UNIT-III ANIMAL ORGANIZATION

INTRODUCTION

- The unicellular protozoan groups are the simplest animal like organisms.
- They show division of labour at protoplasm level.
- Unicellular organisms like protozoans exhibit protoplasmic grade of organization.
- The evolution of tissues is the first key transition in the animal body plan.
- Eumetazoans exhibit higher levels of organization.
- The embryonic tissue layers of eumetazoans are called germ layers
- The lowest level of organization is **cellular grade** of organization
- Cellular grade of organization is exhibited by **sponges**
- Division of labour is seen among the cells in sponges
- Such cells have little tendency to become into tissues.
- Nerve cells and sensory cell are absent, hence cells are functionally isolated in sponges
- In cellular grade of organization cells demonstrate division of labour but are not strongly associated to perform a specific collective function.
- Diploblastic animals such as cnidarians exhibit tissue grade of organization or diploblastic organization
- In tissue grade of organization germ layers such as ectoderm and endoderm are developed.
- Cells are aggregated into tissues
- Nerve cells and sensory cells are present in the epidermis and the gastrodermis.
- Ectoderm gives rise to the epidermis, endoderm gives rise to the gastrodermis.
- The cells of a tissue together perform their common functions as a highly coordinated unit.
- Triploblastic animals exhibit organ system grade of organization or triploblastic organization

- In organ -system grade of organization all the three germ layers are present such as ectoderm endoderm and mesoderm
- The evolution of mesoderm resulted in structural complexicity.
- The tissues are assembled into larger functional units called organs.
- Organs working together to perform one (or more) specific function(s) constitute an organ system.
- Eleven different kinds of organ systems are observed in metazoans such as integumentary, skeletal, muscular, digestive, respiratory, circulatory, excretory, nervous, endocrine, immune, and reproductive.
- Triploblastic animals have highly specialized sensory cells and nerve cells which bring about a higher level of coordination and integration.
- *NOTE:* Follow the options for Statement(S) and Reason(R) Type questions
 - 1) Both S and R are correct R is the correct explanation of S
 - 2) Both S and R are correct but R is not correct explanation of S
 - 3) S is correct, but \mathbf{R} is not correct
 - 4) Both S and R are not correct

INTRODUCTION

LEVEL - I

- The simplest animal like organisms that exhibit 1. protoplasmic grade of organization are the 1) unicellular protozoans 2) multi cellular parazoans 3) multi cellular eumetazoans 4) All eukaryotic organisms Division of labour at a single cell level is seen in 2. 2) cnidarians 1) Sponges 3) protozoans 4) chordates 3. The lowest level of organization in metazoans is 1) protoplasmic grade of organization
 - 2) cellular grade of organization
 - 3) tissue grade of organization
 - 4) organ system grade of organization
- 4. Cellular grade of organization is seen in 1) sponges 2) protozoans
 - 3) cnidarians 4) flatworms
- 5. Division of labour is seen among the cells in 1) protozoans 2) sponges
 - 3) cnidarians 4) arthropods
 - Cells absent in sponges are 1) choanocytes, thesocytes, porocytes
 - 2) nerve cells, sensory cells
 - 3) pinacocytes, choanocytes
 - 4) myocytes, sclerocytes

6.

7.	Multicellular animals wi	thout true tissues are	17.	Mesoderm is for	rmed in
	1) sponges	2) cnidarians		1) Tissue grade of	of organization
	3) arthropods	4) annelids		2) Cellular grade	e of organization
8.	Cells demonstrate divisi	ion of labour but not		3) Organ - system	m grade of organization
	strongly associated to p	erform a specific		4) Sub cellular g	rade of organization
	collective function in		18.	Evolution of this	s germlayer resulted in t
	1) cellular grade of organ	nization		tural complexity	in organization
	2) subcellular grade of o	rganization		1) ectoderm	2) endoderm
	3) tissue grade of organi	zation		3) mesoderm	4) gastrodermis
	4) organ system grade o	forganization	19.	Acellular organis	sms have
9.	Cells are aggregated into	tissues but not assembled		1) protoplasmic	grade of organization
	into organs in			2) cellular grade	of organization
	1) Subcellular grade of o	organization		3) tissue grade o	f organization
	2) Diploblastic organization	tion		4) organ system	grade of organization
	3) Triploblastic organiza	tion	20).	This layer is not o	essential for all multicellu
	4) Cellular grade of orga	nization		animals	
10.	Highly specialized sense	ory cells and nerve cells		1) Ectoderm	2) Mesoderm
	which bring about highe	r level of coordination		3) Endoderm	4) Both 1 and
	and integration is seen in	1	21).	Sponges lack	
	1) cellular grade of organ	nization		1) Nerve cells	2) Sensory cells
	2) tissue grade of organi	zation		3) Mesoderm	4) All the above
	3) diploblastic grade of o	organization	22)	Which one of the	e following is very closel
	4) triploblastic grade of	organization		related to triplob	lastic animals?
11.	The first key transition i	n the animal body plan is		1) They have the	ree layers in the body wa
	the			2) They have thr	ree primary germ layers
	1) evolution of bilateral	symmetry		3) They have ne	rve cells and sensory cel
	2) cephalization			4) They show ra	dial symmetry
	3) development of coeld	om			
10	4) evolution of tissues	• .1 • .11 1 1		LEV	<u>EL - II</u>
12.	The second key transitio	on in the animal body plan	23).	(S): In the cellul	lar level of organization,
	1s the			are functiona	ally isolated
	1) evolution of biradial s	ymmetry		(R): Nerve cells	s and sensory cells are al
	2) evolution of bilaterals	symmetry	24).	(S): Cnidarians a	are called diploblastic an
	4) avalution of spheric)]]]		(R): They exhibit	it radial symmetry
12	European Explored Spherica	alls is seen in	25).	(S):Triploblastic	animals lead a more effic
15.	1) subcellular level of or	conjugation		oflife	
	2) cellular level of organ	ization		(R): They have h	ighly specialized sensory
	3) tissue level of organiz	ration		nerve cells bring	ing higher level of coordi
	4) organs system level of	forgenization		different organs	and organ systems
14	Diploblastic animals sho	w	26).	Only cellular lev	el of organization is four
17.	1) cellular grade of orga	nization		1) Chidarians	2) Sponges
	2) protoplasmic grade of	forganization	27)	3) Flatworms	4) Protozoans
	3) tissue grade of organi	zation	27).	I he type of cells	s that appeared first time
	4) organ system grade of	forganization		in diploblastic a	nimals are 2 Normals -11
15.	Nerve cells and sensory	cells first time formed in		1).Choanocytes	2). Nerve cells
10.	1) Cellular grade of orga	nization		3). Gametes	4). Totipotent cells
	2) Subcellular grade of c	organization		<u>S</u>	<u>YMMETRY</u>
	3) Diploblastic organizati	tion	•	The symmetry o	of an animal generally fit
	4) Triploblastic organiza	tion		style	r an annnar generany m
16.	Animals exhibiting tissu	e grade of organization do		style.	
	not have	<i>C C C</i>	•	Radial symmet	ry is an advantage to se
	1) nerve cells	2) mesoglea		planktonic or slo	w-moving organisms.
	3) mesoderm	4) mesenteries	•	Evolution of bila	tteral symmetry is the sec

is germlayer resulted in the strucin organization 2) endoderm 4) gastrodermis isms have grade of organization e of organization of organization grade of organization essential for all multicellular 2) Mesoderm 4) Both 1 and 3 2) Sensory cells 4) All the above e following is very closely plastic animals? ree layers in the body wall ree primary germ layers erve cells and sensory cells idial symmetry

<u>'EL - II</u>

23).	(S): In the cellular level of organization, the cells
	are functionally isolated

s and sensory cells are absent

- are called diploblastic animals oit radial symmetry
- c animals lead a more efficient way highly specialized sensory cells and

ging higher level of coordination of and organ systems

- vel of organization is found in 2) Sponges
 - 4) Protozoans
- s that appeared first time nimals are
 - 2).Nerve cells
 - 4). Totipotent cells

YMMETRY

- of an animal generally fits its life-
- try is an advantage to sessile or ow-moving organisms.
- lateral symmetry is the second key

transition in the animal body plan.

- In asymmetrical animals the body lacks definite form or geometrical arrangement of parts and cannot be divided into mirror image halves by any plane.
- Gastropods are primarily bilaterally symmetrical and secondarily asymmetrical
- Most of the sponges and some protozoans like *Amoeba* exhibit **asymmetry**
- In a symmetrical animal, similar body parts occur on the opposite sides of a plane passing through the principal axis of the animal.
- A symmetrical animal can be cut into two mirror image halves or antimeres by one or more planes of symmetry passing along the principal axis.
- The term axis refers to an imaginary straight line joining two opposite points at the ends, or on the surfaces of the body,
- The term principal axis means an imaginary straight line joining the midpoint at one end or surface and the midpoint at the opposite end or surface.
- The term plane means a flat area that runs through any axis.
- Bilaterally symmetrical animals possesses anterior (cephalic) end posterior (caudal) end dorsal surface, ventral surface and lateral surfaces
- Frontal plane is the plane that runs through the anterior posterior and sagittal axis.
- Sagittal plane is the plane that runs through the anterior posterior and sagittal axis
- Transverse plane (cross section) passes through sagittal and transverse axis.
- Frontal plane divides a bilaterally symmetrical body into dorsal and ventral portions.
- Sagittal plane divides a bilaterally symmetrical animal into right and left halves
- Transverse plane divides the animal into anterior and posterior portions
- Each of these three planes is at right angles to the other two

SPHERICAL SYMMETRY

• <u>Spherical symmetry</u> is also called Homaxial apolar symmetry

- Spherical symmetrically forms are best suited for **floating and rolling**
- The rare type of symmetry is spherical symmetry
- Spherical symmetry is found in Heliozoans and radiolarians
- Body of the spherically symmetrical animal can be cut into two identical halves in any one of the infinite number of planes that pass through the central point.
- Body parts are arranged concentrically around or radiating from a central point in spherical symmetry.

SPHERICAL SYMMETRY LEVEL - I

28. Homaxial apolar symmetry is 1) Spherical symmetry 2) Radial symmetry 3) Biradial symmetry 4) Pentaradial symmetry 29. These forms are best suited for floating and rolling 1) Spherical symmetry 2) Radial symmetry 3) Biradial symmetry 4)Bilateral symmetry 30. This type of symmetry is rare 1) Homoxial apolar symmetry 2) Monaxial heteropolar symmetry 3) Biradial symmetry 4) Bilateral symmetry 31. Following are statements regarding spherical symmetry 1)They are spherical in shape 2)Organisms exhibiting spherical symmetry are rare 3) Generally they are terrestrial 4) They have only dorsal and ventral surface 2) 2 & 3 1) 1 & 2 3) 1 & 3 4) 1, 2 and 3 32. The type of symmetry in which body parts are arranged in a radiating fashion and they are ball like in form 1) Spherical symmetry 2) Radial symmetry 3) Asymmetry 4) Biradial symmetry The symmetry that lacks anterior and posterior 33. sides and has no polarity at all is called 1) Symmetrogenic 2) Spherical 3) Radial 4) Biradial

LEVEL-II

 Statement (S) : In Heliozoans, symmetry is spherical and their pseudopodia are mainly used for food collection Reason (R) : Heliozoans are planktonic animals

RADIAL SYMMETRY

- <u>Radial symmetry</u> is also called monaxial heteropolar symmetry
- In radial symmetry the sensory and feeding structures are uniformly distributed around the body hence they can interact with their environment equally in all the directions.
- In radially symmetrical animals body is cylindrical (e.g. *Hydra*), or vase like (sponges) or umbrella shaped (e.g. jelly fish).
- In Radially symmetrical animals the principal axis is **oral aboral axis** it is heteropolar
- Anterior, posterior ends and dorsal, ventral, lateral surfaces are not differentiated in radially symmetrical forms as well as spherically symmetrical forms
- Radial symmetry is found in some sponges and most of the cnidarians.
- Echinoderms are primarily bilateral animals (their larvae are bilateral)
- Most of the echinoderms have secondarily become radial, exhibiting pentamerous radial symmetry in the adult stage.

RADIAL SYMMETRY LEVEL-I

- 35. In this type of symmetry the animals acquired oral & aboral ends first
 1) Spherical
 2) Radial
 3) Biradial
 4) Bilateral
- 36. Which of the following exhibit two different types of symmetries in their life cycles 1) Starfishes
 2) Heliozoans & radiolarians
 - 3) Earthworms & insects
 - 4) All invertebrates
- 37 Symmetry advantage to sessile organisms is1) spherical symmetry2) asymmetry3) radial symmetry4) bilateral symmetry
- 38. Sensory and feeding structures are uniformly distributed around the bodies in1) Spherically symmetrical animals
 - 2) Radially symmetrical animals

- 3) Bilaterally symmetrical animals
- 4) Asymmetrical animals
- 39. Monaxial heteropolar symmetry 1) Spherical symmetry 2) Radial symmetry 3) Biradial symmetry 4) Bilateral symmetry 40. Animals which show primary radial symmetry, secondary radial symmetry respectively are 1) jelly fishes and ctenophores 2) sea anemones and ctenophores 3) cnidarians and echinoderms 4) gastropods and echinoderms 41. In ctenophores most of thebody parts are radially arranged but paired parts are the 1) tentacles 2) siphonoglyphs 3) statocysts 4) oral arms 42. The animals in which the principal axis of symmetry changes from the median sagittal plane to oral - aboral axis during their development is 1) Jelly fishes 2) Ctenophores 3) Echinoderms 4) Heliozonas 43. In cnidarians and ctenophores the oroaboral axis is 1) apolar 2) heteropolar 4) multipolar 3) bipolar 44. Biradial symmetry of Sea anemones has been derived from 1) Radial symmetry 2) Pentamerous radial symmetry 3) Bilateral symmetry 4) Spherical symmetry Sea anemones with one siphonoglyph exhibit 45. 1) Bilateral symmetry 2) Radial symmetry 3) Spherical symmetry 4) Biradial symmetry 46. Which of the symmetry is an advatage to sessile or slow moving or planktonic organisms 2) Radial symmetry 1) Spherical symmetry 3) Bilateral symmetry 4) Biradial symmetry 47. The principal axis is oral aboral axis in 1) Monaxial heteropolar symmetry 2) Homaxial apolar symmetry 3) Biradial symmetry 4) Bilateral symmetry 48. Homaxial Apolar symmetry is seen in 1) Hydrozoans and schyphozoans 2) Heliozoans and Radiolarians 3) Ctenophores and Anthozoans
 - 4) Ctenophores and Hydrozoans

- 49. Monaxial Heteropolar symmetry is found in 1) Some sponges and most of cnidarians
 - 1) Most of sponges and few cnidarians
 - 3) All sponges and cnidarians
 - 4) All sponges but no cnidarians
- 50. Indefinite number of planes to cut the body into antimeres can be seen in
 - 1) Homaxial Apolar symmetry
 - 2) Monaxial Heteropolar symmetry
 - 3) Biradial symmetry
 - 4) Pentamerous radial symmetry
- 51. Five planes of symmetry can be seen in 1) Echinodermate larvae
 - 2) Adult echinoderms
 - 3) Sea anemones
 - 4) Adult gastropods
- 52. Animals which show primary radial symmetry, secondary radial symmetry respectively are
 - 1) Jelly fishes and ctenophores
 - 2) Sea anemones and ctenophores
 - 3) Cnidarians and echinoderms
 - 4) Gastropods and echinoderms
- 53. Larvae are bilaterally symmetrical, adults are pentamerous radially symmetrical in
 - 1) Anthozoans 2) Ctenophores
 - 3) Jelly fishes 4) Echinoderms
- 54. Five planes of symmetry can be seen in 1) Echinodermate larvae
 - 2) Adult echinoderms
 - 3) Sea anemones 4) Adult gastropods

LEVEL-II

- 55. (S): Hydra shows radial symmetry.
 (R): Hydra can be cut into identical halves along any plane passing through the centre
 1)Both A and R are correct and R is the correct explanation for A
 2) Both A and R are true and R is not the correct explanation for A
 3) A is true but R is false
 - 4) A is false and R also false
- 56. Read the following and select the correct statement
 - I) Radially symmetrical animal can be cut into two antimeres along any plane passing through oro-aboral axis
 - II) The body of radially symmetrical animal may be elongated or umberlla shaped
 - III) One end of radially symmetrical body is oral and the other is aboral
 - 1) I and III 2) II and III
 - 3) I and II 4) I, II and III

Biradial symmetry

- The biradial type of symmetry of sea anemone seems to have been derived from the radial type primarily by the elongation of the mouth and associated parts
- Biradial symmetry has two planes of symmetry
- Ctenophores and most anthozonas exhibit biradial symmetry
- In ctenophores most of the body parts are radially arranged but the tentacles are paired
- A sea anemone with two siphonoglyphs exhibit **biradial symmetry**
- A sea anemone with one siphonoglyph exhibit radial symmetry

Biradial symmetry LEVEL-I

57.	7. The plane passing at right angle to the sagittal axis is called			
	1)Longitudinal	2) Transverse		
	3) Frontal	4) Dorso-ventral		
58.	Sea anemones wit	h two siphonoglyphs exhibit		
	1) Bilateral symmetry	etry 2) Radial symmetry		
	2) Spherical symn	netry 4) Biradial symmetry		
59.	The long axis and	the short axis of the mouths		
	of sea anemone	sare		
	1) heteropolar	2) bipolar		
	3) apolar	4) multipolar		
60.	Biradial symmetry	is seen in		
	1) Scyphozoans	2) Heliozoans		
	3) Ctenophores	4) Annelids		
61.	Two planes of syn	nmetry can be seen in		
	1) Hydrozoans, ar	id scyphozoans		
2) Heliozoans and radiolarians				
	3) Ctenophores an	nd Anthozoans		
	4) All cnidarians			
62.	In most of anthozo	bans the principal axis is		
	1) oro - aboral ax	is 2) median sagittal axis		
	3) transverse axis	4) antero posterior axis		
63.	Read the following	·		
	i) Transverse plane	of biradially symmetrical		
	animals is short a	ixis.		
	ii) A sea anemone c	an be cut into equal halves		
	passing through	frontal and transverse planes.		
	iii) Biradially sym	netrical animals are		
	intermediate between radial and bilateral			
	groups choose the	wrong option(s)		
	1) i only	2) i & iii		
	3) ii only	4) ii & iii		

LEVEL - II

- 64. Statement (S): Antimeres on either side of the plane are different from antimeres on either side of the other plane in biradial symmetry
 Reason (R): Body parts in the animals with biradial symmetry are arranged not only radially but also in pairs
- 65. It is considered that due to the elongation of mouth alone with associated structures radial symmetry has given rise to
 - 1) Bilateral symmetry
 - 2) Biradial symmetry
 - 3) Trimerous radial symmetry

4) Pentamerous radial symmetry

Bilateral symmetry

- In Bilateral symmetry the principal axis is the anterior - posterior axis, it is heteropolar, with differentiated anterior and posterior ends.
- In Bilateral symmetry sagittal axis is heteropolar and the transverse axis is apolar
- In bilateral symmetry there is only one plane of symmetry, it is **median sagittal plane**
- The apperance of bilateral symmetry was a major advancement in animal evolution.
- Cephalization is associated with bilateral symmetry
- As a result of cephalization, bilaterally symmetrical animals can sense the new environment into which they enter and respond to it more efficiently than other animals.
- All the triploblastic animals of animal kingdom exhibit **bilateral symmetry**

Bilateral symmetry LEVEL-I

- 66. The symmetry with anterior, posterior and dorsal and ventral sides is
 1) Biradial
 2) Bilateral
 3) Radial
 4) Spherical
- 67. Triploblastic phylum which does not show bilateral symmetry in adult stages is
 - 1)Mollusca 2)Arthropoda
 - 3) Cnidaria 4) Echinodermata
- 68. Which of the following animals move primarily in one direction
 - 1) Spherical symmetry2) Radial symmetry3) Bilateral symmetry4) Biradial symmetry
- 69. Cephalization is associated with 1) biradial symmetry 2) bilateral symmetry 3) pentamerous radial symmetry 4) radial symmetry 70. The symmetry in fish is 1) Spherical 2) Radial 3) Bilateral 4) Biradial 71. The plane passing from the middorsal line to midventral line through the principal axis is 1).Sagittal axis 2).Frontal plane 3).Transverse 4).Longitudinal 72. In bilaterally symmetrical animals the principal axis, sagittal axis and the transverse axis respectively are 1) heteropolar, heteropolar and apolar 2) heteropolar, apolar and heteropolar 3) apolar, heteropolar and apolar 4) heteropolar, apolar and apolar 73 Which of the following are secondarily asymmetrical 2)Amoeba 1) All sponges 3) Gastropods 4) Echinoderms 74. Which one of the following is the major advancement in animal evolution 1) Appearance of bilateral symmetry 2) Formation of coelom 3) Developemt of mouth 4) Development of brain 75. Protozoan which exhibits bilateral symmetry is 1)Amoeba 2) Actinophrys 3) Acanthometra 4) Giardia 76. Larvae are bilaterally symmetrical, adults are pentamerous radially symmetrical in 1)Anthozoans 2) Ctenophores 3)Jelly fishes 4)Echinoderms 77. The plane that divides bilaterally symmetrical animal into right and left halves is 1) transverse plane 2) sagittal plane 3) frontal plane 4) oblique plane 78. Bilateral symmetry is found in : [2004] 1) Clathrina 2) Leucosolenia 3) Ophiopleuteus 4) Charybdea0 79. In understanding different types of symmetry, the term used as principal axis means [2007] (1) An imaginary straight line joining two opposite points at the ends. (2) An imaginary straight line joining the mid point at one end and the mid point at the opposite end (3)A flat area that runs through any axis. (4)An animal having its body parts arranged in such a manner to exhibit symmetry.

80.	Which among the following are bisected into two equal halves passing through the median			
	1) Mouth male and fema	ale genital openings		
	2) Spermathecal openings female genital			
	opening and dorsal pores			
	3) Mouth female genital opening and dorsal			
	pores			
	4) Nephridiopores, male openings	and female genital		
81.	Except in Gastropods an	nd Echinoderms,		
	bilateral symmetry is esse	entially exhibited by		
	1) Diploblastic animals	2) Triploblastic animals		
	3) Stalked animals	4) Chordates		
82.	The symmetry in which o	definite dorsal, ventral		
	and lateral sides have o	developed is		
	1)Bilateral	2) Biradial		
	3) Pentaradial	4) All the three		
83.	Bilateral symmetry of an	animal is exhibited		
	from the stage of			
	1) Oocyte	2) Ovum		
~ .	3) Zygote	4) Gastrula		
84.	The grade that includes a	Ill the bilaterally		
	symmetrical phyla is			
	1) Diploblastica	2) Schizocoelomata		
05	3) Iripioblastica 4) Nor	te of these		
85.	Body differentiation in	to nead, concentration of		
	of the symmetry called	in are the consequences		
	1) Directical	2) Dilataral		
	1) Diraciai			
0.6	3) Radial	4) All the three		
86.	Rapid locomotory mov of the group	vements are a capability		
	1)Bilateria	2) Protista		
	3) Schizocoelomata	4) Radiata		
87.	Perfect symmetry is for	und in the group		
	1) Spherical	2) Radial		
	3)Bilateral	4) None		
	I EVI	EL-II		
88	Statement (S): A symm	etrical snails are included		
00.	under grade bilateria			
	Reason(R): Symmetr	y of an animal is		
	determined by the sym	metry of its embryonic		
	stage, irrespective of its stages.	s symmetry in the adult		
89.	Statement (S): A free	-moving bilaterally		
	symmetrical metazoan	has the advantages of the		
	surrounding becoming	aware of conditions in the		
	surroundings during its	locomotion.		
	Reason(R): These ani	mals exhibit		
	diploblastic condition			

SYMMETRY

- 1) Both S and R are correct R is the correct explanation of S
- 2) Both **S** and **R** are correct but **R** is not correct explanation of **S**
- 3) S is correct, but \mathbf{R} is not correct
- 4) Both S and R are not correct
- 90). (S): No animal exhibits perfect symmetry.(R): All animals are asymmetrical in their adult stages.
- 91). (S): Generally, spherically symmetrical animals are planktonic in habit.
 (R): They are spherical in shape and are drifted by water currents easily.
- 92). (S): Hydra shows radial symmetry.(R): Hydra can be cut into identical halves along any plane passing through the centre
- 93). (S): In radiata, all organs are arranged around the oro-aboral axis.

