampness in the soil
 - 2) Coelomic fluid oozing through dorsal pores
 - 3) Mucus secreted by epidermal cells.
- If the skin dries up, the earthworm - dies.
- Respiratory pigment in Pheretima is-Haemoglobin.
- Haemoglobin in Pheretima is dissolved in Plasma of blood
- Permeable layer to gases in the body wall of Pheretima is - Epidermis.
- ٠ The partial pressure of oxygen is more on the surface of skin than in blood.
- As oxygen enters the blood it combines with

- Haemoglobin to form Oxyhaemoglobin.

- At tissues the partial pressure of Carbondioxide is more than that in surroundings.
- Oxyhaemoglobin dissociates at tissues and gives off oxygen to tissues.
- Carbon dioxide enters the blood from tissues and brought to skin surface and sent out side.

Respiratory system

Level - I

٠

174. Special respiratory of	organs in Pheretima
1) Gills	2) Trachea
3) Book lungs	4) Absent
175. Process of respiration	on in Earthworm.
1) Osmosis	2) Diffusion
3) Plasmolysis	4) Necrosis

176. Adaptation for cutaneous respiration in earthworm	BLOOD VASCULAR SYSTEM
1) Exoskeleton 2) Vascularised	
3) Elongated tubular body	• Type of blood vascular system in Pheretima is
4) Moist vascularised skin.	closed system.
177. Adaptation in Earthworm to keep the skin moist.	• Plasma of blood is red due to presence of
1) Always lives in water 2) Drinks more water	- haemoglobin
3) Coelomic fluid and Mucous glands	• Blood corpuscles of Pheretima are colourless and
4) Loss of water through skin	nucleated
178. In earthworm during respiration oxygen present in	• The blood performs several functions. It
atmospheric air.	1) Transports digested food from intestine to tisues
1) Directly enters into blood	2)Transports respiratory gases from body wall to
2) Dissolves in film of moisture and then enters into	tissues and vice-versa
blood	2) Collects nitrogenous wastes and transports to
3) Enters into gills 4) Enters into trachea	s) concets introgenous wastes and transports to
179. The respiratory pigment in the blood of Pheretima	4) Protosta the heady from the investor of nothe
1) Haemoglobin 2) Haemocyanin	4) Protects the body from the invasion of patho-
3) Chlorocruorin 4) Haemolysin	genic microbes. $\mathbf{N} = 1 + 1 $
180. If the skin dries up earthworm	• Number of longitudinal blood vessels in the first thir-
1) Does not feed 2) Feeds voraciously	teen segments - Five
3) Becomes active 4) Dies.	• Dorsal blood vessel, ventral blood vessel, two lat-
181. In Pheritima, haemoglobin receive O, and form	eral oesophageals and supra oesophageal.
oxyhaemoglobin, under this condition on the wet	• Largest blood vessel in the body of Pheretima -
surface of the body wall.	Dorsal blood vessel.
1) NO. O. Partial pressure	• Blood vessel which runs along the mid dorsal line,
2) High $\overset{2}{\text{CO}}$. Partial pressure	above the gut - Dorsal vessel.
3) High O Partial pressure	 Dorsal blood vessel is
4) Less O Partial pressure	-Muscular, valvular, contractile.
182 Respiration in Pheretima is	• Flow of blood in dorsal vessel is - from posterior to
1) Pulmonary 2) Cutaneous	anterior end.
$\begin{array}{c} \text{3)} \text{Branchial} \\ \text{4)} 1 \& 2 \end{array}$	• Number of valves per each segement in dorsal blood
Level - II	vessel -1 pair
183 Statement (S): Blood in Pheretima absorbs CO	• Valves are present - infront of septum
from the tissues	Backward flow in dorsal vessel is prevented by
Denson (B): The partial pressure of CO in the	valves
Keason (K): The partial pressure of CO_2 in the tigmes is high	 Dorsal blood vessel in first thirteeen segments acts
1) Doth S and D are true and D is the correct of	as a distributing vessel
1) Both S and K are true and K is the correct ex-	 Dorsal blood vessel supplies blood to phoryngeal
planation of S	bulk and react of buccal chamber by three branches
2) Both S and R are true and R is not the correct	• A pair of stout branches arise from dersel vessel
explanation of S	from in the asymptote 2.4.5.6 and 8
3) S is true but R is false	Place descende suicing from descelations 2 all
4) Both S and R are false	Blood vessels arising from dorsal vessel from 3rd h
184. Statement (S): In Pheretima respiration takes place	to 8th segments supply blood to - Pharyngeal
through skin	nephridia, Oesophagus, Gizzard, Stomach.
Reason (R):Outer layer of body - wall of	• Blood from dorsal blood vessel is sent to ventral
Pheretima is cuticle	blood vessels through hearts present in 7,9, 12,13
1) Both S and R are true and R is the correct ex-	segments.
planation of S	 Ventral blood vessel extends upto
2) Both S and R are true and R is not the correct	- Second segment anteriorly.
explanation of S	Non-muscular, Non-valvular, Non-contractile blood
3) S is true but R is false	vessel below the gut is - Ventral vessel.
4) Both S and R are false	• The distributing blood vessel below the gut. is ven -
,	tral blood vessel.
	• Flow of blood in the ventral vessel is from anterior
	to posterior.

- Ventral vessel supplies blood to body wall & septa by ventro tegumentaries.
- Number of ventrotegumentary blood vessels in each segment
 1 pair.
- Blood to reproductive organs is supplied by ventral blood vessel.
- Position of lateral oesophageal vessels

- ventrolateral sides of the gut.

- Lateral oesophageals are the anterior continuation of - Sub neural blood vessel.
- Lateral oesophageals collect blood from- body wall, septa, nephridia, buccal cavity, pharynx, oesophagus, gizzard, stomach, pharyngeal nephridia and reproductive organs.
- Supra oesophageal vessel is confined to segments - 9 to 13.
- Supra oesophageal vessel lies on the dorsal side of stomach.
- Supra oesophageal vessel collects blood from

- Gizzard and stomach.

- Supra oesophageal vessel receives blood through anterior loops and ring vessels.
- Blood vessels which contract rhythmically and connect dorsal vessel with ventral vessel **are Hearts**.
- Dorsal vessel is connected to ventral vessel in segments 7,9,12,13 by Hearts.
- Hearts are Four pairs.
- Anterior two pairs of hearts present in 7th and 9th segments
 Lateral hearts
- Posterior lateral hearts which are present in 12,13 segments are known as lateral oesophageal hearts.
- Lateral hearts are dorsally connected to dorsal vessel and ventrally connected to ventral blood vessel.
- Lateral oesophageal hearts dorsally are connected to dorsal vessel, supra oesophageal blood vessel and ventrally are connected to ventral blood vessel.
- Number of valves in each lateral heart-Four pairs.
- Number of valves in each lateral oesophageal heart
 - three pairs.
- Anterior loops are present in the segments

- 10th and 11th.

- Number of anterior loops in each segmet
- one Pair. Anterior loops are non-muscular, non-valvular, and
- Anterior loops are non-muscular, non-valvular, and are non pulsatile.
- Anterior loops connect lateral oesophageals with supra-oesophageal.
- Anterior loops carry the blood from lateral oesophageals to supra oesophageal blood vessel.
- Ring vessels occur in the segments 10th, 11th, 12th 13th.

- Number of ring vessels in each segment are **twelve**.
- Total number of ring vessels 48
- Through ring vessles blood flows from lateral oesophageal into supra - oesophageal vessel.
- The longitudinal vessels behind 13th segement are.

Dorsal blood vessel ventral blood vessel subneural blood vessel

- The chief collecting blood vessel behind 13th segment-Dorsal blood vessel
- Dorsal blood vessel collects blood with the help of-2 pairs of dorso interstinals and 1 pair of commissural blood vessels.
- The chief distributing blood vessel behind 13th segment is **ventral blood vessel**.
- Blood vessels arising from ventral blood vessel are.
 1) Ventrotegumentary vessels

2) Ventrointestinal vessels

- Ventro tegumentaries pierce the posterior septa and supply blood to the organs of succeding segments.
- Ventrotegumentary gives off another branch known as -septo nephridial which supplies blood to - septal nephrdia.
- Blood to the ventral wall of intestine is supplied by a median ventro intestinal blood vessel.
- Blood vessel beneath the ventral nerve cord is subneural blood vessel.
- Sub neural blood vessel extends from 14th to last segment.
- Subneural is a collecting blood vessel.
- Sub neural blood vessel collects blood from ventral body wall and ventral nerve cord.
- Flow of blood in sub neural blood vessel is from anterior to posterior end.
- Sub neural blood vessel is connected to dorsal blood vessel by commissural vessel.
- Commissural blood vessel collects blood from septal nephridia, prostate gland and body wall.
- Commissural blood vessel gives off a branch called **septo intestinal branch.**
- Septo-intestinal branch supplies blood to intestine
- Commissural blood vessels are both *collecting and distributing* vessels.
- Dorso intestinal blood vessels are **two pairs in each** segment from 15th segment to the last.
- Dorso intestinal blood vessels collect blood from intestine and open into dorsal blood vessel.

INTESTINAL BLOOD PLEXUS

• Network of capillaries in the intestinal wall is called Intestinal blood plexus.

EAMCET-JUNIOR ZOOLOGY

•

 Number of capillary networks in intestine - two The two types of capillary networks are External and internal Network which lies between circular muscle layer and internal intestinal epithelium is - Internal Plexus Network on the surface of gut outside of the chloragogen cells is - External Plexus. External plexus receives blood from ventro intestinal and septo intestinals. External plexus opens into - Internal plexus Nutrients are absorbed from the gut by Internal plexus. Internal plexus is connected to the dorsal vessel through - Dorso intestinals. Opening of dorso intestinals and commissurals into the dorsal blood vessel are guarded by valves. Dorsal vessel does not receive blood from the organs of - first thirteen segments. Ventral blood vessel has no connection with anterior part of gut. 	 Anterior part of gut recieves blood from - Dorsal vessel. Peripheral organs recieve blood through ventrotegumentaries. Blood is collected from peripheral organs by Lateral oesophageal vessels. Intestine receives blood through ventrointestinals and septointestianls. Blood is supplied to body wall for oxygenation by ventrotogumentaries. Oxygenated blood from body wall is collected by sub neural, commissural and dorsal vessel. Blood glands are red coloured, follicular bodies. Blood glands are present in - 4,5,6, segments. They lie above the - pharyngeal mass. Blood glands produce Haemoglobin, blood cells.

