

# **Teacher's Handbook**

## **BIOLOGY Class-VIII**

## **CONTENTS**

| <b>S.NO.</b> | <b>CHAPTER NAME</b>                      | <b>PAGE</b> |
|--------------|------------------------------------------|-------------|
| 1            | Improvement in Food Resources            | 3           |
| 2            | Animal Husbandry                         | 8           |
| 3            | Micro Organisms Friend and Foe           | 12          |
| 4            | Plant Tissues                            | 16          |
| 5            | Animal Tissues                           | 21          |
| 6            | Reproduction in Animals                  | 26          |
| 7            | Excretory Products and Their Elimination | 30          |

## EXERCISE-1

### I. Choose the correct answer:

1. Which nutrient is most important for plant growth?  
**Ans:** A. Nitrogen
2. Which method is commonly used to improve soil fertility?  
**Ans:** B. Fertilization
3. Which of the following is a rabi crop?  
**Ans:** A. Wheat
4. Which term refers to the removal of weeds?  
**Ans:** A. Weeding
5. Which microorganism is used in biofertilizers?  
**Ans:** A. Rhizobium
6. Which farming method does not use chemicals?  
**Ans:** A. Organic farming
7. Which crop is grown in the Kharif season?  
**Ans:** A. Rice
8. What is the main purpose of crop rotation?  
**Ans:** C. Improve soil fertility
9. The process of breeding different varieties to improve traits is called:  
**Ans:** A. Hybridization
10. Which element is necessary for photosynthesis?  
**Ans:** B. Magnesium
11. The process of artificially supplying water to crops is called:  
**Ans:** A. Irrigation
12. Which of the following is an oilseed crop?  
**Ans:** A. Mustard
13. Which nutrient deficiency leads to yellowing of leaves?  
**Ans:** A. Nitrogen
14. Which of the following is a macronutrient?  
**Ans:** A. Phosphorus
15. The most common method of weed control is:  
**Ans:** A. Herbicides
16. Which practice conserves soil moisture?  
**Ans:** A. Mulching
17. Organic manure improves soil:  
**Ans:** A. Fertility
18. The main aim of mixed cropping is to:  
**Ans:** A. Reduce risk
19. Which of the following is a milch breed of cattle?  
**Ans:** A. Jersey
20. Which fish culture is done in fresh water?  
**Ans:** A. Inland
21. Which is a leguminous crop?  
**Ans:** A. Pea
22. The process of removing silk fibers from silkworm cocoons is called: **Ans:** A. Reeling
23. The main source of animal protein in diet is:  
**Ans:** A. Meat
24. Which crop requires standing water for cultivation?  
**Ans:** A. Rice
25. Which organism causes foot-and-mouth disease in cattle?  
**Ans:** A. Virus
26. The practice of growing fish with crops is called:  
**Ans:** A. Aquaculture
27. Which disease affects wheat crops?  
**Ans:** A. Rust
28. The removal of unwanted plants from fields is called:  
**Ans:** A. Weeding
29. Which farming technique reduces soil erosion?  
**Ans:** A. Contour plowing
30. Poultry farming is mainly done for:  
**Ans:** C. Both
31. The major component of organic manure is:  
**Ans:** A. Humus
32. The breeding of honeybees is called:  
**Ans:** A. Apiculture
33. Which nutrient is responsible for seed formation?  
**Ans:** A. Phosphorus
34. Which crop is sensitive to frost?  
**Ans:** C. Cotton