(**R**): These animals cannot be cut into two antimeres only in longitudinal plane.

- 94). (S): Triploblastic animals exhibit both biradial and bilateral symmetry(R): Biradially symmetrical animals developed the third germ layer, mesoderm
- 95) (S): Sea anemones exhibit biradial symmetry.(R): They can be cut into two antimeres along two oro-aboral axes
- 96). **(S):** Adult echinoderms exhibit pentaradial symmetry.

(**R**): Bilaterally symmetrical, free swimming larval forms secondarily develop into pentaradial, sed-entary adults.

97). **(S):**Bilaterally symmetrical animals are far more successful than animals having other types of symmetry.

(**R**): Bilaterally symmetrical animals are triploblastic eucoelomates.

- 98). (S):Bilaterally symmetrical animals can be cut into two antimeres in only median sagittal plane.(R): All organs are arranged in pairs, equidistantly on either side of median sagittal plane.
- 99). S: Radially symmetrical animals can interact with their environment equally in all directions
 R: In radially symmetrical animals the sensory and feeding structures are uniformly distributed around the bodies
- 100) **S**: Bilaterally symmetrical animals move from place to place more efficiently and more efficient in seeking food

R: Most of the bilaterally symmetrial animals exhibit cephalization

COELOM

- The third key transition in the evolution of the animal body plan was the evolution of the body cavity.
- The fluid filled body cavity acts like shock absorber, hydrostatic skeleton and aids in locomotion
- The hollow cavity containing embryonic stage of multicellular animals is **blastula**
- Central cavity of the blastula is called the blastocoel, or the segmentation cavity, or the primary body cavity.
- Invagination of cells at one end of the blastula results in the formation of a **gastrula**
- The open cavity of the gastrula lined by endoderm is called the **archenteron or the primitive gut**
- The opening of the gastrula is called <u>blastopore</u>
- The outer wall of the gastrula is ectoderm and inner wall is endoderm
- In bilaterians a third cellular germ layer called mesoderm develops between ectoderm and endoderm
- Based on the body cavity triploblastic animals can be classified into acoelomates, pseudocoelomates, and coelomates

ACOELOM

- <u>Acoelomates:</u> flatworms of the phylum platyhelminthes are acoelomates.
- Acoelomates exhibit a solid bauplan with a dense parenchyma between the gut (absent in tapeworms) and the body wall in the adults
- Parenchyma restricts the movement of the internal organs it is a **disadvantage to accelomates**

ACOELOM

Level - I

- 101. In flatworms the blastocoel is filled with
 1) Coelomic fluid 2) Mesenchyma
 3) Blood 4) Lymph
- 102. Hydrostatic skeleton in flatworms is1)Coelomic fluid
 - 2) Pseudocoelomic fluid
 - 3) Mesenchyme 4) Blood

- 103. Animals that exhibit a solid bauplan with dense paranchyma between the gut and body wall are 1) Flat worms 2) Nematodes 3) Annelids 4) Echinoderms
- 104. The animal group in which the interior of body is packed with mesenchyme in relation with coelom, is called
 1) Pseudocoelomate
 2) Acoelomate
 - 3)Eucoelomate 4)None of the above

Pseudocoelom

- Roundworms of the phylum Nematoda, rotifers and some others possess a **pseudocoelom or blastocoelom**
- Pseudocoelom is neither formed in the mesoderm nor is lined by mesodermal peritoneum
- Pseudocoelom represents persistent blastocoel
- In the developemt of pseudocoelomates mesoderm occupies only a part of blastocoel adjoining the ectoderm
- As mesoderm is confined to thebody wall musculature is confined to thebody wall and the gut wall is almost entirely nonmuscular.
- The intestinal wall is made up of only endodermal epithelium in pseudocoelomates
- In the evolution of animals a tube within a tube arrangement is seen for the first time in pseudocoelomates.

Pseudocoelom

- 105. The part of gut which receive mesoderm derivatives in pseudocoelomates is
 1) Stomach 2) Rectum
 3) Pharynx 4) Intestine
- 106. Mesenchyme occupies only a part of the blastocoel adjoining to the ectoderm leaving the rest of blastocoel towards the endoderm unoccupied in
 - 1) Flatworms 2) Roundworms
 - 3) Segmented worms
 - 4) Spiny skinned animals
- 107. Hydrostatic skeleton in Nematodes is1) Mesenchyme 2) Coelomic fluid3) Pseudocoelomic fluid 4) Blood
- 108. The coelom which is not lined by peritoneum either sides is
 - 1) Eucoel 2) Pseudocoel

3) Schizocoel 4) Enterocoel

- 109. Tube-within- tube body plan first appeared in

 Acoelomates
 Pseudocoelomates
 Enterocoelomates
 Schizocoelomates

 10. The peritoneum covering the alimentary canal is

 Splanchnic peritoneum 2) Pericardium
 Retroperitoneum 4) Parietal peritoneum

 111. Embryonic blastocoel is persistent in

 Platy helminthes
 Nematoda
 Annelida
- 112. Coelom which is neither formed in the mesoderm nor is lined by mesodermal peritoneum is1) Acoelom 2) pseudocoelom
 - 3) haemocoelom 4) enterocoelom

Eucoelom

- A coelom, or ture coelom is a fluid-filled cavity that develops within the mesoderm and is lined by mesodermal epithelium called peritoneum.
- The outer wall of the coelom is called the parietal, or somatic peritoneum, and the portion that covers the internal organs suspended within the cavity including the gut is called the visceral, or splanchnic peritoneum.
- A double layered peritoneum which connects some visceral organs to the dorsal body wall is called mesentery.
- Retroperitoneal organs are kidneys
- Retroperitoneal organs will occur out side the coelom and are coveredby peritoneum only on the surface facing the coelom.
- Annelids, arthropods and molluscs are schizocoelomates.
- Schizocoelomates undergo spiral cleavage.
- In schizocoelomates mesoderm is dervided from a single micromere called 4d blastomere or mesentoblast cells.
- Schizocoelom is formed by splitting of mesoderm
- Coelom of protostomes is schizocoelom
- In arthropods and molluscs schizocoelom is reduced and the functional body cavity is haemocoel.
- Enterocoelomates of animal kingdom are echinoderms, hemichordates and chordates.
- In enterocoelomates mesoderm arises as pouches

that evaginate from the wall of archenteron.

- Enterocoelomates are deuterostomes
- In enterocoelomates mouth is derived from the secondary opening of the archenteron.
- In coelomates both body wall and visceral organs are muscular hence visceral organs show contractions and relaxations which are independent of body wall.
- Gametes are released into coelomic fluid in some invertebrates and in female vertebrates.
- A major advantage of the coelomate body plan is it allows **primary induction** during development.
- **Primary induction** is a kind of interaction between tissues of different origin involved in the development of specialized tissues.

Eucoelom

- 113. Blastocoel is not persistent in1) round worm 2) filarial worm3) earthworm 4) Taenia
- 114. Which of the following coelom show resemblance in origin from

 a) Enterocoel
 b) pseudocoel
 c) Acoel
 d) Schizocoel

 The correct answer is

 a) ab
 b) bc
 a) ad
 b) bd
- 115. Primary body cavity of Echinoderms is1) Schizocoel 2) Enterocoel3) Blastocoel 4) Archenteron
- 116. The type of coelom which is not found in true celomates is
- 1) Eucoelom 2)Schizocoelom 3) Pseudocoelom 4)Enterocoelom 117. Animal groups with two body cavities are 1)Annelids 2)Echinoderms 3)Nematodes 4)Molluscs 118. The closed cavity of blastula is 1) Gastrocoel 2) Archenteron 3) Blastocoel 4) Secondary body cavity 119. The opening of archenteron to outside is 1)Blastopore 2).Gastropore 3).Mouth 4).Anus 120. Primary germ layers are the layers present at 1).Blastula 2).Gastrula 4).Body wall 3).Morula 121. The secondary body cavity in annelids is 1).Haemocoel 2).Blastocoel

	3).Schizocoel 4).Enterocoel	132.	The mesodermal portion attached to the inner
122.	The organs which are placed outside the		surface of body wall is called
	coelom are		1) Parietal or somatic
	1).Visceral organs		2) Visceral or splanchnic
	2).Retroperitoneal organs		3) Parietal or splanchnic
100	3).Not developed 4).Mesentery		4) Visceral or somatic
123.	In schizocoelomates mesoderm develops	133.	Inner coelomic epithelium is also called as
	1).Macromere	1001	1) Parietal or somatic
	2).Lining of archenteron		2) Visceral or splanchnic
	3).4d cell or Mesentoblast cell		3) Parietal or splanchnic
104	4).Both 2 and 3		4) Viscoral or sometic
124.	and a domenal anithalium in	124	The condition of musculature developing only in
	1) flot wormed	154.	the background of musculature developing only in
	2) round worms (1) ship worms		the body wall leaving the alimentary canal non-
125	S) segmented worms 4) sinp worms		muscular is seen in
123.	1) some invertebrates en d in forcele vertebrates		1) Nematoda 2) Annelids
	1) some invertebrates and in remate vertebrates		3) Arthropods 4) Echinoderms
	2) all invertebrates and female vertebrates	135.	Nematoda do not have a separate blood vascu-
	3) some invertebrates and in male vertebrates		lar system as
	4) some temale vertebrates and all invertebrates		1) Body cavity is filled with blood
126.	The vertebrate organ / organs located outside		2) Body cavity is filled with coelomic fluid
	the coelom is / are		3) The digested and absorbed food is released
	1) Liver 2) Kidneys		into pseudocoel
	3) Heart 4) Lungs		4) The body is small and packed with mesen-
127.	Coelom originates from pouch like evaginations		chyme
	of the wall of archenteron	136.	Schizocoelom develops in the animals that
	1)Arthropoda 2)Mollusca		exhibit
	3) Nematoda 4) Echinodermata		1) Radial cleavage 2) Spiral cleavage
128.	During the embryonic development of round		3) Holoblastic 4) Meroblastic
	worms the mesenchyme occupies the blastocoel	137.	Type of coelome present in molluscs is
	1) Adjoining the endoderm		1)Acoelome 2)Pseudocoelome
	2) Adjoining the ectoderm		3) Schizocoelome 4) Enterocoelome
	3) Completely between the ectoderm and	138.	In arthropods and molluses the functional body
	endoderm		cavity is
	4) Adjoining the rim of blastpore only		1) Schizocoelom 2) Haemocoelom
129.	Eucoleom is the term used for the description of		3) Pseudocoelom 4) Enterocoelom
	animal	139	In these animals mouth is derived from the
	1) Body space 2) Body cavity	157.	secondary opening of archenteron
	3) True body cavity 4) Any space		1) A coalomates 2) Pseudocoalomates
130	The coelom or true body cavity is also de-		2) Schizopolomates (1) Enterpopolomates
150.	scribed as	140	S) Schizocoeloniates 4) Enterocoeloniates
	1) Peri visceral cavity	140.	archenteron
	2) Secondary body cavity		1) snails 2) Farthworms
	2) Body space		3) frog 4) cockroach
	1) None of the above	141.	Retro peritoneum is
121	A true coelom is formed within the		1) Somatic peritoneum, covering the parts of
131.	1) Discripto 2) Esta Jama		organ facing coelom
	1) Diasuna 2) Ectoderm 2) Magadama 4) Enderman		2) Visceral peritoneum, covering the part of
	5) Iviesoderiii 4) Endoderiii		organ facing coelom

3) Somatic peritoneum, covering the part of organ facing body wall 4) Visceral peritoneum, covering the part of organ facing body wall 142. The general use of coelom being filled with fluid is 1) Hydraulic skeleton 2) Circulatory system 3) Retains waste till excretion 4) All the three 143. The enterocoelom is so called from the fact that it is derived from 1) Primitive gut 2) Blastocoel 3) Gastrocoel 4) None of the above 144. In Pseudocelomates body cavity lies in between 1) Ectoderm and Endoderm 2) Ectoderm and Mesoderm 3) Mesoderm and Endoderm 4) Between two mesoderms 145. A third key transition in the evolution of the animal body plan is the evolution of 1) Blastcoel 2) body cavity 3) symmetry 4) cephalization 146. Adult eucoelomates are the animals with 1) Secondary body cavity 2) Primary body cavity 3) Blastocoel 4) Primary gut 147. The peritoneum that connects visceral organs to body wall 1) Pericardium 2) Pleuroperitoneum 3) Mesentery 4) Retroperitoneum 148. Choose the most correct combination related to the type of body cavity 1) Annelida- Arthropoda - Echinodermata 2) Annelida - Arthropoda - Mollusca 3) Annelida - Arthropoda - Chordata 4) Annelida - Arthropoda - Nematoda 149. Mesentery which connects different parts to the body wall is derived from 1) Ectoderm 2) Mesoderm 3) Endoderm 4) Both from Ectoderm and Endoderm 150. Majority of animals in the Kingdom Animalia have 1)Acoelom 2) Schizocoelom 3) Enterocoelom 4) Mesenchymal coelom 151. Absence of circulatory system in tube within tube body plan animals is compensated by 1) Body wall 2) Gut 3) Tissue fluid 4) Fluid present in persistent embryonic blastocoel

152. space around the internal organs is filled with parenchyma is seen in 1) Flat worms 2) Nematodes 3)Annelids 4) Echinoderms 153. Coelom found in the animals which show spiral cleavage is 1)Acoelom 2) Pseudocoelom 3) schizocoelom 4) enterocoelom 154. In arthropods and molluses the functional body cavity is 1) schizocoelom 2) haemocoelom 3) pseudocoelom 4) enterocoelom 155. In these animals mouth is derived from the secondary opening of archenteron 1)Acoelomates 2) pseudocoelomates 3) schizocoelomates 4) enterocoelomates 156. Interaction between tissues of different origin involved in the development of specialized tissues is 1) primary induction 2) co adaptation 3) histolysis 4) histosenesis 157. A major advantage of the coelomate body plan is 1) It allows locomotion 2) It allows primary induction 3) It allows peristalitic movements 4) It allows reproduction LEVEL-II 158. Statement (S): Arthropod s are true coelomates but functionally in adults the coelom is not true coelom. **Reason (R)**: True coelom is not present in Arthropoda. 159. Match the following A) pseudocoelomates I) Parenchyma B) acoelomates II) Spiral cleavage III) Blastocoel C) schizocoelomates persistant IV) Blastopore forms D) Enterocoelomates anus B A С D 1) I Ш IV Π 2) IV I Π Ш 3) Ш Ι Π IV Π Ι 4) Ш IV 160. Match the following

A)AcoelomeI) leechB)PseudocoelomeII) TaeniaC) schizocoelomatesIII) Ascaris

D) Enterocoelomates			IV) F	Reptile
	Α	В	С	D
1)	Π	III	Ι	IV
2)	IV	Ι	II	III
3)	III	Ι	Π	IV
4)	III	Π	Ι	IV

161. **Statement (S) :** In Pseudo coelomates coelom is present in between mesoderm and endoderm

Reason (R) : In these animals limiting developmental interactions can be seen.

- 162. Statement (S) : All enterocoelomates are deuterostomiates
 Reason (R) : In these animals blastopore turns into anus
- 163. **Statement (S) :** In nematodes tube -within tube arrangement is present

Reason (R) : In nematodes alimentary canal is present inside the body wall

COELOM

- 164). (S): In flatworms, movement of internal organs and locomotion of animals is restricted(D) El to a local description of animals of the second second
 - (**R**): Flatworms are pseudocoelomates.
- 165). (S): In pseudocoelomates, the wall of alimentary canal is non muscular.(D): More down is attached to the act of the sector down on the sector

(**R**): Mesoderm is attached to the ectoderm only and gives rise to bundles of muscles of body wall.

- 166). (S): Absence of circulatory system in pseudocoelom.(R): Pseudocoelom helps in the distribution of digested nutrients through out the body
- 167). **(S):**Pseudocoelomates exhibits a tube within a tube body organization.

(R): Roundworms and filarial worm are pseudocoelomates.

168). **(S):** Kidneys are retroperitoneal organs in eucoelomates

(R): Kidneys are covered by visceral peritoneum facing the coelomic cavity

- 169). (S): Arthropods are eucoelomates.(R): In arthropods the body cavity is called haemocoel.
- 170). **(S):** Schizocoelomates exhibit determinate type of cleavage.

(**R**): In schizocoelomates the fate of blastomeres is predetermined

GENERALIZED ANIMAL CELL

• Cells are the basic organizational units of life

- A typical animal cell has a plasma membrane surrounding the nucleus and the cytoplasm.
- Plasma membrance is a phospholipid bilayer that forms a fluid sea in which specific proteins float like icebergs.
- Membrane proteins include **peripheral proteins and intrinsic proteins**
- Proteins help to move ions or molecules across the membrane are some intrisic proteins.
- Plasma membrane is selectively permeable and helps in the maintenance of cellular homeostasis
- Molecules can move across the plasma membrane by simple diffusion, facilitated diffusion, osmosis, filtration, active transport, exocytosis, and by three types of endocytosis i.e pinocytosis (cell - drinking), phagocytosis (cell - eating), and receptor mediated endocytosis.
- Fluid portion of the cytoplasm is called the cytosol.
- Cytomembrane system is suspended with in the cytosol.
- Cytomembrane system include endoplasmic reticulum, Golgi apparatus, vesicles, vacuoles, etc.
- Non membrane bound ultramicroscopic structures of cytosol are **ribosomes**
- Animal cell has both 80S ribosome 70S ribosomes occur in mitochondrial matrix.
- 80S ribosomes present in the cytoplasm, 70S ribosomes occur in mitochodrial matrix.
- The clusters of ribosomes connected by a strand of mRNA are called **polyribosomes or polysomes**.
- Ribosomes are the **workbenches** of the cells, **carry out protein synthesis**
- Endoplasmic reticulum (ER) is a network of membrane - bound cisternae (flattened sacs), and tubules.
- The ER with attached ribosomes is **rough ER**, it is the site for **protein synthesis**.
- ER without ribosomes is **smooth ER**, is a site for lipid production and detoxification of drugs.
- Proteins formed by ribosomes sealed off in little packets called **transition vesicles**.

- The cell organelles which are most abundant in secretory cells are Golgi apparatus.
- Transition vesicles formed from the ER fuse with Golgi apparatus at the cis face.
- In the Golgi apparatus the proteins are **concentrated**, **modified** and **are packaged** into secretory vesicles.
- Secretory vesicles formed from Golgi reach the plasma membrane and release contents to the outside of the cell by exocytosis.
- Secretory vesicles are formed from the trans-face of Golgi apparatus.
- Membrane bound spherical organelles that contain enzymes called acid hydrolases are **lysosomes.**
- Lysosomes are involved in **intracelluar digestion**.
- Lysosomes are also called suicidal bags, due to their role in autolysis of injured or diseased cells.
- Lysosomes helpful to recycle worn-out cellular components
- Mitochondria are the **semiautonomous** organelles
- Enzymes involved in Kreb's cycle are present in **mitochondrial matrix**.
- Enzymes of the electron transport chain and the ATP synthetase. are present in the inner membrane of the mitochondria.
- Mitochondria are the **power houses** of the cell
- The thickest cytoskeleton is microtubules and the thinnest cytoskeleton is microfilaments.
- Microtubules are hollow, slender, cylindrical structures, made up of spiralling subunits of globular proteins called **tubulin subunits**.
- Microtubules help in movement of organelles, movement of chromosome and form a part of transport system with in the cell.
- Microtubules are involved in the overall shape changes of the cell during the periods of specialization.
- Intermediate filaments are made up of various types of proteins.
- Intermediate filament help in maintaining the cell

shape and the position of organelles.

- Intermediate filaments also promote mechanical activites withing the cytoplasm.
- Microfilaments are solid strings, made up of actin molecules.
- Microfilaments are most highly developed in muscle cells.
- In non muscle cells microfilaments provided mechanical support for various cellular structures.
- Amoeboid movement are due to microfilaments
- Microtubule organizing centre (MTOC) of the cell is **centrosome.**
- Centrosome has a pair of centrioles that lie at right angles to each other.
- Centrioles are absent in plant cells
- The control and information centre of the cell is **nucleus**.
- Nucleoplasm has a semifluid matrix called karyolymph.
- Chromatin consists of a combination of DNA and protein.
- In Non membrane bound structure in the nucleoplasm is nucleolus.
- Nucleoli are involved in the biosynthesis of ribosomes.