BLOOD VESSELS				
IN FIRST THIRTEEN SEGMENTS	BEHIND THE THIRTEENTH SEGMENT			
1) Longitudinal trunks include five vessles	1) Longitudinal trunks contain three blood vessels			
a) Dorsal vessel	a) Dorsal Vessel			
b) Ventral vessel	b) Ventral Vessel			
c) Two lateral - Oesophageals	c) Sub neural vessel			
d) Supra-Oesophageal				
2) The Hearts	2) Commissural vessels			
3) Anterior loops	3) Dorso-intestinal vessels			
4) Ring vessels	4) Intestinal blood plexus			
5) Blood vessels of gut	5) Septo intestinals			
	6) Ventro intestinals			

Level - I

185. The dark median line through out the length of the body dorsally in Pheretima 1) Nerve cord 2) Dorsal blood vessel 3) Subneural vessel 4) Notochord 186. Blood in Earthworm flows in 1) Cavities 2) Blood Vessels 3) Sinuses 4) Sinuses and vessels 187. Largest blood vessel in the body of Earthworm 1) Dorsal blood vessel 2) Ventral blood vessel 3) Subneural vessel 4) Supra oesophageal vessel 188. Blood flow in dorsal blood vessel in earthworm 1) Anterior to posterior end 2) Posterior to Anterior end 3) Upper to lower end 4) Lower to upper surface 189. Chief distributing vessel in Pheretima 1) Dorsal blood vessel 2) Ventral blood vessel 3) Subneural vessel 4) Lateral oesophageal vessels 190. Dorsal blood vessel receives blood from 1) Commissural vessels and Dorso intestinals 2) Commissural vessels and ventro intestinals 3) Tegumentary vessels and Dorso intestinals 4) Anterior vessels and ventro intestinals 191. Supra oesophageal collects blood only from 1) Gonads 2) Nephridia 3) Septa 4) Gizzard & stomach 192. Blood flow in anterior loops 1) Lateral to dorsal 2) Lateral to ventral 3) Dorsal to ventral 4) Anterior to posterior 193. The total number of anterior loops and ring vessels respectively in Pheretima 1) 2 pairs and 12 (1)2) 2 pairs and 48 (3) A pair and 12 pairs 4) A pair and 8 pairs 195. Anterior loops and ring vessels allow blood flow from 1) Dorsal blood vessel to ventral blood vessel 2) Lateral oesophageal vessels to supra oesophageal vessels 3) Supra oesophageal vessel to lateral oesophageal vessels 4) Ventral blood vessel to supra oesophageal vessels. 196. Segments with lateral oesophageal hearts 1) 7th and 9th 2) 12th and 13th 4) 10th and 11th 3) 9th and 12th 197. Hearts which collect blood from Supra oesophageal vessels 1) First 2 pairs 2) Last 2 pairs 3) First 4 pairs 4) Last 4 pairs

198. Number of valves in each lateral oesophageal heart 1) One pair 2) Two pairs 3) Three pairs 4) Four pairs 199. Four pairs of valves are present in the 1) Lateral hearts 2) Lateral oesophageal hearts 3) Anterior loops 4) Ring vessels 200. The dorsal blood vessel gives out three branches in the 1) Second segment 2) Third segment 3) Fourth segment 4) First segment 201. The dorsal blood vessel gives off a pair of stout branches in segments 1) 3, 4, 5, 6 & 8 2) 3, 4, 5, 6, 7 & 8 3) 3, 5, 6, 7 & 8 4) 4, 5, 6, 7 & 8 201. In Pheretima the anterior loops carry blood from (EAM-2004) 1) Commissural blood vessels 2) Ventral Blood Vessel 3) Supra oesophageal 4) Lateral oesophageals Level - II 202. Arrange the following blood vessels in the proper order dorso-ventrally A) Cheif distributing blood vessel B) Largest blood vessel C) Blood vessel located in 9 to 13 D) Paired large vessel in the first 13 segments 1) A - B - C - D 2) C - D- B - A 3) B - C - D - A 4) D - C - B - A Statement / Reasoning 1) Both S and R are true and R is the correct explanation of S 2) Both S and R are true and R is not the correct explanation of S 3) S is true but R is false 4) Both S and R are false 203. Statement (S): The hearts present in the 12 and 13 segments are called lateral-oesophageal hearts Reason (R): These two pairs of hearts connect both the dorsal blood vessel and the supra-oesophageal blood vesel with the ventral blood vessel. 204. Statement (S): In Pheretima blood is red in colour. Reason (R): In Pheretima haemoglobin is dissolved in plasma. 205. Statement (S): In Pheretima blood circulatory system is of closed type

Reason (R): In Pheretima haemoglobin carries oxygen to tissues

206)6. The following are the statements about dorsal blood				1	A 	В	C	D ·	
	vessel in Pheretima				1)	11	V 	111	1	
	i) Muscular and contractile					2)	1	111	1V	V
	ii) Blood flows from posterior to anterior end			3)	iV	V	111	1		
	iii) Distributing vessel in the first 13 segements			4)	ii	i	iv	iii		
	The correct combination is					211. Study th	e follow	ring in Ph	eretima	a : (EAM-2008)
	1)All are	e true		2) Onl	y i & ii are true	A. Dorse	o intesti	nal blood	l - vesse	els
	3) only i	& iii are	true	4) Onl	y iii and ii are true	B. External intestinal plexus				
207	The follo	owing a	re the st	tatemen	ts about nature of	C Internal intestinal plexus				
	blood in Pheretima					D. Ventro intestinal blood vessel				
	i) With nu	ucleated	erythro	ocytes		A man an			1	
	ii) With n	ucleated	d leucoc	ytes		Arrange	the blo	od vesse		rrect sequence of
	iii)Haem	oglobin	is in Pla	isma		DIOOD IIC	w from	ventral b	lood ves	ssel to dorsal blood
	1)All are	etrue		2) Onl	y i & ii are true	vesser				
	3) only i	& iii are	true	4) Onl	y iii and ii are true	The correct sequence is				
208	The follo	wing are	e the sta	tements	about earthworm.	$1) D \rightarrow$	$B \rightarrow A$	$\rightarrow C$	2) C -	$\rightarrow A \rightarrow B \rightarrow D$
	i) Lateral	l hearts	connec	t dorsal	blood vessel with	$3) B \rightarrow$	$C \rightarrow D$	$\rightarrow A$	4) D -	$\rightarrow B \rightarrow C \rightarrow A$
	ventral b	lood ves	sel.			, .			,	
	ii) Anteri	or loops	conne	ct lateral	oesophageal ves-	ARRAN	GEME	NTOF	RLOO	D VESSELS
	sels with	supra o	esophag	geal vess	sel.	AFTER	CENIE 7 THE '	THIRTE	EEN SI	EGMENTS
	iii) Com	missura	l blood	vessels	will connect sub-	Level - I				
	neural bl	ood ves	sel with	dorsal	blood vessel.	212. Subneur	al vesse	l lies bety	veen	
	The corre	ect comb	oination	is		1) Alimentary canal and Dorsal blood vessel				
	1)All are	etrue		2) Onl	y i & ii are true	2) Alimentary canal and ventral blood vessel				
	3) only i	& iii are	true	4) Onl	y iii and ii are true	3) Below the ventral nerve cord and above ventral				
209.	209. Match the following and choose the correct com-				bodywal	1.				
	bination					4) Betw	een ven	tral nerve	e cord a	and supra oesoph-
	Parts of Bl. vasc. sy. Location				ageal ve	ssel.			1 1	
	A) Bloo	d Gland	s	i) 10th	n and 11th	213. In subne	ural ves	sel blood	flow is	from
				segme	nts	1) Dorsa	al to ven	tral	2) Ven	itral to dorsal
	B) Latera	ıl		ii) 9th	to 13th segments	3)Anter	ior to po	osterior		
	oesoph	nageal h	earts		-	4) Poste	rior to A	nterior		
	C) Anter	rior loop	os	iii) 12	and 13 segments	214. Subneur	al vesse	l extends	into seg	gments
	D)Supra	oesopha	ageal	iv) 4th	. 5th & 6th	1) 1 to 1	4th		2) 14t	h to last
	blood ves	ssel seo	ments		,	3) 1 to 2	21st		4) 21s	t last
	01000 10	5561 5651	linemus	v) 7 &	9 segements	215. The bloc	od vesse	ls with m	ore nut	rients in the blood.
		٨	D	() / Q	D Segements	1) Ventro	otegume	entary	2) Ven	tro intestinals
	1)	A	р :::	:	Б ::	3) Dorse	intestin	als	4) Ant	erior loops
	$\frac{1}{2}$	IV 	· 111	1 	11 •	216. The follo	owing v	essels are	e 2 pairs	s in each segment.
	2)	11	1V 	111	1	1) Ventre	otegume	entary	2) Dor	so intestinals
	3)	1	11	111	1V	3) Ventre	o intestir	nals	4) Rin	g vessels
	4)	iv	111	ii	V	217. The ves	sels whi	ch conne	ect subr	neural vessel with
210	210. Match the following and choose the correct com-						lood ve	ssel		
	bination					1) Comi	ssural ve	essels	2)Ant	erior loops
	Bl. Vasc. sy. parts			Location		3) Ring	vessels		4) Ven	tro intestinals
	A) Lateral hearts			i) 10th to 13th segment		218. Collectin	ng and d	istributin	g blood	l vessel is
	B) Ring vessels			ii) 7th	& 9th segments	1)Anter	ior loop	s	2) Rin	g vessel
	C) Commissural iii) 9th to 13th			to 13th segments	3) Commissural vessel 4) Ventral blood vessel			tral blood vessel		
	vessels			219. In Phere	tima tru	e heart lil	ke vess	el is		
	D) Supra iv) 14th to			h to last segments	1) Later	al hearts	ł	2) Doi	sal blood vessel	
	oesophag	geal vess	sels		1 161	3) Subno	eural blo	od vesse	el	
	v) 1			v) 14t	h - 16th segment.	4) Ventr	al blood	vessel		

