

STRUCTURAL ORGANIZATION IN ANIMALS

SOLUTIONS

LEVEL - 1

EPITHELIAL TISSUE

1. Solution –It is a gelatinous,non-cellular ,double layer matrix. Upper layer is called basal lamina made up of mucopolysaccharide mainly hyaluronic acid ,proteoglycan,glycoprotein secreted by epithelium whereas lower layer made up of collagen type 3 protein which is secreted by connective tissue.
2. SOLUTION – It is the compactly arranged tissue , present on the surface .
3. SOLUTION – It is present in duct of sweat glands, choroid of eye-loose connective tissue,Thin bronchioles-squamous epithelium.
4. SOLUTION –Germinal epithelium is made up of cuboidal epithelium
5. SOLUTION – Simple squamous epithelium appears like a flat tiles of cells therefore it is also called pavement membrane.
6. SOLUTION Protection-compound ep., secretion-glandular ep., sensation-sensory ep., absorption- brush-bordered ep. Respiration done by all tissues and digestion is extracellular in all higher animals.
7. SOLUTION- It arises from all 3 germ layers.
8. SOLUTION- As it is present on the surface therefore it is compactly arranged.
9. SOLUTION – Both epithelium and connective tissue has a good power of regeneration. But epithelium has more regenerative power.
10. SOLUTION- Stratified cuboidal epithelium is found in duct of sweat gland, duct of mammary gland, lining of urethra.
11. SOLUTION- Epithelium tissue arises from all 3 germ layers.
12. SOLUTION – The inner lining of bronchioles is made up of ciliated simple columnar epithelium
13. SOLUTION – Germinal epithelium made up of simple cuboidal epithelium.
14. SOLUTION- Desmosomes (adhering cell junction) is present between two adjacent epithelium.
15. SOLUTION – As epithelium tissue present on surface ,they are more subjected to abrasion.
16. SOLUTION- It is present in the lining of the PCT to increase the surface area for reabsorption of filtrate.As 70-80% filtrate absorbed in PCT.

17. SOLUTION – Schneidarian membrane is also called olfactory mucosa which contains sensory bipolar neuron for sensation of smell.
18. SOLUTION – Skin is made up of keratinized stratified squamous epithelium which makes the skin water resistant as keratin is a hard water proof protein.
19. SOLUTION – Columnar epithelium present in the lining of digestive tract are also called enterocytes having a non-ciliated finger like folding on apical surface to increase surface area for absorption.
20. SOLUTION – The inner lining of vagina, buccal cavity, oesophagus, cornea of eye are made up of non-keratinized stratified squamous epithelium as they are exposed to more wear and tear.
21. SOLUTION- Since it is present on the surface therefore it is subjected to abrasion.
22. SOLUTION – Example of heterocrine gland is pancreas.
23. SOLUTION – Lining of esophagus , vagina , buccal cavity , cornea of eye are made up of non keratinized epithelium.
24. SOLUTION – – Lining of esophagus , vagina , buccal cavity , cornea of eye are made up of non keratinized epithelium.
25. SOLUTION – Ependymal cells are modified ciliated columnar epithelium cell which secretes cerebro-spinal fluid and it is present in the lining of ventricle of brain , central canal of spinal cord .
26. SOLUTION – Transition epithelium is present in the lining of minor calyx , major calyx , renal pelvis , ureter , urinary bladder and upper most part of urethra , therefore it is also called urothelium.
27. SOLUTION – Kinocilia is motile hair like structure at apex of cuboidal or columnar ep.,
28. SOLUTION – Stereocilia are non-motile hair like present on the hair cells of organ of cochlea, epididymis, vas deferens etc.
29. SOLUTION – Different genes are expressed in different types of cells.
30. SOLUTION – Goblet cells are unicellular gland present in between the columnar epithelium tissue . Goblet cells secretes mucous and present in the lining of respiratory tract , digestive tract , urino genital tract.

CONNECTIVE TISSUE

31. SOLUTION – Binding together other tissues-loose and dense connective tissue, Supporting various parts of the body- skeletal con. Tissue , Forming a packing around organs- adipose tissue.
32. SOLUTION – Areolar tissue present beneath the coelom , skin , around muscles , around bone , around nerves , around blood vessels . Muscle and the bone-connected via tendon.
33. SOLUTION – Histiocytes / macrophages is the phagocytic cell , present in the connective tissue.