ANIMAL CELL

Plasma membrane

LEVEL - I

- 171) Plasmalemma of animal cell is made up of 1) Cellulose
 - 2) Proteins and phospholipids
 - 3) Chitin
 - 4) Proteins and Carbohydrates
- 172) Pinocytosis performed by
 1)Plasmalemma
 2)Endoplasmic Reticulum
 3)Lysosomes
 4)Golgi complex
- 173) In animal cell 70S type of ribosomes are present in
 1)Cytoplasm ER
 2)Cytoplasm of Mitochondria
 3)RER SER
 4)Cytoplasm Golgi

174) Which of the following helps in the maintenance of cellular homeostasis
1) plasma membrane 2) mitochondria
3) golgi 4) ER

LEVEL-II

- 175. Statement(S): Plasma membranehelp for the movement of ions or molecules accross it.
 Reason (R): Some of the intrinsic proteins present in the plasma membrane help in performing the above function
- 176. Statement(S): Plasma membrane is selective permeable membrane
 Reason (R): It regulates the movements of selected materials into the cell only

Cytoplasm

- 177) Cytosol of cell consists
 - 1)Nucleus
 - 2)Ribosomes
 - 3)Cytoskeleton
 - 4)Nucleus, Ribosomes and Cytoskeleton

Ribosomes

- 178) polysomes are
 - 1) clusters of lysosomes
 - 2) clusters of ribosomes
 - 3) group of endosomes
 - 4) group of centrosomes

Endo plasmic reticulum

- 179) Cell organelles involved in detoxification of drugs are
 - 1) Ribosomes 2) Smooth ER
 - 3) Rough ER 4) Golgi
- 180) Carriers of secretions of ER to Golgi complex are
 1)Cisternae 2)Transition vesicles
 - 3)Cytosol 4)Lysosomes
- 181). Proteins are synthesized in
 1) RER 2) SER
 3) Lysosomes 4) Golgi complex

GOLGI

LEVEL - I

- 182). Membranous organelle which is highly developed in glandular cells with high secretary activity
 - 1) Centrioles 2) Golgi Complex
 - 3) Lysosomes 4) Ribosomes

- 183) Concentration, modification and package of proteins is associated with1) ER2) Golgi

 - 3) Lysosomes 4) Ribosomes
- 184) Transition vecicles formed from the ER fuse with1) cis face of Golgi
 - 2) Trans face of Golgi
 - 3) lysosomes 4) Ribosomes

LYSOSOMES

LEVEL - I

- 185). Membrane bound cell organelles that show polymorphism are
 1).Ribosomes 2).Lysosomes 3).Basal granules 4).Centrosome
- 186) Cell organelles helpful to recycle worn out cellular components1) Ribosomes 2) Golgi
 - 3) ER 4) Lysosomes

MITOCHONDRIA

- LEVEL I 187) Power houses of cell are 1).Mitochondria 2).Ribosomes 3).Nucleus 4).Golgi Complex
- 188) The cell organelles usually multiply when a cell needs to produce more energy are1) Golgi 2) ER
 - 3) mitochondria 4) lysosomes
- 189) Enzymes of kreb's cycle are present in1).Mitochondrial matrix2).Cristae of mitochondria
 - 3).Lysosomes 4).MTOC
- 190) Membrane bound cell organelles that contain acid hydrolases are involved in
 1) protein synthesis
 2) intra cellular digestion
 3) biosynthesis of ribosomes
 - 4) energy production

LEVEL - II

- 191). Extranuclear parts with DNA and 70S type of ribosomes in animal cells are found in 1). Mitochondria
 2). Plasmids
 - 3).Golgi complex 4).Endoplasmic Reticulum
- 192). In Eukaryotic cells protein synthesis occurs in mitochondria along with cytoplasm. The reason is 1) 80s type ribosome2) 70s type ribosome
 - 3) Presence of cristae
 - 4) They are power houses

CYTOSKELETON LEVEL - I

- 193. Microfilaments of cytoskeleton are formed by1).Actin 2).Myosin 3).Tubulin4).Dynein
- 194. In non muscle cells mechanical support for various cellular structures is provided by
 1) micro tubules
 2) intermediate tubules
 3) micro filaments
 - 4) intermediate tubules
- 195. The components of cytoskeleton involve in the overall shape changes at the cells during periods of specialization are1) micro tubules
 - 2) micro filaments
 - 3) intermediate tubules
 - 4) intermediate filaments

LEVEL-II

196. Hollow slender and cylindrical structures of cytoskeleton are 1) Microfilaments 2) Microtubules 3) Intermediate filaments 4) Cytosol 197. The components of cytoskeleton which keep the nucleus in its position are 1) Microfilaments 2) Intermediate filaments 3) Microtubules 4) Actin filaments 198. The fibres of mitotic spindle are formed by 1).Microtubules 2).Microfilaments 3).Intermediate filaments 4).Both Micro and Intermediate filaments 199. The thickest and the thinnest of cytoskeleton

respectively are 1) microtubules and microfilaments

- 2) intermediate filaments and microfilaments
- 2) intermediate maments and micromaments
- 3) intermediate filaments and microtubules
- 4) microfilaments and microtubules
- 200. The parts of cytoskeleton that helps in amoeboid movement are
 - 1) micro filaments 2) micro tubules
 - 3) macro filaments 4) intermediate tubules
- 201. Cell organelles present in the animal cells but absent in plant cells are

1) centromeres	2) centrosomes
3) plastids	4) thylakoids

- 202. Mechanical activities with in the cytoplasm is promoted by1) micro tubules
 - 2) micro filaments
 - 3) intermediate tubules
 - 4) intermediate filaments
- 203. The proteins involved in the movement of chromosomes towards the poles during cell division are [2008]
 1)Actin 2)Myosin
 3)Tubulin 4)Elastin

CENTROSOME

	LEVE	CL-I
204.	MTOC related to	
	1) Ribosomes	2) Lysosomes
	3) Mitochondria	4) Centrosome
205.	The cell organells usua	lly multiply when a cell
	needs to produce mor	e energy is
	1) ER	2) Ribosome
	3) Mitochondria	4) Nucleus
206.	Cell organelles that are	e involved in biosynthesis
	ofribosomes	
	1) centrosomes	2) centrioles
	3) nucleoli	4) centromeres

CELL

207. (S): Plasma membrane is said to be selectively permeable in nature.(P): It regulates the entry and exit of various sub-

(**R**): It regulates the entry and exit of various substances into and out of the cell

- 208. (S): Golgi complex is highly developed in glandular cells with high secretory activity.(R): It is involved in protein synthesis.
- 209. **(S)::** Lysosomes are organelle essential for intra cellular digestion.

(R): Lysosomes are filled with acid hydrolases.

210. **(S)** Ribosomes are actually the sites of protein synthesis

(R)): Ribosomes in eukaryotes are 80s type.

211. (S): Mitotic spindle in all eukaryotic animal cells is formed by centrioles(R): Centrioles are present at the centre of cytoplasm closer to nucleus

ANIMAL TISSUES Epithelial tissues

- Study of tissue is **microanatomy or histology**
- A group of similar cells and cell products that arise from the same region of the embryo and work together to perform a specific function in an organ is **tissue.**
- Tissues are made up of **cells** and extracellular **matrix**.
- The human body is composed of four basic types of tissues they are epithelial, connective, muscular, and nervous.
- In connective tissues, the matrix usually occupies much more space than the cells do.
- Matrix is small in epithelial tissue, muscle tissue and nervous tissue.
- Tissues that are derived from any of the three primary germ layers are **epithelial tissues**
- Extracellular substance is very little hence cells are joined by intercellular junctions in the epithelial tissues.
- Cells of the epithelium rests on a **basement mem-brane**
- Basement membrane consists of a **basal lamina** and a reticular lamina.
- Basal lamina is secreted by epithelial cells and lie closer to the cells
- Reticular lamina is closer to the underlying connective tissue,
- Epithelial tissue is **avascular** hence obtain nutrients from underline connective tissue by **diffusion**.
- Long nonmotile extensions of cells that arise from free or apical surface of epithelial cells are called stereocilia.
- In simple epithelium all the cells occur in a single layer and all the cells rest on the basal lamina.
- Cells are flat and tile like with centrally located oval and flattended nucleus is seen in simple squamous epithelium.
- Endothelium of blood vessels and heart mesothelium of body cavities wall of Bowman's capsule lining of alveoli of lungs are made up of **simple squamous epithelium**

- Cells are cuboid with spherical centrally located nucleus is seen in **simple cuboidal epithelium**
- Germinal epithelium of ovary, thyroid vesicles, proximal and distal convoluted tubules of nephron. are made up of **simple cuboidal epithelium**
- Cells are pillar like with oval nucleus located at the base is seen in **simple columnar epithelium**.
- Nonciliated simple columnar epithelium is located in **mucosa of stomach and intestine.**
- Location of ciliated simple columar epithelium is lining of fallopian tubes, uterus, central canal of spinal cord and ventricles of brain.
- Mucus secreting goblet cells may occur in nonciliated simple columar epithelium, ciliated simple columnar epithelium and psuedostratified ciliated columnar epithelium.
- Cells occur in two are more layers in **stratified** epithelium.
- In stratified squamous epithelium cells of basal layer are cuboidal or columnar but superficial cells are squamous.
- Staratified squamous keratinized epithelilum found in epidermis of skin.
- The cells of apical layers are stratified squamous keratinized epihtelium contain keratin and constitute stratum corneum.
- Stratified squamous non keratinized epithelium covers wet surfaces such as oesophagus and vagina, without keratin.
- Staratified cuboidal epithelium **ducts of sweat** glands.
- Stratified columnar epithelium located in **conjunc-tiva of the eye.**
- Epithelium specialized to withstand a greater degree of stretch is **transitional epithelium**
- The relative position of nuclei of cells are are various levels in **pseudostratified columnar epithelium.**
- Pseudostratified ciliated columnar epithelium occurs in **trachea**.
- Pseudostratified nonciliated columnar epithelium occurs in **epididymis and a part of urethra.**
- Goblet cells of the lining of the small intestine are unicellular glands

- Multicellular glands are composed of clusters of cells, arise during development by the invagination of covering epithelia into the connective tissue.
- If the secretory portion of the exocrine glands are tubular they are called **tubular glands**.
- If secretory protion is rounded they are called acinar or alveolar glands.
- If the duct that transports the secretions is unbranched they are called **simple glands**.
- If the duct is branched, they are called **compound** glands.
- If the duct is unbranched but secreotry portion is branched they are called **simple brancehd** glands.
- If the glands release the secretory granules by exocytosis with no loss of other cellular material they are called **merocrine glands** (e.g., pancreas)
- The entire cell distintegrates to secrete its substance they are holocrine glands e.g. sebaceous glands.
- If apical portion of the cell is pinched off along with the secretory product they are a**pocrine glands (e.g., mammary gland)**

Epithelial tissues LEVEL - I

212.	Microanatomy is the study of			
	1) cells	2) tissu	es	
	3) organs	4) micr	oscope	
213.	The condition wh	nich is re	sponsible for decrease	
	in the rate of bloc	od coagu	lation is	
	1) Polycythemia	2)Thro	mbocytocythemia	
	3) leucopenia	4) Thro	mbocytopenia	
214.	The tissue which forms from any of the			
	three primary ge	rm layeı	's is	
	1) Epithelial tissu	e	2) Nervous tissue	
	3) Muscular tissu	e	4) Connective tissue	
215.	The tissue which	consists	s of both living and dead	
	cells is			
	1) Nervous		2) Muscular	
	3) Connective		4) Epithelial	
216.	Pseudostratified non ciliated columnar epithelium			
	is found in			
	1) Trachea		2) Branchioles	
	3) Parts of urethr	a	4) Buccal cavity	

- 217. The tissue without direct blood supply is
 1) Muscular 2) Epithelial
 3) Connective tissue proper
 4) Bone
- 218. Central spherical nucleus is the character of

 Cuboidal epithelium
 Columnar epithelium
 Squamous epithelium
 Pseudostratified epithelium

 219. Proximal convoluted tubules of nephron are
 lined by
 - 1) Stratified cuboidal epithelium
 - 2) Squamous epithelium
 - 3) Simple columnar epithelium
 - 4) Simple cuboidal epithelium
- 220. Stomach and intestine are lined by
 1) simple squamous
 3) simple columnar
 4) stratified columnar
- 221. Psuedo stratified ciliated columnar epithelium is found in1) Blood vessel2) Trachea
 - 3) Bronchioles4) Buccal cavity of mammal
- 222. In the epithelial tissues the component of the basement membrane which lies close to the epithelial cells is1) basal lamina2) reticular lamina
 - 3) intracellular junctions 4) microvilli
- 223. Long non motile extension of the free surfaces of epithelial cells are called1)microvilli2) stereo cilia
 - 3) cilia 4) reticular lamina
- 224. The layers of the basement membrane of the epithelial tissues lies close to the connective tissue is
 - 1) basal lamina2) reticular lamina
 - 3) stratum spongiform 4) stratum corneum
- 225. Stratified columnar epithelium is found in the 1) conjunctiva of eye 2) ducts of sweat glands 3) lining of vagina
 - 4) lining of thyroid vesicles
- 226. Pseudo stratified non ciliated columnar epithelium found in
 - 1) uninary bladder and ureters
 - 2) epididymis and parts of urethra
 - 3) trachea and bronchi
 - 4) fallopian tubes and uterus
- 227. Ependyma is1). The epithelium which lines the ventricles of brain
 - 2). The epithelium which covers neurons
 - 3). The epithelium which lines body cavity
 - 4). The epithelium which present around the bones

228.	The tissue present in the	epididymis is		
1).Non ciliated pseudo stratified epithelium				
	2) Ciliated pseudo stratifi	ied epithelium		
	3) Germinal epithelium	Germinal epithelium		
	4) Stratified columnar epithelium			
229.	The lining of buccal cavity, vagina and			
	oesophagus is formed by			
	1) Stratified squamous no	n-keratinized epithelium		
	2) Stratified squamous ke	eratinized epithelium		
	3) Stratified cuboidal epit			
220	4) Stratified columnar epi The emithelium that lines	the dusts of sugget		
230.	alanda ia	the ducts of sweat		
	1) Stratified squamous			
	2) Stratified cuboidal			
	3) Stratified columnar	4) Pseudostratified		
231.	The lining of urinary blac	lder is formed by		
	1).Transitional epithelium	1		
	2).Columnar epithelium			
	3).Keratinized squamous	epithelium		
	4).Non keratinized squar	nous epithelium		
232.	Sebaceous glnds are			
	1) Holocrine glands	2) Merocrine glands		
	3) Apocrine glands	4) Endocrine glands		
233.	Mammary glands are			
	1) Holocrine glands	2) Merocrine glands		
	3) Apocrine glands	4) Endocrine glands		
234.	Pancreas is			
	1) Holocrine glands	2) Merocrine glands		
	3) Apocrine glands	4) Endocrine glands		
235.	All other connective tiss	ues are derived from		
	1) Mucous connective tis	ssue		
	2) Areolar tissue 3) Mes	enchyme		
	4) Reticular tissue			
236.	Wharton's jelly is			
	1) Mesenchyme of foetu	S		
	2) Areolar connective tis	sue of embryo		
	3) Adipose tissue of emb	oryo		
	4) Mucous connective tis	ssue of umbilical cord		
237.	The cell contains numero	ous lipid droplets in		
	1) white adipose tissue			
 2) areolar connective tissue 3) reticular connective tissue 4) Brown adipose tissue 		sue		
		ssue		
238.	Elastic ligaments presen	t between vertebrae are		
	made up of			
	1) dense regular connect	ive tissue		
	2) elastic connective tiss	ue		
	3) reticual r connective tis	ssue		
	4) dense irregular connec	ctive tissue		
	-			

239.	Simple ciliated columnar epithelium is not found				
	in I I I I I I I I I I I I I I I I I I I				
	1) Central canal 2) Uterus				
240	3) Sweat glands 4) Fallopian tubes				
240.	Pseudostratified tissue which lacks gobiet cells				
	and without cilla alt 1) Non ciliated needed stratified anithalium				
	2) Ciliated pseudo stratified epithelium				
	3) Germinal epithelium				
	4) Stratified columnar epithelium				
241.	The lining of buccal cavity, is lined by				
	1) Stratified squamous non-keratinized epithe				
	lium				
	2) Stratified squamous keratinized epithelium				
	4) Stratified cuboidal epithelium				
242	A) Suamed columnal epidenum Rare type of epithelium is				
272.	1) Stratified squamous enithelium				
	2) Stratified cuboidal epithelium				
	3) Stratified columnar epithelium				
	4) Pseudostratified epithelium				
243.	The lining of the ureter is formed by				
	1) Transitional epithelium				
	2) Columnar epithelium				
	4) Non keretinized squamous epithelium				
244	The transitional epithelial cells of superficial				
211.	laver, when the urinary bladder is with full of				
	urine				
	1) Round 2) Squamous				
	3) Irregular 4) Oval				
245.	In the epithelial tissues the component of the				
	basement membrane which lies close to the				
	epitnelial cells is				
	2) reticular lamina				
	3) intracellular junctions				
	4) microvillus				
246.	The tissue that protects the under lying tissues				
	from microbes, heat and chemicals is				
	1) Stratified squamous non keratinised				
	epithelium 2) Startified aguerous Ironatinized onithelium				
	3) Simple squamous non keratinised epithelium				
	4) Simple squamous keratinised epithelium				
247.	Endothelium of blood also lines the				
	1) Walls of proximal convoluted part of nephron				
	2) Mesothelium that lines body cavities				
	3) endo thelium that lines body cavities				
	4) Walls of distal convoluted part of nephron				
248.	Urethra is lined by				
2.00	1) Transitional enithelium				
	2) Drawda startifiad y an ailiatad a shurman				
	2) Pseudostratified non cinated columnar				
	epithe lium				
	3) Both 1 & 2				
	4) Pseudostratified ciliated columnar epithelium				
249.	The type of tissue with flat and tile - like cells				
	1) simple cubodial 2) Simple columnar				
	3) simple squamous				
	sysmpte squamous				

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4) Simple columnar ciliated

250. Distal convoluted tubules of nephron is lined by 1) Simple columnar ciliated epithelium 2) Simple squamous epithelium 3) Simple cuboidal epithelium 4) Simple columnar non ciliated epithelium 251. Pancreas is 1) Holocrine glands 2) Merocrine glands 3) Apocrine glands 4) Endocrine glands 252. Urinary bladder contains 1) Transitional epithelium 2) Stratified epithelium 3) Glandular epithelium 4) cuboidal epithelium 253. Basic function of epithelial tissue is 1) Secretion of mucus and enzymes 2) Sensory 3) Covering free surfaces of other tissues 4) Connecting various tissues 254. Heart is lined by 1) Simple squamous epithelium 2) Simple glandular epithelium 3) Simple cuboidal epithelium 4) Simple columnar epithelium 255. Thyroid vesicles are lined by the 1) Simple columnar epithelium 2) Simple squamous epithelium 3) Simple cuboidal epithelium 4) Simple ciliated columnar epithilium 256. Shape of the nucleus of simple cuboidal epithelium is 1) Oval 2) Spherical 3) Round 4) Flat 257. The epithelium that lines the glands like, thyroid vescicle is 1) Cuboidal 2) Squamous 3) Columnar 4) Germinal 258. The epithelium found in distal convolued tubule is 1) Columnar 2) Cuboidal 3) Sensory 4) Squamosus 260. Ciliated epithelium is found in 1) Genital ducts 2) Central canal of spinal cord 3) Brain ventricles 4)All 260. Generally the layer of cells in stratified epthelium are 1)2 2) 2, to many layers 3)4 4) 1 261. The shape of cells of basal layer of stratified epithelium is usually 2) Cuboidal only

1) Squamous

,		3) Columnar onl	у		
		4) Cuboidal and	columna	ar	
	262.	. Oesophagus is lined by			
		1) Stratified squa	amous ke	eratinized epithelium	
		2) Stratified squa	amous no	on keratinized epithelium	
		3) Stratified cubo	oidal epit	helium	
		4) Stratified colu	mnar epi	thelium	
	263.	Transitional epith	nelium is	found in	
		1)Trachea	2)Gen	ital ducts	
		3) Sole	4) Wal	l of the urinary bladder	
	264.	Intestine is made	eby	•	
		1) non ciliated ep	oithelium	L	
		2) ciliated epithel	lium		
		3) cuboidal epith	elium		
		4) columnar epith	nelium		
	265.	Duct of sweat gl	and is m	ade by	
		1) stratified squa	mous ep	ithelium	
		2) stratified squa	mous ke	ratinised epithelium	
		3) stratified squa	mous no	on-keratinised	
		epithelium			
		4) stratified cubo	idal epit	helium	
	266.	If the duct of glan	ndular ep	oithelium is branched it	
		is called as			
		1)Tubular		2) acinar	
		3) simple		4) compound	
	267.	The inner lining	of the tra	chea is containing	
		1) Tall cells, or	ne cell th	ick with all nuclei at the	
		same level			
		2) Flat cells, one	cell thic	k with central bulged	
		nucleus			
		3) Cuboidal cells	s, one ce	ll thick with spherical	
		4) Tall cells, one	cell thic	k, nuclei at different	
	2.00	levels			
	268.	Mammary gland	1 1S a	• • • • •	
		1) apocrine glan	d	2) merocrine gland	
		3) holocrine glan	ld	4) exocrine gland	
			LEVE	тп	
	260	Statement (S).		L-II	
	209.	statement (S):	Aussuel	is a group of certs of	
		Similar origin to \mathbf{p}		ll tissue are held	
		together by cell i	unotion	II USSUE al e lieiu	
	270	Statement (S)	unction Enithelig	l tissue obtain nutrients	
	270.	from blood vessels located in the adjacent			
		connective tissue			
		Reason(R) Enit	helial tis	sue are avascular	
271		Number of layers number of covities and			
	number of apertures present in blastula			ent in blastula	
		respectively	· P- •		
		1) 1, 1, 0		2) 3, 2, 0	
		3) 2, 2, 1		4) 3, 0, 1	
		, , ,		, , , ,	

- 272. Read the following statements about transitional epithelium and choose the correct answer
 - I) It is modified stratified epithelium
 - II) Number of cells remains same in both
 - unstretched and stretched condition
 - III) Thickness is more in unstretched condition than in stretched condition
 - IV) Shape of cells remain same in both unstretched and stretched condition
 - 1) All are true
 - 2) All except I are true
 - 3) All except II, IV are true
 - 4) All except IV are true
- 273. **Statement (S):**Urinary bladder can considerably be distended to accommodate urine

Reason (R): It is lined by stretchable one cell thick squamous epithelium

274. (S): Mammary gland is an apocrine gland(R): The apical portion is pinched along the secretion

Connective tissue

- Connective tissues are **mesodermal** in origin.
- The major constituent of connective tissue is the **extracellular matrix.**
- Matrix consists of ground substance and fibres
- With few exceptions, connective tissues are vascular.
- Cells of the connective tissue are fibroblasts, mast cells, macrophages, plasma cells, adipocytes and leucocytes.
- Fibre secreting cells are **fibroblasts**, inactive fibro blasts are called **fibrocytes**.
- Mast cells produce heparin, histamine and bradykinin
- Heparin is an **anticoagulant**, histamine and bradykinins are **vasodilators**.
- Histamine and bradykinin play a role in **inflam-mation.**
- Monocytes of the blood enter connective tissue matrix, and become **macrophages.**
- Macrophage may be tissue fixed (histiocytes) or wandering, phagocytic and act as **internal scavengers.**
- Large ovoid cells with spherical and eccentric nu-

cleus are plasma cells.

- Plasma cells derived from B cells and synthesize antibodies.
- Fat storage cells of connective tissue are **adipocytes.**
- Leucocytes migrate from the blood vessels into connective tissues by **diapedesis**.
- Three main types of connective tissue fibres are collagen, reticular, and elastic.
- Collagen and reticular fibres are formed by collagen protein and elastic fibres are composed of elastin protein.
- Fibres which are arranged parallel to one another in bundles are **collagen fibres.**
- Elastic fibres are branched and join together to form a network.
- The three main types of connective tissues are connective tissue proper, supportive tissue, fluid connective tissue.
- Embryonic connective tissue is present primarily in embryo and foetus.
- Emryonic connective tissue includes mesenchyme, mucous connective tissue
- All other connective tissues are derived from mesenchyme
- Mucous connective tissue mainly found in the **umbilical cord.**
- Mucous connective tissue in umbilical cord where it is referred to as **Wharton's Jelly.**
- Mature connective tissue is present in the newborn and in the adult.
- Loose connective tissue are Areolar tissue, adipose tissue and reticular connective tissue.
- One of the most widely distributed connective tissues in the body is **areolar connective tissue**.
- Subcutaneous layer that binds skin to underlying tissues is **areolar connective tissue**.
- Fat -storing tissue , contributes to thermal insulation body is **adipose tissue.**
- Blubber of marine mammals like whales and sea cows is made up of adipose tissue.
 - Adipose tissue acts as shock absorber, gives body

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contour.