220.	Ventro - tegumentary blo 1) Dorsal blood vessel 3) Septo-Intestinal blood 4) Subneural blood vessel The blood vessel that pies septum and supplies blood	2) Vental blood vessel 2) Vental blood vessel l vessel el rces through the posterior od to next segment is	1)Both S and R nation of S 2) Both S and I explanation of S 3) S is true but I 4) Both S and F
	 Ventro-Intestinal blood Ventro - tegumentary Ventral blood vessel Septonephridial blood 	d vessel blood vessel vessel	BLOOD CIRC THIRT Level - I
222.	Ventro intestinal blood ve 1) Ventral blood vessel 2) Dorso - intestinal blood 3) Ventro - tegumentary 4) Lateral oesonhageal b	essel arises from od vessel blood vessel lood vessel	229. The blood vess ductive organs i 1) Dorsal blood 2) Ventral blood 3) Sub-neural b
223.	 Septo-nephridial blood v Ventro intestinal blood Ventro tegumentary bl Subneural blood vesse Commissural blood vesse 	vessel is a branch of l vessel ood vessel el	4) Lateral - oese 230 The blood vess productive orga 1) Ventral blood 2) Dorsal blood
224.	Septo intestinal blood ve 1) Ventro intestinal blood 2) Ventro tegumentary bl 3) Subneural blood vesse 4) Commissural blood ve	ssel is a branch of l vessel ood vessel el essel	 3) Supra - oesoj 4) Lateral oesoj 231. Ventro - tegume 1) Intersegment 2) Testis ovaries
225.	The number of dorso intes in 17th segment	stinal blood vessels present	3) Septa and Ne 4) Nephridia an
	1) One pair	2) Two pairs	BLOOD
Ιων	1) One pair 3) Only one	2) Two pairs 4) Four pairs	BLOOD THE IN
Leve 226	1) One pair 3) Only one el - II Arrange the following bl	2) Two pairs4) Four pairsa od vessels in the proper	BLOOD THE INT Level - I
Leve 226.	 1) One pair 3) Only one el - II Arrange the following bl sequence dorso-ventrally 	2) Two pairs4) Four pairsbood vessels in the proper	BLOOD THE INT Level - I 232. Nutrients from
Leve 226.	1) One pair 3) Only one el - II Arrange the following bl sequence dorso-ventrally A) Cheif distributing blog	 2) Two pairs 4) Four pairs lood vessels in the proper od vessel 	BLOOD THE INT Level - I 232. Nutrients from 1) External plex
Leve 226.	 One pair Only one I - II Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-y 	 2) Two pairs 4) Four pairs bood vessels in the proper bod vessel valvular collecting blood 	BLOOD THE INT Level - I 232. Nutrients from 1) External plex 3) Septo intestir
Leve 226.	 One pair Only one II Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-v vessel 	 2) Two pairs 4) Four pairs lood vessels in the proper od vessel valvular collecting blood 	BLOOD THE IN Level - I 232. Nutrients from 1) External plex 3) Septo intestir 233. Internal plexus
Leve 226.	 One pair Only one II Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-vessel C) Muscular and valvular 	 2) Two pairs 4) Four pairs lood vessels in the proper od vessel valvular collecting blood r collecting blood vessel 	BLOOD THE INT Level - I 232. Nutrients from 1) External plex 3) Septo intestir 233. Internal plexus 1) Ventro intesti
Leve 226.	 One pair Only one I I Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-vessel C) Muscular and valvular A - B - C 	2) Two pairs 4) Four pairs ood vessels in the proper od vessel valvular collecting blood r collecting blood vessel 2) C - B -A	BLOOD THE IN Level - I 232. Nutrients from 1) External plex 3) Septo intestir 233. Internal plexus 1) Ventro intesti 3) Dorso intestir
Leve 226.	 One pair Only one el - II Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-vessel C) Muscular and valvular A - B - C B - A - C 	2) Two pairs 4) Four pairs lood vessels in the proper od vessel valvular collecting blood r collecting blood vessel 2) C - B -A 4) B - C - A	BLOOD THE INT Level - I 232. Nutrients from 1) External plex 3) Septo intestin 233. Internal plexus 1) Ventro intesti 3) Dorso intestin Level - II
Leve 226.	 One pair Only one II Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-versel C) Muscular and valvular A - B - C B - A - C Trace the flow of blood find 	 2) Two pairs 4) Four pairs bod vessels in the proper bod vessel valvular collecting blood r collecting blood vessel 2) C - B - A 4) B - C - A rom the ventral blood ves- 	BLOOD THE INT Level - I 232. Nutrients from 1) External plex 3) Septo intestir 233. Internal plexus 1) Ventro intesti 3) Dorso intestir Level - II 1) Both S and I
Leve 226. 227.	 One pair Only one II Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-vessel C) Muscular and valvular A - B - C B - A - C Trace the flow of blood finsel to the dorsal blood vessel 	 2) Two pairs 4) Four pairs bood vessels in the proper bod vessel valvular collecting blood r collecting blood vessel 2) C - B - A 4) B - C - A com the ventral blood vessel cossel in the 17th s e g - 	BLOOD THE INT Level - I 232. Nutrients from 1) External plex 3) Septo intestin 233. Internal plexus 1) Ventro intestin 3) Dorso intestin Level - II 1) Both S and I planation of S 2) Deth S and I
Leve 226. 227.	 One pair Only one II Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-versel C) Muscular and valvular A - B - C B - A - C Trace the flow of blood finsel to the dorsal blood versel 	 2) Two pairs 4) Four pairs dood vessels in the proper dod vessel valvular collecting blood r collecting blood vessel 2) C - B - A 4) B - C - A room the ventral blood vessels in the 17th s e g - e following structures in a 	BLOOD THE INT Level - I 232. Nutrients from 1) External plex 3) Septo intestir 233. Internal plexus 1) Ventro intesti 3) Dorso intestir Level - II 1) Both S and I planation of S 2) Both S and I explanation of S
Leve 226.	 One pair Only one II Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-vessel C) Muscular and valvular A - B - C B - A - C Trace the flow of blood fi sel to the dorsal blood ve ment with reference to the proper sequence 	 2) Two pairs 4) Four pairs 4) Four pairs cod vessels in the proper od vessel valvular collecting blood r collecting blood vessel 2) C - B - A 4) B - C - A rom the ventral blood vessels ressel in the 17th s e g - e following structures in a 	BLOOD THE INT Level - I 232. Nutrients from 1) External plex 3) Septo intestir 233. Internal plexus 1) Ventro intesti 3) Dorso intestir Level - II 1) Both S and I planation of S 2) Both S and I explanation of S 3) S is true but I
Leve 226.	 One pair Only one II Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-vessel C) Muscular and valvular A - B - C B - A - C Trace the flow of blood finsel to the dorsal blood ver ment with reference to the proper sequence A) Internal plexus 	 2) Two pairs 4) Four pairs 4) Four pairs cod vessels in the proper od vessel valvular collecting blood r collecting blood vessel 2) C - B -A 4) B - C - A com the ventral blood vessel sesel in the 17th s e g - e following structures in a B) Ventro intestinal 	BLOOD THE INT Level - I 232. Nutrients from 1) External plex 3) Septo intestin 233. Internal plexus 1) Ventro intestin 3) Dorso intestin Level - II 1) Both S and I planation of S 2) Both S and I explanation of S 3) S is true but I 4) Both S and R
Leve 226.	 One pair Only one II Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-versel C) Muscular and valvular A - B - C B - A - C Trace the flow of blood fingel to the dorsal blood versel Trace the flow of blood fingel to the dorsal blood verse Muscular and valvular 	 2) Two pairs 4) Four pairs 4) Four pairs cod vessels in the proper b) vessel collecting blood vessel d) blood vessel collecting blood vessel d) Ventro intestinal d) External plexus 	BLOOD THE INT Level - I 232. Nutrients from 1) External plex 3) Septo intestir 233. Internal plexus 1) Ventro intesti 3) Dorso intestir Level - II 1) Both S and I planation of S 2) Both S and I explanation of S 3) S is true but I 4) Both S and F 234. Statement (S) :1
Leve 226.	 One pair Only one II Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-versel C) Muscular and valvular A - B - C B - A - C Trace the flow of blood fr sel to the dorsal blood versel A) Internal plexus C) Ventral blood versel 	 2) Two pairs 4) Four pairs 4) Four pairs cod vessels in the proper od vessel valvular collecting blood r collecting blood vessel 2) C - B - A 4) B - C - A com the ventral blood vessel e following structures in a B) Ventro intestinal D) External plexus F) Dorso intestinals 	BLOOD THE INT Level - I 232. Nutrients from 1) External plex 3) Septo intestin 233. Internal plexus 1) Ventro intestin 3) Dorso intestin Level - II 1) Both S and H planation of S 2) Both S and H explanation of S 3) S is true but I 4) Both S and F 234. Statement (S) :1 vessel consists o
Leve 226.	 One pair Only one II Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-vessel C) Muscular and valvular A - B - C B - A - C Trace the flow of blood finsel to the dorsal blood versel A) Internal plexus C) Ventral blood vessel E) Dorsal blood vessel A - B - C - D - E - F 	 2) Two pairs 4) Four pairs b) vessel a) C - B - A b) Ventro intestinal b) Ventro intestinal c) External plexus f) Dorso intestinals c) C - B - A - F - E c) C - B - D - A - F - E 	BLOOD THE INT Level - I 232. Nutrients from 1) External plex 3) Septo intestin 233. Internal plexus 1) Ventro intestin 3) Dorso intestin Level - II 1) Both S and I planation of S 2) Both S and I explanation of S 3) S is true but I 4) Both S and F 234. Statement (S) : vessel consists of acids
Leve 226. 227.	 One pair Only one II Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-versel C) Muscular and valvular A - B - C B - A - C Trace the flow of blood fr sel to the dorsal blood versel A) Internal plexus C) Ventral blood vessel E) Dorsal blood vessel A - B - C - D - E - F F - E - D - C - B - A 	 2) Two pairs 4) Four pairs 4) Four pairs 4) Four pairs 4) Four pairs 4) Bout events 5) Ventro intestinal 1) External plexus 5) Dorso intestinals 2) Course events 2) Course events 2) Course events 4) Events 4) Events 4) Events 5) Dorso intestinals 5) Course events 4) Course events<!--</td--><td>BLOOD THE INT Level - I 232. Nutrients from 1) External plex 3) Septo intestin 233. Internal plexus 1) Ventro intestin 3) Dorso intestin Level - II 1) Both S and I planation of S 2) Both S and I explanation of S 3) S is true but I 4) Both S and F 234. Statement (S) : vessel consists of acids Reason (R) : S</td>	BLOOD THE INT Level - I 232. Nutrients from 1) External plex 3) Septo intestin 233. Internal plexus 1) Ventro intestin 3) Dorso intestin Level - II 1) Both S and I planation of S 2) Both S and I explanation of S 3) S is true but I 4) Both S and F 234. Statement (S) : vessel consists of acids Reason (R) : S
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Levo 226. 227. 228.	 One pair Only one el - II Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-versel C) Muscular and valvular A - B - C B - A - C Trace the flow of blood finds and valvular A - B - C Trace the flow of blood versel B) Internal plexus C) Ventral blood versel Dorsal blood versel A - B - C - D - E - F F - E - D - C - B - A Statement (S): In Pherety 	 2) Two pairs 4) Four pairs 6) od vessels in the proper 6) d vessel 7) C - B - A 4) B - C - A 7) C - B - A 4) B - C - A 7) context blood vessel 2) C - B - A 4) B - C - A 7) context blood vessels 8) Ventro intestinal 1) External plexus 7) Dorso intestinals 2) C - B - D - A - F - E 4) C - B - D - F - A - E 4) C - B - D - F - A - E 4) the sub-neural blood vessel" 	BLOOD THE INT Level - I 232. Nutrients from 1) External plex 3) Septo intestin 233. Internal plexus 1) Ventro intestin 3) Dorso intestin Level - II 1) Both S and I planation of S 2) Both S and I explanation of S 3) S is true but I 4) Both S and F 234. Statement (S) : vessel consists o acids Reason (R) : S from ventral blo 235. Statement (S) :
Leve 226. 227. 228.	 One pair Only one II Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-versel C) Muscular and valvular A - B - C B - A - C Trace the flow of blood firsel to the dorsal blood versel B) Nontral plexus C) Ventral blood vessel E) Dorsal blood vessel A - B - C - D - E - F F - E - D - C - B - A Statement (S) : In Pheret vessel is a "collecting blood 	 2) Two pairs 4) Four pairs 6) od vessels in the proper 6) od vessel 7) od vessel 7) C - B - A 4) B - C - A 7) C - B - A 4) B - C - A 7) conthe ventral blood vessel 8) Ventro intestinal 10) External plexus F) Dorso intestinals 2) C - B - D - A - F - E 4) C - B - D - F - A - E 4) C - B - D - F - A - E 4) the sub-neural blood vessel runs 	BLOOD THE INT Level - I 232. Nutrients from 1) External plexus 3) Septo intestin 233. Internal plexus 1) Ventro intesti 3) Dorso intestin Level - II 1) Both S and I planation of S 2) Both S and I explanation of S 3) S is true but I 4) Both S and F 234. Statement (S) : vessel consists of acids Reason (R) : S from ventral blo 235. Statement (S) : vessels are rich
Leve 226. 227. 228.	 One pair Only one II Arrange the following bl sequence dorso-ventrally A) Cheif distributing bloc B) Non-muscular, non-versel C) Muscular and valvular A - B - C B - A - C Trace the flow of blood firsel to the dorsal blood versel A) Internal plexus C) Ventral blood vessel Dorsal blood vessel A - B - C - D - E - F F - E - D - C - B - A Statement (S) : In Pheret vessel is a "collecting blood 	 2) Two pairs 4) Four pairs 4) Four pairs cood vessels in the proper od vessel valvular collecting blood r collecting blood vessel 2) C - B -A 4) B - C - A com the ventral blood vessel e following structures in a B) Ventro intestinal D) External plexus F) Dorso intestinals 2) C - B - D - A - F - E 4) C - B - D - F - A - E tima the sub-neural blood od vessel" neural blood vessel runs e cord from 14th segment 	BLOOD THE INT Level - I 232. Nutrients from 1) External plex 3) Septo intestin 233. Internal plexus 1) Ventro intestin 3) Dorso intestin Level - II 1) Both S and I planation of S 2) Both S and I explanation of S 3) S is true but I 4) Both S and F 234. Statement (S) : vessel consists o acids Reason (R) : vessels are rich Reason (R) :

are true and R is the correct expla-

R are true and R is not the correct

R is false

R are false

CULATION IN THE FIRST FEEN SEGMENTS

- sel that distributes blood to reprois
 - lvessel
 - d vessel
 - blood vessel
 - ophageal blood vessel

sel that collects blood from the rens is

- d vessel
- d vessel
- phageal blood vessel
- phageal blood vessel
- entary blood vessel supply blood to tal septa and Intestine
 - s and Intestine
 - ephridia
 - d Intestine.

CIRCULATION IN FESTINAL REGION

gut are absorbed into

- 2) Internal plexus us
 - 4) Ventro intestinal nal
- is connected to the
 - 2) Septo intestinals inals
 - nals 4) Commissural

R are true and R is the correct ex-

R are true and R is not the correct 5

- R is false
- R are false
- In Pheretima septo intestinal blood fhigh amounts of glucose and amino

Septo-intestinal blood vessel arises ood vessel.

In Pheretima dorso intestinal blood in nutrients

The dorso intestinal blood vessels m the intestinal to the dorsal blood vessels

- 236. Statement (S): Peristalsis is seen only in the dorsal blood vessel but not in ventral blood vessel
 Reason (R): Muscles are absent in ventral blood vessel but present in dorsal blood vessel
- 237. Statement (S): In Pheretima the sub-neural blood vessel is a "collecting blood vessel"Reason (R): The sub-neural blood vessel runs

beneath the ventral nerve cord from 14th segment to the posterior end.