34. SOLUTION – It is made up of glycoprotein and it is gelatinous matrix secreted by fibroblast cells.
35. SOLUTION – Connective tissue contains only cells and matrix. Matrix is vascularized.
36. SOLUTION – Tendons contains fibroblast and collagen fibres which are arranged in parallel bundles. Tendons present in between bones and muscles.
37. SOLUTION – Connective tissue are the most abundant tissue present in human body.
38. SOLUTION - Iron containing Cytochrome pigments are abundant in the membrane of mitochondria.
39. SOLUTION – Hump contains adipose tissue which stores fat and this fat on metabolization produces water in order to tolerate the scarcity of water in dessert condition.
40. SOLUTION – Brown fat contain abundant mitochondria so it has more ability to produce energy.
41. SOLUTION – Areolar tissue contains two fibres that is collagen which is hard and another is elastin which is flexible .
42. SOLUTION – Glissons capsule(typical mammalian characteristic) covers the liver lobule and it is made up of loose connective tissue .
43. SOLUTION – Elastin protein is present in areolar connective tissue which covers the blood vessel.
44. SOLUTION – Brown adipose tissue contain numerous small fat globules and abundant mitochondria to produce more energy.
45. Solution – Matrix of the bone consist of inorganic salts called calcium hydroxyl apatite ($\text{Ca}_{10}(\text{PO}_4)_6\text{H}_2\text{O}$)
46. SOLUTION – Periosteum is made up of collagen fibres and osteoblast .
47. SOLUTION – Haversian canal is made up of blood vessels , lymphatic vessels , nerves , bone cells , fat cells .
48. SOLUTION – Chondrocytes are the mature cells present in the cartilage.
49. (4)
50. SOLUTION – Fibrous cartilage is the strongest cartilage present in the intervertebral disc , pubic symphysis , between manubrium and body of sternum.
51. SOLUTION – Fibrous cartilage is the strongest cartilage present in the intervertebral disc , pubic symphysis , between manubrium and body of sternum.
52. SOLUTION – Hyaline cartilage does not contains blood vessels and nerves ,so it the transparent tissue.

53. SOLUTION – Sesamoid bone are ossified tendons , eg. Patella
54. Bone marrow is site of hemopoiesis and hence rich with stem cells .Yellow bone marrow is rich with fats.
55. SOLUTION – Inorganic salts are calcium hydroxyl apatite and organic components are collagen protein in the ratio 60:40 respectively.
56. SOLUTION – HAversian system present in diaphysis region of mammalian bone has centrally placed haversian canal and arranged as concentric rings around it is osteocytes and matrix (haversian lamellae)
57. SOLUTION – Volkmann canal interconnect the haversian canal.
58. SOLUTION – Osteocytes are bone maintaining cells and osteoblast are bone forming cells.

MUSCLES

59. SOLUTION – Bundle of striated muscle fibre is called fascicle which is covered by a connective tissue called perimysium.
60. Cytoplasm of muscle cell means sarcoplasm.
61. SOLUTION – ATP is the energy currency of cell.
62. SOLUTION – Plasma membrane of muscle fibre is called sarcolemma.
63. SOLUTION – Myoglobin is oxygen storing pigment present in muscle fibre.
64. Total number of skeletal muscles in human body are 639.
65. SOLUTION – Huxley discovered the sliding filament theory of muscle contraction.
66. SOLUTION – Masseter muscle of the jaw is the strongest muscle.
67. SOLUTION – Due to excessive workout , muscle cells undergo hypertrophy in which cell size increases due to more formation of myosin ,actin ,myoglobin ,glycogen in the cytoplasm(sarcoplasm) and blood vessels around muscle fibres.
68. SOLUTION – Skeletal muscle is highly fatigue whereas smooth muscle is seldom fatigue and cardiac muscle is non fatigue.
69. SOLUTION – All types of muscle have contractile protein that is actin and myosin because of which muscle is a contractile tissue.
70. SOLUTION – Smooth muscle cell has single central , oval nucleus and hence uni-nucleated .
71. Smooth muscle fibres are Spindle-shaped, unbranched, non-striated, uninucleate and involuntary
72. SOLUTION – Endothelium is made up of simple squamous epithelium.