- Adipose tissue is also found in **yellow bone mar**row.
- White adipose tissue (WAT) is predominate type in adults.
- Brown adipose tissue(BAT) is widespread in foetus and infant.
- The cell of WAT has a single large lipid droplet, and that of BAT has numerous lipid droplets.
- BAT generates considerable heat and maintains body temperature in the newborn.
- Reticular connective tissue consists of reticular fibres and fibroblasts called reticular cells
- Reticular connective tissue is located in haemopoietic organs lymphoid organs, and reticular lamina of basement membrane.
- Good examples for dense regular connective tissue are **tendons and ligaments**
- Dense irregular connective tissue occurs in periosteum, perichondrium pericardium, heart valves, joint capsules, and in deeper region of dermis of skin.
- The tissue that can recoil to its original shape after being stretched is elastic connective tissue.
- Elastic connective tissue occurs in the wall of arteries, vocal cords, trachea, bronchi and few ligaments called elastic ligaments (between vertebrae).

Connective tissue

LEVEL-I

			_
275.	Reticular fibers are made-up of		
	1)Actin	2) Colla	agen
	3) Elastin	4) Myo	sin
276.	Vasodilator secre	eted by n	nast cells is
	1) Heparin	2)Hista	amines
	3) Acetylcholine	4) Vasc	pressin
277.	The tissue that fo	rms the	supporting frame work
	of haemopoitic or	rgans is	
	1) Adipose tissue	;	2) Aereolar tissue
	3) Reticular tissue	e	4) Jelly like tissue
278.	Stroma of red box	ne marro	ow, spleen, lymph
	nodes are formed	lby	
	1) Epithelial tissu	e	2) Ependyma
	3) Reticular tissue	e	4) Fibrocytes
	,		· •

- 279. Deeper region of dermis of skin is formed by 1) Reticular tissue
 - 2) Dense irregular connective tissue
 - 3) Dense regular connective tissue
 - 4) Yellow elastic tissue
- 280. Among the four basic types of tissues, the matrix usually occupies much more space than cells in 1) epithelial tissues 2) connective tissues 3) muscular tissues 4) nervous tissues
 281. The tissue that forms the supporting frame work
- of haemopoitic organs is 1) Adipose tissue 2) Aereolar tissue
 - 3) Reticular tissue 4) Jelly like tissue
- 282. The plasma cells of areolar tissue are the descendents of
 - 1) B cells2) T cells3) Mast cells4) Monocytes
- 283. Stroma of lymph nodes are formed by 1) Epithelial tissue2) Ependyma
 - 3) Reticular tissue 4) Fibrocytes
- 284. Extremely thin fibres of connective tissue are1) Collagen fibres2) Retucular fibres
 - 3) Elastic fibres 4) Myosin fibres
- 285. Heart valves are made by1) Reticular tissue2) Dense irregular connective tissue
 - 3) Dense regular connective tissue
 - 4) Yellow elastic tissue
- 286. All other connective tissues are derived from 1) Mucous connective tissue
 - 2) Areolar tissue
 - 3) Mesenchyme
 - 4) Reticular tissue
- 287. Whartons jelly is
 - 1) Mesenchyme of foetus
 - 2) Areolar connective tissue of embryo
 - 3) Adipose tissue of embryo
 - 4) Mucous connective tissue of umbilical cord
- 288. Elastic ligaments present between vertebrae are made up of
 - 1) Dense regular connective tissue
 - 2) Elastic connective tissue
 - 3) Reticular connective tissue
 - 4) Dense irregular connective tissue
- 289. Ground substance of matrix of connective tissue is mainly contains
 - 1) Water only
 - 2) Polysacharides only
 - 3) Proteins only
 - 4) Water, polysacharides and proteins

290.	Which of the following	facilitates easy passage		tissue					
	of plasma proteins, mor	ocytes through capillary		3) Matu	re conne	ective ti	issue		
	walls			4) Loos	e conne	ctive tis	sue		
	1)Heparin	2) Bradykinin	301.	Wharton	ns jelly				
	3) Acetly choline	4) Haemolysin		1) Conta	ains wid	ely sca	ttred fil	oroblast	
291.	Thinnest fibres of cinne	ctive tissue are		2) A fev	v fibrob	last			
	1) Reticular fibres	2) Collagen fibres		3)Noth	aving fi	broblas	sts		
	3) Elastic fibres	<i>)</i>		4) Cont	ains soli	d grou	nd subs	stances	
	4) Collagen & elastic fi	ores	302.	Frame	vork of]	haemoi	ooietic	organs is 1	made by
292.	Mesenchyme ground su	lbstance is		1)Aeree	olar con	nective	tissue	U	2
	1) solid	2) fuild		2) Retic	ular con	nective	tissue		
	3) semifluid 4) wit	hout reticular fibres		3) Dens	e conne	ctive tis	sue		
293.	Cvtoplasm of white adi	pose tissue is located		4) Elast	c conne	ctive tis	ssue		
_, .	1)centrally	2) basal	303.	Reticula	r lamina	ofbas	ementr	nembrane	of
	3) tip of the cell	4) peripheral		epithelia	al tissue	is made	ebv		
294.	Nucleus shape of plasm	a cells of connevtive		1) Dens	e conne	ctive tis	sue		
_,	tissue are			2) Areo	ar conn	ective t	issue		
	1) Oval	2) Round		3) Retic	ular con	nective	tissue		
	3) Spherical	4) Absent		4) Elasti	c conne	ctive tis	ssue		
295.	Blubber is		304	Type of	tissue w	vith mor	re nume	erous dens	ser fibers
_, .	1) Adipose tissue of mar	rine mammals	0011	but few	er cells i	s	• 110111		
	2) Adipose tissue of all	mammals		1) Retic	ular con	nective	tissue		
	3) Aereolar connective	tissue		2) Dens	e conne	ctive tis	sue		
	4) Reticular connective	tissue		3) Bloo	d		4) R	one	
296.	Nucleus of white adisp	ose tissue is present at	305	Ligame	nts conn	ects	1) D	0110	
	1) Central part of cells	2) Base of the cells		1)Bone	tomus	ele	2) M	fuscle to F	oone
	3) Peripheral part of cel	1 4) Apical part of cells		3) Bone	to bone	2	4) T	endons to	bones
297.	Read the statements ab	out brown adipose tissue	306.	Ligame	nts are n	nade by	,		
	and select in correct on	e		1)Loos	e regula	r conne	ctive ti	ssue	
	1) It is wide spread in fo	betus and infant		2) Dens	e regula	r conne	ctive ti	ssue	
	2) It contains numerous	lipid droplets		3) Dens	e irregul	ar conr	nective	tissue	
	3) It has rich blood sup	oly		4) Dens	e regula	r conne	ctive ti	ssue	
	4) It has less mitochond	ria	307.	Joint ca	psule is:	made b	v		
298.	The only formed eleme	nts that can move through		1) Dens	e regula	r conne	ctive ti	ssue	
	the walls of the capillar	ies and the process is		2) Dens	e irregul	ar conr	nective	tissue	
	known is	-		3) Elasti	c conne	ctive tis	ssue		
	1) Leucocytes and Dia	pedesis		4) Supp	ortive ti	ssue			
	2) Leucocytes and Disk	inesis	308.	Match t	ne follov	ving			
	3) Erythrocytes and Dia	phyes	A)U	mbilical o	ord	1)Re	ticular	connectiv	e tissue
	4) Erythrocytes and Dia	pedesis	B)Ha	aemopoie	etic tissu	e 2) Jel	ly like o	connective	e tissue
299.	The cells of areolar tissu	which are chemically	CB_1	rown fat		3)Ac	lipose t	issue	
	attracted by histamine t	o the site of injury are	D)M	[ast cell		4) co	nnectiv	e tissue	
	1) Internal scavengers				A	B	С	D	
	2) Microscropic policer	nen		1)	2	1	4	3	
	3) Megakaryocytes			2)	1	2	3	4	
	4) Tissue fixed macroph	nages		3)	2	1	3	4	
300.	Type of tissue present in	umbilical cord is		4)	1	4	2	3	
	1) Mesenchyme	2) Mucus connevtive		,				-	
	· •	,							

309.	Tendons are			
	1) Dense regular connective tissue			
	2) Dense irregula	ar conneo	ctive tissue	
	3) Dense recticul	lar conne	ective tissue	
	4) Supportive tis	sue		
310.	Vasodilating sub	stance of	f mast cell is	
	1)Bradykinin		2) Heparin	
	3) Histolysins		4) hirudin	
311.	Following are the	e statem	ents about adipose	
0111	tissue		••••••••••••••••••••••••••••••••••••••	
	i) cell has a single	e large li	pid droplet	
	ii) if has rich bloc	od supply	V V	
	iii) it is predomina	ant in ad	nlt	
	iv) it generates co	onsidera	ble heat	
	Which of the abo	we are t	be characteristics of	
	WAT (white adir	ose tiss		
	1) i and ii	2) ii on	1;;;	
	$1) 1 and 11 \\ 2) i and iii$	2) II and	4 III 1 Jan	
212	5) 1 and 111 The characters of	4)1 and	l IV	
512.	1) Large matrix	2) Rich	blood supply	
	3) Derived from	2) Kich mesoder	rm	
	4) All the above	mesoder		
313	The tissue that or	curs in t	the subcutaneous laver	
515.	of the skin is		ine subculture ous layer	
	1) Dense fibrous	tissue	2) Aereolar tissue	
	3) Reticular tissu	e	4) Tendon	
314.	The wandering c	ells in ae	ereolar tissue	
	1) Macrophages		2) Monocytes	
	3) Histiocytes		4) Mast cells	
315.	The plasma cells	ofaered	olar tissue are	
	the descendents	of		
	1) B cells	2) T ce	lls	
	3) Mast cells	4) Mor	nocytes	
316.	Extremely thin fi	bres of c	onnective tissue are	
	1) collagen fibres	s 2) retic	ular fibres	
	3) elastic fibres	4) myo	sin fibres	
	Lł	EVEL	- 11	
317.	Statement (S): 7	The gran	ules of mast cells	
	secretes histamin	e and br	adykinin	
	Reason (R): M	last cell	take part in allergy	
	reactions and als	o help ir	n body defence	
318.	The following are	e some s	tatements regarding	
	connective tissue	e proper		
	I) Mast cells secr	rete coag	gulant heparin	
	II) Plasma cells p	oroduce	antibodies	
	III) Histiocytes a	re tissue	fixed macrophages	
	Correct combina	tion is		
	1) I, III		2) I, II	
	3) II, III		4)All	

319. Match the following and choose the correct option

	option						
	List - I			Lis	t - II		
	A. Fibrin	olysin		I. Pı	events clotting		
	B. Heparin		II. E	II. Blood coagulation			
	C. Brady	kinin		III.	Distruction of red		
	-			bloo	od cells		
	D. Thron	nboplas	stin	IV.	Dissolution of old		
				bloo	od clots		
				V. V	asodilation		
		A	В	С	D		
	1)	IV	Ι	V	III		
	2.	III	V	Ι	Π		
	3)	III	Π	V	Ι		
	4)	IV	Ι	V	Π		
320.	Stateme	nt (S):	Voca	l cords o	an recoil to its		
	originals	shape a	fter be	eing stre	tched		
	Reason	$(\mathbf{R}):\mathbf{V}$	/ocal o	cords ar	e made by dense		
	irregular	connec	tive ti	ssue	5		
321.	Stateme	nt (S):	In hea	rt valves	s pulling forces are		
	exerted in	n vario	us dire	ections	ions		
	Reason	(R): I	Heart	valves a	lves are made by dense		
	irregular	connec	tive ti	ssue	5		
322.	Read the	follow	ing sta	atements	s about connective		
	tissue an	ssue and select correct combination					
	I) Fibrob	last cel	ls are	most co	mmon cells		
	II) Histar	nines a	nd bra	dykinin	helps for causing		
	inflammation. III) Monocytes turn into plasma cells after						
					ma cells after		
	entering	into coi	nnecti	ve tissue			
	1)All			2) I	and II		
	3) II and	III		4) I	and III		
323.	Selecte in	ncorrec	et state	ements a	bout embryonic		
	connectiv	ve tissu	e				
	1) It is pr	esent i	n emb	ryo and	foetus stage		
	2) Meser	nchyme	e tissue	e matrix	contains reticular		
	fibres						
	3) Mucu	s conne	ective	tissue is	present in		
	whartons	jelly					
	4) Meser	nchyme	e tissu	e gives r	ise to all other		
	types						
324.	Match th	e follov	ving				
	Set - A			Set	- B		
	A. Adipo	ocytes		I.B	radykinin		
	B. Plasm	a cells		II. F	Production of heat		
	C. Mast	cells		III.	Engulfbacteria		
	D. Macro	ophage	s	IV.	Synthesize anti		
				bod	ies		

		А	В	С	D	333
	1)	Π	IV	III	Ι	
	2)	Ι	II	III	IV	
	3)	Π	IV	Ι	III	334
	4)	IV	II	Ι	III	
325.	Read the	e statem	ents ab	out adir	ose tissue and se-	
	lect corr	ect state	ements	1		
	I. White	adipose	e tissue	is predo	minent type in	
	adult	1		1		335
	II. WAT	- cells v	vill hav	e single s	small lipid droplet	
	III. BAT	genara	tes con	siderabl	e heat	
	1) Lonly	, ,		2) I a	nd II	
	3) II and	1111		4) II (only	
326	Pericard	ium is r	nade hi	,	Jilly	
520.	1) Dong		roonne	otivo tic		
	$\frac{1}{2} Dong$	e legula		cuve us	suc	
	2) Electi	e nitegui	ativo ti		ssue	
	3) Elasu			tianua		
227	4) Kelici		necuve	ussue	~~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	
327.	Select In	ie incor	rectabl	out areof	arconnective	336
	ussue	1	1 1 .			
	I. It is m	OST W100	ely disti	ibuted t	issue	
	II. It is n	hade by	collage	en, elasti	c and reticular	
	fibers					337
	III. It is c	combin	ed with	adıpose	tissue and forms	
	sub cuta	neous la	ayer			
	1)All			2) I a	nd II only	
	3) III on	ly		4) II,	III only	
328.	Stateme	ent (S):	Elastic	connect	tive tissue is	
	yellow ii	n colour	•			
	Reason	(R):	It is hav	ving pre	dominate elastic	
	fibres					
329	Stateme	ent (S):	Elastic	connec	tive tissue can	
	recoil to	its orig	inal sha	pe after	being stretched	
	Reason	(R):]	lt is ma	de by pi	redominate	
	elastic fi	bres				
330.	Stateme	ent (S):	BATm	aintains	the body tempera-	
	ture in a	dults as	lo			
	Reason	(R):	lt genei	ate the	considerable	
	heat in a	dults				
	(CONN	ECTIV	'E TISS	SUE	
331)	(S): Plas	sma cell	s of are	olar tiss	ue provide	1 1 1 1
,	imm	unity ag	gainst d	iseases.	-	ii)Si
	(R): The	ey are th	e desc	endants	of T - lympho	
	c	ytes			J 1	iii) I
332).	(S): Her	, parin pro	oduced	by baso	phils is an antico	
)•	agula	ant.		,		^{1V)B}
	(R): Her	parin is	also se	creted b	y mast cells	whi
	· · ·		-	-	•	1

- 333). **(S):** Reticulocytes cells are present in haemopoietic tissues.
 - (**R**): Reticulate cells are immature red blood cells.
- 34) (S): Neutrophils increase in number during infections(D) L

(R): Lymphocytes are phagocytic in function.

<u>CELL</u>

35.	Arrange the following cell organelles in a correct			
	sequence based on the synthesis, transport and			
	secretion of the substances			
	a) golgi apparatus	b) rough ER		
	c)lysosomes	d) endosomes		
	e) transition vesicles			
	1) c -a- d - b - e 2) b - c	l- a- c- e		
	3) b - e- a- d- c 4) c - d	l- b - a- e		

EPITHELIUM

336. The blubber is formed by :

		[2004]
	1) Elastic Tissue	2) Reticular tissue
	3) Adipose tissue	4) Fibrous tissue
7.	Match the following:	

[2006]

Set - I	Set-II
a)Columnar epithelium	1)Larynx
b)Ligaments	2)Eosinopaenia
c)Chondroblast	3)Elastic tissue
d)Acidophils	4)Urinary bladder
e)Uninucleated spindle	5)Microvilli
shaped muscle fibers	
The correct set is :	
1) a - 5, b - 3, c - 1, d	- 2, e - 4
2) a - 5, b - 1, c - 3, d	- 2, e - 4
3) a - 1, b - 5, c - 3, d	- 2, e - 4
4) a - 5, b - 3, c - 1 d -	- 4, e - 2

TRIPLE MATCHING TYPE

338. Study the follow	ving	
SYMMETRY PRIM	NCIPAL AXIS	EXAMPLE
i) Radial symmetry	oral - aboral aixs	Hydra
ii)Spherical symmetry	antero posterior axis	Collozoum
iii) Bilateral symmetry	anterior - posterior axis	Giardia
iv)Biradial symmetry	transverse axis	Cternophore

which of the above are correct

 1)All
 2) i and iii
 3) ii and iv
 4)

4) i, iii and iv UNIT-III

339. Study the following

CYTOSKELETON	PROTEIN	FUNCTION
i) Microfilaments	Actin	Cellular movements
ii) Intermediate filaments	Various types of proteins	maintain cell shape
iii) Microtubules	tubulin	chromosomal movement
which of the	above are correct	rt
1) all	2) i and	l ii only
3) only ii	4) only	y i and iii
340. Study the followi	ng	
CELL ORGANALLE	OTHER NAME	FUNCTION
i)lysosomes	suicidal bags	autolysis
ii)mitochondria	power houses	production of energy
iii)ribosomes	work benches	protein synthesis
which of the a	bove are correct	
1) all	2) i and	l ii only
3) only ii	4) only	y i and iii
341. Study the followi	ng	
TISSUE	FIBRES	CELLS
i) mesenchyme	reticular fibres	mesenchymal cells
ii) mucous	collagen fibres	fibroblasts
connective tissue		
iii) reticular tissue	reticular fibres	reticulocytes
iv) elastic	elastic fibres	adipocytes
connective tissue		
which of the a	bove are correct	
1) i and ii	2) ii and	d iii
3) iii and iv	4) i an	d iv
SUPPO	ORTIVE TISSU	E
• Supportive tis	sue forms the end	loskeleton

Cartilage

- Cartilage is also called **gristle**.
- Cartilage forms endoskeleton of cyclostomes and cartilaginous fishes.
- Cartilage is surrounded by **perichondrium**
- Cartilage is **avascular** and is nourished by the **diffusion** of nutrients from capillaries in **perichon-drium**.
- Matrix secreting cells of cartilage are chondroblasts.

- Each lacuna of cartilage may contain upto eight chondrocytes.
- Growth of cartilage is either **interstitial growth**, or more commonly **appositional growth**.
- Growth of cartilage resulting from the mitotic division and reactivation of preexisting chondrocytes is **interstitial growth.**
- Growth of cartilage resulting from the differentiation of perichondrial cells is **appositional growth.**

Hyaline Cartilage

- Bluish white and translucent cartilage is **hyaline cartilage**.
- The weakest cartilage is **hyaline cartilage**
- Hyaline cartilage is located in the walls of nose, larynx, trachea, bronchi, in the ventral ends of ribs (costal cartilage), epiphyseal plate, and articular cartilage in joints and in embryonic skeleton of bony vertebrates.
- In Hyaline cartilage perichondrium is absent in articular cartilages and epiphyseal plates.

Elastic cartilage

- The cartilage with elastic fibres along with collagen fibres is **elastic cartilage**
- Elastic cartilage is found in the **ear pinna**, **eustachian tubes and epiglottis.**

Fibrous cartilage

- The Strongest of all the three cartilages is **fibro-**cartilage.
- Fibrocartilage found in intervertebral discs and in the pubic symphysis.