BLOOD GLANDS

Level - I

238. Nature of blood glands 1) White coloured follicular bodies 2) Coloure less follicular bodies 3) Red coloured follicular bodies 4) Red coloured racemose bodies 239. The number of segments that bear blood glands 1)3 2)4 3) 5 4) 6 240. Blood glands are present in the segments 1) 3, 4, 5 2)4, 5, 63) 5, 6, 7 4) 2, 3, 4 241. Blood glands occur 1) on the stomach region 2) pharyngeal mass 3) buccal mass 4) mouth 242. Blood glands produce 1) Plasma and Haemoglobin 2) Blood corpuscles and Plasma

3) Blood corpuscles and Haemoglobin4) Lymphocytes and Blood corpuscles

EXCRETORY SYSTEM

- The process of elimination of nitrogenous wastes from the body is called **Excretion**.
- In Earthworms excretion takes place with the help of segmentally arranged coiled and tubular structures called **nephrdia and chloragogen cells**.
- Nephridia are ectodermal in origin.

TYPICAL NEPHRIDIUM

- Typical nephridium is found in earth worms like Lumbricus and Drawida grandis but absent in Pheretima.
- A pair of typical nephidia are arranged on either side of the alimentary canal in each segments.
- Each typical nephridium consists of three parts i.e. Nephrostome, neck and body of nephridium.
- Nephrostome is a ciliated **funnel which opens into coelom.**
- A short ciliated neck which pierces the septum and enters the next segment.
- Body of nephridium is a long convoluted tube which opens outside through nephridiopore on the ventral or lateral surface of a segment.

- Body of nephridium has three parts i.e ciliated, intracellular tube, glandular intracellular tube and muscular intercellular tube.
- The nitrogenous wastes received along with blood are filtered in the glandular part.
- Nephridium which bears nephrostome is called **'open type'**
- Nephridium without nephrostome is 'closed type'
- Nephridium with **nephridiopore which opens** to the exterior is called **Exonephric nephridum**.
- Typical nephridia are "Open & Exonephric nephridia"
- Nephridium which opens into alimentary canal is called 'Enteronephric nephridium.

TYPICAL NEPHRIDIUM

Level - I

- 243. The type of nephridium present in Drawida grandis 1) Open & Exonephric
 - 2) Open & Enteronephric
 - 3) Closed & Exonephric
 - 4)Closed Enteronephric
- 244. In the body of typical nephridium intercellular parts are.
 - 1) Ciliated & glandular
 - 2) Ciliated & muscular
 - 3) Glandular & muscular
 - 4) Only muscular
- 245. Origin of nephridia in Earthworms.
 - 1) Ectoderm 2) Endoderm
 - 3) Mesoderm 4) Ecto-Endoderm
- 246. Number of segments occupied by a typical nephridium in Drawida grandis
 - 1) 2 2) 1 3) 3 4) 4
- 247. The region of the typical nephridium that collects nitrogenous wastes from the blood is
 - 1) Nephrostome 2) Ciliated region
 - 3) Glandular region 4) Muscular region
- 248. The region of the typical nephridium that collects nitrogenous wastes from the coelomic fluid is
 - 1) Muscular region 2) Ciliated region
 - 3) Glandular region 4) Nephrostome
- 249. In Pheretima nephridia are absent in
 - 1) First four segments 2) First six segments
 - 3) First two segments 4) Last two segments

Level - II

- 250. The following are the parts of the typical nephridium of earthworm
 - (a) Nephrostome (b) Nephridopore
 - (c) Muscular intercelluar part (d) Neck
 - (e) Ciliated and glandular intracellular part

Arrange them in the correct sequence

1) a-d-e-c-b	2) d - a - c - e - b
3) a - d - c - e - b	4) a - b - c - d - e.

NEPHRIDIA IN PHERETIMA

- In Pheretima nephridia occur in all segments except the first two.
- Based on their postion three types of nephridia are distinguished in Pheretima i.e., Integumentary nephridia, Pharyngeal nephridia and septal nephridia.

INTEGUMENTARY NEPHRIDIA

- These are the smallest nephridia present in Pheretima and hence called *Micronephridia*.
- They lie scattered on the inner surface of the body wall, except in the first two segments. Hence the name integumentary nephridia.
- They are 'V' shaped structures and project into the coelomic cavity.
- Nearly 200 to 250 rephridia are present in each segment.
- Their number is 10 times more in the clitellar segments 2000 to 2500.
- Largest mumber of Integumentary nephridia in clittelar region is described as "forests of nephridia".
- Integumentary nephridia open on the surface of the body by nephridiopore.
- Integumentary nephridia are "Closed, exonephric nephridia".

INTEGUMENTARY NEPHRIDIA

Level - I

251. Shape of integumentary nephridia.				
1) S - shape	2) W- shape			
3) V - shape	4) Loop-like			
252. Forests of nephridia are	e formed by			
1) Mega nephridia	2) Tufted nephridia			
3) Micronephridia	4)Typical nephridia			
253. The number of integum	entary nephridia in each seg-			
ment except in the clitel	llar segments			
1) 100 - 120	2) 100 - 200			
3) 200 - 250	4) 300 - 350			
254. Segments with forests of	of nephridia			
1) 13, 14, 15	2) 14, 15, 16			
3) 17, 18, 19	4) 16 & 17			
255. Exonephric nephridia in	n Pheretima are			
1) Septal nephridia				
2) Integumentary nephr	ridia			
3) Typical nephridia	4) Pharyngeal nephridia			

Level - II

- 256. The following are the statements about integumentary nephridia in Pheretima
 - i) Closed nephridia
 - ii) Forests of nephridia iii) Micronephridia
 - The correct combination is
 - 1) All are true 2) Only i & ii are true
 - 3) only i & iii are true 4) Only iii and ii are true

PHARYNGEAL NEPHRIDIA

- Pharyngeal nephridia are present in **4th**, **5th and 6th segments on either** side of pharynx and oesophagus Hence the name **pharyngeal nephridia**.
- Pharyngeal nephridia are as large as the septal nephridia
- Pharyngeal nephridia are large in number and arranged in the form of two bundles in each segment, on either side of gut. Hence they are called **tufted nephridia**.
- The terminal ducts of pharyngeal nephridia unite to form long thick walled excretory canals.
- The pair of ducts from the nephridial bunches of the **sixth segment open into** buccal **chamber**, while that of fourth and fifth segments open into the pharynx.
- Pharyngeal nephridia are without **nephrostome**
- Pharyngeal nephridia are 'Closed & Enterophric nephridia''

PHARYNGEAL NEPHRIDIA

Level - I

257. Closed enteronephric nephridia are.

- 3) Micro nephridia 4) Septal nephridia
- 258. Closed, Enteronephric nephridia in Pheretima are present in which segments.
 - 1) 3,4&52) 4,5&63) 2,3 & 44) 5,6, & 7
- 259. In pharyngeal nephridia the pair of ducts from the nephridial bunches of the sixth segment opens into the

1) Pharynx	2) Buccal cavity
1 0 1	1) (1)

- 3) Oesophagous 4) Gizzard
- 260. The ducts from the nephridia of the fourth and sixth segment open into the
 - 1) Pharynx 2) Buccal cavity
 - 3) Oesophagous 4) Gizzard

Level - II

261. Statement (S) : Pharyngeal nephridia are discribed as enteronephric nephridia

Reason (R): They discharge their excretory products into the lumen of the gut

1) Both S and R are true and R is the correct explanation of S

2) Both S and R are true and R is not the correct explanation of S

3) S is true but R is false

4) Both S and R are false

SEPTAL NEPHRIDIA

- Septal nephridia are the **largest nephridia** in the body of Pheretima.
- Septal nephridia are present attached to the inter segmental septum from 15 & 16 segment onwards to last segment.
- **80 to 100 septal** nephridia are present in each segment. They are arranged in 4 rows on either side of the septum -two rows on its anterrior face and two rows on its posterior face.
- Each septum has 40 to 50 nephridia attached to its anterior face and 40 to 50 to its posterior face.
- Septal nephridium bears **nephrostome**, **neck and nephridial** body.
- Nephrostome is a ciliated funnel which opens into the coelom.
- Nephrostome is followed by ciliated narrow tube called neck.
- Neck leads into the body of nephridium.
- The body of nephridium has a short straight lobe and a long spirally twisted loop and a terminal duct.
- The twisted loop is more than twice the length of the straight lobe.
- The twisted loop has **two limbs spirally twisted** around each other. **The proximal limb** and distal limb.
- The straight lobe is continued into the **distal limb**.
- The proximal limb gives off the **terminal duct**.
- The terminal ducts of the nephridia open into a pair of **septal excretory canals**, which run along **the septum.**
- The septal excretory canals open dorsally into a pair of **supra-intestinal excretory canals** which lie mid - dorsally above the intestine and beneath the **dorsal vessel**.
- The supra intestinal excretory canals extend from 15th to last segment.
- The supra intestinal excretory canals open into the lumen of intestine through narrow ductules at the level of septum. Each opening into the intestine is guarded by sphincter, which controls the discharge of excretory fluids into intestine
- Septal nephridia are 'Open & Enteronephric nephridia'.

SEPTAL NEPHRIDIA

Level - I

262. Open & enteronephric nephridia in Pheretima are.				
1) Typical nephridia				
2) Integumentary nephrid	lia			
3) Micro nephridia	4) Septal nephridia			
263. The terminal nephridial d	uct of septal nephridium is			
formed from.				
1) Straight lobe	2) Apical limb			
3) Proximal limb	4) Distal limb			
264. Septal nephridia are attac	ched to each intersegmen-			
tal septum starting from.				
1) 14/15	2) 15/16			
3) 13/14	4) 12/13			
265. The number of septal nephridia attached to each				
row of the septum.				
1) 20 to 25	2) 26 to 30			
3) 15 to 18	4) 26 to 35			
266. The terminal ducts of sep	otal nephridia opens into.			
1) Septal excretory cance	als			
2) Straight lobe				

- 3) Supra intestinal excretory canals
- 4) Lumen of intestine
- 267. Nephridia in Pheretima opening into the lumen of alimentary canal.
 - 1) Mega & Micronephridia
 - 2) Mega nephridia only.
 - 3) Micro & pharyngeal nephridia
 - 4) Tufted and septal nephridia.

Level - II

268. The following are the parts of a septal nephridium of Pheretima. Arrange them in a proper sequence

- A) Short straight lobe B) Apical part
 - D) Terminal duct
- E) Septal excretory canal
- 1) C B A E D

C) Nephrostome

- 2) C A B D E
- 3) C B D E A
- 4) B D C E A
- 269. Statement (S): In Pheretima eleocytes are eliminated by septal nephridia Reaso (R): Septal nephridia open into alimentary canal
- 270. **Statement (S) :** In Pheretima only septal nephridia can eliminate eleocytes

Reason (R) :They are the only open nephridia in Pheretima

PHYSIOLOGY OF EXCRETION

- Urine is hypotonic and contains **urea**, **ammonia and creatinine**.
- Urea is the major excretory product. So Pheretima is described as ureotelic animal.

- All the three types of nephridia extract the nitrogenous wastes from blood.
- Septal nephridia eliminate excretory wastes from the **blood and coelomic fluid.**
- The elaborate ' enteronephric nephridial system of Pheretima discharging excretory fluid into the lumen of the intestine is an adaptation for **conserva-tion of water.**
- Nephridia also play a role in osmoregulation.