73. SOLUTION – Striped muscles are also called striated muscle which have alternate light and dark bands. Like unstriped muscles cardiac is involuntary.
74. SOLUTION – Myocardium is the thickest among the all 3 outer wall of heart , it is the middle wall made up of cardiac muscles.
75. SOLUTION – Thin filament is made up of two F-filament , two tropomyosin and intermediate troponin proteins.
76. SOLUTION – Due to accumulation of lactic acid in muscle ,pain in muscle occurs.
77. SOLUTION – Striped muscles are also called as striated , voluntary , skeletal muscle.
78. SOLUTION – Cardiac muscles are non fatigue muscle because they are highly vascular and have high myoglobin content.
79. SOLUTION – Sartorius muscle is the longest muscle present in the dorsal pelvic ie buttock region.
80. SOLUTION – Skeletal muscle are multinucleated. Multinucleated cells are also called syncytium.
81. SOLUTION – During shivering ,striated muscle undergo involuntary contraction to produce energy in form of heat which helps to maintain body temperature.

NEURAL TISSUE

82. SOLUTION – Nerve cell may be approximately about 1 metre in length.
83. XI NCERT pg 317
84. SOLUTION – Axon hillock is naked portion of axon connected to cyton.
85. SOLUTION – Neuroglial cells cannot produce nerve impulse ,they provide support , protection and nourishment to neurons.
86. SOLUTION – They are neuroglial cells which present around axon in PNS .
87. Glial cells are more in number in neural organs to protect, support, nourish neurons.
88. Node of Ranvier are gaps between myelin sheath in myelinated neurons.
89. Solution – Depending upon the process neurons are apolar , unipolar , bipolar , pseudo-unipolar , multipolar neuron.
90. SOLUTION –The loose sheath of connective tissue enclosing the entire nerve is EPINEURIUM.
91. SOLUTION – It is the gap between the two adjacent nerve cells.

92. SOLUTION – Velocity of impulse depend upon thickness of axon , myelin sheath and temperature.
93. SOLUTION – It is present in the dorsal root of spinal cord.
94. Nerves are part of somatic neural system which in turn is part of PNS.
95. SOLUTION – Bipolar neuron is present in the olfactory mucosa of nose for detection of smell and it is the only neuron present in body which is in direct contact with environment. Bipolar neuron is also present in eye of retina .
96. SOLUTION – Nissls granules are ribonucleoprotein in which neurotransmitter synthesizes.
97. SOLUTION – After 4-5 years of age neurons lack centrioles due to which spindle fibre formation stops and neurons enter into Go phase.
98. SOLUTION – Plasma membrane of schwann cells is called as neurilemma .
99. SOLUTION – Unipolar neuron is present in the embryos.
100. Neural tissue originates only from ectoderm germ layer.

COCKROACH

101. SOLUTION – Cockroach being an arthropod is coelomate but has open circulatory system. Hence coelom filled with blood called as haemocoel.
102. SOLUTION – Mandible acts as a teeth and it is for grinding the food .
103. XI NCERT pg 112,2nd para
104. SOLUTION – XI NCERT pg 112,1st para, It is also called tegmina ,elytra , forewing , mesothoracic wings and hind cover.
105. SOLUTION – XI NCERT pg 112, fig 7.15 .It is hanging like structure between mandible and maxilla use for detection of taste.
106. SOLUTION – Each compound eye consist of 2000 hexagonal units called ommatidia which can produce image of the object.
107. SOLUTION – Ventral thoracic appendages that is legs in cockroach helps in locomotion
108. Salivary duct opens at the base of tongue.
109. SOLUTION – Gizzard (six teeth) and mesenteron (midgut) are organs of mastication and maximum digestion respectively in cockroach.
110. SOLUTION – Midgut receives digestive juices rich with enzymes from hepatic caecae and midgut glands, and hence site for max. digestion.