SUPPORTIVE TISSUE Cartilage

LEVEL - I

- 342) The matrix of cartilage is secreted by
 1) chondrocytes
 2) chondroblasts
 3) osteoblasts
 4) osteocytes
 343) Gristle is derived from
- 1)ectoderm 2)mesoderm 3)endoderm 4)ecto-endodermal
- 344). The outer covering of gristle is1) periosteum3) endosteum4).meninx

345). '	This part of cartilage re	ceives direct blood
5	supply	
	1) lacunae	2)chondrocytes
-	3) chondrin	4)perichondrium
346).	Connective tissues ar	e vascular but avascular
,	connective tissue is	
	1) dense regular conn	ective tissue
	2) cartilage	3) bone
	4) dense irregular con	nective tissue
347)	More commonly the	prowth of cartilage is
517).	1) interstitial growth	Grow an of curtiling of is
	2) anical growth	
	2) appear growth 2) appearitional growth	հ
	4) autra callular growt	11 t 1 -
240)	4) extra cellular grow	ull
348).	I he growth of cartilag	ge resulting from the
1	mitotic divisions and re	activation of preexisting
(chondrocytes is	
	1) interstitial growth	2) apical growth
	3) appositional growt	h 4) extra cellular growth
349).	Matrix of cartilage dif	ffers from matrix of bone
	in not having	
	1) collagen fibres	2) elastic fibres
	3) lacunae	4) blood vessels
350).	Growth of the gristle	is promoted by
	1) osteoblasts	2) chondrocytes
	3) fibroblasts	4) perichondroblasts
351).	Perichondrium cover	ing the cartilage is made
,	upof	0 0
	1) irregular white fibr	ous tissue
	2) vellow elastic tissu	e
	3) regular white fibro	us tissue
	4) reticular connectiv	e tissue
	+) refering connective	e ussue
LEVF	EL-H	
352)	The following are the	statements about gristle.
552).	I It is semirigid and s	ome what flexible
	supportive tissue w	hich can withstand
	compression and de	formation forces that act
		cionnation forces that act
	U) Cartila a duara u	······································
	II). Cartilage draws no	ourishment from
	perichondrium	
		in the matrix enclose
	III) Lacunae present i	
	chodroblasts.	
	III) Lacunae present i chodroblasts. IV) Perichondroblast	s promote the growth of
	III) Lacunae present f chodroblasts. IV) Perichondroblast cartilage	s promote the growth of
	III) Lacunae present i chodroblasts.IV) Perichondroblast cartilageChoose the correct st	s promote the growth of atements
	III) Lacunae present fchodroblasts.IV) PerichondroblastcartilageChoose the correct st1) I, II	s promote the growth of atements 2) II , IV
	 III) Lacunae present f chodroblasts. IV) Perichondroblast cartilage Choose the correct st 1) I, II 3) I, II, IV 	atements 2) II , IV 4) I, II, III and IV
353).	 III) Lacunae present f chodroblasts. IV) Perichondroblast cartilage Choose the correct st I) I, II J, II, IV Statement (S) : Grist 	as promote the growth of atements 2) II , IV 4) I, II, III and IV the draws nourishment
353).	 III) Lacunae present for chodroblasts. IV) Perichondroblasts IV) Perichondroblast cartilage Choose the correct st I) I, II 3) I, II, IV Statement (S) : Grist from perichondrium 	atements 2) II , IV 4) I, II, III and IV cle draws nourishment
353).	 III) Lacunae present f chodroblasts. IV) Perichondroblast cartilage Choose the correct st I) I, II I, II, IV Statement (S) : Grist from perichondrium Reason (R) : Cartila 	atements 2) II , IV 4) I, II, III and IV cle draws nourishment age does not have blood
353).	 III) Lacunae present f chodroblasts. IV) Perichondroblast cartilage Choose the correct st I) I, II J, II, IV Statement (S) : Grist from perichondrium Reason (R) : Cartila vessels but peri-chondria 	as promote the growth of atements 2) II , IV 4) I, II, III and IV de draws nourishment age does not have blood drium contains blood

Hyaline Cartilage

LEVEL-I

354).	Hyaline cartilage witho	ut perichondrium is
1	present in	
	1) pubic symphysis	2) articular cartilage
-	3) costal cartilage	4) epiglottis
355).	Costal cartilage is seen	in
	1) tips of long bones	2) centre of the sternum
-	3) between joints	4) ventral ends of ribs
356). "	The weakest cartilage i	S
	1) hyaline cartilage	2) elastic cartilage
-	3) fibrous cartilage	4) calcified cartilage
357).]	Endoskeleton of embry	yos and bronchial
	rings are formed by	
	1) fibrous cartilage	2) hyaline cartilage
-	3) calcified cartilage	4) elastic cartilage
358).	Bluish white transluce	ent cartilage is found in
	1) vocal cards	2) epiglottis
	3) periosteum	4) coastal cartilage
359).	The cartilage that sup	ports larger branchioles is
	without	
	1) elastin fibres	2) collagen fibres
	3) perichondrium	4) chondroblasts
360).	Cartilage that provide	es strength and elasticity is
	found in	
	1) public symphysis	2) costal cartilage
	3) eustachian tubes	
	4) embryonic skeleto	on of vertebrates
LEVE	EL-II	
361).	The following are the	statements about Hyaline
	cartilage. Identify the	correct statements.
	I. It is light bluish - w	hite and translucent
	II. 1 to 4 Chondrocy	tes are enclosed in each
	Lacuna in the matrix	
	III. It is the strongest	and least flexible of all
	types of cartilage	
	1) I only	2) II and III
	3) I and III	4) I,II and III
362).	Statement (S) :Hval	ine cartilage is the weak
,	est among all types of	fcartilage
	Reason(R): Verv th	in collagen fibres are
	prese	ent in its matrix
	L	

ELASTIC CARTILAGE

LEVEL-I

363).	The only cartilage with	yellow fibers is
	1) elastic cartilage	2) hyaline cartilage
	3) fibrous cartilage	4) all the above
364).	The cartilage present in	epiglottis is
	1) hyaline	2) fibrous
	3) elastic	4) calcified

- 365). Yellow fibres of cartilage
 - 1) made up of collagen
 - 2) occur in bundles
 - 3) arranged parallel to one another
 - 4) have forked ends

LEVEL-II

366). The following are the statements about Elastic cartilage

I Elastic and collagen fibres are present in the matrix

II. It exhibits ability to regain the original shape after distortion

III. It lacks perichondrium in the adult

1)All 2) I 3) II 4) III

Assertion(A): Elastic cartilage exhibits high 367). degree of resillience Reason(R): Elastic cartilage is the only type of cartilage which contains elastic fibres.

1) Both A and R are correct R is the correct explanation of A

2) Both A and R are correct but R is not correct explanation of A 3) A is correct, but R is not correct

- 4) Both A and B are not correct
- 368) Statement (S): External ear lobe shows a high degree of resilience **Reason (R)**: External ear lobe contains elastic cartilage which has elastic fibres
- 369) Statement (S): External ear lobe shows flexibility and regains its shape after distortion. Reason (R): External ear lobe is made of hyaline cartilage.

FIBROUS CARTILAGE

LEVEL-I

- 370). Matirx has a dense network of coarse collagen fibres in
 - 1) elastic cartilage 2) fibrous cartilage

3) hyaline cartilage 4) calcified cartilage

- 371). Intervertebral discs are made-up of a cartilage called 2) fibrous cartilage
 - 1) nuclei pulposi
 - 4) hyaline cartilage 3) elastic cartilage
- 372). The strogest cartilage is without
 - 1) perichondrium 2) collagen fibres
 - 3) lacunae 4) chondrocytes
- 373). Gristle present in intervertebral discs is characterised by
 - 1) Presence of yellow and white fibres widely
 - 2) Absence of white fibres and perichondrium
 - 3) Absence of lacunae and blood vessels
 - 4) Absence of blood vessels, elastic fibres and

perichondrium

LEVEL-II

- 374). The following are the statements about fibrous cartilage I. It is an inelastic cartilage II. Its matrix consists of very large number of bundles of elastic fibres III. It is totally without blood capilaries and lacks perichondrium in the adult Which of the above are correct 2) I and II 1) I and III 3) II and III 4)All
- 375). Statement (S) : Fibrous cartilage is the stron gest and least flexible of all types of cartilage Reason (R): Fibrous cartilage consists of very large number of bundles of collagen fibres in the matrix but elastic fibres are absent

BONE

- Strongest of all connective tissues is bone.
- Bone tissue is highly vascular
- Cells of the bone found in lacunae within the matrix are osteocytes.

Types of Bones

- The cells of bone that synthesize the organic components of the matrix are osteoblasts.
- An osteoblast is gradually surrounded by newly formed matrix and becomes osteocyte.
- The cells of the bone that are involved in the resorption and remodelling of bone tissue are osteoclasts.
- Bones of the cranium are membrane bones or investing bones or dermal bones.
- Membrane bones are formed by intramembranous ossification of mesenchyme.
- Short bones and long bones are endochondral bones or cartilage bones or replacing bones.
- Endochondral bones are formed due to ossification within hyaline cartilage.
- Bones develop within tendons are sesamoid bones
 - E.g. for sesamoid bone is patella (knee-cap)
- The part of the long bone between two expanded ends (epiphyses) is diaphysis or shaft
- The region between diaphysis and epiphysis is metaphysis.

EAMCET-JUNIOR ZOOLOGY

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- Bones can grow in thickness only by **appositional growth.**
- Appositional growth of bone is resulting from the differentiation of **periosteal cells.**
- Short bones are carpals and tarsals
- Bones of cranium are **flat bones**
- Vertebrae are irregular bones
- Diaphysis of long bones is almost entirely composed of **compact bones**.
- Trabeculae (columns of bone) found in **spongy** or cancellous bone.
- Spaces between trabeculae are filled with **red bone marrow.**

Structure of compact bone

- Haversian system is present in compact bone of mammals.
- Compact bone is lined by **endosteum** on the internal surface and **periosteum** on the external surface.
- Each lacuna of bone enclose **one osteocyte**.
- Haversian canals communicate with the marrow cavity, the periosteum, and one another through transverse or oblique **volkmann's canals.**

Chemical composition of bone

- Dry weight of bone has 65% inorganic material and 35% of organic material.
- The major mineral of bone is **calcium phosphate.**
- Calcium phosphate of bone is present in the form of **hydroxyapatite crystals.**
- The major organic substance of the bone is **col**lagen.

BONE Types of Bones

LEVEL - I

- 376. Irregular bones are
 - 1) wrist and ankle bones 2) vertebrae 3) cranial bones 4) humerus
- 377. The swollen terminals of long bones are called
 1) diaphysis
 2) epiphysis
 3) occipital condyles
 4) shaft

378.	Red bone marrow is pro	esent in
	1) shaft of the bone	2) epiphysis
	3) diaphysis	4) compact bone
379.	Cells involved in the r	esorption and remodelling
	of bone tissue are	
	1) osteocytes	2) osteoblast
	3) osteoclasts	4) chondrocytes
380.	Appositition growths c	of cartilage results from the
	1) maturation of chon	docytes
	2) differentiration of p	erichondrial cells
	3) reactivation of chor	ndrocytes
	4) mitotic divisions of	chondrocytes
381.	Intramembranous ossi	fication of mesenchyme
	occurs in the formatio	n of
	1) investing bones	2) replacing bones
	3) sesamoid bones	4) cartilage bones
382.	Short bones and long	bones form good
	example for	
	1) investing bones	2) dermal bones
	3) Hyaline cartilage	4) calcified cartilage
383.	Patella (knee cap) for	m good example for the
	1) flat bone	2) short bone
	3) spongy bone	4) sesamoid bone
384.	Marrow cavity of the	bone is confined to the
	1) Diaphysis	2) Metaphysis
205	3) Epiphysis	4) Zygapophysis
385.	I he region between d	iaphysis and epiphysis of
	bone is	2) Matanhania
	1)Zygapopnysis	2) Nietaphysis
286	Donas con grow in thi	4) periosieum
560.	1) A prositional growth	h
	2) super positional growt	an
	2) super positional gro 3) interstitial growth	Jwui
	4) intramembranous o	ssification
387	Bones of cranium are	SSITICATION
2071	1) membranous bone	s and flat bones
	2) dermal bones and f	flat bones
	3) investing bones and	d irregular bones
	4) short bones and car	rtilage bones
388.	Appositional growth of	of bone resulting from the
	1) maturation of osteo	oblasts
	2) differentiation of pe	eriosteal cells
	3) reactivation of oste	eocytes
	4) inactivation of period	osteocytes
389.	Endochondral bones	are formed due to ossifi
	cation within the	
	1) hyaline cartilage	2) fibrous cartilage
	3) elastic cartilage	4) calcified cartilage
390.	Study of bone is calle	d
	1) chondrology	2) osteology
	3) haematology	4) palaeontology

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391.	Irregular cancellous bones are	
	1) ribs	2) vertebrae
	3) diaphysis	4) bones of cranium

- 392. Vertebrae of mammals are
 1) irregular bones without haemopoietic tissue
 2) flat bones without haemopoietic tissue
 3) irregular bones with haemopoietic tissue
 - 4) flat bones with haemopoietic tissue
- 393. Bones which are formed by membranous ossification of connective tissue of the dermis in skin are
 - 1) endochondral bones
 - 2) investing bones
 - 3) cartilage bones
 - 4) replacing bones
- 394. Flat bones among the following1) cranial bones2) vertebrae3) carpals4) radio-ulna

LEVEL-II

- 395. The following are the statements about Osseous tissue.
 - I. Bones formed from cartilage are replacing bones
 - II. Bones directly formed from mesenchyma are cartilage bones
 - III. Bones formed from tendons are called sesamoid bonesWhich of the above are correct1) I and II2) I and III

3) II and III 4) All

- 396. Assertion(S): Ends of vertebrae are consid ered as cancellous bones Reason (R): They have irregular matrix with
- irregular spaces filled with red bone marrow
 397. Statement (S): Membrane bones are also called as investing bones
 Reason(R): Membrane bones after their formation they sink deeper and form covering over the underlying Bones
- 398. Statement (S) : Bones does not grow in length in the adult

Reason(R): The epiphyseal plate disappears leaving epiphyseal line

399. Correct sequence of various regions in a thigh bone of mammals is

a) diaphysis b) epiphysis c) metaphysis 1) b - c - a - c - b 2) c - a - b - a - c 3) a - b - c - a - b 4) c - b - a - b - a

STRUCTURE OF COMPACT BONE LEVEL-I

400. Haversian systems are found in

periosteum
gristle
compact bone
diaphysis

401. Two osteons are interconnected by

volkmans canal
canaliculi
haversian canal
lacunae

- 402. Haversian canal is connected to lacunae through
 - 1) volkman's canals 2) marrow cavity
 - 3) osteoblasts 4) canaliculi
- 403. In a haversian system of bone the structures that run through the lamellae connect
 - 1) lacunae of one concentric ring only
 - 2) haversian canals of two osteons
 - 3) haversian canals and volkmans canals
 - 4) lacunae with one another and with the haversian canal
- 404 Diaphysis is the part of bone present between 1) two epiphyses
 - 2) periosteum and endosteum
 - 3) endosteum and marrow cavity
 - 4) epiphysis and marrow cavity
- 405. The matix of bone is not constituted by 1) osteoblasts
 - 2) concentria hono lar
 - 2) concentric bone lamellae3) osteocytes4)

4) perichondroblasts

- 406. Periosteum on the outer suface of bone is
 - 1) irregular fibrous connective tissue sheath
 - 2) regular fibrous connective tissue sheath
 - 3) reticular connective tissue
 - 4) yellow elastic connective tissue

LEVEL - II

407). Following are the statemeths about **Osseous tissue**

I. The structural unit of cancellous bone is osteon

II. Major portion of bone matrix in compact bone is calcium phosphate

III. Haversian canals of neighbouring haversian systems are connected by volkman's canals IV. Bones directly formed from dermis are

called endochondral bones

The correct	ct statements are
1) A 11	2) Land IV

1)1111	2) I ullu I (
3) II and III	4) III and IV

408). Statement (S) : The matrix of the bone is extremely hard with the great tensile and compressional strengths

Reason (R): The concentric bone lamellae with large number of collagen fibres constitute the matrix of the bone

409). **Statement (S) :** All compact bones are mostly non-haemopoietic in function.

Reason (R): Red bone marrow is haemopoietic tissue.

410). Arrange the following layers/ parts in the cross section of compact bone of mammals from outside to inside

a) interstitial lamellae b) periosteum

- c) endosteum
- d) inner circumferential lamellae
- e) outer circumferential lamellae
- 1) b -d a- c- e 2) c b- a- d- e

3) a - d- b- c - e 4) b- e- a- d - c

- 411). The following are the statements about Bone I. Volkman's canals are the transverse canals that connect Haversian canals
 II. Osseous tissue is non-vascular
 III. Bone forming cells are osteocytes.
 - The incorrect statements are
 - 1) I and II 2) I and III
 - 3) II and III 4) All
- 412). The following are the statements about bone I. The bone marrow cavity is surrounded by endosteum
 - II. Bone forming cells are called osteoblasts.III. Haversian and Volkman's canals are present in the boneWhich of the above are correct
 - 1) I and II 2) I and III
 - 3) II and III 4) All the above

CHEMICAL COMPOSITION OF BONE LEVEL - I

- 413) The major organic substance of the bone is1) collagen3) calcium carbonate4) hydroxyapatite
- 414) Complex salt Hydroxyapatite of bone is formed by
 - 1) Carbonates of calcium
 - 2) Phosphates of calcium
 - 3) Chondroitin 4 -sulphate
 - 4) Hyaluronic acid

Fluid Tissues Blood

- The total volume of blood in adult human being is about **5 to 6 litres.**
- In the centrifuged blood sample the bottom layer has RBC.
- In centrifuged blood sample the white or greyish layer immediately above the bottom layer is called **buffy coat.**
- Buffy coat consists of **leucocytes.**
- The percentage of total blood volume occupied by RBCs is called **haematocrit**.

Plasma

- Liquid matrix of the blood is **plasma**.
- Plasma is with 92% of water and 8% of solutes.
- The main plasma proteins of blood are **albumins**, **globulins**, **fibrinogen and prothrombin**.
- Most abundant plasma protein is **albumin**.
- The blood's colloidal osmotic pressure is due to **albumin.**
- Fall in the level of **albumin** in blood plsama results in accumulation of fluid in tissues called **oedema.**
- Antibodies are immunoglobulins and are γ globulins
- Proteins useful in blood clotting are fibrinogen and prothrombin
- pH of blood plasma 7.4

Formed Elements

- Production of blood cells from stem cells is termed as **haemopoiesis or haematopoiesis**.
- In the earliest stages of embryogenesis, blood cells arise from the **yolk sac mesoderm**.
- Temporary hematopoietic tissues in the later stages of embryogenesis are **liver and spleen**
- The primary site of haemopoiesis in the final stages of development after birth is red bone marrow.

RBC

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- Number of RBC per mm³ or µ L of blood is about 5 million in men and 4.5 million in women.
- Decreased number of erythrocytes is termed erythrocytopenia.
 - An increased number of erythrocytes is termed erythrocytosis or polycythemia.
- Mammalian erythrocytes are **enucleate and biconcave.**
 - The biconcave shape provides a large surface to - volume ratio, thus facilitating gas exchange.
- Nucleus and other organelles are lost during development and maturation of RBC.
- Life span of human erythrocytes is about **120**

days.

• Old RBCs are phagocytosed by macrophages in spleen, liver or red bone marrow.

WBC

- The number of leucocytes is roughly 6000 10,000 / μ L
- Movement of leucocytes into the connective tissue by diapedesis.
- Granulocytes are also called polymorphonuclear leucocytes
- Microscopic policemen of blood are neutrophils
- Neutrophils constitute about 62% of WBC
- Nuclear lobes in neutrophils are two to five.(usually three)
- In the cytoplasm of neutrophils **specific granules are more abundant than azurophilic granules, stained by neutral dyes.**
- Pus is a viscous fluid composed of **dead** neutrophils, bacteria and tissue fluid.
- Eosinophils constitute about 2.3% of WBC.
- Nucleus of eosinophils is **bilobed**.
- An increase in the number of eosinophils in blood is **eosinophilia**.
- WBC increase in number during allergic reactions and helminthic infections are **eosinophils**.
- Leucocytes which engulf antigen antbody complexes are **eosinophils**
- Basophils constitute about 0.4% of WBC.
- Nucleus of basophils is irregular lobed
- Specific granules are fewer and irregular in size and shape and stain with the basic dyes in basophils
- The cells of blood that supplement the functions of mast cells are basophils.
- WBC which do not have specific granules, but they contain azurophilic granules are **agranulocytes.**
- a granulocytes are lymphocytes and monocytes.
- Lymphocytes constitute 30% of WBC
- WBC with spherical nucleus and scanty

peripheral cytoplasm are lymphocytes.

- The leucocytes that play important role in immune reactions are lymphocytes.
- The leucocytes that live only few days are lymphocytes.
 - The only typeof leucocytes that return from the tissues back to the blood, after diapedesis are **lymphocytes.**
 - Monocytes constitute about 5.3% of WBC
 - The leucocytes with kidney shaped nucleus are monocytes.

Plateletes

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- Enucleated disk like cell fragments of blood are platelets (thrombocytes)
- Number of blood platelets is 200,000 to 400,000 per microliter of blood
- Blood platelets are formed by the fragmentation of giant megakaryocytes in the bone marrow.
 - Life span of platelets is 10 days

Lymph

- Extra cellular fluid (ECF) includes the interstitial fluid (tissue fluid) present in tissues and the blood plasma.
- Most of the plasma proteins cannot escape through the capillaries so that the concentration of proteins is greater in the plasma than in the interstitial fluid.
- ECF that flows through lymphatic system is called lymph.
- Lymph passes through lymph capillaries, lymphatic vessels and eventually enters thoracic (left lymphatic) duct and right lymphatic duct which drain into subclavian veins.
- Lymph differs from the blood plasma by the absence of RBCs.

FLUID TISSUES BLOOD

Plasma

LEVEL - I

415). The most abundant plasma protein is

1) fibrinogen	2) prothrombin
3) globulin	4) albumin

416)	pH of blood plasma is		
417)	1) 4.7 2) 5.6	3) 7.4	4) 8.2
417).	1) Osteology	ea 2) Chon	drology
	3) Haematology	4) Angie	logy
418)	Following serum prot	eins functio	nogy m as
+10 <i>j</i> .	antibodies		ni as
	1)Albumins	2)Globi	lins
	3) Prothrombins	4) Fibrir	logens
419).	Oedema occurs due	to	
-)	1)Accumulation of tis	ssue fluid ir	the tissue
	space due to decrease	e in plasma	proteins in
	capillaries	1	1
	2)Accumulation of tis	ssue fluid ir	the tissue
	spaces due to increas	e in plasma	proteins in
	capillaries		
	3) Accumulation of tis	ssue fluid ir	the tissue
	spaces due to increas	ed re-entry	of water into
	capillaries		
	4) Accumulation of th	e tissue flui	d in capillaries
	due to decrease of pro	oteins in tis	sue spaces
420).	Immunoglobulins are		
	1) α – globulins	$(2)\beta - gl$	obulins
	$3)\gamma$ – globulins	4) d – g	lobulins
	EL-II		
421).	Statement (S) : Deci	ease in pla	sma proteins
	causes swelling of tis	sues called	oedema.
	Reason (R): Decrea	ise in plasn	ha proteins
	tissue fluid in to blood	l conillorico	ater from the
		TEMEN	TC
	FURMEDEI		15
	RB	C	
LEV	EL-I		
422).	An increase in RBC nu	mber is	
	1) polycythemia	2) erythro	cytopenia
	3) leukemia	4) anaemi	a
423).	The percentage of tot	al blood vo	lume
	occupied by RBC is a	called	
	1) buffycoat	2) haem	atocrit
42.4)	3) haemostat	4) erythi	rocrit
424).	If a sample of blood is	s centrifuge	ed in a glass
	tube the layers formed	from the b	ottom to top
	1) huffr aget harmot	o omit and m	agmaa
	2) plasma buffy coat	ocrit and p	lasilla
	2) plasma, bully coal 3) haemotocrit buffy	coat and n	lasma
	4) buffy cost plasma	and hasma	asilia
425)	Buffycoat of a health	and natilla	shides
r23J.	1) 10% of blood volu	me	14405

- 2) 100% of blood volume
- 3) 1% of blood volume
- 4) 5 % of blood volume

426). In the earliest stages of embryogenesis, blood cells arise from the 1) liver 2) spleen 3) bone marrow 4) yolk sac mesoderm 427). Advantage in the biconcave shape of RBC is that it provides 1) large surface to volume ratio 2) large volume to pressure ratio 3) large size to surface ratio 4) large size to volume ratio 428). Plasma memberane of RBC is permeable to 2) HCO,-1) O_2 and CO_2 3) Cl⁻ 4) All the above 429). RBC of mammals are produced in the following organs during embryonic development 1) liver and bone marrow 2) spleen and bone marrow 3) liver and spleen 4) liver, spleen and bone marrow 430). The destruction of RBC is called 1) haemostasis 2) haemolysis 3) homeostasis 4) erythrolysis 431). Vitamins required fot the maturation of RBC 1) pyridoxine and cyanacobalamin 2) folic acid and biotin 3) cvanacobalamin and folacin 4) pantothenic acid and riboflavin Which of the following haemopoietic organ 432). does not produce leucocytes in adults 1) spleen 2) liver 3) lymph nodes 4) bone marrow LEVEL-II 433). Statement (S): Reticulocytes cells are present in haemopoietic tissues. **Reason (R):** Reticular cells support frame work of hemopoitic tissue 434). Arrange the following haemopoitic organs/ tissues in a correct order from the earliest stage of embryonic development to the adult stage a) liver and spleen b) bone marrow c) yolk sac mesoderm 1) a -c - b 2) c - a- b 3) c - b- a 4) b- c- a WBC

LEVEL - I

435). Leucocytes which in	ncrease in number during
helminthic infection	ns and allergic reaction are
1) lymphocytes	2) eosinophils
3) neutrophils	4) monocytes