PHYSOLOGY OF EXCRETION

Level - I

- 271. Major excretory product in Pheretima is.
 - 1) Urea 2) Ammonia
 - 3) Uric acid 4) Creatinine
- 272. Chlorogogen cells loaded with excretory wastes drop into the coelom as free cells called.
 - 1) Phagocytes 2) Eleocytes
 - 3) Amoebocytes 4) Oenocytes
- 273. Urine of earthworm is----- to blood and body fluid.
 - 1) Isotonic 2) Hypotonic
 - 3) Hypertonic 4) Semisolid
- 274. The type of nephridia that play an important role in osmoregulation
 - 1) Integumentary nephridia
 - 2) Pharyngeal nephridia
 - 3) Septal nephridia 4) 2 & 3
- 275. The following type of nephridia are described as enteronephric nephridia
 - 1) Integumentary nephridia
 - 2) Pharyngeal nephridia
 - 3) Septal nephridia 4) 2 & 3

Level - II

276. Statement (S) : Earthworm is a ureotelic animal Reason (R) : Nephridia will excrete urea.

1)Both S and R are true and R is the correct explanation of S $\,$

2) Both S and R are true and R is not the correct explanation of S

3) S is true but R is false

- 4) Both S and R are false
- 277. **Statement (S) :** In Pheretima "Enteronephric nephridial system" is an adaptation for conservation of water

Reason (R) : The pharyngeal nephridia and septal nephridia discharge the exectrety fluieds into the lumen of the intestine which facilitates the effective reabsorption of water.

1) Both S and R are true and R is the correct explanation of S

2) Both S and R are true and R is not the correct explanation of S

- 3) S is true but R is false
- 4) Both S and R are false
- 278. Match the following and choose the correct combination

Nephrli	dia		Ty	pe	
A) Typic	cal nepl	nridium	i) (Open exonep	ohric
B) Phary	ngeal n	ephridium	ii) (Closed	
	-	_	ent	eronephric	
C)Integu	mentar	у	iii)	iii) closed	
nephridiu	ım		exc	onephric	
D) Septa	al neph	ridium	iv)	iv) Open	
			ent	eronephric	
			v) (Chlorogogen	cells
	Α	В	С	D	
1)	i	ii	iv	iii	
2)	i	ii	iii	iv	
3)	i	iii	ii	iv	
4)	i	iv	ii	iii	

CHLORAGOGEN CELLS

- The chloragogen cells are **star shaped**, yellow specialised cells derived from inner coelomic epithelium.
- They contain yellowish granules called chloragosomes.
- They collect the nitrogenous wastes from coelomic fluid and blood supplied to the intestinal wall.
- When chloragogen cells are loaded with excretory wastes, they drop into the coelom as free cells called **Eleocytes.**
- Eleocytes are ingested by amoebocytes of the coelomic fluid.
- The septal nephridia send the amoebocytes to the exterior.

NERVOUS SYSTEM

- Nervous system of Pheretima consists of two components i.e. central nervous system and peripheral nervous system.
- In earthworm in addition to central nervous system and peripheral nervous system, sub epidermal, intermuscular nerve plexii are highly developed.
- Central nervous system includes nerve ring and double ventral ganglionated nerve cord.
- Nerve ring is formed around the pharynx in 3rd and 4th segments.
- Nerve ring is formed by a pair of supra pharyngeal ganglia (cerebral ganglia), a pair of sub pharyngeal ganglia and a pair of circum pharygeal connectives.
- Brain of earthworm is formed by **supra-pharyn**geal ganglia.
- A pair of sub pharyngeal connectives are present on either side of pharynx, **connect the cerebral ganglia with sub-pharyngeal ganglia**.

- Subpharyngeal ganglia lie beneath the pharynx in the fourth segment.
- Nerve cord is double, ventral, solid and ganglionated.
- Two longitudinal nerve cords start in **4th segment**. from sub-pharyngeal ganglia and extend upto the **last segment**.
- The two nerve cords are wrapped by a fold of connective tissue called **perineurium**.
- In each segment behind the fourth, there is a swelling of nerve cord formed by a pair of ganglia.
- Successive pairs of ganglia are connected from segment to segment by double nerve cords
- On the nerve cord four giant axons are present, one is mid dorsal, two are dorsolateral and the other one is mid ventral in position
- The giant neurons help in the rapid transmission of impulses along the nerve cord.

CENTRAL NERVOUS SYSTEM

Level - I

- 279. Dorsal part in the nervous system of Pheretima.1) Cerebral ganglia2) Segmental ganglia
 - 3) Sub-Pharyngeal ganglia 4) Nerve cord
- 280. Nerve ring in Pheretima is formed around.
 - 1) Oesophagus 2) Pharynx
 - 3) Buccalchamber 4) Stomach
- 281. The nerve cord in Pheretima is surrounded by 1) Epimysium 2) Endoneurium
 - 3) Perineurium 4) Mesoneurium
- 282. Rapid transmission of nerve impules along double ventral nerve cord is facilitated by.
 - 1) Giant axons
 - 2) Segmental ganglia
 - 3) Cerebral ganglia
 - 4) Sub-pharyngeal ganglia.
- 283. Nerves arising from cerebral ganglia.
 - 1) 8 to 10 pairs 2) 5 to 6 pairs
 - 3) 6 to 8 pairs 4) 6 to 7 pairs
- 284. The contraction and relaxation of muscles in one segment leads to the muscles of the next segment with the help of repeated.
 - 1) Gaint neurons 2) Reflex arcs
 - 3) Segmental ganglia 4) Nerve ring
- 285. Segmental ganglia in earthworm start from.
 - 1) 4th segment 2) 6th segment
 - 3) 5th segment 4) 7th segment
- 286. Earthworms are characterised by
 - 1) Circum oesophageal nerve ring
 - 2) Circum pharyngeal nerve ring
 - 3) Circum enteric nerve ring
 - 4) Circum oral nerve ring

- 287. Sub-phayngeal ganglia lies
 - 1) Beneath the pharynx in the 3rd segment
 - 2) Beneath the stomach in the 7th segment
 - 3) Beneath the pharynx in the 5th segment
 - 4) Beneath the phaynx in the 4th segment
- 288. If the sub-pharyngeal ganglion is removed the worm loses
 - 1) Endocrine control 2) Metabolic control
 - 3) Motor control 4) Sensory control
- 289. Number of giant axons present on the ventral nerve cord

l) One pair	2) Only one
3) Four	4) Three

PERIPHERAL NERVOUS SYSTEM

- Peripheral nervous system includes the nerves arising from the central nervous system and innervating the body parts.
- 8 to 10 pairs of nerves arise from cerebral ganglia which divide and supply branches to prostomium and the wall of the buccal chamber.
- Nerves arising from sub pharyngeal ganglia are supplied to organs of second, third and fourth segments.
- Number of nerves which arise from segmental gangila are **3 pairs** supply to gut wall, body wall and visceral organs of the respective segment.

PERIPHERAL NERVOUS SYSTEM

Level - I

- 290. Number of nerves arising from each segmental ganglia.
 - 1) Three pairs2) Four pairs3) Two pairs4) Five pairs
- 291. The number of nerves connected to the brain on each side
 - 1) 8 to 10 pairs 2) 2 to 4 pairs
 - 3) 8 to 10 4) 4 to 8
- 292. Nerves arising from prostomium and the wall of the buccal chamber are connected to
 - 1) Sub-pharyngeal ganglia
 - 2) Segmental ganglia
 - 3) Circum-pharyngeal nerve ring 4) Brain
- 293. Nerves are given off from circum-pharyngeal connectives to
 - 1) Second segment and pharynx
 - 2) Wall of the first segment and wall of the buccal chamber
 - 3) Only pharynx 4) Only to buccal chamber
- 294.2, 3 & 4 segments are supplied by nerves from
 - 1) Sub-pharyngeal ganglia
 - 2) Segmental ganglia
 - 3) Circum-pharyngeal nerve ring 4) Brain

Level - II

295. Arrange the following parts of the nerves system from anterior to the posterior

A) Sigmental ganglian B) Brain

C) Sub-pharyngeal ganglian

1) A - B - C	2) A - C - B
3) B - C - A	4) B - A - C

RECEPTOR ORGANS

- Epidermal cells with special nerve endings, whose function is to receive stimuli are called receptors.
- Three types of receptors are present in Pheretima i.e. Epidermal, Buccal and Photoreceptors.
- Epidermal receptors are formed by groups of tall slender supporting cells, which end in hair like processes at their outer free surfaces.
- Epidermal receptors are present in large numbers on the ventral and lateral sides of the body.
- The Epidermal receptors cause elevations of the cuticle and found in epidermis.
- Epidermal receptors are **Tango receptors (Tactile)** or **Touch receptors**
- Buccal receptors are present in **Buccal epithelium**.
- Buccal receptors resemble the epidermal receptors in their form.
- Distinguishing feature of buccal receptor cell

-Deep seated nucleus.

- Buccal receptors act as chemo receptors and gustatory receptors and also as olfactory receptors.
- Photo receptors are formed in the epidermis on the dorsal side of prostomium and the anterior segments.
- Each photoreceptor is an oval cell containing L-shaped optic organelle or lens consisting of a hyaline substance. It is also called **phaeosome.**
- The photoreceptors detect changes in light intensity.
- Cyto plasm contains a network of nerve fibrillae.
- Earthworm is negatively phototaxic.

EPIDERMAL RECEPTORY

Level - I

- 296. Tango receptors in Pheretima are more on.
 - 1) Dorsal side 2) Ventral side
 - 3) Lateral side 4) Ventro lateral sides.
- 297. The kind of receptors which are tall and lie along with slender supporting cells are
 - 1) Buccal receptors
 - 2) Photoreceptors
 - 3) Epidermal receptors
 - 4) Thermo receptors

- 298. The kind of receptors with hairlike process at their outer free ends are
 - 1) Buccal receptors
- 2) Photoreceptors
- 3) Epidermal receptors
- 4) Thermo receptors

BUCCAL RECEPTORS

Level - I

- 299. Gustatory receptors are located in.
 - 1) Buccal epithelium 2) Skin
 - 3) Mouth 4) Prostomium
- 300. The kind of receptors with deep lying nuclei in their cells are
 - 1) Buccal receptors 2) Photoreceptors
 - 3) Epidermal receptors
 - 4) Thermo receptors
- 301. The kind of receptors whose cells have better developed sensory hairs are
 - 1) Buccal receptors 2) Photoreceptors
 - 3) Epidermal receptors 4) Thermo receptors

PHOTORECEPTORS

Level - I

- 302. Phaeosome is present in.
 - 1) Epidermal receptor
 - 2) Buccal receptors
 - 3) Photo receptors 4) Chemo receptors
- 303. The kind of receptors the are present on the dorsal side and abundant on prostomium and the peristomium
 - 1) Buccal receptors 2) Photoreceptors
 - 3) Epidermal receptors 4) Thermo receptors
- 304. 'L' shaped optic organelle present in photoreceptor is
 - 1) Optosome 2) Phaeosome
 - 3) Photosome 4) Nerve fibrillae
- 305. The kind of receptors where sensory hairs are absent
 - 1) Buccal receptors 2) Photoreceptors
 - 3) Epidermal receptors 4) Thermo receptors

Level - II

306. Statement (S) : Earthworm retreats into the burrow during daytime.

Reason (R): Earthworm is negatively phototaxic

1)Both S and R are true and R is the correct explanation of S

2) Both S and R are true and R is not the correct explanation of S

- 3) S is true but R is false
- 4) Both S and R are false

REPRODUCTIVE SYSTEM:

- Earh worms are monoecious or hermaphrodite or bisexual animals.
- Reproductive system develops from mesoderm.