111. Solution – Collateral gland secretes a proteinaceous substance which forms coat around 14 to 16 fertilised eggs to form ootheca.
112. SOLUTION – Each ovary comprises of 8 ovarioles such that each ovarioles produces one egg.
113. SOLUTION – All the non-chordate animals contains double, ventral and solid ganglionated nerve cord.

LEVEL – II

EPITHELIAL TISSUE

1. Tissues is group of cells similar in structure, function, origin and matrix may be present or absent.
2. SOLUTION –connective tissue and muscles are mesodermal and nervous tissue is ectodermal.
3. SOLUTION – Epithelium tissue have intercellular space either negligible or very less.
4. SOLUTION – Innermost layer of stratified squamous epithelium are cuboidal or columnar. Top layer may be dead (cells can lack nucleus) or living .
5. SOLUTION –In hemidesmosomes (anchoring junctions), Integrin protein from basal surface of epithelium attaches to laminin protein of basement membrane. Desmosomes (adhering junctions) attach adjacent cells.
6. SOLUTION – Mucosa of GI tract is columnar epi.
7. XI NCERT pg 101, 1st para
8. SOLUTION – Mucosa of GI tract is columnar epi. Columnar epithelium is present in lining of gall bladder , intestine , stomach.
9. SOLUTION – XI NCERT pg 101, 1st para. Epithelium tissue present on the surface ,facing either external or body fluids..
10. SOLUTION – XI NCERT pg 101, 1st para. Epithelium tissue present on the surface ,facing either external or body fluids..
11. SOLUTION – Simple squamous epithelium is present in the lining of alveoli.
12. SOLUTION – The granules are secreted from apical surface by diffusion or exocytosis , eg. Salivary gland and pancreas.
13. SOLUTION – Squamous epithelium appears like a thin flat tiles and its apical surface is flat thus called pavement membrane.
14. Glandular epithelia is modified cuboidal or columnar epi.

15. SOLUTION –XI NCERT pg 102, 2nd para. Compound epi. plays negligible role in absorption and secretion.
16. Maximally glands means majority of glands are Merocrine and exocrine
17. SOLUTION – Non – keratinized stratified squamous epithelium is present in lining of vagina , esophagus and urethra.
18. SOLUTION – Transitional Epithelium or urothelium being modified compound epi.,hence the cells of its deepest layer cannot be squamous in nature.

CONNECTIVE TISSUE

19. SOLUTION – It consist of fibroblast and elastin fibres.Ligament connects bones to prevent their dislocation.
20. Areolar tissue is the most widely distributed tissue of the body and is a type of loose connective tissue.
21. SOLUTION – All the types of connective tissue contains nerves only cartilage is avascular.
22. SOLUTION – Areolar connective tissue present beneath skin.
23. Connective tissue has abundant matrix with various types of fibres. Hence distribution and type of fibres in matrix shall decide the type of connective tissue.
24. SOLUTION – Areolar tissue contains 3 prominent types of cells – fibroblast , mast cell , macrophage .
25. SOLUTION – Tendons comprises of fibroblast and collagen fibres arranged in parallel bundles.
26. SOLUTION – Adipose tissue is type of loose connective tissue and all others are dense connective tissue..
27. SOLUTION – Lamallae are concentric rings of matrix found only in mammalian bones.
28. SOLUTION – Cartilage is avascularised. Only bone cells shows Canaliculi.
29. SOLUTION – lacunae are the fluid filled cavity enclosing the cells when the matrix is solid (seen in bone and cartilage), and such solid matrix is absent in tendons and ligaments and hence they lack lacunae.
30. SOLUTION – Mastocytes involve in allergy by secreting histamine whereas rest other cells involved in phagocytosis.
31. SOLUTION – Mast cells is present in areolar connective tissue which is a type of loose connective tissue.

32. Heart being an organ its wall has all tissues, majorly cardiac muscles.
33. SOLUTION – Bone is vascularized and cartilage is avascularised.
34. Protein found in cartilage is chondrin, Protein found in bone is ossein, Protein found in muscle is myosin, Protein found in connective tissue like ligament is elastin.
35. SOLUTION – Injury or Pulling of ligaments without dislocation of bones is called sprain and strain is injury to muscle or tendon due to their overstretching.
36. SOLUTION – The intercellular material of cartilage is solid and pliable due to chondroitin sulphates. Bone matrix is solid and non pliable. Red bone marrow is primarily involved in production of blood cells.
37. SOLUTION – Haversian system is typical characteristic of diaphysis region of long mammalian bone only.
38. SOLUTION – Spongy bone have red bone marrow present in between trabeculae whereas compact bone has yellow bone marrow which stores fat.