436).	Polymorphic blood cel	ls are
	1) WBC	2) RBC
	3) Thrombocytes	4) Platelets
437).	Least number of WBC	
	1) eosinophils	2) neutrophils
	3) monocytes	4) basophils
438).	Vasodilators are secret	ed by
	1) monocytes	2) neutrophils
	3) basophils	
	4) all types of granuloc	ytes
439).	The microscopic police	e men are
	1) lymphocytes	2) neutrophils
	3) basophils	4) monocytes
440).	Among WBC, spherica	l cells with spherical
	nucleus and scanty peri	pheral cytoplasm are the
	1) lymphocytes	2) monocytes
	3) basophils	4) eosinophils
441).	Macrophages and histi	ocytes are modified
	1) basophils	2) neutrophils
	3) megakaryocytic cell	s 4) monocytes
442).	Movement of WBC t	hrough the walls of the
	capillaries is called	
	1) leucocytosis	2) diapedesis
	3) leucopedesis	4) haemopedesis
443).	Abnormal increase in	the number of leucocytes
	is called	\sim 1 d
	I) leucopaenia	2) polycythemia
4.4.4)	3) leucocytosis	4) leucocytopaenia
444).	Non phagocytic cells	are
	1) histiocytes	2) basophils
445)	3) acidophils	4) neutrophils
445).	Basophils are compared	rable to 2 where the all α
	2) misuocytes	2) mast cens
116)	3) plasma cells	4) lymphocytes
440).	Inucleus of the larges	t and most motile
	1) 3 to 5 lobed	2) raniformed
	$\frac{1}{3} \text{ oval}$	4) bilobed
447)	Clinical indication of	arasitic infection is
++ <i>)</i> .	1) leukemia	2) thrombocythemia
	3) polycythemia	4) eosinonhilia
448)	Granules present in th	e granulocytes are
тт о).	1) volutin granules ni	ssl granules
	2) chromophilic gran	iles volutin granules
	3) specific granules a	zurophilic granules
	4) haemozoin granule	s nissi's granules
449)	In the cytoplasm smal	l specific granules more
,.	abundant than azurophi	lic granules in
	1) eosinophils 2) ner	utrophils
	3) basophils 4) lar	ge granular lymphocytes
	/ 1)	

450).	The specific granules are fewer and irregular in
	size and shape in
	1) Neutrophils 2) eosinophils
	3) basophils 4) large granular lymphocytes
451).	Dead cells of the pus are
- /	1) Neutrophils 2) basophils
	3) eosinophils 4) large granular lymphocytes
452).	Active phagocytes of the blood are
,	1) basophils 2) eosinophils
	3) monocytes 4) neutrophils
453).	Nucleus of the microscopic policeman of
	blood has
	1) irregular lobes 2) Two - five lobes
	3) no lobes 4) one lobe
454).	The only type of leucocytes that return from
	the tissues back to blood after diapedesis are
	1) basophils 2) neutrophils
	3) lymphocytes 4) monocytes
455).	Fibrinolysin which dissolves old blood clots in
	the circulating blood is produced by
	1) Leucocytes in which cytoplasmic granules
	stain with eosin
	2) Leucocytes which have a bean shaped
	nucleus
	3) The structures that are formed from mega
	A) Leven extension and collect microscopic
	a) Leucocytes which are called microscopic
IFVI	
456)	Statement (S) · Granulocytes are also called
150).	polymorphonuclear leucocytes
	Reason (R) : Their nuclei occur in different
	shapes
457).	Statement (S) : Heparin produced by basophils
,	is an anticoagulant.
	Reason (R): Heparin is also secreted by mast
	cells
458)	Statement (S): Acidophils increase in number
	during infections
	Reason (R): Lymphocytes are phagocytic in
	function.
459).	Statement (S) : Eosinophilia occurs at the
	time of infection or allergy
	Reason (R) : Eosinophils produce fibrinolysin
	that dissolve old blood clots
460).	Statement (S): Basophils of blood are
	comparable to mast cells of connective tissue
	Keason (K) : In injured tissues basophils
4(1)	secrete neparin, nistamine and bradykinin
401).	Statement (S): Action and a size of the si
	D ecore (D) · Economia contribution for the second
	Keason (K) : Eosinophils produce fibrinol ysin.

462).	Statement (S) : Neut	rophils are called	46
	microscopic policeme	en.	
	Reason (R): During	infection neutrophils	
	increase in number an	d engulf becteria by the	
	process of phagocytos	sis and fight against	
	infection.		
463).	Statement (S) : Mon	ocytes are described as	
	internal scavangers.		47
	Reason(R): Monocy	ytes removed dead cells	
	and toxic substances l	oy phagocytosis	
464).	Arrange the following	in descending order	
•	according to their per	centage in total count of	
	leucocytes in blood		
	A. Acidophils B. Ne	utrophils	
	C. Lymphocytes	D. Monocytes	
	E. Basophils		
	1) BCDAE	2) DCABE	
	3) EADCB	4) BDCAE	
465).	The correct sequence o	f WBC in relation to	47
	percentage of their occu	arrence is	
	1).Neutrophils - Basop	hils - Monocytes -	
	eosinophils-Lymph	ocytes	
	2).Neutrophils-Lymph	ocytes- Monocytes	
	- Eosinophils - Baso	phils	
	3).Basophils - lymphoc	ytes-Monocytes-	
	Neutrophils-eosino	phils	
	4). Eosinophils-Lympho	ocytes -Basophils	
	- Neutrophils-Mono	cytes	47
466).	Arrange the following	formed elements in a	
	descending order based	l on their number	
	a) thrombocytes	b) neutrophils	
	c) erythrocytes	d) eosinophils	
	e) basophils	f) lymphocytes	
	g) monocytes		
	1) c - a- b- f- g- d- e		
	2) b - d- c- a - g- e- t	f	
	3) c - a- b - e- d- f- g	5	
	4) d - a- b- e- c- g- f		
467).	Arrange the following	in descending order	
	according to their per	centages in the total	
	leucocyte count of the	eblood	
	A. Basophils	B. Neutrophils	
	C. Monocytes	D. Lymphocytes	
	E. Acidophils		
	1)A-E-C-D-B	2) B-D-C-E-A	
	3) D-B-C-A-E	4) A-D-B-C-E	47
468).	Identity the features of	t microscopic policemen	
	A. Nucleus is entire, r	non lobed	
	B. Most abundant W	BC	
	C. Stamable with neu	tral dyes	
	D. They contain histar	nine	
	The correct combination	ion is	
	1) A and B	2) B and C	
	3) C and D	4) B and D	

469).	Identify the features	of internal scavengers
	I. The largest agranu	llocytes
	II. Stained with acid	ic dyes
	III. Most abundant a	among WBC
	IV. Reniform nucleus	S
	1) I and IV	2) II and III
	3) I and II	4) III and IV
470).	The following are th	e statements about blood
	I. The abundant bloc	od cells in granulocytes are
	Neutrophils	
	II. Basophils are pre	sent in very less number in
	the blood	
	III. Acidophils are c	onsidered as internal
	scavangers	
	IV. The pH of blood	l plasma is 7.4
	The correct stateme	nts are
	1) II and III	2) II and IV
	3) III and IV	4) I. II and IV
471).	Identify a wrong stat	ement from the following
• • • • •	1 Antigen and antib	ody complexes formed in
	the blood are remo	oved by neutronhils
	2 Monocytes are th	e largest WBC with
	reniform nucleus	e largest where with
	3 Lymphocytes are	with spherical nucleus and
	5. Lymphocytes are	with spherical fideleds and
	4 Emailing cytopiasi	$\frac{11}{2}$
	4. Erythrocytes cons	stitute about 90% of the
472)	total blood cells	
+/2).	Match the following	I • 4 II
	List -I	
	A. Monocytes	1. Secretes histamines
		and bradykinins
	B. Basophils	II. Most mobile and
		phagocytic
		agranulocytes
	C. Lymphocytes	III. Produce
		antibodies
	D. Neutrophils	IV. Phagocytic
		granulocytes
		V. Engulf antigen
		antibody complexes
	A B	C D
	1) IV II	III I
	2) II III	V IV
	3) IV I	III II
	4) II I	III IV
473).	Match the following	
,	List-I	List-II
	A. Lymphocytes	I. Microscopic
	5 1 5	policemen
	B. Monocvtes	II. Immunity
	C.Neutrophils	III.Internal scavangers
	D. Eosinophils	IV. Removal of antigen
	D. Eosinophils	IV. Removal of antigen and antibody
	D. Eosinophils	IV. Removal of antigen and antibody complexes

	The co	orrect m	natch is		
		А	В	С	D
	1)	IV	Ι	III	Π
	2)	Π	Ш	Ι	IV
	3)	Π	Ι	IV	III
	4)	III	Π	Ι	IV
474).	Match	the foll	owing		
,	Lis	t-I	0	List	-II
	A. Mo	nocyte	s	I. Ant	ibodies
	B. Bas	ophils		II. Hi	stiocytes
	C. Blo	od plat	elets	III. M	[ast cells
	D. B-I	ympho	cytes	IV. Tł	rombinase
	The co	orrect m	atch is		
		Α	В	С	D
	1)	Ш	П	ĪV	Ī
	$\frac{2}{2}$	П	Ш	IV	T
	3)	V	IV	Ш	П
	4)	ĪV	V	П	I
475).	Match	the foll	owing		-
.,.).	List -I	110 1011	owing		List-II
	A Ant	່າດຈອກໄ	ant	I Bra	ndvkinin
	R Vas	odilato	r	II B-	I vmphocyte
	C Fib	inolvsi	n	ШН	enarin
	D Ant	ibodies		IV Fe	sinonhils
	D.7 III	1000105		V Ma	onocyte
	The co	orrect m	natch is	v. 1010	Shoeyte
	The ec	A	B	С	D
	1)	V	I	п	IV
	2)	ш	T	IV	П
	3)	I	Ш	IV	N V
	4)	ш	П	IV	Ţ
476)	Match	the foll	owing	1,	1
170).	I jet_I				List-II
	A Thr	ombok	inase	I Neu	trophils
	R Fibr	inolysii	n	II Rlc	odplatelets
	CLar	norysn rest Wl	BC	III Fe	sinonhils
	D Abi	indant]	blood	III. LA IV M	onocytes
	cells	andunt	01000	V Ers	vthrocytes
	The co	orrect m	natch is	·· L1	, un ocytes
	The ec	A	B	С	D
	1)	Ш	П	IV	I
	2)	П	Ш	IV	V
	3)	Ш	П	V	ĪV
	4)	IV	V	п	Ш
477 St	., udv the	follow	ing		
FOI	RMEDEI	LEMEN	IS NUCI	EUS	FUNCTION
i) 1	neutrop	hils	many n	uclear	phagocytic
,	I		lobes		
ii) (eosinop	hils	3-5 loł	bed	phagocytic
iii) 1	basophi	ls	irregula	r lobes	inflammation
iv)	monocy	tes	kidney	shaped	phagocytic
whi	ich of th	e above	e are cor	rect	

	1) i,ii,iii and iv	2) i, iii and iv only	
	3) ii, iii and iv only	4) ii and iii only	
	PLATEI	LETES	
	LEVE	L-I	
478)	Some of the blood clot	tting factors are released	
	by		
	1).Eosinophils	2).Platelets	
	3).Monocytes	4).Basophils	
479)	Which of the following	g are not considered as	
	cells in mammals		
	1).WBC	2).RBC	
10.0	3).Blood platelets	4).Megakaryocytes	
480)	Enucleated disc like c	cell fragments of the	
	blood are		
	1) RBC	2) WBC	
	3) Blood platelets	4) Megakaryocytes	
481)	Life span of blood pl	atelets is	
	1) 120 days	2) 30 days	
	3) 350 days	4) 10 days	
482)	Physical adaptation in	n people who live in high	
	altitudes is		
	1) erythropenia	2) polycythemia	
	3) eosinophilia	4) anaemia	
483)	Megakaryocytes forr	n	
	1) Neutrophils	2) Monocytes	
	3) Blood platelets	4) Lymphocytes	
484)	Following factor star	rts the process of blood	
	coagulation		
	1) Thrombin	2) Prothrombin	
405)	3) Thrombokinase	4) Fibrinogen	
485)	Stopping of bleeding	1s called	
	1) Homeostasis	2) Osmorgulation	
тех	5) Hemostasis	4) Haemophilis	
	(EL - 11		
486)	Statement (S) : Concentration of plasma		
	proteins is greater in	the plasma than in the	
	interstitial fluid		
	Reason (R) : Most of	of plasma proteins cannot	
	escape through the ca	apillaries because of their	
	large size		

LYMPH

LEVEL-I

487)	The middle mar	h between blood and tissue is
	1) Plasma	2) ECF

1)1 1451114	_) L ei
3) Lymph	4) Blood cells

LEVEL - II

- 488) Statement (S) : ECF acts as the actual middle man between the blood and the tissues. Reason (R) : ECF is in contact with cells and supplies them with CO_2 and collects O_2 and nutrients from them.
- 489). Study the following statements and choose the correct one

I. Plasma proteins are responsible for osmotic pressure of plasma

II. Blockage of alternate route for flow of ECF into blood, decreases the speed of flow of blood

- III. The matrix of gristle is avascular
- IV. Osseous tissue is vascular

1)All 2) Only II

3) Only IV 4) Only III

- 490). Read the following and select the correct statements
 - i) most of the fluid of the blood is filtered from the capillaries near their arteriolar ends
 ii) About 85% of fluid filtered out is returned to the capillaries near their arteriolar on do have

to the capillaries near their venular ends by osmosis

- iii) Extracellular fluid so called lymph finally enter the venous system by subclavian veins
- All are correct
 only i and ii correct
 only i and iii correct

Muscular Tissues

Skeletal muscle

- Muscle cells are **mesodermal origin**
- Muscles derived from ectoderm are **iris muscles in the eye**.
- Muscle spindles of skeleton muscles and Golgi tendon organs detect tensional differences and monitor muscle contraction
- Muscles usually attached to the bones occurs in the diaphragm, tongue, pharynx, and the begining of oesophagus are skeletal muscles.
- Skeletal muscle are striated and voluntary.
- Each skeletal muscle fibre is surrounded by a delicate layer called endomysium.
- A bundle of muscle fibres (fascicle) is surrounded by a dense connective tissue layer called perimysium.

- A dense irregular connective tissue layer surrounding the whole muscle is called epimysium.
- Muscle attach to the bones by chord like tendon or sheetlike aponeurosis.
- Tendon, aponeurosis are formed by extensions of endomysium, perimysium, epimysium.
- The site of attachment of tendon to a fixed bone is called the origin of muscle
- The site of attachement of tendon to a movable bone is called the insertion of muscle
- Muscle fibre of skeletal muscle is a long, cylindrical, multinucleated cell.
- Each fibre is formed by the fusion of emryonic mononucleated myoblasts.
- Skeletal muscle can undergo limited regeneration due to satellite cells.
- Satellite cells are inactive myoblasts but cells become activated, proliferated and fuse to form new skeletal muscle fibres.

Skeletal muscle

LEVEL - I

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491). Connective tissue sheath enveloping the muscle is

	1) epimysium	2) endomysium
	3) perimysium	4) sarcolemma
492).	Tendons are formed by	
	1) epimysium	2) endomysium
	3) perimysium	4) all the above
493).	The site of attachment of	of tendon to the

- 493). The site of attachment of tendon to the immovable bone is1) origin2) insertion
 - 3) epiphysis 4) diaphysis
- 494). The phosphogen in striped muscle is 1) Creatine phosphate
 - 2) Arginine phosphate
 - 3) Calcium phosphate
 - 4) Adenosine Tri Phosphate
- 495). Striped muscles under go fatigue because1) they contract slowly
 - 2) contraction is very quick
 - 3) they have dark and light bands.
 - 4) in dark bands contract more
- 496). Encapsulated proprioceptor that detect tensional differences and monitor muscle contraction of skeletal muscles are
 - 1) stretch receptors 2) muscle spindles
 - 3) golgi tendon organs 4) tango receptors

497).	Golgi tendon organs o	of tendons are the		
,	1) tango receptors	2) mechanoreceptors		
	3) encapsulated proprioceptors			
	4) stem cells of tendons			
498).	A sheet like structure	that serves to attach the		
	muscle to bone and oth	er tissues is		
	1) tendon	2) ligament		
	3) aponeurosis	4) insertion		
499).	Satellite cells of skele	tal muscle are located in		
,	the			
	1) basal lamina of end	omysium		
	2) reticular lamina of p	erimysium		
	3) basal lamina of peri	mysium and endomysium		
	4) reticular lamina of e	pimysium		
500).	Voluntary striped mus	cle cells are		
	1) Spindle shaped wit	h tapering ends		
	2) Long and cylindrica	al with blunt ends		
	3) Short and cylindric	al with truncated ends		
501)	The site of attachmen	t of tendon to a movable		
501).	bone is called			
	1) Insertion of the mu	Iscle		
	2) Origin of the muscl	e		
	3) Intrinsic muscle			
	4) Synapse			
502).	Regeneration power is	s very limited for		
	1) Cardiac muscle			
	2) Smooth involuntary	muscle		
	4) Striped involuntary	muscles		
503)	Following structures i	n musices are capable of		
505).	receiving and conduct	ing electric impulses		
	1) Sarcosome	2) Myofibrils		
	3) Sarcoplasmic reticu	ılum 4) Cisternae		
LEVI	EL-II			
504).	Statement (S) : Strip	ed muscle is also called		
	skeletal muscle			
	Reason(R): It surrou	nds the skeletal structure		
505).	Arrange the following	a layers of muscle in a		
correct sequence from out side to the inside				
	a) epimysium b) end	lomysium c)perimysium		
	d) sarcoelmma			
	1) a - c- d- b	2) b- d- c- a		
	3) a - c- b - d	4) c- a- b- d		
506).	Arrange the following	parts of musculoskeletal		
	system in a correct orde	er		
	a) movable bone	b) insertion		
	c) fixed bone	d) origin		
	1) c - d- b - a	2) b - d- a- c		

507).	Following are structures seen in the muscle		
	a. myofilaments	b. myofibres	
	c. Myofibrils	d. Fasciculus	
	1) c-d-a-b	2) d-a-c-b	
	3) d-b-c-a	4) c-a-b-d	
508).	Read the following stat	tements regarding	
	muscles		
	I. Skeletal muscles show limited power of		
	regeneration		
	II. Striped and volunta	ry muscles are richly	
	vascular and are syncy	itial	
	III. Skeletal muscles a	re richly vasular and are	
	fatigue quickly	-	
	Which of the above statements are correct		
	1) Only I and II	2) Only II and III	
	3) Only I and III	4) All are correct	

Visceral muscle

· · · · · · · · · · · · · · · · · · ·

- Muscles located on the walls of visceral organs such as blood vessels, trachea, bronchi, stomach, intestine, urinary, bladder, etc.
- Iris and ciliary body of eye and arrector pili muscles of dermis are smooth muscle.
- Smooth muscle cells are fusiform.
- When smooth muscle contracts the nucleus has the apperance of a corkscrew.
- Thick and thin myofilaments are not regularly arranged hence smooth muscle fibres are unstriated.
- Skeletal muscles cells are arranged in bundles where as smooth muscles occurs in large sheets.
- Smooth muscle cells may remain contracted for long period without fatigue.
- Contraction of skeletal muscle is regulated by somatic nervous system where as smooth muscles is by autonomic nervous system.
- The muscle which have greater powers of regeneration are smooth muscles.
- New smooth muscle fibres can arise from stem cells called pericytes.
- Certain smooth muscle fibres, which can divide can be seen in uterus .

3) c - a- b - d

4) d -c - a- b

VISCERAL MUSCLE

509).	The muscles in which A	ctin and myosin
	filaments are arranged i	irregularly
	1) cardiac muscles	2) striped muscles
	3) smooth muscles	4) biceps muscles
510).	Arrector pilli muscles a	re
ŕ	1) unstriped, involuntar	y2) striped, voluntary
	3) unstriped, voluntary	4) striped, involuntary
511).	Non visceral organ whi	ch consists of Visceral
	muscle is	
	1) iris	2) tongue
	3) stomach	4) heart
512).	Tissue repairing cells of	smooth muscular tissue
	are	
	1) satellite cells	2) pericytes
	3) myeloblasts	4) intercalated discs
513).	When smooth muscle	es contract the nucleus has
	the apperence	
	1) wave	2) worm
	3) fusiform	4) cork screw
514)	Smooth muscle that c	an divide are found in
011)	1) uterus	2) out
	3) ureters	4) enididymis
515)	Identify the smooth m	uscles not present in the
515).	visceral organs from f	he following
	1) muscles present in	the reting of eve
	2) muscles present in	the retina of skin
	3) muscles present in	the wall of urinary
	bladder	and want of armany
	4) muscles of tongue	
516).	Damaged smooth mu	scles can be regenerated
)	by the activity of	8
	1) chondrocvtes	2) pericytes
	3) myeloblasts	4) reticulocytes
517).	Considerable power of	of regeneration is seen in
/	1) smooth muscles	0
	2) all involuntary mus	cles
	3) striped involuntary	muscles
	4) striped voluntary m	nuscles
518).	Blood supply is not al	oundant in
,	1) smooth muscles	2) striped muscles
	3) cardiac muscles	4) skeletal muscles
1 13 7		
LEVI	EL-11	
510)	Statement (S) · Smo	oth muscle do not

scle do not Statement (S) exhibit striations Reason (R): Actin and myosin filaments are not regulary arranged

520). Statement (S): Contractions and relaxations of sphincters are under the conscious control of the animal

Reason (R): Sphincters are made of volun tary muscles.

Cardiac muscle

- Cardiac muscles are striated and involuntary
- Cardiac muscles fibres are branched forming a network, present in the wall of heart.
- A cardiac muscle fibre is a short cylindrical cell with single centrally located nucleus (rarely two nuclei)
- Mitochondira are more numerous in cardiac muscle than skeletal muscle fibre.
- Cardiac muscle fibre are joined end to end by transverse thickenings of plasma membrane called intercalated discs.
- Intercalated discs contain gap junctions and desmosomes.
- Ionic continuity between adjacent cells of cardiac muscle are due to gap junctions.
- Cardiac muscle acts as a functional syncytium due to gap junctions.
- Contraction of cardiac muscles is spontaneous, involuntary, vigorous, and rhythmic.
- Pace maker of heart formed by cardiac muscles.
- Function of pace makers is initiation of action potentials.
- Rhythm of cardiac muscle can be modified by autonomic nervous system and hormones like epinephrine.
- Muscles which have almost no regenerative capacity in adults are cardiac muscles.