REPRODUCTIVE SYSTEM

Level - I

307. The set of cells that are present in clitellar region are

- 1) Mucous, albumin & gelatin cells
- 2) Albumin, mucous & cocoon secreting cells
- 3) Albumin, mucous & starch secreting cells
- 4) Mucous, albumin & lipid secreting cells
- 308. Find out the correct statement

1) Outer case of the cocoon is formed by the cocoon secreting cells

2) Outer case is formed by the albumin secreting cells

3) Copulation is helped by mucous secreting cells and albumin cells

4) Outer case of the cocoon is formed by the mucous secreting cells

309. Reproductive system is

1) Ecto dermal	2) Endo dermal
3) Meso dermal	4) 1 & 2

MALE REPRODUCTIVE SYSTEM

- The male reproductive system in Pheretima consists of testes, testis sac, seminal vesicles, spermiducal funnels, vasadeferentia, prostate glands, accessory glands and genital pores.
- Testes and testis sacs are derived from **coelomic epithelium**.
- Testes are two pairs and are located one each in **10th and 11th** segments.
- Each testis shows 4 to 8 finger shaped bunches of cells.
- Testes produce *spermatogonia or sperm mother cells* **and release into** testis sacs.
- Testis sacs are two and present in **10th and 11th** segments.
- The testis sac of 10th segment encloses a pair of testes and a pair of spermiducal funnels.
- The testis sac of 11th segment encloses a pair of testes, a pair of spermiducal funnels and a pair of seminal vesicles.
- Seminal vesicles are two pairs located in segments 11 and 12 each one pair, formed from intersegmental septum of 10/11 and 11/12 segments.
- Seminal vesicles are also called **septal pouches** as they are formed as pouches from septa.
- Seminal vesicle receives spermatogonia from the testis sac to form spermatozoa.

- Spermatogonia undergo maturation division to produce sperms or spermatozoa
- Seminal vesicles release spermatozoa into the testis sacs present in preceding segments.
- Spermiducal funnels are two pairs located in segments 10 & 11, one pair each.
- Each funnel has a folded and ciliated margin and lead into vas deferens.
- Spermiducal funnels collect the spermatozoa and pass into vasadeferentia.
- Two vasa deferentia of one side run close along the inner surface of the body wall from 12th to 18th segments.
- Vasa deferentia are internally ciliated and also called **spermatic ducts.**
- A pair of **prostate or spermiducal glands** lie on either side of gut from 16th or 17th to 20th or 21st segments.
- Each prostate gland is a large, solid white structure with irregular outline and consists of a large glandular and a small non-glandular portions.
- The glandular portion contains many closely packed tubules with active secretory cells.
- The non-glandular portion consists of small ductules which unite to form common **prostatic duct**.
- The common prostatic duct joins two vasa deferentia of its own side and the three ducts are enclosed together by a common muscular sheath to form **common prostatic and spermatic duct** which opens to outside through male genital opening.
- In Pheretima there is no mixing of the spermatic and prostatic fluids within the body.
- In other earth worms the secretions of prostate glands help in the formation of spermatophores.
- There are two pairs of accessory glands present in **17th & 19th segments -** a pair in each at the bases of **genital papillae**.
- The secretions of accessory glands help in attachment of two earthworms during copulation.
- A pair of **male genital pores** are located on the ventral side of **18th segment**.

MALE REPRODUCTIVE SYSTEM

Level-I

- 310. Testis and testis sacs are derived from
 - 1) Coelomic Epithelium 2) Gut wall
 - 3) Endoderm 4) Ectoderm
- 311. In Pheretima spermatogonia are produced from.
 - 1) Testis 2) Testis sac
 - 3) Seminal vesicles 4) Septal pouches

312. Testis sac of eleventh se	egment encloses.
1) Testes	2) Seminal vesicles
3) Spermiducal funnels	4) All the above.
313. Spermatogenesis centre	es in earthworm.
1) Testis sacs	2) Testis
3) Seminal vesicles	4) Spermiducal funnels
314. The parts of the male	e reproductive system in
Pheretima described as	septal pouches.
1) Testis sacs	2) Testis
3) Seminal vesicles	4) Spermiducal funnels
315. Irregularly arranged g	ands from seventeenth to
twenty first segments in	Pheretima.
1) Prostate glands	2) Accessory glands
3) Mehlis glands	4) Conglobate glands
316 The number of ducts en	closed in common prostatic
and spermatic sheath	closed in common prostatic
1) Two	2) Three
$\frac{1}{2}$ Equi	$\frac{2}{100}$
217 A accessory clouds are le	4) Five
31/. Accessory giands are it	2) 16 ≈ 17
$1) 1/ \propto 18$	$2) 10 \propto 1/$
$3)1/ \ll 19$	4) 18 & 19
318. Testes are present in the	2×10^{-1}
1) 9 and 10 2) 12 112	2) 10 and 11 4) 12 114
3) 12 and 13	4) 13 and 14
319. Testis sacs are present i	n segments
1) 9 and 10	2) 10 and 11
3) 12 and 13	4) 13 and 14
320. Seminal vesicles are pre	esent in segments
1) 9 and 10	2) 10 and 11
3) 11 and 12	4) 13 and 14
321. Spermiducal funnels are	e present in segments
1) 9 and 10 $(1)^{1}$	2) 10 and 11
3) 12 and 13	4) 13 and 14
Level - II	
322. Statement (S) : In Pher	etima reproductive system
is mesodermal in origin.	
Reason (R) : Testes an	d ovaries in Pheretima are
formed from inner coeld	omic epitherlium
1)Both S and R are true	and R is the correct expla-
nation of S	
2) Both S and R are true	are and R is not the correct
explanation of S	
3) S is true but R is fals	e
4) Both S and R are fal	se
323. The following are the	e statements about septal
pouches in Pheretima	
i) Situated in 11th and 1	2th segments
ii) Spermatogonia deve	lop into sperms
iii) Also called seminal v	vesicles.
The correct combination	nis
1) All are true	2) Only i & ii are true
3) only i & iii are true	4) Only iii and ii are true
/ ·	· •

324. The following are the statements about earthworm

i) Female genital aperture is present in the 14th segment.
ii) Male genital apertures are present in the 18th segment
iii) Seminal vesicles are present in 11th and 12th segments.

1) All are true	2) Only 1 & 11 are true
3) only i & iii are true	4) Only iii and ii are true

FEMALE REPRODUCTIVE SYSTEM

- Female reproductive system includes ovaries, oviducts and spermathecae.
- Ovaries are present in the 13th segment attached to **12/13 septum** on either side of ventral nerve cord.
- Ovaries are whitish masses with **finger shaped processes containg ova arranged in a linear series** and in different stages of development.
- Oogonia in the ovary undergo maturation division and are released as ova into the 13th segment.
- A pair of **oviducal funnels** in 13th segment lie behind the ovaries.
- Oviducal funnels are saucer shaped with folded and ciliated margins. They collect ova.
- A pair of oviducts arise from oviducal funnels in 13th segment, penetrate the 13/14 septum, enter the 14th segment where they converge beneath the nerve cord to form a **common oviduct**.
- The oviducts are ciliated.
- The common oviduct opens on the ventral side in the 14th segment by a median **female genital aperture.**
- Four pairs of spermathecae are situated in 6th, 7th 8th, 9th segments.
- Each spermatheca is a flask shaped structure with a pear shaped **ampulla** and a **diverticulum**.
- Sperms are received by spermathecae during copulation and stored in **diverticulum in Pheritima**.
- In other earthworms they are stored in the ampulla.
- Sperms are nourished by ampulla in Pheritima
- The spermathecae open ventro-laterally through 4 pairs of spermathecal openings, which are situated in the inter segmental septum between 5/6, 6/7, 7/8 and 8/9 segments.
- The mature ova are released into the cocoon through female genital aperture.

FEMALE REPRODUCTIVE SYSTEM

Level - I

- 325. In Pheretima ovaries are attached to the posterior face of septum.
 - 1) 11/12 2) 12/13 3) 13/14 4) 14/15

326. Into the body cavity of thirteenth segment the ova-	. 33
ries release.	
1) Ova 2) Oogonia	R
3) Primary oocytes 4) Secondary oocytes	
327. In Pheretima sperms received during copulation are	;
stored in this part of the spermatheca.	
1)Ampulla 2)Diverticulum	
3) Neck 4) Base	
328. Number of oviducts and female genital pores in	L
Pheretima respectively.	
1) 4 & 2 2) 3 & 1	
3) 2 & 1 4) 2 & 2	
329. Female genital apertures	
1) Single median on the ventral side of 13th seg-	,
2) Double lateral on the ventral side of 14th seg-	3
2) Single modion on the ventral side of 14th see	
5) Shigle median on the ventral side of 14th seg-	·
1) Double lateral on the ventral side of 13th sea	
ment	
330 In Pheretima spermathecae are located in	
(FAMCET - 2004)	
1) Dorso-lateral sides of 6.7.8 and 9th segments	
2) Ventro-lateral sides of 6, 7, 8 and 9th seg-	
ments	
3) Ventral surface of 5/6, 6/7, 7/8 and 8/9 seg-	
mental grooves	•
4) Dorsurface of 5/6, 6/7, 7/8 and 8/9 segmental	
grooves	•
331. The oviducts penetrate the septum between the seg-	. •
ments	
1) 12 and 13 2) 14 and 15	
3) 13 and 14 4) 15 and 16	•
Level - II	
332. The following are the statements about spermath-	· •
ecae of Pheretima	•
1) They belong to male reproductive system	
11) Present in 6, 7,8 and 9th segment	•
111) Diverticulum stores sperms	
1) All are true 2 Or $\frac{1}{2}$ or $\frac{1}{2}$	
2) only i & iii oro true 4) Only iii ord ii oro true	
222 The following are the organs of reproductive due	
555. The following are the organs of reproductive sys-	·
	L
a) Ovaries b) Testes	3
c) Prostate glands d) Seminal vesicles	
Arrange in the correct sequence of these organs	
trom the anterior to the posterior	
1) $a - b - c - d$ 2) $b - d - a - c$	
3) $c - a - d - b$ 4) $b - a - c - d$	

34. Match the following and choose the correct combination

eproductive Sy. Parts Location

	· • ~ j• =					
A) Testes			i) 11th and 12th			
			segment	s		
B) Ova	ries		ii) 13 th	segment		
C) Sem	inal vesi	cles	iii) 10th	and 11th	L	
/			segment	s		
D) Pros	tate ala	nde	iv) 14th	- to last se	oments	
D) 1103	state gra	lius	10 / 1741		gments	
			v) 1/th	- 21st		
			segment	s.		
	Α	В	С	D		
1)	iv	\mathbf{V}	iii	i		
2)	iii	ii	i	v		
3)	iv	\mathbf{V}	ii	i		
4)	i	iii	iv	\mathbf{V}		
. The foll	owing a	re the st	atements	about ea	arthworn	
i)Femal	e genita	l apertu	re is pres	ent in the	14th seg	

35. n gդ ł ment.

ii) Male genital apertures are present in the 18th segment

iii) Seminal vesicles are present in 11th and 12th segments.

1) All are true	2) Only i & ii are true
3) only i & iii are true	4) Only iii and ii are true

COPULATION

- Self fertilization in earth worms is avoided due to protandry.
- Fertilization is cross fertilization.
- During copulation two earthworms meet and become apposed to each other ventrally in head to tail position
- The male genital pores of one earthworm lie opposite to the spermathecal pores of the other.
- The male genital pores are raised into papillae.
- Papillae are inserted into spermathecal openings for reciprocal exchange of spermatozoa.
- Secretions of accessory glands and copulatory papillae assist in copulation.
- The act of copulation lasts for about **an hour**.
- Fertilization is external and takes place inside the cocoon.

COPULATION

evel - I

- 36. Early maturity occurs in
 - 1) Male earthworm
 - 2) Female earthworm
 - 3) Female reproductive organs
 - 4) Male reproductive organs

- 337. During copulation in Pheretima the following structures are raised into papillae.
 - 1) Spermathecal apertures
 - 2) Male Genital apertures
 - 3) Oviducal pores 4) Accessory glands
- 338. During copulation the following are exchange between the two earthworms
 - 1) Ova and spermatozoa 2) Ova only
 - 3) Spermatozoa only 4) Oogonia

COCOON FORMATION

- Cocoons of Pheretima are laid during **and after the monsoon** season - August to october, where there is plenty of moisture and suiatable temperature for the development of embryo.
- A membranous girdle is formed around the clitellum formed by the secretion of clitellar glands
- The secretion hardens on exposure to air to form a cocoon.
- When the earthworm wriggles back, the cocoon is pushed forward.
- The cocoon receives **ova**, then the **sperms** and also **albumin** from the glands of anterior segments.
- The cocoon is finally released from the anterior end and its two ends close up due to the elasticity of the girdle.
- Cocoon is spherical and olive or light yellow in colour.
- Fertilization occurs in Cocoon.
- Though many zygotes are formed, only one develops into an young earth worm.

COCOON FORMATION

339. Clitellum is responsible for 1) Copulation 2) Fertilization 3) Cocoon formation 4) Development 340. In Pheretima fertilization takes place in 1)Clitellum 2) Cocoon 3) Seminal vesicles 4) Spermathecae. 341. Cocoons are laid during the months 1) April to June 2) June to August 4) August to December 3) August to October 342. Fertilization in Pheretima is 1) Internal and cross 2) External and cross 3) Internal and self 4) External and self Level - II 343. Statement (S): Only one young earthworm develops in one cocoon. Reason (R): Inside the cocoon only one zygote is formed 1) Both S and R are true and R is the correct explanation of S

2) Both S and R are true and R is not the correct explanation of S

- 3) S is true but R is false
- 4) Both S and R are false
- 344. The following are the statements about cocoon i) It is produced by clitellum

ii) Fertilization takes place inside the cocoon

iii) All the zygotes undergo further development in one cocoon.

The correct combination is

1) All are true2) Only i & ii are true3) only i & iii are true4) Only iii and ii are true

Development

- Development is **direct and there is no larval stage.**
- After fertilization polar bodies are extruded.
- Ovum is surounded by vitelline membrane and filled with yolk granules.
- Cleavage is holoblastic, unequal, spiral and determinate.
- As the cleavage proceeds a hollow sphere called **blastula** is formed
- The micromeres line the blastuala at the animal pole.
- The megameres line the blastula at the vegetal pole.
- The cavity of blastuala is **blastocoel**.
- A pair of mesoblastic pole cells give raise to two rows of mesoblastic bands.
- The spherical blastula becomes flattened to form a solid oval structure.
- The lower surface of the embryo invaginates to form the gastrula.
- Gastrulation is by- invagination
- A new cavity called **archenteron or primtive gut is formed**, opening of which is alled **blastopore**.
- After gastrulation the embryo is provided with 3 germinal layers- Ectoderm, Endoderm, Meso-derm.
- Enteron is lined by endoderm
- Mesomeres form mesoderm
- Ectoderm gives rise to epidermis, nervous system, nephridia, setal sacs, stomodium and proctodium.
- Endoderm gives rise to the lining of the alimentary canal and the associated glands.
- Mesoderm gives rise to muscles, **coelomic epitheliuum** inter segmental septa, blood vessels and reproductive organs.
- The tall ciliated cells of ectoderm that surround the mouth grow inwards to form stomodaeum.
- Stomodium leads into archenteron.

- Embryo starts feeding on albumen after the formation of stomodium.
- Somatopleure becomes the outer coelomic epithelium.
- The splachnopleure forms the inner coelomic epithelium.
- The ectodermal invagnation of the last segment fuses with the enteron to form proctodaeum.

DEVELOPEMENT

Level - I

345. The type of cleavage i	n Pheretima.				
1) Holoblastic & unec	jual, spiral & determinate				
2) Holoblastic & equa	2) Holoblastic & equal spiral & indeterminate				
3) Meroblastic & une	oual. radial & determinate				
4) Meroblastic & equ	al radial & in determinate				
346 In the blastula of Pher	retima the pole cell is cut off				
from.					
1) Micromeres	2) Mesomeres				
3) Macromeres	4) Telomeres.				
347. Gastrulation in Pheret	ima is by				
1) Invagination	2) Delamination				
3) Epiboly	4) Involution				
348. The cells which lie s	ide by side near the equator				
remain quiescent for s	ome time are				
1) Megameres	2) Micromeres				
3) Mesomeres					
4) Mesoblastic pole c	ells				
349. The tall ciliated cells of	Fectoderm that surround grow				
inwards to form					
1) Proctodaeum	2) Stomodaeum				
3) Mesodaeum	4) Urodaeum				
350. After the formation of	of stomodaeum the embryo				
strats feeding on					
1)Gelatin	2) Starch				
3)Albumen	4) Lipids				
351. Excretory system dev	elops from				
1) Ectoderm	2) Endoderm				
3) Mesoderm	4) Ectoendoderm				
352. Setal sacs develop fro	m				
1) Mesoderm	2) Endoderm				
3) Ectoderm	4) Ectoendoderm				
353. Intersegmental septa a	are developed from				
1) Ectoendoderm	2) Endoderm				
3) Ectoderm	4) Mesoderm				
Level - II					
354. Statement (S) : In ea	rthworm embryonic devel-				
opment takes place in	cocoon.				
Reason (R) : Earthw	orm is viviparous.				
1) Both S and R are true and R is the correct ex-					
planation of S					
2) Both S and R are true and R is not the correct					
explanation of S					

3) S is true but R is false

4) Both S and R are false

- 355. The following are the developmental stages
 - a) Blastula b) Gastrula c) Morula d) Zygote Arrange in the correct sequence of these stages. 1) a-b-c-d 2) d-a-b-c
 - 3) d c a b 4) b a c d.
- 356. During the development of zygote of Earthworm macromeres develp into (EAM-2007)

(1) Mesoderm (2) Endoderm

(3) Ectoderm (4) All the three germinal layers

REGENERATION

- Earthworms exhibit limited power of regeneration.
- Regeneration power is more towards the posterior end.
- If earthworm is cut behind 20 th segment into two, the anterior bit will regenerate the posterior part but the posterior bit cannot develop the anterior part.
- It can produce a limited number of segments at the anterior end.
- Reproductive organs are not regenerated.

REGENERATION

Level - I

- 357. Earthworms cannot regenerate.
 - 1) First 4-6 segments 2) Gonads
 - 3) Head
 - 4) Segments behind 18th segment

MISCELLANIOUS

Level - I

- 358. The following organs in Pheretima are equally arranged in most of the body segments except anterior few segments
 - 1) Ganglia and Gonads
 - 2) Ganglia and Nephridia
 - 3) Nephridia and Gonads
 - 4) Nephridia and lateral hearts.

359. Study the following				
NAME OF THE BLOOD VESSEL	PRESENT IN SEGMENTS		DIRECTION OF BL	OOD FLOW
i) Ringvessels	10,11, 12, 13		Lateral to dorsal	
ii) Dorsal blood vessel	1 to 13		Anterior to poster	ior
iii) Commissurals	14 to last		Dorsal to ventral	
iv) Ventral blood vessel	1 to last		Anterior to poster	ior
which of the above are correct			*	
1) i & iv 2) ii a	&iii 3	3) ii (& iv	4) iii & iv
360 Study the following				
EXTERNAL APERTURES	SEGMENTS		POSITION	
i) Nephridiopores	1 st to last		Ventral	
ii) Spermathecal openings	5 to 9		Dorsal	
iii) Female genital pore	14th		Ventral	
iv) Male genital openings	18th		Ventral	
which of the above are correct	-			
1) i & iii	2) ii & iii		3) iii & iv	4) i & ii
261 Study the following	,		,	,
501. Study the following				
Dhowy you good wow here die	LUCATION		Character Classed enteron en	
i) Pharygngeal hephridia	4th, 5th & 6th segments		Closed enteronepr	hric
ii) Integumentary	STO to fast		Open exonephric	
m) Typical	All the segments		Closed enteronepr	
iv) Septai	1 Jui to last		Openenteronephi	
	2) :: e. :::		2) :::: 0- :	$(1): e_{r}:$
1)1& III	$2)$ II α III		5) III & IV	4) I & IV
362. Study the following				
TYPE OF GANGLION	LOCATION		INNERVATES	
i) Supra-pharyngeal ganglion	3rd segment		Prostomium and w	vall of buccal chamber
ii) Segmental ganglia	5th segments to last		Internal organs	
iii) Circumoesophagealconnective	S		3rd-4th segments	1st and 2nd segments
			only	
iv) Sub-pharyngeal ganglion	4th segment		3rd and 4th segme	ents only
which of the above are correct				
1)1&111	2) 11 & 111		3) 111 & 1V	4) 1 & 11
363. Study the following				
NAME OF THE RECEPTORS	LOCATION		FUNCTION	
i) Epidermal receptors	All over the body		Tactile	
ii) Buccal receptors	Epithelium of oesophagus		Chemoreceptors	
iii) Photo receptors	Dorsal side of the prostomin	ium	Detect light intensi	ty
iv) Phono receptors	Setae		Auditory	
which of the above are correct				
1) i & iii	2) ii & iii		3) iii & iv	4) i & ii
364 Study the following				
NAME OF THE GLAND	LOCATION		FUNCTIONS	
i) Saliyary glands	Pharyngeal bulb		Digestion of protei	ins
i) Lymph glands	15th & 26th segments		Produce phagocyt	tes
ii) Blood glands	4th. 5th & 6th segments		Produce lencocyte	es and haemoglobin
iv) Accessory glands	17th & 18th segments		Help in binding the	e sperms
which of the above are correct	-, ee rour beginning		r in onioning th	r
1) i & iii	2) ii & iii		3) iii & iv	4) i & ii
-,	-)		- ,	,

365. Study the following		,			
NAME OF THE ORGAN	LOCATION		FUNCTIONS		
i) Testes	10th & 11th seg	ments	Produce haploi	d sperms.	
ii) Seminal vesicles	11th & 12th seg	ments	Maturation of s	perms	
iii) Spermathecae	6th, 7th,8th & 9	th segments	Storage of sper	ms	
iv) Ovaries	14th segment		Produce ova		
which of the above are corr	rect				
1) i & iii	2) ii & iii		3) iii & iv	4) i & ii	
366. Study the following					
NAME OF THE CELLS	GERMLAYER		DERIVATIVES		
i) Micromere	Ectoderm		Nervous system	n and nephridia	
ii) Macromeres	Endoderm		Blood vascular	Blood vascular system	
iii) Mesomeres	Mesoderm		Muscles and rep	productive	
			organs		
iv) Chormophilic cells	Mesenchyme		Coelom		
which of the above are corr	rect				
1) i & iii	2) ii & iii	3) iii & iv	4) i &	è ii	
367 Study the following					
PARTOF NEPHRIDIUM	CHARACTER		FUNCTION		
i) Nephrostome	ciliated funnel		Collection of ex	cretory material	
i) repliestonie	entated furnier		from coelomic f	huid	
ii) Glandular part of	Intracellular		Separtes excret	ory material from blood	
nenhridium	mudentular		Separtes exerci	ory material from blood	
ii) Ciliated part	Intercelular		Excretory mate	rial is sent out	
m) Chiated part	Intercerului		through the nen	hridionore	
iv) Nenhridionore	Anterior part of		Discharges exc	retory material out	
	the periodium		side	letory material out	
Which of the above are cor	rect		Side		
1) i & iii	2) ii & iii	3) iii & iv	4) i & ii		
	2) II & III	5) 11 00 11	1)10011		
368. Study the following:			FINGELONG		
BODY PART	APERTURES		FUNCTIONS		
i) Prostomium	Mouth		Ingestion of foo	d	
ii) Peristomium	Mouth		Ingestion of foo	d	
m) Genital papillae	Anus		Excretion		
iv) Pygidium	Anus		Defaecation of pellets.		
Which of the above are cor	rect.	2) 6 .	4) • 6	, . .	
1)1&111	2) 11 & IV	3) 111 & IV	4)18	č 11	
369. Study the following:					
BLOOD VESSELS	WAY OF BLO	OD MOVEN	MENT NAT	URE	
i) Dorsal blood vessel	Posterior to ante	erior	Collecting & distributing		
ii) Ventral blood vessel	Anterior to posterior		Collecting		
iii) Sub-neural blood vessel	Anterior to post	Anterior to posterior		Collecting	
iv) Supra oesophageal vessel	Anterior to post	erior	Mixed.		
Which of the above two are	e correct.				
1) i & ii	2) i & iii	3) i & iv	4) iii	i&iv	
370. Study the following.					
NEPHRIDIA					
	LOCATION		NATURE		
i) Pharyngeal nephridia	LOCATION 4th - 6th segmen	nt	NATURE Osmoregulation		
i) Pharyngeal nephridia ii) Integumentary nephridia	LOCATION 4th - 6th segmen 3rd to last segmen	nt ent	NATURE Osmoregulation Excretion	ı	