MUSCLE

39. SOLUTION – Auto-rhythmicity is the auto-excitability of cardiac muscle due to presence of inter-calated disc.
40. SOLUTION – Sarcomere is the area between two Z-line and it is the structural and functional unit of muscle.
41. Smooth muscle cell is spindle shaped ie fibres taper at both the ends.They lack alternate light and dark bands and hence unstriated. They contain gap junctions.
42. Fascicle or fasciculus means bundle of muscle cells.
43. SOLUTION – Cardiac muscle is striated and involuntary in nature. Red and white skeletal muscle have alternate light band and dark band but is voluntary.
44. Cardiac and smooth muscle cells are uninucleated.
45. Actin and myosin are chief contractile proteins of all muscles.

NEURAL TISSUE

46. Unmyelinated axons have Schwann cells for protection but that do not produce myelin sheath.
47. SOLUTION –Olfactory cells- sensory epithelium. Pseudounipolar neuron is present in the dorsal root ganglia of spinal cord.
48. SOLUTION – Neurilemma is the plasma membrane of schwann cells. Schwann cell is a type of glial cells which may or may not secrete myelin sheath.

49. SOLUTION – Neuroglial cells provide support , protection and nutrition to neurons.
 50. Neurons are the structural and functional units of neural system.

COCKROACH

51. SOLUTION – Intimal lining are also called teanidia which is a chitinous ring present around tracheal tubes to prevent collapse of tracheal tubes.
52. SOLUTION – Ostia is related to circulatory system . Ostia is the opening of heart chamber for entry of blood..
53. SOLUTION – 100 – 150 malpighian tubules are present at the junction of midgut and hind gut.
54. Gonapophysis are referred as phallogeres only in male cockroaches.
55. SOLUTION – Chitinous exoskeleton helps arthropods to conserve water and hence be omnipresent.
56. SOLUTION – Spiracles are present on the lateral side of body in cockroach .
57. SOLUTION – Each ootheca contains 14 – 16 eggs.
58. SOLUTION – Gonapophysis present in male is 3 and in female is 6.
59. Vestibulum means oothecal chamber that's present only in female cockroach.
60. SOLUTION – Hepatic caecae and midgut glands secrete the digestive juice which contains digestive enzymes.
61. SOLUTION – Malpighian tubule removes the uric acid from the hemocoelomic fluid.
62. SOLUTION – Rectal papillae absorbs the water in the gut , waxy layer prevents the loss of water from the surface of the body , uric acid require very less amount of water (10ml) to excrete out of the body.
63. SOLUTION – Inner layer of spermatophore is secreted by uricose gland , middle layer by ejaculatory duct and outermost layer is by phallic gland.
64. Insects are uricotelic in nature.
65. XI NCERT pg 112
66. XI NCERT pg 115 fig. 7.18
67. SOLUTION – Heart is located in the pericardial sinus.
68. XI NCERT pg 113 ,1st para

69. SOLUTION – Malpighian tubules ,Uricose gland , fat body cells , nephrocytes and cuticle play a role in excretion.
70. SOLUTION – Hard chitinous plate is called sclerites . Ventral sclerite is called sternites whereas dorsal sclerites is called tergites.
71. XI NCERT pg 114, 3rd para
72. SOLUTION – ANS is a part of PNS which is present in the cockroach but not well developed. Haemocoelomic circulation means open circulation.
73. Ostia are the opening of heart chambers that allows blood to enter from Pericardial sinus to the heart chamber
74. SOLUTION – Boat shaped sternum is present only in 7th abdominal segment of female cockroach.
75. SOLUTION – The covering of chitin is absent in midgut. Foregut is lined by cuticle.
76. SOLUTION – Stomodeal valve is present between gizzard and midgut.
77. Blood of cockroach lacks respiratory pigment and hence blood plays no role in transport of gases.