CARDIAC MUSCLE

LEVEL-I

521). Cardiac muslce fibres are joined end to end by transverse thickenings of plasma membrane are called

1) intercalated discs	2) intervertebral discs
3) gap junctions	4) desmosomes

522).	Short, cylindrical usually uninucleated muscle	53
	1) striated voluntary 2) striated involuntary	
	3) unstriated involuntary	53
	4) unstriated voluntary	5.
523)	The characteristic feature of the muscle which	
525).	has almost no regenerative capacity in adults	
	1) intercalated discs	
	2) uninucleated condition	
	3) striped myofibrils	
	4) corkscrew shaped nucleus	т
524)	The muscles which forms functional syncytium	
524).	are	5:
	1) striped muscle 2) unstriped muscle	
	3) cardiac muscle 4) only visceral muscle	
525)	The rate of contractions generated in Heart	_
525).	muscles are under the control of	5
	1) SA Node 2) AV node	
	3) Autonomous pervous system	
	1) Designed nervous system	
526	Which of the following of the intercolated discs	
520.	provide ionic continuity between adjacent cells	
	of cardiac muscle	
	1) tight junctions 2) desmosomes	
	3) gap junctions (1) gated channels	
527)	The functional significance of intercalated discs	_
527).	in cardiac muscle is	53
	1) they generate the rhythm	
	2) they conduct the cardiac impulse	
	2) they stop stimulus	
	A) they activate the cells	
528)	Intercalated discs are present	
526).	1) between two smooth muscular cells	
	2) between two cells of strined muscles	
	3) at regular intervals of cardiac muscles	
	4) on either ends of bones	_
529)	Cardiac muscles resemble the striated muscles	5:
527).	in having	
	1) distinct darker irregular transverse bands	
	occuring at regular intervals	
	2) structural synextium	
	3) arrangement of contractile proteins in	
	alternate dark and light bands	
	4) voluntary action	
530)	Striped involuntary muscles occurs in	_
220).	1) jris of eve 2) tongue	5.
	3) at the base of great blood vessels	
	4) limbs	
531)	Shorter myocytes with truncated ends are	
<i></i>	present in	
	1) visceral muscles 2) skeletal muscles	
	3) cardiac muscles 4) voluntary muscles	
	i) to minute interest of the second	

32).	Cardiac muscle	
	1) fatigue slowly 2) does not fatigue	
	3) fatigue quickly 4) fatigue continuously	I
33).	The rate of rhythmic contraction of heart is	
	regulated by	
	1) pace maker	
	2) central nervous system	
	3) automic nervous system only	
	4) autonomic nervous system and some	
	hormones	
Jeve	el - II	
34).	Assertion(A): Guvton considered the cardiac	2
-)	muscle fibre as a functional syncytium	
	Reason (R): In cardiac muscles the	
	contractions are initiated by a pace maker	
35).	Identify a correct statement from the following	F
)	regarding cardiac muscles fibres	,
	I. Pericytes are useful to repair damaged	
	cardiac muscle fibres	
	II. Intercalated discs are present	
	III. Innervated by nerves from central nervous	5
	system	
	IV. Actin and Myosin are irregularly arranged	
	1) II only 2) II and IV	
	3) I and III 4) I and IV	
36).	Read the following statements	
00).	I. Cardiac muscles contract more quickly than	1
	the voluntary muscles	
	II. Without any exception, smooth muscles are	2
	confined to visceral organs	
	III. Smooth muscles are present in sphincters	
	IV. Cardiac muscle fibres are branched	
	The correct combination	
	1) I and III 2) I.II and IV	
	3) III and IV 4) II and IV	
37).	Which of the following are true related	
)	to muscles	
	i) Muscles do not expand	
	ii) Fully developed muscle cells do not	
	divide	
	iii) Iris muscle is originated from	
	ectoderm	
	1) i, ii 2) i, iii	
	3) ii, iii 4) i,ii,iii	
38).	Contractile tissues have the following features	:
)	D Mesodermal in origin	
	I) They contain stratch recentors	
	II) They contain succentreceptors	
	III) Knythmic contractions are seen in them	
	IV) They do not fatigue during the life of the	
	anımal	

Which of the above are characteristic of sphincters ? 1) All the four 2) Only I, II and III 3) Only I, II, and IV

4) Only I, III, and IV

NERVOUS TISSUES

- Nervous tissue derived from ectoderm
- Function of nervous tissue is react to stimuli by propagation of action potential.
- Cells of nervous tissue that can undergo mitosis are glial cells
- Nervous tissue is composed of neurons (nerve cells) and supporting cells called glial cells

Components of Nervous System

Neuron:

- Structural and functional unit of nervous tissue is neuron.
- Cell body of neuron is also called perikaryon or soma or cyton
- Perikaryon has nucleus and cytoplasm that contains nissl bodies.
- Nissl bodies are formed of RER and ribosomes.
- Occasionally pigments present in the cytoplasm of cell body are lipofuscin.
- Short branches arise from cell body of neurons are dendrites
- dendrites conduct the impulse to the cell body.
- Single long cylindrical process arise from the cyton is axon.
- Axon originates from the short cone-shaped region of perikaryon called the axon hillock.
- Plasma numberane of axon is called axolemma and cytoplasm is called axoplasm.
- Axon conducts nerve impulses away from cell body to other nerve cells, and effectors.
- The axon terminates on other neurons or effectors by small branches called the terminal arborization.
- The small branches of axon end in small swellings called terminal boutons.

- A region formed by an axon terminal on the surface of dendrite of another nerve cell is synapse.
- Synaptic vesicles present in presynaptic terminal and contain neurotransmitters and numerous mitochondria.
- Most synapses transmit information to the next neuron by releasing chemical neurotransmitters.
- Nerve tissue has only a very small amount of extracellular matrix.

Components of Nervous System Neuron: LEVEL - I

- 539). The cells of nervous tissue that can undergo mitosis are
 1) neurons
 2) satillite cells
 3) pericytes
 4) glial cells
- 540). The axon teminates on other meurons or effectors by small branches called1) terminal boutons
 - 2) terminal arborization
 - 3) dendrites 4) axon hillock
- 541). An interneuron is present between
 1) axon of efferent neuron and dendrite of afferent neuron
 2) group of efferent neuron
 - 2) axon of afferent neuron and dendrite of efferent neuron
 - 3) motor neuron and effector organ
 - 4) collateral of motor neuron and dendrite of sensory neuron
- 542). Sarcolemma resembles axolemma in 1) presence of myelin sheath
 - 2) presence of nodes of Ranvier
 - 3) conduction of impulse
 - 4) presence of collateral branches
- 543). Nissil bodies present in the cytoplasm of cyton are rich in

1) centrioles	2) golgi bodies
3) ribosomes	4) lysosomes

- 544). The part of the perikaryon from which axon arises is known as 1) nodes of Ranvier
 - 2) collateral axon
 - 3) soma 4) axon hillock
- 545). Vascular loose connective tissue sheath round the axon is
 - 1) axolemma 2) perineurium
 - 3) epineurium 4) endoneurium
- 546). Neurotrasmitter stimulates 1) presynaptic membrane of dendrite

	2) post synaptic membrane of axon						
	3) post synaptic membrane of dendrites						
	4) pre synaptic membrane of axon						
LEVI	EL - II						
547).	Statement (S)	: Schwa	ann shea	th prevents the			
		mover	nent of]	Na^+ and K^+ ions			
	in and out of axon						
	Reason (R) :	Schwar	nn sheat	h is composed			
		ofonly	proteins	3			
548).	Arrange follow	ving fron	n inner to	o outer of the			
	region in betw	een the t	wo succ	essive nodes of			
	Ranvier in a m	yelinated	neuron				
	A. Myelin shea	ath	B. Neu	rilemma			
	C. Endoneuriu	m	D. Axo	lemma			
	I) DABC	2) DBC					
540)	3) DCAB	(4) DA(СВ СВ	11			
549).	Arrange the fo	llowingp	Darts of f	herve cells			
	in correct ord	er accor	ang to t	ine pathway of			
	A A yon	P Cut	212	C Symonse			
	D Dendrites o	D. Cyu fothern	ouron	C. Synapse			
	E Avon termin	nole nale	curon				
	1) BEACD	2) BAF	FCD				
	3) DEACB	4) DCF	EAB				
550).	Arrange the fo	llowing i	n a sequ	ence according			
	to the direction	nofflow	of impu	lse across the			
	synapse.		1				
	A. Post synapa	atic mem	brane				
	B. Synaptic cle	eft					
	C. Pre-synapt	ic memb	rane				
	D. Synaptic K	nob					
	1)D-C-B-A		2) C-D	9-В-А			
	3) A-B-C-D		4) A-B	-C-D			
551).	Arrange the fo	llowingi	n a sequ	ence according			
	to the nerve im	pulse tra	nsimissi	on in a neuron			
	A. Telodendrit	e	B. Den	drite			
	C. Perikaryon		D. Axo	n NDA			
	1) C-D-A-B		2) B-C	Z-D-A			
552)	3) A-D-C-B	11	4) D-C	л-B-A			
<i>332)</i> .	Arrange the lo	llowing i lo of thou	n a sequ	ence from			
	neuron		axon or	a myennateu			
	A Avolemma		R Avo	nlasm			
	C Myelin shee	ath	D. AAU D. Neu	rilemma			
	1) D-C-A-B	****	2) R-A	-C-D			
	3) A-B-D-C		4) B-A	-D-C			
553).	Arrange the fo	llowing	parts of a	a neuron from			
000).	anterior end to	posterio	or end in	a sequence			
	A. Dendrite	1	B. Axo	n hillock			
	C. Axon termin	nals	D.Axo	n			
	1) C-D-B-A		2) C-D	9-В-А			
	3) A-B-D-C		4) A-D	9-В-С			

554)	Arrange the following	in a sequence fro	m
	outside to inside of a ne	erve	
	A. Endoneurium	B. Perineurium	
	C. Fasciculus	D. Epineurium	
	1) D-B-C-A	2) D-C-B-A	
	3) A-C-B-D	4) A-B-C-D	
555)	Identify the correct stat	tements	
	I. Unmyelinated neuro	ns are not seen ir	ı
	peripheral nervous syst	em	
	II. In autonomous nerv	ous system only	
	myelinated neurons are	epresent	
	III. In central nervous s	system both mye	linated
	and non-myelinated ne	eurons are seen	
	1) I and II	2) I and III	
	3) II and III	4) I, II and III	
556)	The following are the s	tatements about	neurons
	I. Neurons function as	means of	_
	communication betwee	en the receptors a	and
	effectors.		
	II. Neurons which cond	luct impulses fro	m
	receptors towards cent	ral nervous systemet	em are
	called sensory neurons		
	III. Neurons which cor	inect sensory ne	urons to
	Motor neurons are call	ed Afferent neur	ons.
	IV. Neurons which con	duct impulses fr	om the
	central nervous system	towards the effe	ectors
	are called efferent neur	ons	
	The incorrect statemen	1, 1S	4) 137
557)	$\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $	3) III tata wa anta al'a ant	4) I V
557)	I he following are the s	tatements about	
	I A nouron mouthage	and to many day	duitag
	hut always has only on	a ayon	lumes
	UL A nouron having on	e axuii a dandrita is calle	ad
	II. A neuron naving one	e dendi ne is cane	eu
	III A neuron with two	dendrites is calle	ha
	Bipolar neuron	dendines is cane	u
	IV A neuron having m	any dendrites an	done
	axon is called multin	olar neuron	u one
	Which of the above an	e correct	
	1) I and II	2) II and III	
	3) Land IV	4) I II and IV	
558)	The following are the s	tatements about	
220)	Neuroglia	utements usout	
	L Neuroglia are both F	ctodermal and	
	Mesodermal in origin		
	II. The small tree like n	euroglial cells ar	e called
	Microglia	8	
	III. The tall columnar ci	liated neuroglial	cells
	are called ependymal c	ells	
	The incorrect statemen	ts is	
	1) I 2) II	3) III	4)All
			-

Glial Cells:

- Glial cell of the central nervous system are oligodendrocytes, astrocytes, ependymal cells and microglia.
- Glial cells of the peripheral nervous system of satellite cells and schwann cells.
- The cells that produce the myelin sheath are oligodendrocytes.
- Star shaped glial cells are astrocytes
- The glial cells which bind neurons to capillaries are astrocytes.
- The glial cells which form blood brain barrier are astrocytes.
- Columnar epithelial cells lining the ventricles of the brain and central canal of the spinal cord are ependymal cells.
- The cells which faciliates the movement of cerebrospinal fluid are ependymal cells.
- Small elongated cells derived from mesoderm are microglia.
- The cells that represent mononuclear phagocytic system of nerve tissue are microglia.
- Microglia are derived from precursor cells in the bone marrow.
- Phagocytic glial cells are microglia
- The glial cells of peripheral nervous system surrounding the cell bodies of ganglia are satelite cells.
- The glial cells of peripheral surrounding axons are schwann cells.
- The layer of cell membranes of schwann cell unite and form a whitish myelin sheath around axon called myelin sheath.
- Outer most layer of schwann cells that contains cytoplasm and nucleus is called neurilemma or sheath of schwann.
- Gaps in the myelin sheath are called the nodes of Ranvier.
- The distance between the nodes is called an internode and consists of one schwann cell.
- Supporting cells are absent around the unmyelinated axons of the central nervous system.

GLIAL CELLS:

LEVEL-I

559). 5	Star shaped glial cells w	vith many radiating
Ĩ	process are	
1) oligodendrocytes	2) astrocytes
2	B) microglia	4) satellite cells
560). T	he origin of non - impu	ulse conducting
Ce	ells of nervous system	is
1) ectoderma	2) endodermal
3) mesodermal	4) ecto-mesodermal
561).	The blood and brain b	arrier is formed by
1) astrocytes	2) microgleal cells
2	B) neurons	4) oligodendroglia
562).	Which of the following	g cells represent the
r	nononuclear phagocyti	ic system
1)) microglia	2) oligodendroglia
3	B) astrocytes	4) all neuroglial cells
563). E	longated glial cells of	CNS, derived from
r	nesoderm are	
1) oligodendrocytes	2) ependymal cells
	3) microgleal cells	4) astrocytes
564).	Myelin sheath produc	cing cells of axon of CNS
	are	
	1) astrocytes	2) ependymal cells
	3) microglia	4) oligodendrocytes
565).	The cells of central ne	ervous system that they
	represent the mononu	iclear phagocytic system
	are	A) 1 1 1
	1) oligodendrocytes	2) ependymal cells
- (()	3) microglia	4) astrocytes
566).	Microglia are derived	f from the precursor cells
	$\frac{1}{1}$	2) 1:
	1) bone marrow	2) liver
567)	5) spicell Glial calls of the parir	4) Tympii nodes
507).	the	merar nervous system are
	1) microalia and astro	ooutes
	2) oligodendrocytes	enendymal cells
	3) myelinated fibres	ependymareens
	4) satellite cells and so	chwann cells
568)	One of the following t	non-impulse conduction
500).	cells originates from t	he germ layer that forms
	the muscles	and germina jer maar torring
	1) microglia	2) astrocytes
	3) schwann cells	4) ependymal cells
569).	Precursors of myelin	sheath in CNS are
<i>c c y y</i>	1) microglia cells	2) oligodendrocytes
	3) schwann cells	4) astrocytes
570).	Épendyma in central	nervous system made
,	up of	
	1) columnar epitheliur	m 2) cuboidal epithelium
	3) columnar ciliated ep	pithelium
	4) pseudostratified cil	iated epithelium

 571). Statement (S) : Astrocytes act as blood brain barrier. Reason (R): They are in contact with neurons and the basement membranes of blood capillaries 572). Statement (S) : Astrocytes protect the neurons in the brain from toxins present in the blood Reason (R) : Astrocytes form a part of the blood brain barrier 573) Match the following : (EAMCET 2007) 	 Cytons of unipolar neurons found in the dorsal root ganglia of the spinal nerves. Neurons of dorsal root ganglia of the spinal nerves also called pseudounipolar neurons (they are sensory) Neurons that control effector organs by carrying impulses are motor (afferent) neurons. Neurons involved in the reception of sensory stimuli from the enviroment are sensory neurons (afferent)
Set - I Set - II	• Sensory and motor neurons are connected by
(a) astrocytes 1. Resting macrophages	interneurons.
(b) Microglia 2. Precursors of	• Motor neurons and interneurons are multipolar.
Myelin sheath	• White matter of the brain and spinal cord contains
(c) Oligodendrocytes 3. Set up currents	myelinated axons and oligodendrocytes.
in cerebrospinal fluid	• Grey matter contains neuronal cell bodies,
(d) Ependymal 4. Protects neurons	dendrites and the unmyelinated axons and glial
cells of brain from toxins	cells.
The correct match is	• White appearrance of white matter is due to myelin,
(1) a-2 b-3 c-4 d-1	grey apperance of grey matter is due to nissl
(2) a-1 b-3 c-2 d-4	• Crowns of normal filmes in the control normans
(3) a-3 b-2 c-4 d-1	• Groups of nerve fibres in the central nervous
(4) a-4 b-1 c-2 d-3	• A comparison of non-model call had iss in the control
574). Match the following	- Aggregates of neuronal cell bodies in the central
A Oligodendrocytes I Resting	• A generates of nouronal call hading in the neurish
macrophages	- Aggregates of neuronal cell bodies in the periph-
B. Astrocytes II. Precusors of myelin	• Name is a burdles of the set of the set
sheaths	• Inerve is a bundles of nerve fibres.
C. Ependyma III. Blood brain barrier	• Loose connective tissue sheath surrounding a nerve
D. Microglia IV. Lining of ventricles	fibre is endoneurium.
A B C D	• A bundle of nerve fibres is called fascicle.
1) II III I IV	• Dense irregular connective tissue surrounding a
2) III II I IV	fascicle is called perineurium.
3) II III IV I	• Dense irregular connective tissue surrounding all
4) III II IV I	fascicles of a nerve is called epineurium.
Types of Neurons and Nerve Fibres	• Myelinated nerve fibres present in cranial nerves and spinal nerves
• Most neurons of the body are multipolar.	Unmyelinated fibres present in autonomic perves
• Multipolar neurons have one axon and two or more	Maailin ale aale anare 1
dendrites.	• Myelin sheath around axons is produced in the CNS by oligodondroottos and in the DNS by
• Bipolar neurons have one dendrite and one axon.	schwann cells

- Bipolar neurons have one dendrite and one axon. ٠
- Bipolar neurons are found in the retina of eye, inner ٠ ear and olfactory membrane.
- Unipolar neurons have a single process. ٠

Types of Neurons and Nerve Fibres 585). Bipolar neurons found in LEVEL-I 575). Axon arise from this part of perikaryon 1) axon hillcok 2) terminal bouton 586). 4) synaptic cleft 3) nodes of Ranvier 576). Multipolar neurons are 1) sensory neurons and interneurons 2) efferent neurons and astrocytes 3) microglia and afferent neurons LEVEL-II 4) motor neurons and interneurons 587). 577). Nerve fibers are formed by 1) cytons 2) axons possess 3) dendrites 4) total neuron 578). The neurons with single axon and single dendrite is 1) B-A-C 1) unipolar neuron 3) C-A-B 2) bipolar neuron 588). 3) pseudounipolar neuron 4) multipolar neuron axon 579). Dorsal root nerve ganglia is an example for 1) apolar neuron 2) bipolar neuron 3) pseudounipolar neuron without axon 4) multipolar neuron 580). Neurilemma is receptor 1) schwann cell with cytoplasm and nucleus 2) lipid filled part of schwann cell 1) I and III 3) formed by astrocytes 3) II and IV 4) formed by axon of neuron 581). Synapse is a wide gap present between 1) axons of two neurons 2) axon of a neuron and dendrite of another neuron 3) dendrites of two neurons 4) two cytons of two nerve cells 582). Schwann sheaths and nodes of Ranvier are absent in 1). White matter of central nervous system 2).Myelinated neurons 3).Grey matter with non medullated neurons 4).Motor neurons 583). Inter node consists of 1) one schwann cell 2) two schwann cells 3) many schwann cells 4) no schwann cells 584). Myelin sheath around axons is produced in the peripheral nervous system by 1) oligodendrocytes 2) schwann cells 3) astrocytes 4) ependymal cells

1) retina of eye 2) inner ear 3) olfactory membrane 4) all White matter contains 1) cell bodies and unmyelinated axons 2) dendrites and glial cells 3) neuronal cell bodies and dendrites 4) myelinated axons and oligodendrocytes Arrange the following neurons in descending order based on the number of dendrites they A. Bipolar neuron B. Unipolar neuron C. Multipolar neuron 2) B-C-A 4) A-C-B Read the following statements I. Bipolar neuron contains a dendrite and an II.Pseudounipolar neuron has a dentrite and an axon that arise from a common process III. A neuron may be without dendrites but not IV. Sometimes perikaryon itself acts as a The correct combination is 2) I,II and IV 4) II and IV

ANIMAL ORGANISATION LEVEL-III

589.	Match the following							
	A) protoplasmic grade	i) Scypha						
	oforganization							
	B) cellular grade	ii) Periplaneta						
	oforganization							
	C) tissue grade	iii)Amoeba						
	oforganization							
	D) organ system grade	iv)Hydra						
	of organization							
	1) A - ii, B - i, C - iv, D -	· iii						
	2) A - iv, B -i, C - iii, D -	· ii						
	3) A - iii, B -i, C - iv, D	- ii						
	4) A - iii, B -iv, C - ii, D)-i						
590.	Match the following							
	A) Tubular glands	i) branched secretory						
		portion						
	B)Acinar glands	ii) tubular secretory						
		portion						

	C) Simple glands	iii) branched duct					
	D) Compound glands	iv) unbranched duct					
	E) Simple branched galn	ids v) rounded secretory					
	portion						
	1) A - iv B - ii C - i D - ii F - v						
	1 j A - Iv, D - II, C - I, D - II, E - V						
	$2) \mathbf{A} = \mathbf{V}, \mathbf{D} = \mathbf{III}, \mathbf{C} = \mathbf{II}, \mathbf{D} = \mathbf{II}$	тv, L-1					
	5) A - 11, B - V, C - 1V, D -	III, E-1					
-01	4) A - 11, B - 1V, C - 1, D - V	V, E-111					
591.	Match the following						
	A) homaxial	1) Ctenophores					
	apolar symmetry						
	B) monaxial	ii)Adult echino derms					
	heteropolar symmetry						
	C) bilateral symmetry	iii) Echinoderm larvae					
	D) biradial symmetry	iv)Heliozoans					
	E) pentamerous	v) Jelly fishes					
	radial symmetry	, .					
	1) A - iv. B -i. C - iii. D	- v. E - ii					
	2) A - iv. B -v. C - iii. D	- i. E - ii					
	3) $A - v B - iv C - ii D$	- iii E - i					
	4) A_{-} iii $B_{-v} C_{-}$ ii D	- iv F - i					
502	A) M^{-1} III, D^{-1} , C^{-1} II, D^{-1}	- IV, L - I					
592	A) manufa analamataa	i) Doron ohr					
	A) pseudocoelomates	i) Fatenchyma					
	D) accelonnates	ii) Spirai cleavage					
	C) schizocoelomates	111) Blastocoel					
		persistant					
	D) Enterocoelomates	iv) Blastopore forms					
		anus					
	l) A - 1, B - 111, C - 1V, D	- 11					
	2) A - iv, B - i, C - ii, D	- 111					
	3) A - iii, B - i, C - ii, D	- iv					
	4) A - iii, B - ii, C - i, D	- iv					
593.	Match the following						
	A) plasma membrane	i) Intracellular diges					
		tion					
	B) ribosomes	ii) Work benches					
	C) lysosomes	iii) Biosynthesis of					
		ribosomes					
	D) nucleolus	iv) Cellular homeosta					
	,	sis					
	E) smooth ER	v) Detoxification of					
	,	drugs					
	1) A - i, B -iv, C - iii D	- v. E - ii					
	2) $A - iy B - ii C - y D$	- iii E - i					
	3) A - iii R -ii C - i D	- iv F - v					
	$\begin{array}{c} \mathbf{J}_{1} \mathbf{X}_{-} \mathbf{i}_{1} \mathbf{N}_{-} \mathbf{i}_{2} \mathbf{N}_{-} \mathbf{i}_{1} \mathbf{N}_{-} \mathbf{i}_{2} \mathbf{N}_{-} \mathbf{i}_{1} \mathbf{N}_{-} \mathbf{i}_{2} \mathbf{i}_$	iii E - v					
504	τ_{j} π_{-1} , D -11, C - 1, D -	- 111, L/ - V					
574.	A) simple squameus	i) Mucoco of stomost					
	r) simple squamous	1) IVIUCOSA OI SIOIIIACII					