## II. Say True or False:

- |                                                |                   |
|------------------------------------------------|-------------------|
| 1. Wheat is a Kharif crop.                     | <b>Ans:</b> False |
| 2. Rice needs more water than wheat.           | <b>Ans:</b> True  |
| 3. Nitrogen is a micronutrient.                | <b>Ans:</b> False |
| 4. Earthworms improve soil fertility.          | <b>Ans:</b> True  |
| 5. Crop rotation reduces soil fertility.       | <b>Ans:</b> False |
| 6. Biofertilizers increase soil fertility.     | <b>Ans:</b> True  |
| 7. Rearing fish is called pisciculture.        | <b>Ans:</b> True  |
| 8. Hybrid seeds give higher yield.             | <b>Ans:</b> True  |
| 9. Weeds increase crop production.             | <b>Ans:</b> False |
| 10. Red Sindhi is a dairy breed.               | <b>Ans:</b> True  |
| 11. Rust is a disease in wheat.                | <b>Ans:</b> True  |
| 12. Poultry farming is for wool.               | <b>Ans:</b> False |
| 13. Legumes fix nitrogen in soil.              | <b>Ans:</b> True  |
| 14. Potassium helps in root growth.            | <b>Ans:</b> True  |
| 15. Irrigation is artificial watering.         | <b>Ans:</b> True  |
| 16. Mustard is an oilseed crop.                | <b>Ans:</b> True  |
| 17. Mulching reduces soil moisture.            | <b>Ans:</b> False |
| 18. Silk is obtained from sheep.               | <b>Ans:</b> False |
| 19. Apiculture is honeybee farming.            | <b>Ans:</b> True  |
| 20. Phosphorus helps in seed growth.           | <b>Ans:</b> True  |
| 21. Organic farming uses no chemicals.         | <b>Ans:</b> True  |
| 22. Rust is caused by a virus.                 | <b>Ans:</b> False |
| 23. Fish liver oil is rich in vitamin A.       | <b>Ans:</b> True  |
| 24. Marine fish farming is called mariculture. | <b>Ans:</b> True  |
| 25. Foot-and-mouth disease affects cattle.     | <b>Ans:</b> True  |

## III. Match the following

### Set 1:

- |            |                      |
|------------|----------------------|
| 1. Wheat   | - D. Rabi crop       |
| 2. Rice    | - A. Kharif crop     |
| 3. Mustard | - E. Oilseed crop    |
| 4. Pea     | - C. Leguminous crop |
| 5. Cotton  | - B. Fiber crop      |

### Set 2:

- |                    |            |
|--------------------|------------|
| 1. Apiculture      | - E. Honey |
| 2. Sericulture     | - D. Silk  |
| 3. Pisciculture    | - A. Fish  |
| 4. Poultry farming | - C. Eggs  |
| 5. Dairy farming   | - B. Milk  |

### Set 3:

1. Nitrogen - B. Leafy growth
2. Phosphorus - D. Seed development
3. Potassium - E. Disease resistance
4. Iron - C. Chlorophyll formation
5. Calcium - A. Cell wall strength

### IV. Multi correct answer type questions

1. Which are Kharif crops?

**Answer:** A. Rice, B. Maize, C. Bajra

2. Which nutrients are macronutrients?

**Answer:** A. Nitrogen, B. Phosphorus, C. Potassium

3. Which are oilseed crops?

**Answer:** A. Mustard, B. Groundnut, C. Sunflower

4. Which crops need high water supply?

**Answer:** A. Rice, B. Sugarcane, C. Jute

5. Which farming methods prevent soil erosion?

**Answer:** A. Terrace farming, B. Mulching, C. Contour plowing

6. Which are rabi crops?

**Answer:** A. Wheat, B. Barley, C. Gram

7. Which are sources of animal protein?

**Answer:** A. Meat, B. Eggs, C. Fish

8. Which are types of irrigation?

**Answer:** A. Drip, B. Sprinkler, C. Furrow

9. Which are biofertilizers?

**Answer:** A. Rhizobium, B. Blue-green algae, C. Mycorrhiza

10. Which are dairy cattle breeds?

**Answer:** A. Jersey, B. Holstein, C. Red Sindhi

### V. Reasoning Type Questions

1. **Assertion :** Green Revolution increased food production in India.

**Reason :** High-yielding variety seeds and fertilizers were used.

**Answer:** (a) Both correct; Reason explains Assertion.

2. **Assertion :** Organic farming avoids the use of chemical fertilizers.

**Reason :** Chemical fertilizers improve soil fertility in the long term.

**Answer:** (b) Both correct; Reason contradicts Assertion.

3. **Assertion :** Kharif crops require a lot of water for growth.

**Reason :** Kharif crops are grown in the rainy season.

**Answer:** (a) Both correct; Reason explains Assertion.

4. **Assertion :** Silk is obtained from sheep.

**Reason :** Silkworms produce wool fibers.

**Answer:** (d) Assertion incorrect, Reason incorrect.

5. **Assertion** : Hybrid seeds give higher yield than normal seeds.  
**Reason** : Hybridization improves plant resistance to diseases.  
**Answer:** (a) Both correct; Reason explains Assertion.
6. **Assertion** : Crop rotation improves soil fertility.  
**Reason** : Different crops use and replenish different nutrients in the soil.  
**Answer:** (a) Both correct; Reason explains Assertion.
7. **Assertion** : Pulses are rich in carbohydrates.  
**Reason** : They are primarily grown for their starch content.  
**Answer:** (d) Assertion incorrect, Reason incorrect.
8. **Assertion** : Poultry farming provides a source of protein-rich food.  
**Reason** : Eggs and meat are good sources of proteins.  
**Answer:** (a) Both correct; Reason explains Assertion.
9. **Assertion** : Drip irrigation is an efficient water conservation method.  
**Reason** : It provides water directly to the roots of plants.  
**Answer:** (a) Both correct; Reason explains Assertion.
10. **Assertion** : Biofertilizers improve soil fertility.  
**Reason** : They add organic matter to the soil.  
**Answer:** (a) Both correct; Reason explains Assertion.