PREVIOUS YEARS QUESTIONS

1. SOLUTION – There are 10 pairs of spiracles out of which 2 pairs are present in the thorax and remaining 8 pairs are present in the abdomen.
2. Connective tissue arise from mesoderm germ layer and has abundant matrix.
3. SOLUTION – Respiration in cockroach occurs through tracheal tubes therefore such respiration is called tracheal respiration which is a type of indirect respiration. Blood of cockroach lacks respiratory pigment and hence blood plays no role in transport of gases.
4. SOLUTION – Phallic gland is also called conglobate gland that secretes the outermost covering of spermatophore..
5. XI NCERT pg 115. It has 2 rows with 8 eggs in each row.
6. SOLUTION – Mammary gland is apocrine , Ceruminous gland and sebaceous glands are holocrine and pineal gland being endocrine gland is merocrine in nature .All endocrine glands and majority of exocrine glands are merocrine in nature.
7. Haversian system is found only in the diaphysis region of long bones of mammals.
8. SOLUTION – Ciliated columnar epithelium is present in the lining of fallopian tube for ova movement , in bronchioles and bronchi to trap dust particles.
9. Only bones have Haversian system and hence Haversian canals.
10. SOLUTION – Transition epithelium is also called urothelium.

11. SOLUTION – Hyaline cartilage present near the ends of long bones is called articular cartilage.
12. Cockroach have 2 pairs of wings. Earthworm shows cocoon formation. Annelids, Arthropods and chordates show segmented body.
13. SOLUTION – Hormones like MSH and melatonin are responsible for the skin colour.
14. SOLUTION – There are 12 pairs of alary muscles associated with 13 chambered heart of cockroach.
15. SOLUTION – Cell junction is a typical characteristic of epithelium , as epithelium is compactly arranged tissue.
16. SOLUTION – Whartons jelly (modified connective tissue) is present around the umbilical cord to prevent bending of cord.
17. Blood cells like RBCs, WBCs, Platelets are characteristic of only vertebrates. Cockroach blood lacks respiratory pigment
18. SOLUTION – Peritropic membrane is present in the midgut of cockroach .
19. SOLUTION – Z – line is present in between I-band.
20. SOLUTION – Schwann cells ,a type of glial cells are present PNS.
21. Areolar tissue contains mainly 3 types of cells –fibroblasts, mast cells and macrophages.
22. SOLUTION – Left phallomeres bears titillator , pseudopenis etc. .
23. SOLUTION – Cardiac muscle being striated muscle therefore they contract quickly and are immune to fatigue.
24. SOLUTION – Hyaline cartilage is also called transparent tissue , it does not contain blood vessels and nerves.
25. SOLUTION – Pinna , Eustachian tube , larynx except thyroid cartilage and epiglottis are made up of elastic cartilage.
26. A is columnar epi.but nephron mainly has cuboidal epi. and not columnar. D is cardiac muscle. C is dense fibrous tissue and not cartilage .Tendon attach muscle to bones
27. XI NCERT pg 103 Fig 7.4
28. SOLUTION – Bone marrow are absent in birds ,Their bones are hollow filled with air also called pneumatic bone.
29. Lining of intestine and of kidney nephron (PCT) is brush bordered columnar and brush bordered cuboidal epi. respectively.
30. SOLUTION – PCT and DCT of nephron is lined by cuboidal epithelium. Inner surface of bronchioles – ciliated epithelium. Inner lining of salivary ducts – Compound epithelium . Moist surface of buccal cavity – Compound epithelium
31. Cartilage – Specialised skeletal connective tissue. Tendon – Dense connective tissue.

Adipose tissue – Loose connective tissue

32. SOLUTION – Chitinous exoskeleton that helps in water conservation.
33. SOLUTION – Arthroial membrane is a thin, delicate, flexible membrane which connects two sclerites. It is also called as articular membrane .
34. Cockroach being an insect is uricotelic in nature.
35. XI NCERT pg 103 ,3rd para
36. Indeterminate and radial cleavage during embryonic development- feature of vertebrates, chordates.
37. Areolar Tissue (loose con.tissue) whereas Tendon (dense con. Tissue). Transitional epithelium (urinary system) and Tip of nose has elastic cartilage. Lining of stomach has columnar epi.
38. Solution – Seminal vesicle are paired pouch in which sperms are temporarily stored and are glued together to form spermatophore.
39. SOLUTION – Smooth musles are spindle shaped,involuntary, unstriated muscle.
40. XI NCERT pg 119,3rd para
41. Volkmann's canal are transverse canal to connect Haversian canals.
42. SOLUTION –The inner lining of trachea is made up of ciliated Pseudostratified columnar epithelial tissue. Seminiferous tubule- Germinal epi., Fallopian tube- Ciliated epi., Kidney tubule- cuboidal epi.
43. SOLUTION – Schwann cells present in PNS which may or may not secrete myelin sheath whereas oligodendrocytes is present in CNS which secretes myelin sheath.
44. Epithelium is first to originate and neural is last to originate tissues of animals.
45. SOLUTION – Nissls granules are ribonucleoprotein present in the cyton due to which cyton appears grey.
46. XI NCERT pg 113
47. SOLUTION – Ciliated columnar epithelium with some goblet cells are present in lining of respiratory tract to trap the dust particles.
48. Goblet cells of alimentary canal are modified from columnar epithelial cells, which secrete mucus. These cells are found in the lining of organs like intestine and respiratory tract. These secretes mucin (glycoprotein) and maintains the layer of mucus. As each cell secretes mucin for mucous production it is called as a unicellular mucous gland.
49. Cuboidal epithelium with brush border of microvili is found in proximal convoluted tubule of nephron. The epithelium fills the lumen, and the microvilli increases the surface area by 30-40 fold. A brush border is a name for the microvilli-covered surface of simple cuboidal epithelium and simple columnar epithelium cells found in certain locations of the body. The proximal convoluted tubule of the vertebrate nephron lies between Bowman's capsule and the loop of

Henle and functions especially in the absorption of sugar, sodium and chloride ions and water from the glomerular filtrate.

50. In cockroach, the parts of the foregut in correct sequence are Mouth → Pharynx → Oesophagus → Crop → Gizzard
The alimentary canal in cockroach has three regions, i.e. foregut, midgut and hindgut. The foregut comprises of the mouth, which opens into a short tubular pharynx, leading to a narrow tubular passage called oesophagus. This in turn opens into a sac-like structure called crop used for storing food. The crop is followed by gizzard or proventriculus which helps in grinding the food particles.
51. The option (a) is the correct match with reference to cockroach which is as follows
Grinding of the food particles is done by proventriculus or gizzard. Hepatic caeca is a ring of 6-8 blind tubules present at the junction of foregut and midgut. It secretes digestive juice.
52. Option (b) is correct because the nervous system of cockroach consists of a series of fused segmentally arranged ganglia joined by paired longitudinal connectives on the ventral side. Three ganglia, i.e. in the thorax and six in the abdomen. In this way Cockroach nervous system is spread throughout the body. The head holds a bit of a nervous system, while the rest is situated along the ventral (belly side) part of its body. Therefore if the head region of a cockroach is removed it may live for few days.
53. Tight junction helps to stop the leakage of the substances across a tissue and Gap junction are channels that physically connect neighbouring cells, mediating the rapid exchange of small molecules or ions. Adhering junction They are cell-cell junction complexes that make important contribution to embryogenesis and tissue homeostasis.
54. Statement in option (c) is incorrect and can be Corrected as Intercalated discs are not found in smooth muscles these are found in cardiac muscles. Smooth muscle cells are spindle-shaped, have a single nucleus and do not show striations. These involuntary muscles are found on the walls of internal organs such as blood vessels.
55. In cockroach ,a ring of 6-8 blind tubules called hepatic or gastric caeca is present at the junction of foregut and midgut which secrete digestive juice to facilitate digestion. Rest statements are correct.
56. Statements I, II and III are correct. Earthworms have cylindrical body. Anterior end consists of the mouth and the prostomium, a lobe which serves as a covering for the mouth and as a wedge to force open cracks in the soil. The prostomium is sensory in function. Statement IV is incorrect and can be corrected as: The first body segment is called the peristomium.