	B) simple epitheliu	e cuboid m	al	ii)linin	gofuterus	
	C) non c	iliated si	mple	iii) ende	othelium of	
	columna	r epithel	ium	heart		
	D) ciliate	ed simple	e	iv) Trac	chea	
	columna	repihteliu	ım	,		
	E) pseud	lostratifi	ed	v) germ	ninal	
	ciliated e	pitheliun	n	epitheli	um	
	1) A - ii,	B - iv, C	C- i, D- i	ii, E- ii		
	2) A - iii	, B - v, C	C- i, D- i	i, E- iv		
	3) A - iv	, B - i, C	- iii, D-	iv, E- ii		
	4) A - v,	B - i, C-	ii, D- iv	v, E- iii		
595.	Match th	e follow	ing			
	A) mast	cells		i)Antib	oodies	
	B) fibrol	olasts		ii) Phag	gocytes	
	C) plasm	na cells		iii) fibr	e production	
	D) macr	ophages		iv) Hea	at production	
	E)Adipo	ocytes		v) In fla	ammation	
	1) A - i,	B - iv, C	- iii, D-	i, E- v		
	2) A - iii	, B - ii, (C- i, D- i	iv, E- v		
	3) A - v,	B - iii, C	C- i, D- i	i, E- iv		
	4) A - v,	B - iv, C	C- iii, D-	ii, E- i		
596).	Identif	y wrong	statemer	nts from	the following	
	I. The	skeleton	of the e	mbryos	of vertebrates	
	IS IOIII II Inter	vertebra	discs a	u illage	ed by Flastic	
	cartilag	vencon ve	11 UISUS d		ed by Elastic	
	III. Epi	iglottis is	s formed	l by Fibr	ous cartilage	
	1) I	e	2) II	3)III	4) II and III	
597).	Match	the follo	wing			
	List-I				List-II	
	A. Cos	stal cartil	age	I. Inter	vertebral discs	
	B. Hya	line cart	ilage	II. Epiglottis		
	C. Fibi	rous cart	ilage	III. Ribs		
	D. Elas	suc caru	lage	IV. Inte	al sentum	
	The co	orrect ma	tch is	v. Indo	aiseptuin	
	1110 00	A	B	С	D	
	1)	Ш	V	Ι	Π	
	2)	III	V	IV	II	
	3)	V	Π	IV	Ι	
	4)	Π	III	Ι	IV	
598).	Arrang	ge the fol	lowing	artilage	s present in	
	interve	ertebral d	liscs, epi	glottis a	nd nasal septum	
	in a sec	quence		р н	1	
	A. Elas	suc cartil	age	в. Нуа	line cartilage	
	$1) C^{A}$	rous cart	nage	2) A D	L-C	
	3) R.C	ν-D Γ_Δ		$\Delta = A - B$ $\Delta = A - B$	-C	
	J) D- C	- n			- -C	

599).	Study the f	ollowing a	nd choos	se the correct		3) 4)	IV V	II I	III II	V III
		n Natu	reof	Location	604).	Matel	the fol	llowing		
	Cartilage	matri	v	Location		Lis	t-I		LC	List-II
	L Fibrous	Rundl	A es of	Intercalated		A. Pe B. Sat	ricytes	11 _c	I. Cy	ton of neuron
	cartilage	collag	en fibres	discs		C Int	ercalat	ed discs	III V	isceral muscle
	II Uvolino	Thin o	allagon	Ends of short		C. III	erealat	ea albeb	fi	bres
	cartilage	fibres	onagen	bones		D. Ni	ssl bod	ies	IV. C	ardiac muscle
	III. Elastic	Both	collagen	Epiglottis					VLie	paments
	cartilage	and el	astic			The c	orrect	natch is	••• 1218	Sumenus
	C C	fibres					А	В	С	D
	1) I and II	2) I ar	nd III			1)	II	III	IV	I
	3) Only II	4) On	ly III			2)	V	IV II		l T
600. St	udy the follo	owing	5			3) 4)	III V			I T
CA	RTILAGE	FIBR	ES	EXAMPLE	605.	Choose	the co	rrect set	of state	ments about the
i) I	Hvaline carti	ilage collag	en fibre	s tracheal rings	0000	epitheli	um linir	ng the buc	cal cavi	ty of human
i	Elastic cartil	age colla	gen elas	tic vocal cords		being.		U		5
ш) 1		fibres	5011, 0141 S			I. the la	yer of c	ells at th	e free sı	urface are dead
iii)	Fibrocartilad	re collage	n fibres	pubic		II. the c	ells on	the baser	nent me	embrane are
m)	i ioroeurinag	ge conage	in nores	symphysis		Columna III it is	ir non ke	rotinicad	stratifia	dequemous
iv)	Rone	collage	n	endoskeleton		epitheli	m	latiniscu	Suatific	u squamous
1.	Done	conage	211	of cyclostomes		1) I and	II		2) II	and III
whi	ich of the ab	ove are cor	rect	or cyclostomes		3) I and	III		4)All	
vv 11	ich of the ab		2) ji ar	d iii	606.	Asserti	on(A)	:- Macro	phages	are defensive in
	3) j and jij		2) II al (1) ii a	ndiv		function	(D) . 7	Thomasu	a inflor	nmation of
601)	Identify the	l a ticcula acco	4) II a vioted u	with traches		tissues	v relea	i ney cau ising vaso	se innar dilators	
001).	1) Vollow	loctic ticcu	o clastic		1) both A	and R	are true	and R	s the correct
	1) renow e			cartilage,		explan	ation of	fA		
	pseudos	tratified epi			2) both A	and R	are true	but R i	s not the correct
	2) Pseudos	tratified nor		epithelium,		explar	nation c	of A	A	C1 1 (D)
	hyaline c	artilage, ye	100 elas	stic tissue	607) A 1s tr Idontifi	ue but I	K is false	4) A 18	false but R is true
	3) Simple c		liated epi	thelium, yellow	List	- I	ule co	rrect set	ormater	List-II
		sue, nyalin	e cartilag	ge	AB	Bronchio	oles		I.Pseud	lostratified
	4) Hyaline	cartilage, p	seudostr	atified cillated					epithe	elium
(02)		m, yellow e	lastic tis	sue	BC	Bermina	lepithe	lium	II. Ciliat	ted
602).	The comm	on leature (of a neur	on and			•	TTT	colum	har epithelium
	I. Conducti	ion of impu	lse			ndotne	Ium	111	enithel	lium
	II. Contrac	tile nature			DU	Jrinary I	oladdei	r IV	Simple	e cuboidal
	III. Similar	embryonic	origin			2			epithel	lium
	IV. Incapat	ble of division of the second se	on		E D	Oucts of	sweat g	gland V	Transiti	onal epithelium
	1) I and III	Comoman	011 IS 2) 11 a	nd IV				VI	Strati	tied cuboidal
	3) I and IV	7	$\frac{2}{11}$ at 4) I at	nd II		A D	C ·	n f	epith	enum
603).	Match the f	following)			ч р		ре VV		
,	List-I			List-II	$\begin{vmatrix} 1 \\ 1 \end{vmatrix}$			V VI		
	A. Tongue	muscles	I. Inter	realated dises	$\begin{pmatrix} 2 \end{pmatrix}$ $\begin{pmatrix} 2 \end{pmatrix}$ $\begin{pmatrix} 2 \end{pmatrix}$			V VI		
	B. Skeletal	muscles	II. Un	striated			V. п			
	C. Smooth	muscles	III. Sti	iated voluntary	(4) 1		11 41	V 1	.1. :	
	D. Cardiac	Muscles	IV. Int	rinsic muscles	608.	Choose	the col	rrect con	noinatio	ons from the
			V. Uns	striated voluntary		Tollowin	g			
	The correc	t match is	G	, ,		Anima		rincipa	I AXIS	
	A	В	Сп	D	A	Aurelia	Or	o-aboral	axıs	
	1) $1V2) V$	111 TT	Ш	1 T	В	Actino	Ant	ero-poste	erior ax	IS
	<i>)</i> v	11	111	*	8	sphaerit	Im			

С	A	dams	ia	Oro-a	aboral	axis
_	(se	a anei	none	e)		
D	A (sta	steria. arfish)	s A	Anter	o-pos	terior axis
Pl	ane	of pro	oduc	tion	of anti	imeres
An	y pla	ane pas	ssing	throu	ıgh pri	ncipal axis
An	y pla	ane pa	ssing	thro	ugh ce	nter of the body
Lo	nga	nd sho	ort ax	, is of 1	nouth	2
An	y pla	ane pa	ssing	thro	ugh ce	nter of the body
	1) A, B	C		C	2) B, C
	3) A, C				4) B, D
609). Ic	lentify	the c	correc	et set o	fmatching
	Lis	t-I		Lis	st-II	C
А	Sta	r fish		Ι	Bilater	ally
					svmm	etrical, acoelomate
В	Sna	ul		П	Bilater	allv
_					symm	etrical. schizocoelomate
С	Ear	th wo	m	Ш	Asvm	metrical Schizocoelomate
D	Ro	und w	orm	IV	Pentar	adially symmetrical
D	110	und m		e	nteroc	coelomate
E	Fis	h		V	Bilater	ally
L	1 10			, SV	/mmet	rical enterocoelomate
			V	I Bila	aterall	v symmetrical.
				p	seudo	coelomate
	Α	В	С	D	Е	
1)	V	Ī	Ī	VI	III	
2)	IV	III	Π	VI	V	
3)	Ш	Ι	Π	V	VI	
4)	IV	II	Ш	VI	V	
610).	Read	the f	ollow	/ing ar	nd choose the correct
		comb	inatio	ons p	ertaini	ng to adipose tissue
		I. Br	own	fat ce	ells are	metabolically active
		II. W	hite f	at cel	ls have	e relatively more blood
		cap	oillar	ies		
		III. B	rown	fat h	elps in	the production of more
		hea	at in 1	newb	orn ba	lbies
		IV. W	hite f	fat is t	the lon	g term source of energy in
		ad	ults			
		1) I a	nd II	only		2) I, III and IV only
		3) II a	ind I	Ionl	у	4) All are correct
611	•	State	nent	(I) : I	Pseudo	stratified epithelium gives
		a false	emp	ressi	on of th	he epithelium being a
		stratif	led ep	otheli	um	1
		State	ment	:(Ш): 11	In pse	udostratified epithelium,
		the sh	ort ce	ells w	hich d	o not reach the surface of
		ine ep	itneli	ium a	na lon	g cells which reach the
		surfac	e ot 1	ine ep		im possess the nuclei at
		unter	ent le	veis 1	unough	t me two types of cells are
		$1) \mathbf{D}_{2}$	g on i th I a		areter	in memorane
		1) D0	ui I a lanat	ion t	are tri	at and it is the correct
		2	iaiial th I a	nd II	are tri	e but II is not the correct
		2) DU 9Vn	ur r a Ignat	ion t	n I	
		-AV	initul		- I	

3) I is false and II is true							
	4) I is true and II is false						
612.	Read the following and choose the correct						
	combinations						
Туре	of epithelium	State of nucleus					
I. Sim	ple squamous	Absence of nucleus					
II. Sin	ple cuboidal	Spherical nucleus					
III. Sin	nple columnar	Nucleus near at the basal end					
IV. Pse	eudostratified	Nuclei at different levels					
Exam	ple						
Layer	of alveolar cavit	у					
Vesicle	es of thyroid glar	nd					
Inner s	surface of gall bla	adder					
Epend	yma						
1) I an	d II	2) II and III					
3) III a	and IV	4) I and III					
613)	Find the correct	t statement with regard to the func-					
	tions of coelon	nic fluid					
	1) It receives	gametes in all the invertebrates					
	2) It receives	gametes in all the vertebrates					
	3) It receives g	gametes in all the vertebrates and					
	invertebrate	s					
	4) It receives	gamets in female vertebrates					
614)	In the epithelial	tissue the cells functioning as sup-					
	porting cells ar	re					
	1) non glandul	ar cuboidal epithelial cells					
	2) non absorpt	ive cuboidal epithelial cells					
	3) non glandu	lar and non absorptive cuboidal					
	epithelial cel	ls					
	4) non glandua	alr and non absorptive columnar					
	epithelial cel	ls					
615)	Find the misma	atched pair from the following					
1) Lys	sosomes	- intracellular digestion					
2) Mi	crotubules	- mitotic spindle					
3) Mi	crofilaments	- maintain the position of the					
		organelles					
4) Mit	tochondria	- power houses of the cell					
616)	Read the following	ng:					
i) Transverse plane of biradially							
symmetrical animals is short axis.							
	ii) A sea anemor	e can be cut into equal halves					
j	passing through	frontal and transverse planes.					
	iii) Biradially symmetrical animals are						
	intermediate bet	tween radial and bilateral groups					
	choose the wron	g option(s)					
	1) i only	2) i & iii					
	3) ii only	4) ii & iii					

617).	Bilaterally symmetrical a ful than the animals hav metry because. i) They show dorsal and ii) They have a single bo iii) Sense organs are con Which of the above is no	animals are more success- ing other types of sym- ventral sides dy axis accentrated at anterior end ot incorrect ?
	1) i only 2) ii on	nly 3) iii only
	4) i & iii	
618.	Based on the number of make the antimeres arran of symmetries in ascenda a) biradial symmetry	plane of symmetry to nge the following types ing order b) spherical symmetry
	c) bilateral symmetry	
	d) pentamerous radial sy	mmetry
	1) $c_{-2} = d_{-} e_{-} b_{-}$	2) $h_{-} d_{-} a_{-} c_{-} e_{-}$
	3) $c - a - e - b - d$	4) $a - c - b - e - d$
	<i>5) c a c c a</i>	1) a e e e a
	***	:

KEY

INTRODUCTION

1) 1	2) 3	3) 2	4) 1	5) 2	6) 2	7) 1
8) 1	9) 2	10) 4	11)4	12) 2	13) 2	14) 3
15) 3	16) 3	17) 3	18) 3	19) 1	20) 2	21) 4
22) 2	23) 1	24) 2	25) 1	26) 2	27) 2	
SPHERICAL SYMMETRY						
28) 1	29) 1	30) 1	31) 1	32) 1	33) 2	34) 2
RADIAL SYMMETRY						
35) 2	36) 1	37) 3	38) 2	39) 2	40) 3	41) 1
42) 3	43) 2	44) 1	45) 2	46) 2	47) 1	48)2
49) 1	50) 1	51) 2	52) 3	53) 4	54) 2	55) 3
56) 4						
BIRADIAL SYMMETRY						
57) 2	58) 4	59) 3	60) 3	61) 3	62) 1	63) 3
64) 1	65) 2					
BILATERAL SYMMETRY						
66) 2	67) 4	68) 3	69) 2	70) 3	71) 1	72) 1
73) 3	74) 1	75) 4	76) 4	77) 2	78) 3	79) 2
80) 3	81) 2	82) 1	83) 3	84) 3	85) 2	86) 1
87) 4	88) 1	89) 3				
SYMMETRY						
90) 3	91) 1	92) 1	93) 3	94) 4	95) 1	96) 1
97) 2	98) 1	99) 1	100) 1			
ACOELOM						
101) 2 102) 3 103) 1 104) 2						
PSEUDOCOELOM						
105) 3	106) 2	107) 3	108) 2	109) 2	110) 1	111)2
112) 2						
EUCOELOM						
113) 3	114) 3	115) 3	116) 3	117)4	118) 3	119)1
120) 2	121) 3	122) 2	123) 3	124) 2	125) 4	126) 2
127) 4	128) 2	129) 3	130) 2	131) 3	132) 1	133) 2
134) 1	135) 3	136) 2	137) 3	138) 2	139) 4	140) 3
141)1	142)4	143) 1	144) 3	145) 2	146) 1	147) 3
148) 2	149) 2	150) 2	151)4	152) 1	153) 3	154) 2
155)4	130) I 162) 1	137)2	138)3	139)3	100) 1	101)3
102) 2 103) 1 COELOM						
164) 2	165) 1	166) 1	167) 2	1601 2	160) 2	170) 1
104) 3	103) [100) [10/)2	108) 3	109)2	1/0) 1

ANIMAL CELL

171) 2 172) 1 173) 2 174) 1 175) 1 176) 3

CYTOPLASM

177) 4

RIBOSOMES

178)2

ENDO PLASMIC RETICULUM

179) 2 180) 2 181) 1

GOLGI

182) 2 183) 2 184) 1

LYSOSOMES

185) 2 186) 4

MITOCHONDRIA

- 187) 1 188) 3 189) 1 190) 2 191) 1 192) 2 CYTOSKELETON
- 193) 1 194) 3 195) 1 196) 2 197) 2 198)1 199) 1 200) 1 201) 2 202) 4 203) 3

CENTROSOME

204) 4 205) 4 206) 3

CELL

207) 1 208) 3 209) 1 210) 2 211) 2

EPITHELIAL TISSUES

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212) 2 213) 4 214) 1 215) 4 216) 3 217) 2 218) 1
219) 4 220) 3 221) 2 222) 1 223) 2 224) 2 225) 1
226) 2 227) 1 228) 1 229) 1 230) 2 231) 1 232) 1
233) 3 234) 2 235) 3 235) 4 236) 4 237) 2 238) 3
239) 1 240) 1 241) 2 242) 1 243) 2 244) 1 245) 2
246) 2 247) 3 248) 3 249) 3 250) 2 251) 1 252) 3
253) 1 254) 3 255) 3 256) 1 257) 1 258) 4 259) 2
260) 2 261) 3 262) 2 263) 4 264) 4 265) 4 266) 4
267) 4 268) 1 269) 1 270) 1 271) 1 272) 4 273) 3
274) 2
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CONNECTIVE TISSUE

275) 1276) 3277) 2278) 2279) 1280) 2281) 3282) 1283) 3284) 2285) 2286) 3287) 4288) 4289) 4290) 2291) 1292) 3293) 4294) 3295) 1296) 3297) 4298) 1299) 1300) 2301) 1302) 2303) 3304) 2305) 3306) 2307) 2308) 3309) 1310) 1311) 3312) 4313) 2314) 1315) 1316) 2317) 1318) 3319) 4320) 3321) 1322) 2323) 3324) 3325) 4326) 2327) 1328) 1329) 1330) 4

CONNECTIVE TISSUE

331) 3 332) 2 333) 3 334) 3

CELL

EPITHELIUM

336) 3 337)1

335) 3

TRIPLE MATCHING TYPE

338) 2 339) 1 340) 1 341) 1

SUPPORTIVE TISSUE

342) 2 343) 2 344) 2 345) 4 346) 2 347) 3 348) 1 349) 4 350) 4 351) 1 352) 3 353) 1

HYALINE CARTILAGE

354) 2 355) 4 356) 1 357) 2 358) 4 359) 1 360) 3 361) 3 362) 1

ELASTIC CARTILAGE

363) 1 364) 3 365) 4 366) 4 367) 1 368) 1 369) 3 FIBROUS CARTILAGE

370) 2 371) 2 372) 1 373) 4 374) 1 375) 1

BONE

376) 2 377) 2 378) 2 379) 3 380) 2 381) 1 382) 3 383) 4 384) 1 385) 2 386) 1 387) 1 388) 2 389) 1 390) 2 391) 2 392) 3 393) 2 394) 1 395) 2 396) 1 397) 3 398) 1 399) 1

STRUCTURE OF COMPACT BONE

400) 4 401) 1 402) 4 403) 4 404) 1 405) 4 406) 1 407) 3 408) 1 409) 2 410) 4 411) 3 412) 4

CHEMICAL COMPOSITION OF BONE 413) 1 414) 2

FLUID TISSUES

415) 4 416) 3 417) 3 418) 2 419) 1 420) 3 421) 3 FORMED ELEMENTS

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422) 1 423) 2 424) 3 425) 3 426) 4 427) 1 428) 4
429) 3 430) 2 431) 3 432) 2 433) 2 434) 2
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WBC

435) 2 436) 1 437) 4 438) 2 439) 3 440)1 441) 4 442) 2 443) 3 444) 2 445) 2 446) 1 447) 4 448) 3 449) 2 450) 3 451) 1 452) 4 453) 2 454) 3 455) 1 456) 1 457) 2 458) 3 459) 2 460) 1 461) 1 462) 1 463) 1 464) 1 465) 2 466) 1 467) 2 468) 2 469) 1 470) 4 471) 1 472) 4 473) 2 474) 2 475) 2 476) 2 477) 2

PLATELETES

478) 2 479) 3 480) 3 481) 4 482) 2 483) 3 484) 3 485) 3 486) 1

LYMPH

487) 2 488) 3 489) 1 490) 1

SKELETAL MUSCLE

491) 1 492) 4 493) 1 494) 1 495) 2 496) 2 497) 3 498) 3 499) 1 500) 2 501) 1 502) 4 503) 2 504) 1

- 505) 3 506) 1 507) 3 508) 4
 - 5)5 500)1 507)5 500)4

VISCERAL MUSCLE

509) 3 510) 1 511) 1 512) 2 513) 4 514) 1 515) 4

516) 2 517) 1 518) 1 519) 1 520) 3

CARDIAC MUSCLE

521) 1 522) 2 523) 1 524) 3 525) 3 526) 3 527) 2

- 528) 3 529) 3 530) 3 531) 3 532) 2 533) 4 534) 2
- 535) 1 536) 3 537) 4 538) 1

COMPONENTS OF

NERVOUS SYSTEM NEURON:

539) 4 540) 2 541) 2 542) 3 543) 3 544) 4 545) 4

- 546) 3 547) 3 548) 3 549) 2 550) 1 551) 2 552) 2
- 553) 3 554) 1 555) 4 556) 3 557) 3 558) 2

GLIAL CELLS:

559) 2 560) 4 561) 1 562) 1 563) 3 564) 4 565) 3 566) 1 567) 4 568) 1 569) 2 570) 3 571) 1 572) 1 573) 4 574) 3

TYPES OF NEURONS AND NERVE FIBRES

575) 1 576) 4 577) 2 578) 2 579) 3 580) 1 581) 2 582) 3 583) 1 584) 2 585) 4 586) 4 587) 3 588) 2

LEVEL - III

589) 3 590) 3 591) 2 592) 3 593) 4 594) 2 595) 3 596) 4 597) 1 598) 1 599) 2 600) 3 601) 4 602) 3 603) 1 604) 3 605) 2 606) 3 607) 2 608) 3 609) 2 610) 2 611) 1 612) 2 613) 4 614) 4 615) 3 616) 3 617) 3 618) 1