#### **VI. Choose the Odd Man Out:**

1. **Answer:** C. Mustard (oilseed; others are cereals)
2. **Answer:** C. Zinc (micronutrient; others are macronutrients)
3. **Answer:** D. Plowing (not an irrigation method)
4. **Answer:** D. Buffalo (not a fish)
5. **Answer:** D. Horticulture (not animal farming)
6. **Answer:** D. Tuberculosis (animal disease; others are plant diseases)
7. **Answer:** D. Cotton (plant fiber; others are animal products)
8. **Answer:** C. Hen (poultry; others are livestock)
9. **Answer:** D. Maize (cereal; others are oilseeds)
10. **Answer:** C. Jute (fiber crop; others are food crops)

#### **VII. Answer the following Questions:**

##### **1. What are the differences between Rabi and Kharif crops?**

**Ans:** Differences between Rabi and Kharif crops:

Rabi: Winter-grown (Oct–Mar), e.g., wheat, gram.

Kharif: Monsoon-grown (Jun–Oct), e.g., rice, maize.

##### **2. Explain the role of biofertilizers in agriculture.**

**Ans:** Role of biofertilizers:

Microbes like Rhizobium fix nitrogen, enriching soil naturally and reducing chemical use.

##### **3. What are the advantages and disadvantages of using chemical fertilizers?**

**Ans:** Advantages and disadvantages of chemical fertilizers:

Advantages: Quick nutrient supply, higher yields.

Disadvantages: Soil degradation, water pollution.

**4. Describe the process of hybridization in crops.**

**Ans:** Process of hybridization:

Cross-breeding plants to combine desirable traits (e.g., disease resistance + high yield).

**5. Why is crop rotation important for maintaining soil fertility?**

**Ans:** Importance of crop rotation:

Prevents soil nutrient depletion (e.g., legumes replenish nitrogen).

**6. What are the different methods of irrigation used in agriculture?**

**Ans:** Methods of irrigation:

Drip, sprinkler, canal, and furrow irrigation.

**7. Explain the significance of the Green Revolution in India.**

**Ans:** Significance of Green Revolution:

Introduced high-yield varieties and fertilizers, boosting India's food production.

**8. What are the causes and effects of soil erosion?**

**Ans:** Causes and effects of soil erosion:

Causes: Deforestation, overgrazing.

Effects: Loss of fertile topsoil, reduced agricultural productivity.

**9. Discuss the role of organic farming in sustainable agriculture.**

**Ans:** Role of organic farming in sustainable agriculture:

Uses natural inputs (compost, biopesticides) to sustain soil health and reduce pollution.

**10. How do leguminous plants help in nitrogen fixation?**

**Ans:** Nitrogen fixation by leguminous plants:

Host Rhizobium bacteria in root nodules to convert atmospheric nitrogen into soil nitrates.