iii) Septal nephridia		2nd to last segment		Osmoreg	ulation
iv) Typical nephridia	J	In all segments		Nutrition	
Which of the above	two are correc	rect			
1) i & iii	2) i & iv	3) i & ii	4) iii & iv		
371 Study the followir	ισ				
REPRODUCTIVE STRI	'5 ICTURES I	LOCATION		FUNCTIO	N
i) Testes		10th and 11th sec	oments	Productic	on of spermatogonia
ii) Testis sacs		10th and 11th see	oments	Copulatio	n
ii) Seminal vesicles		11th and 12th see	oments	Productic	on of spermatozoa
iv) Prostate glands	-	17th to 21st segn	nents	ats Respiration	
Which of the above	e two are correc	t.		respine	
1) i & ii	2)i&	iii	3) iii & iv	4) ii &	iv
372. Study the followi	ing:		•)	.)	
REPRODUCTIVE STI	RUCTURE	LOCATION		FUNCTIO	N
i) Ovaries	-	13th segment		Productio	on of eggs
ii) Oviducal funnels	-	14th segment		Fertilisatio	on
iii) Oviducts	-	14th segment		Embryon	ic development
iv) Female genital pore		14th segment		Liberation	nofeggs
Which of the above	e two are correc	t.			66
1) i & iii	2) iii 8	2 iv	3) i & iv	4) iii 8	z ii
373. The following are	the statements	about mesoderm		,	
i) Gives rise to coe	lomic epitelium	1			
ii) Gives rise to Ex	cretory system				
iii) Gives rise to B	lood vessels.				
The correct comb	ination is				
1) All are true	2) On	ly i & ii are true	3) only i & i	ii are true	4) Only iii and ii are true
374. The following are	the statements a	about earthworm	1		, .
i) The body wall is dermomuscular			ii) Open typ	e of circula	tory system is present
iii) Typical nephri	dia are absent in	Pheretima.			
The correct comb	ination is				
1) All are true	2) On	ly i & ii are true	3) only i & i	ii are true	4) Only iii and ii are true
375. The following are	the statements a	about earthworm	l		
i) Longitudinal and	d circular muscl	es are helpful in l	ocomotion		
ii) Coelomic fluid	acts as hydrauli	c skeleton	iii) Setae are	the chief l	ocomotory organs.
The correct comb	ination is				
1) All are true	2) On	ly i & ii are true	3) only i & i	ii are true	4) Only iii and ii are true
376. The following stru	ictures are prese	ent in Pheretima		_	
a) Blood glands	b) Giz	zard c) Stor	nach d) P	rostate gla	nds
Arrange the corre	ct sequence of	their occurrence	from the ante	erior to the	posterior end.
1) $a - b - c - d$	2) d -	b - c - a	3) d - c - b	- a	4) b - d - a - c
3//. The following stru	ictures are notic	Section Prioritima	a) A mtamian 1		d) Dlaad alan da
A rrange the corre	igear nearts b)	spermamecae	C) Anterior I	oops rior to the r	a) blood giands
1) a b c d	2) d	h c a	3 d c b		A) b d a c
1)a = 0 = 0 = 0	- u - are associated w	vith Pheretima N	Jatch them (- a 7 M_2005	$\frac{1}{2} = \frac{1}{2} = \frac{1}{2} = \frac{1}{2}$
Jiet	I	viui i neretiina. I	I jet II	2/101-2005	<i>'</i>)
1 Vellow	rcella	۸)	Drimordial a	erm cells	
$\begin{array}{ccc} 1. & 1000 \\ 2 & 0 \\ 0 \\ \end{array}$	nhinctered nora	A)	Totinotent	CHILCEIIS	
$\begin{array}{ccc} 2. & \text{Oval S} \\ 2 & \text{Decel} \end{array}$	philo pole	·• D)	Deamination		
J. Dasal C	llover		The contract	i hativaan 1	1/15
		$\frac{D}{2}$	$2 \mathbf{p} 2 \mathbf{A}$		T 1 J
1) 1 - U, 2 - U, 3	-D, 4-A, C, 4 D	2) I-C	, 2-D, 3-A, 4	י-ט ו ח	
эј I-А, Z-В, З	-C, 4-D	4) I-A	l, ∠-U, S-D, [∠]	t-D	

379. Match the following with reference to Pheretima: (EAM-2006)

a) Spermiducal funnels 1. 200-250

Set-I

- b) Ring vessels 2. 17 and 19th segments
- c) Exo-nephric nephridia 3. 12 / 13th septum
- d) accessory gland 4. 10, 11, 12 and 13th segments
- e) Ovary 5. 10th and 11th segments
- 1) a-4, b-3, c-1, d-2, e-5 2) a 5, b- 4, c-1, d-2, e-3
- 3) a-1, b-2, c-3, d-5, e-4 4) a-3, b-5, c-2, d-4, e-1

380. A transverse section of Pheretima taken through the 10th segment is observed in microscope. Which of the following structures can be observed in the section? (EAM-2007)

(1)Stomach, Dorsal blood vessel, Ventral blood vessel, Supraoesophageal vessel, Anterior loops, Ring vessels and Micronephridia.

(2) Stomach, Dorsal blood vessel, Ventral blood vessel, Lateral hearts, Ring Vessels and Pharyngeal nephridia.

(3)Intestine,Dorsal blood vessel, Ventral blood vessel,Supra oesophageal vessel and Septal nephridia.(4)Stomach,Dorsal blood vessel,Sub neural blood vessel and Lateral hearts.

			KE	Y			LYMPH GLANDS
INTRODUCTION						109) 2 110) 1 111) 2 112) 3	
1) 2	2) 3	3) 4	4) 3	5) 3	6) 2	7) 3	WALL OF ALIMENTARY CANAL
8) 1	9) 4	10) 4	11)3	12) 2	13) 3		113) 3 114) 4 115) 3 116) 2
]	HABIT	AND H	IABIT	AT		LOCOMOTION
14) 2	15) 2	16) 1	17) 3	18) 4	19) 3	20) 1	
	EC	ONOM	IIC IM	PORTA	NCE		124) 4
21) 2	22) 2	23) 2	24) 4	25) 4			ALIMENTARY CANAL
ŕ	EX	TERNA	AL CH	ARAC	ΓERS		125) 1 126) 4 127) 2 128) 2 129) 3 130) 1 131) 3
26) 1	27) 3	28) 4	29) 1	30) 3	31) 1	32) 2	132) 2 133) 4 134) 1 135) 3 136) 1 137) 4 138) 1
33) 4	34) 2	35) 3	36) 1	37) 1	38) 2		$(102)^{-2} (100)^{-1} (101)^{-1} (100)^{-1$
	Ē	XTER	NAL O	PENIN	IGS		146) 1 147) 4 148) 2 149) 2 150) 3 151) 4 152) 2
39) 1	40) 4	41) 2	42) 3	43) 1	44) 2	45) 3	PROCESS OFDIGESTION
46) 1	47) 3	48) 2	49) 4	50) 4	51)1	52) 1	153) 3 154) 1 155) 2 156) 3 157) 1 158) 2 159) 2
53) 1	54) 2	55) 2	,	,	,	,	160) 2 161) 4 162) 3 163) 2 164) 3 165) 3 166) 1
,	,	,	SETA	E			167) 1 168) 1 169) 3 170) 3 171) 3 172) 3 173) 4
56) 2	57) 1	58) 1	59) 3	60) 2	61) 1	62) 4	
63) 2	64) 2	,	,	,	,	,	174) 4 175) 2 176) 4 177) 3 178) 2 179) 1 180) 4
	,	BC	DDY W.	ALL			181) 3 182) 2 183) 1 184) 2
65) 2	66) 2	67) 1	68) 3	69) 1	70) 2	71)4	
72) 3	73) 4	74) 2	75) 3	76) 2	77)4	78) 1	ARRANGEMENT OF BLOOD VESSELS
79) 2	80) 2	81) 3	82) 1	83) 2	84) 3	85) 2	BEFORE THE THIRTEENTH SEGMENT
86) 1	87) 3	,	,	,	,	,	185) 2 186) 2 187) 1 188) 2 189) 2 190) 1 191) 4
/	,	(COELC	ЭM			100) 2 100) 2 100) 1 100) 2 100) 2 100) 1 101) 1 100) 2 100) 2 100) 1 101) 1 100) 2 100) 2 100) 2 100) 1 101) 1 100) 2 100) 2 100) 2 100) 2 100) 1 101) 1 100) 2
88) 4	89) 3	90) 3	91) 4	92) 4	93) 3	94) 1	(192) (193) (2191) (2193) (2193) (2193) (2197) (2197) (2193) (2197) (2197) (2193) $(21$
95)4	96) 3	97) 2	98) 3	99) 4	100) 1	101) 3	206) 1 207) 4 208) 1 209) 1 210) 4 211) 4
102)1	103) 1	104) 3	105) 2	106) 4	107) 3	108) 4	200,1 201,1 200,1 200,1 210,7 211,7
/	,	,	,	,	,	,	
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ARRANGEMENT OF BLOOD VESSELS AFTER THE THIRTEEN SEGMENTS

212) 3 213) 3 214) 2 215) 3 216) 2 217) 1 218) 3 219) 2 220) 2 221) 2 222)1 223) 2 224) 4 225) 2 226) 2 227) 2 228) 2

BLOOD CIRCULATION IN THE FIRST THIRTEEN SEGMENTS

229) 2 230) 4 231) 3

BLOOD CIRCULATION IN THE INTESTINAL REGION

232) 2 233) 3 234) 4 235) 1 236) 1 237) 2

BLOOD GLANDS

238) 3 239) 1 240) 2 241) 2 242) 3 **TYPICAL NEPHRIDIUM**

243) 1 244) 4 245) 1 246) 1 247) 3 248) 4 249) 3 250) 1

INTEGUMENTARY NEPHRIDIA

251) 3 252) 3 253) 3 254) 2 255) 2 256) 1 PHARYNGEAL NEPHRIDIA

257) 2 258) 2 259) 2 260) 1 261) 1

SEPTAL NEPHRIDIA

262) 4 263) 3 264) 2 265) 1 266) 1 267) 4 268) 2 269) 2 270) 1

PHYSOLOGY OF EXCRETION

271) 1 272) 2 273) 2 274) 4 275) 4 276) 1 277) 1 278) 2

CENTRAL NERVOUS SYSTEM

279) 1 280) 2 281) 3 282) 1 283) 1 284) 2 285) 3 286) 2 287) 4 288) 3 289) 3

PERIPHERAL NERVOUS SYSTEM 290) 1 291) 3 292) 4 293) 2 294) 4 295) 3

EPIDERMAL RECEPTORY

296) 4 297) 3 298) 3

BUCCAL RECEPTORS

299) 1 300) 1 301) 1

PHOTORECEPTORS

302) 3 303) 2 304) 2 305) 2 306) 1

REPRODUCTIVE SYSTEM

307) 2 308) 4 309) 3

MALE REPRODUCTIVE SYSTEM

310) 1 311) 1 312) 4 313) 3 314) 3 315) 1 316) 2 317) 3 318) 2 319) 2 320) 3 321) 2 322) 3 323) 1 324) 1

FEMALE REPRODUCTIVE SYSTEM

325) 2 326) 1 327) 2 328) 3 329) 3 330) 2 331) 3

- 332) 4 333) 2 334) 2 335) 1
 - COPULATION
- 336) 4 337) 2 338) 3

COCOON FORMATION

339) 3 340) 2 341) 3 342) 2 343) 3 344) 2

DEVELOPEMENT

345) 1 346) 3 347) 1 348) 4 349) 2 350) 3 351) 1

352) 3 353) 4 354) 3 355) 3 356) 2

REGENERATION

357) 2

MISCELLANIOUS

358) 2

LEVEL - III

359) 1 360) 3 361) 4 362) 4 363) 1 364) 1 365) 2 366) 1 367) 4 368) 2 369)2 370)3 371) 2 372) 3 373) 3 374) 3 375) 1 376) 1 377) 2 378) 1 379) 2 380) 1