3. ANIMAL TISSUES (SOLUTIONS)

TEACHING TASK (Page 66 – 68)

Multiple Choice Questions (Single Correct Answer)

1. Intestine absorbs the digested food materials; what type of epithelial cells are responsible for that?

Correct Answer: B) Columnar epithelium

Explanation: The inner lining of the intestine is composed of simple columnar epithelium, which is specialized for absorption and secretion. These cells have microvilli that increase the surface area for efficient absorption of digested nutrients.

A) Stratified squamous epithelium: Found in areas like the skin, suited for protection, not absorption.

C) Spindle fibre: Not a tissue; it's a structure involved in cell division.

D) Cuboidal epithelium: Found in glandular tissues and kidney tubules, primarily for secretion and absorption in smaller quantities.

2. Which type of tissue changes the diameter of a blood vessel?

Correct Answer: C) Muscle

Explanation: Smooth muscle tissue, found in the walls of blood vessels, contracts and relaxes to regulate the diameter of blood vessels (vasoconstriction and vasodilation), controlling blood flow and pressure.

A) Connective tissue: Provides structural support, not contraction.

B) Nervous: Sends signals but doesn't directly change vessel diameter.

D) Epithelial: Lines surfaces, not involved in contraction.

3. Which of the following helps in repair of tissue and fills up the space inside the organ?

Correct Answer: C) Areolar

Explanation: Areolar tissue is a loose connective tissue that fills spaces between organs, supports them, and aids in tissue repair due to its fibroblasts and extracellular matrix.

A) Tendon: Connects muscle to bone, not involved in repair.

B) Adipose: Stores fat, not primarily for repair.

D) Cartilage: Provides structural support, not tissue repair.

4. Select the incorrect sentence.

Correct Answer: C) Tendons are non-fibrous tissue and fragile

Explanation:

A) Blood has matrix containing proteins, salts, and hormones: Correct, as blood plasma contains these components.

B) Two bones are connected with ligament: Correct, ligaments connect bone to bone.

C) Tendons are non-fibrous tissue and fragile: Incorrect, tendons are fibrous connective tissue (collagen-rich) and strong, connecting muscle to bone.

D) Cartilage is a form of connective tissue**: Correct, cartilage is a type of connective tissue.

5. A person met with an accident in which two long bones of hand were disjointed. Which among the following may be the possible reason?

Correct Answer: C) Ligament

Explanation: Dislocation of bones occurs when ligaments, which connect bones at joints, are torn or stretched, allowing bones to move out of alignment.

A) Tendon break: Tendons connect muscle to bone, not bone to bone.

B) Break of skeletal muscle: Muscles don’t hold bones together at joints.

D) Areolar tissue break: Areolar tissue is not involved in joint stability.

6. Which of the cells is found in the cartilaginous tissue of the body?

Correct Answer: D) Chondrocytes

Explanation: Chondrocytes are the specialized cells found in cartilage, responsible for producing and maintaining the cartilaginous matrix.

A) Mast cells: Found in connective tissues, involved in immune responses.

B) Basophils: A type of white blood cell, not in cartilage.

C) Osteocytes: Found in bone tissue, not cartilage.

7. While doing work and running, you move your organs like hands, legs, etc. Which among the following is correct?

Correct Answer: D) Skeletal muscles contract and pull the tendon to move the bones

Explanation: Skeletal muscles are voluntary muscles that contract to pull tendons, which are attached to bones, causing movement at joints.

A) Smooth muscle and ligament: Smooth muscles are involuntary and not involved in bone movement; ligaments connect bones.

B) Smooth muscle and tendon**: Smooth muscles don't control bone movement.

C) Skeletal muscle and ligament: Ligaments don't attach muscles to bones; tendons do.

8. Strain is caused by excessive pulling of:

Correct Answer: A) Muscles

Explanation: A strain is an injury caused by overstretching or tearing of muscles or tendons due to excessive pulling or overuse.

B) Ligaments: Injury to ligaments is called a sprain, not a strain.

C) Tendons: While tendons can be involved in strains, muscles are the primary tissue affected.

D) Nerves: Nerve injuries are not classified as strains.

9. A bone left in dilute HCl for about 3 days will:

Correct Answer: B) Become soft and elastic

Explanation: Dilute HCl dissolves the mineral content (calcium phosphate) of the bone, leaving behind the organic matrix (collagen), which makes the bone soft and elastic.

A) Crack into pieces: HCl doesn't cause cracking.

C) Dissolve completely: Bone doesn't dissolve completely; organic components remain.

D) Remain as it is: HCl reacts with bone minerals, causing a change.

10. The muscular tissue which functions throughout life continuously without fatigue is:

Correct Answer: B) Cardiac muscle

Explanation: Cardiac muscle, found in the heart, contracts rhythmically and continuously throughout life without fatigue due to its unique structure and energy supply.

A) Skeletal: Voluntary muscle, fatigues with prolonged use.

C) Smooth muscle: Involuntary but can fatigue in some cases.

D) Voluntary muscle: Refers to skeletal muscle, which fatigues.

11. Sheath nuclei, Schwann cells, and nodes of Ranvier are found in:

Correct Answer: A) Nervous

Explanation: Schwann cells produce the myelin sheath, which contains sheath nuclei, and nodes of Ranvier are gaps in the myelin sheath, all characteristic of nervous tissue (specifically neurons).

B) Osteoblasts: Bone-forming cells.

C) Chondroblasts: Cartilage-forming cells.

D) Gland cells: Part of epithelial tissue, not nervous tissue.

Advanced Questions

12. Choose the wrong statement:

Correct Answer: B) Only iii

Explanation:

(i) The nature of matrix differs according to the function of the tissue: Correct, as the matrix varies (e.g., blood plasma vs. bone matrix).

(ii) Fats are stored below the skin and in between the internal organs: Correct, adipose tissue stores fat in these locations.

(iii) Epithelial tissues have intercellular spaces between them: Incorrect, epithelial cells are tightly packed with minimal intercellular space.

(iv) Cells of striated muscles are multinucleate and unbranched: Correct for skeletal muscles (multinucleate, unbranched), though cardiac muscles are branched and typically uninucleate.

13. Which muscles act involuntarily?

Correct Answer: B) (ii) and (iii)

Explanation:

(i) Striated muscles: Include skeletal (voluntary) and cardiac (involuntary) muscles, so not entirely involuntary.

(ii) Smooth muscles: Involuntary, found in organs like the stomach and blood vessels.

(iii) Cardiac muscles: Involuntary, found in the heart.

(iv) Skeletal muscles: Voluntary, not involuntary.

Thus, smooth and cardiac muscles (ii and iii) are involuntary.

14. Assertion & Reason:

Assertion (A): Non-striated muscles are said to be voluntary in nature.

Reason (R): Non-striated muscles can be moved according to will. Correct Answer: D) A & R are false

Explanation: Non-striated muscles (smooth muscles) are involuntary, not voluntary, and cannot be moved at will. Both the assertion and reason are incorrect.

15. Assertion & Reason:

Assertion (A): Smooth muscle fibres do not appear to be striated.

Reason (R): This is due to the regular alternate arrangement of thick and thin filaments in smooth muscle fibres.

Correct Answer: C) A is true, R is false

Explanation:

A: True, smooth muscles lack striations due to the absence of a regular sarcomere structure.

R: False, smooth muscles lack striations because their actin and myosin filaments are not arranged in a regular, alternating pattern like in striated muscles.

16. Match the following:

Correct Answer: A) 1-c, 2-a, 3-d, 4-b

Explanation:

1. Fluid connective tissue: Blood (c), as it is a liquid connective tissue.

2. Filling of space inside the organs: Areolar tissue (a), which fills spaces and supports organs.

3. Striated muscle: Skeletal muscle (d), which is voluntary and striated.

4. Adipose tissue: Subcutaneous layer (b), where fat is stored.

17. Match the following:

Correct Answer: C) 1-d, 2-a, 3-b, 4-c

Explanation:

1. Surface of joints: Cartilage (d), as hyaline cartilage covers joint surfaces.

2. Columnar stratified epithelium: Ducts of glands (a), where stratified columnar epithelium is found.

3. Transitional epithelium: Urinary bladder (b), which stretches to accommodate urine.

4. Ciliated epithelium: Respiratory tract (c), where cilia help move mucus.

Comprehensive (Blood Paragraph)

18. What is the pH of blood?

Correct Answer: B) 7.4

Explanation: The paragraph states blood is slightly alkaline with a pH of 7.35–7.4, making 7.4 the closest correct option.