## CHAPTER-2

### I. Choose the correct answer:

1. Which branch of agriculture deals with the care and breeding of livestock?  
**Ans:** B) Animal Husbandry
2. Which is the most commonly used breed for dairy farming?  
**Ans:** B) Holstein Friesian
3. Poultry farming is mainly concerned with the rearing of  
**Ans:** C) Chickens
4. Which nutrient is most essential for milk production in dairy animals?  
**Ans:** A) Protein
5. The scientific term for goat farming is  
**Ans:** C) Caprine farming
6. Which breed of buffalo is known for high milk yield?  
**Ans:** A) Murrah
7. What is the term for crossbreeding two different breeds of the same species?  
**Ans:** A) Hybridization
8. What is the gestation period of a cow?  
**Ans:** B) 280 days
9. What is the scientific name of domestic cattle?  
**Ans:** B) Bos taurus
10. Which animal is mainly reared for wool production?  
**Ans:** A) Sheep
11. Which Indian state is the leading producer of milk?  
**Ans:** B) Uttar Pradesh
12. Which factor is essential for the growth of fish in aquaculture?  
**Ans:** C) Oxygen level
13. Which system of poultry farming provides the most space for birds?  
**Ans:** C) Free range system
14. Which mineral is crucial for bone development in livestock?  
**Ans:** A) Calcium
15. Which disease is caused by a deficiency of calcium in cattle?  
**Ans:** C) Milk fever
16. Which Indian breed of cow is well known for heat resistance?  
**Ans:** A) Sahiwal
17. The main component of egg protein is  
**Ans:** B) Albumin
18. Which breed of sheep is famous for pashmina wool?  
**Ans:** B) Kashmiri
19. Which vitamin deficiency causes night blindness in animals?  
**Ans:** A) Vitamin A
20. Which fodder crop is rich in protein?  
**Ans:** B) Berseem
21. The main purpose of beekeeping is to produce  
**Ans:** B) Honey
22. Which fish species is widely used in aquaculture?  
**Ans:** C) Tilapia
23. Which disease in poultry is caused by a virus?  
**Ans:** A) Newcastle disease
24. Which instrument is used to test milk quality?  
**Ans:** B) Lactometer
25. Which of the following is a dual-purpose cattle breed?  
**Ans:** A) Hariana
26. What is the function of gizzard in birds?  
**Ans:** A) Grinding food
27. What is the term for the removal of wool from sheep?  
**Ans:** A) Shearing
28. Which is the best season for fish breeding?  
**Ans:** B) Monsoon
29. The study of fish culture is called  
**Ans:** B) Pisciculture
30. What is the main advantage of silage over dry fodder?  
**Ans:** A) More nutrients
31. Which hormone is responsible for milk production in animals?  
**Ans:** C) Prolactin
32. Which structure in poultry farming ensures temperature regulation?  
**Ans:** B) Brooder

## II. Say True or False:

1. Sheep farming is called sericulture. **Ans: False**
2. Poultry farming is for milk production. **Ans: False**
3. Holstein Friesian is a dairy breed. **Ans: True**
4. Sheep provide wool and meat. **Ans: True**
5. Foot and Mouth disease is viral. **Ans: True**
6. Artificial insemination improves breeds. **Ans: True**
7. Calcium is essential for strong bones. **Ans: True**
8. Jowar is a protein-rich fodder. **Ans: False**
9. Murrah is a breed of buffalo. **Ans: True**
10. Dairy cows need high protein diets. **Ans: True**
11. Mastitis is caused by bacteria. **Ans: True**
12. Castration is done in male animals. **Ans: True**
13. Silage is dried fodder. **Ans: False**
14. Pisciculture is related to fish farming. **Ans: True**
15. Pashmina wool comes from goats. **Ans: True**
16. Brooders regulate poultry temperature. **Ans: True**
17. Prolactin controls milk production. **Ans: True**
18. Newcastle disease affects cattle. **Ans: False**
19. Beekeeping is called apiculture. **Ans: True**
20. Vitamin A deficiency causes blindness. **Ans: True**

## III. Match the following:

### Set 1:

- 1 - A (Sahiwal - Cow)
- 2 - D (Murrah - Buffalo)
- 3 - A (Gir - Cow)
- 4 - B (Kashmiri - Pashmina Wool)
- 5 - E (Jamunapari - Goat)

### Set 2:

- 1 - E (Wool - Sheep)
- 2 - C (Milk - Cow)
- 3 - D (Honey - Bees)
- 4 - B (Eggs - Hen)
- 5 - A (Meat - Goat)

### Set 3:

- 1 - A (Protein - Muscle growth)
- 2 - E (Calcium - Strong bones)
- 3 - D (Carbohydrates - Energy)
- 4 - C (Vitamin A - Vision)
- 5 - B (Iron - Blood formation)

#### IV. Multi-correct answer type questions:

1. Which are dairy cattle breeds? **Ans:** A) Jersey, B) Holstein, C) Gir
2. Which animals are reared for wool? **Ans:** A) Sheep, B) Goat, C) Alpaca
3. Which are common poultry birds? **Ans:** A) Hen, B) Duck, C) Turkey
4. Which of these are ruminants? **Ans:** A) Cow, B) Buffalo, C) Goat
5. Which nutrients are essential for growth? **Ans:** A) Protein, B) Carbohydrates, C) Vitamins
6. Which diseases affect cattle? **Ans:** A) Foot and Mouth, B) Anthrax, C) Mastitis
7. Which are fish species used in aquaculture? **Ans:** A) Rohu, B) Catla, C) Tilapia
8. Which fodder crops are rich in protein? **Ans:** A) Berseem, B) Lucerne, C) Cowpea
9. Which products come from bees? **Ans:** A) Honey, B) Wax, C) Pollen
10. Which are exotic cattle breeds? **Ans:** A) Jersey, B) Holstein, C) Brown Swiss

#### V. Reasoning Type Questions:

1. **Assertion:** Crossbreeding improves milk production in cattle.  
**Reasoning:** It combines the desirable traits of two breeds.  
**Ans:** (a) Both correct; Reason explains Assertion.
2. **Assertion:** Poultry birds require a balanced diet for good health.  
**Reasoning:** Malnutrition leads to low egg production and poor immunity.  
**Ans:** (a) Both correct; Reason explains Assertion.
3. **Assertion:** Sheep farming is mainly done for wool and meat production.  
**Reasoning:** Wool is a byproduct of cattle farming.  
**Ans:** (c) Assertion correct, Reason incorrect.
4. **Assertion:** Artificial insemination is widely used in dairy farming.  
**Reasoning:** It helps in selective breeding and disease control.  
**Ans:** (a) Both correct; Reason explains Assertion.
5. **Assertion:** Foot and Mouth Disease is common in cattle.  
**Reasoning:** It is caused by a bacterial infection.  
**Ans:** (c) Assertion correct, Reason incorrect (viral disease).
6. **Assertion:** Murrah is a high-yield buffalo breed.  
**Reasoning:** It is native to India and produces high-fat milk.  
**Ans:** (a) Both correct; Reason explains Assertion.
7. **Assertion:** Calcium is essential for livestock.  
**Reasoning:** It prevents bone deformities and improves egg shell quality.  
**Ans:** (a) Both correct; Reason explains Assertion.
8. **Assertion:** Beekeeping is known as apiculture.  
**Reasoning:** Bees are reared mainly for honey and pollination services.  
**Ans:** (a) Both correct; Reason explains Assertion.
9. **Assertion:** Vaccination helps prevent diseases.  
**Reasoning:** It boosts the animal's immune system against infections.  
**Ans:** (a) Both correct; Reason explains Assertion.

10. **Assertion:** Silage is used as cattle feed.

**Reasoning:** It is a preserved form of green fodder with high moisture content.

**Ans:** (a) Both correct; Reason explains Assertion.

#### VI. Choose the Odd Man Out:

1. **Ans:** C) Jaffarabadi (buffalo breed; others are cattle breeds)
2. **Ans:** C) Goat (not a poultry bird)
3. **Ans:** C) Horse (non-ruminant)
4. **Ans:** C) Calcium (mineral; others are vitamins)
5. **Ans:** C) Buffalo (not wool-yielding)
6. **Ans:** C) Gir (cattle breed; others are fish)
7. **Ans:** C) Ranikhet (viral disease)
8. **Ans:** C) Foot and Mouth (cattle disease)
9. **Ans:** C) Castration (not a breeding method)
10. **Ans:** C) Hemoglobin (not a milk component)

#### VII. Answer the following Questions:

1. **Animal husbandry:** The branch of agriculture focused on breeding, feeding, and caring for livestock.  
**Importance:** Provides milk, meat, wool, and labor; supports rural livelihoods; enhances food security.
2. **Crossbreeding vs. Inbreeding:**  
**Crossbreeding:** Mating different breeds to combine desirable traits (e.g., higher milk yield).  
**Inbreeding:** Mating closely related animals to maintain pure lines (risks genetic defects).
3. **Major dairy cattle breeds in India:** Sahiwal, Gir, Red Sindhi, Tharparkar.
4. **Artificial insemination:**  
**Significance:** Ensures genetic improvement, disease control, and access to superior breeds.
5. **Common cattle diseases:**  
Foot and Mouth (viral), Mastitis (bacterial), Anthrax (bacterial).  
**Prevention:** Vaccination, hygiene, balanced nutrition.
6. **Wool production:** Shearing → Cleaning (scouring) → Sorting → Spinning → Weaving.
7. **Advantages of poultry farming:**  
High protein source (eggs/meat); low space requirement; quick returns; employment generation.

## CHAPTER-3

### I. Choose the correct answer:

1. Which microorganism helps in decomposition?  
**Ans:** A) Fungi
2. Which microorganism is used in making curd?  
**Ans:** A) Lactobacillus
3. Which microorganism is used in alcohol production?  
**Ans:** A) Yeast
4. Which microorganism causes malaria?  
**Ans:** A) