

Structural Organisation in Animals

7.1 Animal Tissues

- Cuboidal epithelium with brush border of microvilli is found in
 - lining of intestine
 - ducts of salivary glands
 - proximal convoluted tubule of nephron
 - Eustachian tube *(NEET 2020)*
- Goblet cells of alimentary canal are modified from
 - squamous epithelial cells
 - columnar epithelial cells
 - chondrocytes
 - compound epithelial cells. *(NEET 2020)*
- The ciliated epithelial cells are required to move particles or mucus in a specific direction. In humans, these cells are mainly present in
 - bronchioles and Fallopian tubes
 - bile duct and bronchioles
 - Fallopian tubes and pancreatic duct
 - Eustachian tube and salivary duct. *(NEET 2019)*
- Match the following cell structure with its characteristic feature.

(A) Tight junctions	(i) Cement neighbouring cells together to form sheet
(B) Adhering junctions	(ii) Transmit information through chemical to another cells
(C) Gap junctions	(iii) Establish a barrier to prevent leakage of fluid across epithelial cells
(D) Synaptic junctions	(iv) Cytoplasmic channels to facilitate communication between adjacent cells

Select correct option from the following.

(A) (B) (C) (D)

 - (ii) (iv) (i) (iii)
 - (iv) (ii) (i) (iii)
 - (iii) (i) (iv) (ii)
 - (iv) (iii) (i) (ii) *(Odisha NEET 2019)*
- Smooth muscles are
 - involuntary, fusiform, non-striated
 - voluntary, multinucleate, cylindrical

- involuntary, cylindrical, striated
- voluntary, spindle-shaped, uninucleate. *(NEET-II 2016)*

- Which type of tissue correctly matches with its location?

Tissue	Location
(a) Transitional epithelium	Tip of nose
(b) Cuboidal epithelium	Lining of stomach
(c) Smooth muscle	Wall of intestine
(d) Areolar tissue	Tendons

(NEET-I 2016)

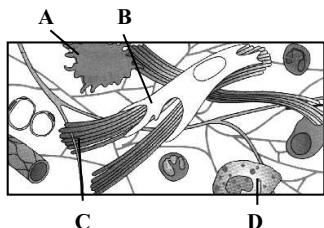
- The function of the gap junction is to
 - separate two cells from each other
 - stop substance from leaking across a tissue
 - performing cementing to keep neighbouring cells together
 - facilitate communication between adjoining cells by connecting the cytoplasm for rapid transfer of ions, small molecules and some large molecules. *(2015)*
- Choose the correctly matched pair.
 - Tendon - Specialized connective tissue
 - Adipose tissue - Dense connective tissue
 - Areolar tissue - Loose connective tissue
 - Cartilage - Loose connective tissue *(2014)*
- Choose the correctly matched pair.
 - Inner lining of salivary ducts - Ciliated epithelium
 - Moist surface of buccal cavity - Glandular epithelium
 - Tubular parts of nephrons - Cuboidal epithelium
 - Inner surface of bronchioles - Squamous epithelium *(2014)*
- Identify the tissue shown in the diagram and match with its characteristics and its location.
 - Smooth muscles, show branching, found in the wall of the heart



- (b) Cardiac muscles, unbranched muscles, found in the walls of the heart
- (c) Striated muscles, tapering at both-ends, attached with the bones of the ribs
- (d) Skeletal muscles show striations and are closely attached with the bones of the limbs

(Karnataka NEET 2013)

11. Given below is the diagrammatic sketch of a certain type of connective tissue. Identify the parts labelled A, B, C and D and select the right option about them.



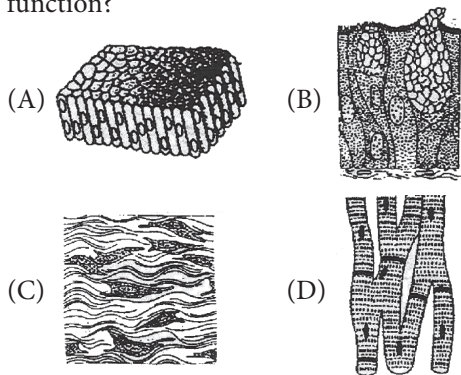
- | | A | B | C | D |
|-----|------------|-----------------|-----------------|-----------------|
| (a) | Macrophage | Fibroblast | Collagen fibres | Mast cell |
| (b) | Mast cell | Macrophage | Fibroblast | Collagen fibres |
| (c) | Macrophage | Collagen fibres | Fibroblast | Mast cell |
| (d) | Mast cell | Collagen fibres | Fibroblast | Macrophage |

(Mains 2012)

12. The supportive skeletal structures in the human external ears and in the nose tip are examples of
- (a) ligament
 - (b) areolar tissue
 - (c) bone
 - (d) cartilage.

(Mains 2012)

13. The four sketches (A, B, C and D) given below, represent four different types of animal tissues. Which one of these is correctly identified in the options given, along with its correct location and function?



- | | Tissue | Location | Function |
|-----|--------------------------|-----------|----------------------------------|
| (a) | (B) Glandular epithelium | Intestine | Secretion |
| (b) | (C) Collagen fibres | Cartilage | Attach skeletal muscles to bones |

- (c) (D) Smooth muscle tissue
 - (d) (A) Columnar epithelium
- Heart contraction
Nephron Secretion and absorption

(Mains 2012)

14. The ciliated columnar epithelial cells in humans are known to occur in
- (a) Eustachian tube and stomach lining
 - (b) bronchioles and Fallopian tube
 - (c) bile duct and oesophagus
 - (d) Fallopian tube and urethra.

(2011)

15. The cells lining the blood vessels belong to the category of
- (a) smooth muscle tissue
 - (b) squamous epithelium
 - (c) columnar epithelium
 - (d) connective tissue.

(Mains 2011, 2010)

16. Which one of the following is correct pairing of a body part and the kind of muscle tissue that moves it?

- (a) Biceps of upper arm – Smooth muscle fibres
- (b) Abdominal wall – Smooth muscle
- (c) Iris – Involuntary smooth muscle
- (d) Heart wall – Involuntary unstriated muscle

(2009)

17. The epithelial tissue present on the inner surface of bronchioles and Fallopian tubes is

- (a) glandular
- (b) ciliated
- (c) squamous
- (d) cuboidal.

(2009)

18. The cell junctions called tight, adhering and gap junctions are found in

- (a) connective tissue
- (b) epithelial tissue
- (c) neural tissue
- (d) muscular tissue.

(2009)

19. The kind of tissue that forms the supportive structure in our pinna (external ears) is also found in

- (a) nails
- (b) ear ossicles
- (c) tip of the nose
- (d) vertebrae.

(2009)

20. Which one of the following pairs of structures distinguishes a nerve cell from other types of cell?

- (a) Vacuoles and fibres
- (b) Flagellum and medullary sheath
- (c) Nucleus and mitochondria
- (d) Perikaryon and dendrites

(2007)

21. In which one of the following preparations are you likely to come across cell junctions most frequently?

- (a) Thrombocytes
- (b) Tendon
- (c) Hyaline cartilage
- (d) Ciliated epithelium

(2007)

22. Areolar connective tissue joins
(a) bones with bones (b) fat body with muscles
(c) integument with muscles
(d) bones with muscles. (2006)
23. Mast cells secrete
(a) haemoglobin (b) hippurin
(c) myoglobin (d) histamine. (2006)
24. Four healthy people in their twenties got involved in injuries resulting in damage and death of few cells of the following. Which of the cells are least likely to be replaced by new cells?
(a) Liver cells (b) Neurons
(c) Malpighian layer of the skin
(d) Osteocytes (2005)
25. Mast cells of connective tissue contain
(a) vasopressin and relaxin
(b) heparin and histamine
(c) heparin and calcitonin
(d) serotonin and melanin. (2004)
26. Which one of the following contains the largest quantity of extracellular material?
(a) Striated muscle (b) Areolar tissue
(c) Stratified epithelium
(d) Myelinated nerve fibres (2003)
27. Collagen is
(a) fibrous protein (b) globular protein
(c) lipid (d) carbohydrate. (2002)
28. During an injury nasal septum gets damaged and for its recovery which cartilage is preferred?
(a) Elastic cartilage (b) Hyaline cartilage
(c) Calcified cartilage (d) Fibrous cartilage (2001)
29. Which cells do not form layer and remains structurally separate?
(a) Epithelial cells (b) Muscle cells
(c) Nerve cells (d) Gland cells (2001)
30. Proteoglycan in cartilages which is a part of polysaccharide is
(a) chondroitin (b) ossein
(c) casein (d) cartilagin. (2000)
31. Characteristic of simple epithelium is that they
(a) are arranged indiscriminately
(b) make a definite layer
(c) continue to divide and help in organ function
(d) none of the above. (2000)
32. Ligament is a/an
(a) inelastic white fibrous tissue
(b) modified white fibrous tissue
(c) modified yellow elastic fibrous tissue
(d) none of the above. (1999)
33. Tendon is made up of
(a) yellow fibrous connective tissue
(b) modified white fibrous tissue
(c) areolar tissue
(d) adipose tissue. (1999)
34. In mammals, histamine is secreted by
(a) lymphocytes (b) mast cells
(c) fibroblasts (d) histiocytes. (1998)
35. Protein present in cartilage is
(a) cartilagin (b) ossein
(c) chondrin (d) none of these. (1997)
36. Basement membrane is made up of
(a) no cell product of epithelial cell
(b) epidermal cell only (c) endodermal cell
(d) both (b) and (c). (1997)
37. Stratum germinativum is an example of which kind of epithelium?
(a) Columnar (b) Squamous
(c) Cuboidal (d) Ciliated (1997)
38. An epithelial tissue which has thin flat cells, arranged edge to edge so as to appear like closely packed tiles, is found to be present at
(a) outer surface of ovary
(b) inner lining of Fallopian tube
(c) inner lining of stomach
(d) inner lining of cheeks. (1994)
39. Hair present in the skin are
(a) epidermal in origin and made of dead cells
(b) epidermal in origin and made of living cells
(c) dermal in origin and made of living cells
(d) dermal in origin and made of dead cells. (1993)
40. The layer of actively dividing cells of skin is termed as
(a) stratum compactum (b) stratum corneum
(c) stratum malpighii/stratum germinativum
(d) stratum lucidum. (1993)
41. Formation of cartilage bones involves
(a) deposition of bony matter by osteoblasts and resorption by chondroclasts
(b) deposition of bony matter by osteoclasts
(c) deposition of bony matter by osteoclasts only
(d) deposition of bony matter by osteoblasts only. (1993)
42. Characteristics of smooth muscle fibres are
(a) spindle-shaped, unbranched, nonstriated, uninucleate and involuntary
(b) spindle-shaped, unbranched, unstriated, multinucleate and involuntary
(c) cylindrical, unbranched, unstriated, multinucleate and involuntary
(d) cylindrical, unbranched, striated, multinucleate and voluntary. (1992)
43. Haversian canals occur in
(a) humerus (b) pubis
(c) scapula (d) clavicle. (1989)

44. Histamine secreting cells are found in
 (a) connective tissues (b) lungs
 (c) muscular tissue (d) nervous tissue. (1989)
45. Mineral found in red pigment of vertebrate blood is
 (a) magnesium (b) iron
 (c) calcium (d) copper. (1989)

7.3 Earthworm

46. *Pheretima* and its close relatives derive nourishment from
 (a) sugarcane roots
 (b) decaying fallen leaves and soil organic matter
 (c) soil insects
 (d) small pieces of fresh fallen leaves of maize, etc. (2012)
47. One very special feature in the earthworm (*Pheretima*) is that
 (a) fertilization of eggs occurs inside the body
 (b) the typhlosole greatly increases the effective absorption area of the digested food in the intestine
 (c) the S-shaped setae embedded in the integument are the defensive weapons used against the enemies
 (d) it has a long dorsal tubular heart. (2011)
48. Which one of the following structures in *Pheretima* is correctly matched with its function?
 (a) Clitellum - Secretes cocoon
 (b) Gizzard - Absorbs digested food
 (c) Setae - Defence against predators
 (d) Typhlosole - Storage of extra nutrients (Mains 2011)
49. Consider the following four statements (A–D) related to the common frog *Rana tigrina*, and select the correct option stating which ones are true (T) and which ones are false (F).
 Statements:
 A. On dry land it would die due to lack of O₂ if its mouth is forcibly kept closed for a few days.
 B. It has four-chambered heart.
 C. On dry land it turns uricotelic from ureotelic.
 D. Its life-history is carried out in pond water.
- | | A | B | C | D |
|-----|---|---|---|---|
| (a) | T | F | F | T |
| (b) | T | T | F | F |
| (c) | F | F | T | T |
| (d) | F | T | T | F |
- (Mains 2011)
50. Which one of the following correctly describes the location of some body parts in the earthworm *Pheretima*?
 (a) Four pairs of spermathecae in 4th-7th segments
 (b) One pair of ovaries attached at intersegmental septum of 14th and 15th segments

- (c) Two pairs of testes in 10th and 11th segments
 (d) Two pairs of accessory glands in 16th-18th segments (2009)
51. If a live earthworm is pricked with a needle on its outer surface without damaging its gut, the fluid that comes out is
 (a) coelomic fluid (b) haemolymph
 (c) slimy mucus (d) excretory fluid. (2009)
52. Earthworms have no skeleton but during burrowing, the anterior end becomes turgid and acts as a hydraulic skeleton. It is due to
 (a) gut peristalsis (b) setae
 (c) coelomic fluid (d) blood. (2008)
53. Earthworms are
 (a) ammonotelic when plenty of water is available
 (b) ureotelic when plenty of water is available
 (c) uricotelic when plenty of water is available
 (d) uricotelic under conditions of water scarcity. (2006)
54. Primary function of enteronephric nephridia of *Pheretima* is
 (a) osmoregulation
 (b) excretion of nitrogenous wastes
 (c) respiration (d) locomotion. (2000)
55. Earthworm possesses hearts
 (a) 6 pairs (b) 4 pairs
 (c) 2 pairs (d) 1. (1991)
56. Blood of *Pheretima* is
 (a) blue with haemocyanin in corpuscles
 (b) blue with haemocyanin in plasma
 (c) red with haemoglobin in corpuscles
 (d) red with haemoglobin in plasma. (1990)
57. *Pheretima posthuma* is highly useful as
 (a) their burrows make the soil loose
 (b) they make the soil porous, leave their castings and take organic debris in the soil
 (c) they are used as fish meal
 (d) they kill the birds due to biomagnification of chlorinated hydrocarbons. (1990)
58. Earthworms are
 (a) useful (b) harmful
 (c) more useful than harmful
 (d) more harmful. (1989)
59. Photoreceptors of earthworm occur on
 (a) clitellum (b) many eyes
 (c) dorsal surface (d) lateral sides. (1989)

7.4 Cockroach

60. If the head of cockroach is removed, it may live for few days because
 (a) the supra-oesophageal ganglia of the cockroach are situated in ventral part of abdomen
 (b) the cockroach does not have nervous system

- (c) the head holds a small proportion of a nervous system while the rest is situated along the ventral part of its body
(d) the head holds a $\frac{1}{3}^{\text{rd}}$ of a nervous system while the rest is situated along the dorsal part of its body.
(NEET 2020)
61. Select the correct sequence of organs in the alimentary canal of cockroach starting from mouth.
(a) Pharynx → Oesophagus → Ileum → Crop → Gizzard → Colon → Rectum
(b) Pharynx → Oesophagus → Crop → Gizzard → Ileum → Colon → Rectum
(c) Pharynx → Oesophagus → Gizzard → Crop → Ileum → Colon → Rectum
(d) Pharynx → Oesophagus → Gizzard → Ileum → Crop → Colon → Rectum (NEET 2019)
62. Which of the following features is used to identify a male cockroach from a female cockroach?
(a) Presence of a boat-shaped sternum on the 9th abdominal segment
(b) Presence of caudal styles
(c) Forewings with darker tegmina
(d) Presence of anal cerci (NEET 2018)
63. In male cockroaches, sperms are stored in which part of the reproductive system?
(a) Seminal vesicles (b) Mushroom glands
(c) Testes (d) Vas deferens (NEET-II 2016)
64. Which of the following features is not present in *Periplaneta americana*?
(a) Exoskeleton composed of N-acetylglucosamine
(b) Metamerically segmented body
(c) Schizocoelom as body cavity
(d) Indeterminate and radial cleavage during embryonic development (NEET-I 2016)
65. The body cells in cockroach discharge their nitrogenous waste in the haemolymph mainly in the form of
(a) urea (b) calcium carbonate
(c) ammonia (d) potassium urate. (2015)
66. The terga, sterna and pleura of cockroach body are joined by
(a) arthrodial membrane (b) cartilage
(c) cementing glue (d) muscular tissue. (2015 Cancelled)
67. What external changes are visible after the last moult of a cockroach nymph?
(a) Both forewings and hindwings develop
(b) Labium develops
(c) Mandibles become harder
(d) Anal cerci develop (NEET 2013)
68. Select the correct option with respect to cockroaches.
(a) Malpighian tubules convert nitrogenous wastes into urea.
(b) Males bear short anal styles not present in females.
(c) Nervous system comprises of a dorsal nerve cord and ten pairs of ganglia.
(d) The forewings are tegmina which are used in flight. (Karnataka NEET 2013)
69. Which one of the following is one of the paths followed by air or O₂ during respiration in the adult male *Periplaneta americana* as it enters the animal body?
(a) Spiracle in metathorax, trachea, tracheoles, oxygen diffuses into cells
(b) Mouth, bronchial tube, trachea, oxygen enters cells
(c) Spiracles in prothorax, tracheoles, trachea, oxygen diffuses into cells
(d) Hypopharynx, mouth, pharynx, trachea, tissues (Karnataka NEET 2013)
70. Select the correct statement from the ones given below with respect to *Periplaneta americana*.
(a) Nervous system located dorsally, consists of segmentally arranged ganglia joined by a pair of longitudinal connectives.
(b) Males bear a pair of short thread like anal styles.
(c) There are 16 very long Malpighian tubules present at the junctions of midgut and hindgut.
(d) Grinding of food is carried out only by the mouth parts. (2012)
71. Which of the following happens in the common cockroach?
(a) Malpighian tubules are excretory organs projecting out from the colon.
(b) Oxygen is transported by haemoglobin in blood.
(c) Nitrogenous excretory product is urea.
(d) The food is ground by mandibles and gizzard. (2011)
72. **Assertion (A) :** *Periplaneta americana* is nocturnal, omnivorous, household pest.
Reason (R) : It is because it acts as scavenger.
(a) A is true but R is false.
(b) A is false but R is true.
(c) Both A and R are true and R is correct explanation of A.
(d) Both A and R are true but R is not correct explanation of A. (1992)
73. Male and female cockroaches can be distinguished externally through
(a) anal styles in male (b) anal cerci in female
(c) anal style and antennae in females
(d) both (b) and (c). (1991)
- 7.5 Frog**
74. Select the correct route for the passage of sperms in male frogs.

- (a) Testes → Vasa efferentia → Kidney → Seminal vesicle → Urinogenital duct → Cloaca
 (b) Testes → Vasa efferentia → Bidder's canal → Ureter → Cloaca
 (c) Testes → Vasa efferentia → Kidney → Bidder's canal → Urinogenital duct → Cloaca
 (d) Testes → Bidder's canal → Kidney → Vasa efferentia → Urinogenital duct → Cloaca
 (NEET 2017)
- 75.** Frog's heart when taken out of the body continues to beat for sometime.
 Select the best option from the following statements.
 (1) Frog is a poikilotherm.
 (2) Frog does not have any coronary circulation.
 (3) Heart is "myogenic" in nature.
 (4) Heart is autoexcitable.
 (a) Only (4) (b) (1) and (2)
 (c) (3) and (4) (d) Only (3) (NEET 2017)
- 76.** Compared to those of humans, the erythrocytes in frog are
 (a) without nucleus but with haemoglobin
 (b) nucleated and with haemoglobin
 (c) very much smaller and fewer
 (d) nucleated and without haemoglobin. (2012)
- 77.** Frogs differ from humans in possessing
 (a) paired cerebral hemispheres
 (b) hepatic portal system
 (c) nucleated red blood cells
 (d) thyroid as well as parathyroid. (Mains 2011)
- 78.** Ureters act as urinogenital ducts in
 (a) human males (b) human females
 (c) both male and female frogs
 (d) male frogs. (Mains 2011)
- 79.** Which one of the following is the true description about an animal concerned?
 (a) Rat - Left kidney is slightly higher in position than the right one
 (b) Cockroach - 10 pairs of spiracles (2 pairs on thorax and 8 pairs on abdomen)
- (c) Earthworm - The alimentary canal consists of a sequence of pharynx, oesophagus, stomach, gizzard and intestine
 (d) Frog - Body divisible into three regions - head, neck and trunk (2008)
- 80.** What happens if bone of frog is kept in dilute hydrochloric acid?
 (a) Will become flexible (b) Will turn black
 (c) Will break into pieces (d) Will shrink (2000)
- 81.** The roof of the cranium of frog is formed by
 (a) frontoparietal (b) orbitosphenoid
 (c) parasphenoid (d) alisphenoid. (1997)
- 82.** In frog, the surface of attachment of tongue is
 (a) pterygoid (b) hyoid apparatus
 (c) parasphenoid (d) palatine. (1997)
- 83.** In frog, "fenestra ovalis" is
 (a) the communication between the pharynx and the tympanic cavity
 (b) the external opening of the tympanic cavity which is covered by the tympanic membrane
 (c) the air filled cavity of the middle ear
 (d) the opening in the auditory capsule which separates the middle ear from the internal ear. (1997)
- 84.** The kidney of an adult frog is
 (a) metanephros (b) opisthonephros
 (c) pronephros (d) mesonephros. (1997)
- 85.** Mucus helps frog in forming
 (a) thick skin (b) dry skin
 (c) smooth skin (d) moist skin. (1993)
- 86.** Bullfrog of India is
 (a) *Rana tigrina* (b) *R. sylvatica*
 (c) *R. catesbeiana* (d) *R. esculenta*. (1992)
- 87.** Addition of a trace of thyroxine or iodine in water containing tadpoles will
 (a) keep them in larval stage
 (b) hasten their metamorphosis
 (c) slow down their metamorphosis
 (d) kill the tadpoles. (1990)

ANSWER KEY

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|-----------|---------|---------|---------|---------|
| 1. (c) | 2. (b) | 3. (a) | 4. (c) | 5. (a) | 6. (c) | 7. (d) | 8. (c) | 9. (c) | 10. (d) |
| 11. (a) | 12. (d) | 13. (a) | 14. (b) | 15. (b) | 16. (b,c) | 17. (b) | 18. (b) | 19. (c) | 20. (d) |
| 21. (d) | 22. (c) | 23. (d) | 24. (b) | 25. (b) | 26. (b) | 27. (a) | 28. (b) | 29. (c) | 30. (a) |
| 31. (b) | 32. (c) | 33. (b) | 34. (b) | 35. (c) | 36. (a) | 37. (a) | 38. (d) | 39. (a) | 40. (c) |
| 41. (a) | 42. (a) | 43. (a) | 44. (a) | 45. (b) | 46. (b) | 47. (b) | 48. (b) | 49. (*) | 50. (c) |
| 51. (a) | 52. (c) | 53. (a) | 54. (a) | 55. (b) | 56. (d) | 57. (b) | 58. (a) | 59. (c) | 60. (c) |
| 61. (b) | 62. (b) | 63. (a) | 64. (d) | 65. (d) | 66. (a) | 67. (a) | 68. (b) | 69. (a) | 70. (b) |
| 71. (d) | 72. (d) | 73. (a) | 74. (c) | 75. (c) | 76. (b) | 77. (c) | 78. (d) | 79. (b) | 80. (a) |
| 81. (a) | 82. (b) | 83. (c) | 84. (d) | 85. (d) | 86. (a) | 87. (b) | | | |