19. Study of blood is called:

Correct Answer: B) Haematology

Explanation: The paragraph explicitly states that the study of blood is called haematology.

20. The main components of blood:

Correct Answer: D) All the above

Explanation: The paragraph mentions plasma, erythrocytes, leucocytes, and platelets as components of blood, so all are included.

21. How much water is present in plasma?

Correct Answer: D) 90%

Explanation: The paragraph states plasma contains 90–92% water, so 90% is correct.

22. What is the element present in haemoglobin?

Correct Answer: B) Fe+2

Explanation: Haemoglobin contains iron (Fe^{2+}) in its heme group, which binds oxygen.

23. Role of haemoglobin in blood:

Correct Answer: B) Transport of gases

Explanation: Haemoglobin's primary role is to transport oxygen and carbon dioxide in the blood.

LEARNERS TASK (Page 69 – 72)

Multiple Choice Questions (Single Correct Answer)

1. Cartilage is not found in

Correct Answer: C) Kidney

Solution: Cartilage is a flexible connective tissue found in the nose, ear, and larynx, providing structural support. Kidneys, however, are primarily composed of epithelial, connective, and nervous tissues, with no cartilage present.

2. Fat is stored in the human body as

Correct Answer: B) Adipose tissue

Solution: Adipose tissue is a specialized connective tissue that stores fat in adipocytes (fat cells). Cuboidal epithelium lines ducts and glands, bones provide structural support, and cartilage is for flexibility, not fat storage.

3. Bone matrix is rich in

Correct Answer: B) Calcium and Phosphorus

Solution: The bone matrix is primarily composed of calcium phosphate, which provides strength and rigidity. Fluoride, potassium, and other minerals are present in trace amounts but are not dominant.

4. Contractile proteins are found in

Correct Answer: C) Muscles

Solution: Contractile proteins, such as actin and myosin, are responsible for muscle contraction and are primarily found in muscle tissue. Bones, blood, and cartilage do not contain these proteins.

5. Voluntary muscles are found in

Correct Answer: B) Legs

Solution: Voluntary muscles (skeletal muscles) are under conscious control and found in limbs like legs. Alimentary canal, iris, and bronchi contain involuntary smooth or cardiac muscles.

6. Nerve cell does not contain

Correct Answer: C) Tendo

Solution: Nerve cells (neurons) are part of the nervous system, including the brain, spinal cord, and nerves. Tendons are connective tissues that connect muscles to bones, not part of neurons.

7. Nerve cell does not contain

Correct Answer: C) Tendons

Solution: Neurons contain axons, nerve endings, and dendrites for signal transmission. Tendons, as connective tissues, are not components of nerve cells.

8. Adipose tissue is

Correct Answer: A) Connective Tissue

Solution: Adipose tissue is a type of loose connective tissue that stores fat. It is not supporting, vascular, or epithelial tissue.

9. Nails, hooves, and horns are examples of

Correct Answer: D) Epidermal tissue

Solution: Nails, hooves, and horns are derived from the epidermis, a type of epithelial tissue, specifically keratinized stratified squamous epithelium.

10. Bone-forming cells are

Correct Answer: A) Osteoblast

Solution: Osteoblasts are cells that synthesize bone matrix. Osteocytes maintain bone, chondroblasts form cartilage, and chondroclasts break down cartilage.

11. The strongest muscle in the body is present in

Correct Answer: C) Jaw

Solution: The masseter muscle in the jaw is considered the strongest muscle based on force exerted (e.g., during biting). Unstriped, cardiac, and skeletal muscles vary in strength but are not the strongest.

12. Mast cells occur in

Correct Answer: A) Connective tissue

Solution: Mast cells, which release histamine and are involved in immune responses, are found in connective tissues, not epithelial, skeletal, or nervous tissues.

Descriptive Questions

1. What will happen if:

a. Ligament gets overstretched:

Answer: Overstretching a ligament (sprain) can cause pain, swelling, and reduced joint stability. Severe cases may lead to partial or complete tearing, impairing joint function.

b. Heparin is absent in blood:

Answer: Heparin is an anticoagulant that prevents blood clotting. Its absence could lead to excessive clot formation, increasing the risk of thrombosis, which may block blood vessels and cause complications like stroke or heart attack.

c. Striated muscles contract rapidly for longer duration:

Answer: Rapid, prolonged contraction of striated (skeletal) muscles can lead to muscle fatigue due to lactic acid buildup and depletion of energy reserves

(ATP). This may cause cramps, soreness, or temporary loss of muscle function.

2. Connective tissues A and B:

a. Name the tissue A (binds skin to underlying tissues):

Answer: Areolar tissue

Explanation: Areolar tissue, a loose connective tissue, binds the skin to underlying muscles and other tissues, providing flexibility and support.

b. Name the tissue B (connects muscles to bones, non-elastic, tough):

Answer: Tendon

Explanation: Tendons are dense connective tissues made of white collagen fibers, connecting muscles to bones. They are tough and relatively non-elastic to transmit muscle force effectively.

3. Correct the incorrect functions of cells/tissues:

a. Muscle cells: carry messages

Correct Answer: Muscle cells contract and relax to cause movement.

Explanation: Muscle cells (myocytes) contain contractile proteins (actin, myosin) for movement, not for carrying messages (a function of nerve cells).

b. Nerve cells contract and relax to cause movement

Correct Answer: Nerve cells transmit impulses to coordinate body functions.

Explanation: Nerve cells (neurons) transmit electrical and chemical signals, not contract. Muscle cells are responsible for contraction and movement.

c. Blood conducts water, minerals, and organic solutes from one part of the organism to other parts

Correct Answer: Blood transports oxygen, nutrients, hormones, and waste products throughout the body.

Explanation: While blood does transport water, minerals, and solutes, its primary role is broader, including oxygen and waste transport, not just conduction like xylem in plants.

4. Give reasons why:

a. Blood is connective tissue:

Reason: Blood is a fluid connective tissue with a liquid matrix (plasma) that connects different parts of the body by transporting nutrients, oxygen, and waste. It contains cells (RBCs, WBCs, platelets) suspended in this matrix, fitting the definition of connective tissue.

b. Muscles contain contractile proteins:

Reason: Muscles contain contractile proteins (actin and myosin) that enable contraction and relaxation, allowing movement and force generation in the body.

c. Muscles of the heart are involuntary:

Reason: Cardiac muscles are involuntary because they contract rhythmically without conscious control, regulated by the autonomic nervous system to maintain continuous heartbeats essential for life.

5. Name the following:

a. Tissue that forms inner lining of our mouth: Stratified squamous epithelium

b. Tissue that connects muscle to bone in humans: Tendon

c. Tissue that stores fat in our body: Adipose tissue

d. Connective tissue with a fluid matrix: Blood

e. Tissue present in the brain: Nervous tissue

6. Identify the type of tissue in the following:

Skin: Epithelial tissue (stratified squamous epithelium)

Bone: Connective tissue (osseous tissue)

Lining of kidney tubule: Epithelial tissue (simple cuboidal epithelium)

Advanced Questions

Multiple Choice Questions (More than one answer)

1. Which muscles act involuntarily?

Correct Answer: B) ii & iii (Smooth muscles and Cardiac muscles)

Solution: Smooth muscles (e.g., in alimentary canal) and cardiac muscles (in the heart) are involuntary, controlled by the autonomic nervous system. Striated (skeletal) muscles are voluntary.

2. Which of the following statements is incorrect?

Correct Answer: B) ii & iii

Solution:

i. Correct: Areolar tissue is widely distributed, binding organs and tissues.

ii. Incorrect: Tendons connect muscles to bones, not bones to bones (ligaments do that).

iii. Incorrect: Ligaments connect bones to bones, not muscles to bones.

iv. Correct: Cartilage is non-porous, lacking blood vessels and nerves.

3. Which of the following is incorrect?

Correct Answer: D) None

Solution:

i. Correct: Mature mammalian RBCs lack a nucleus to maximize oxygen-carrying capacity.

ii. Correct: WBCs exhibit amoeboid movement to reach infection sites.

iii. Correct: Platelets are critical for blood clotting.

iv. Correct: Lymph consists of plasma and WBCs, with fewer proteins than blood.

Assertion & Reason

4. A) Presence of connective tissue inside the brain is essential for conduction of nerve impulse

R) Connective tissue holds together the nerve cells of the brain

Correct Answer: C) A is true, R is false

Solution: Connective tissue (e.g., meninges) supports and protects the brain but is not essential for nerve impulse conduction, which is the function of neurons. The reason is incorrect as connective tissue does not directly hold nerve cells together; glial cells provide structural support within nervous tissue.

5. A) Compound epithelium covers surfaces exposed to mechanical or chemical abrasions

R) Protection of underlying tissues is the major function of simple epithelium

Correct Answer: C) A is true, R is false

Solution: Compound (stratified) epithelium, found in areas like skin, protects against abrasions. Simple epithelium (e.g., in alveoli) is primarily for absorption, secretion, or diffusion, not protection.

6. A) Materials are exchanged between epithelial and connective tissue by diffusion

R) Blood vessels are absent in epithelial tissue

Correct Answer: A) A & R are true, R explains A

Solution: Epithelial tissue lacks blood vessels, so materials (e.g., nutrients, oxygen) diffuse from underlying connective tissue (which has blood vessels) to epithelial cells. The reason explains the assertion.

Match the Following

7. Match tissues with their characteristics:

Epithelial tissue: d. Ecto, meso & endoderm (originates from all germ layers)

- Muscular tissue: c. Contraction and relaxation
- Connective tissue: a. Mesoderm (origin)
- Nervous tissue: b. Transmission of impulses

Correct Answer: C) 1-d, 2-c, 3-a, 4-b

8. Match connective tissues with their cells:

- Areolar: c. Fibroblasts (produce fibers)
- Adipose: d. Adipocytes (store fat)
- Cartilage: b. Chondroblasts (form cartilage)
- Bone: a. Osteocytes (maintain bone)

**Correct Answer: D) 1-c, 2-d, 3-b, 4-a

Comprehensive (Paragraph-Based Questions)

9. Which are the smallest glial cells?

Correct Answer: C) Microglial cells

Solution: The paragraph states that microglial cells are the smallest glial cells with few feathery processes.

10. Which glial cells show phagocytosis process?

Correct Answer: B) Microglial cells

Solution: Microglial cells are described as helping in phagocytosis, engulfing debris or pathogens.

11. These cells form the blood-brain barrier:

Correct Answer: B) Astrocytes

Solution: Astrocytes are noted to help form the blood-brain barrier, regulating substance passage to the brain.

12. These cells are more in number:

Correct Answer: B) Astrocytes

Solution: Astrocytes form the maximum number of glial cells, as per the paragraph.

13. In the absence of Schwann cells, which one forms myelin sheath around axons?

Correct Answer: B) Oligodendrocytes

Solution: Oligodendrocytes form the myelin sheath in the central nervous system (CNS) by spirally wrapping nerve fibers, unlike Schwann cells in the peripheral nervous system.

Additional Questions (Single Correct Answer)

1. Histamines are secreted by

Correct Answer: A) Mast cell

Solution: Mast cells, found in connective tissue, secrete histamine during immune responses. Kupffer cells (liver macrophages), macrophages, and Nissl's granules (in neurons) do not secrete histamine.

2. White fibres are found in

Correct Answer: C) Collagen

Solution: White fibers refer to collagen fibers, found in connective tissues like tendons and ligaments, providing strength.

3.The junction between the axon of one neuron and the dendrites of the next neuron is called

Correct Answer: B) Synapse

Solution: A synapse is the junction where an axon of one neuron communicates with the dendrites (or cell body) of another neuron via neurotransmitters.

4. Nissl's granules are present in

Correct Answer: B) Cyton

Solution: Nissl's granules (rough endoplasmic reticulum) are found in the cyton (cell body) of neurons, involved in protein synthesis.

5. Tendons and ligaments are special types of

Correct Answer: D) Fibrous connective tissue

Solution: Tendons and ligaments are dense fibrous connective tissues, composed mainly of collagen, connecting muscle to bone (tendons) and bone to bone (ligaments).

6. What will happen if ligaments are cut or broken?

Correct Answer: A) Bones will move freely at joints

Solution: Ligaments stabilize joints by connecting bones. If cut or broken, joints become unstable, allowing excessive or free movement, potentially causing dislocation.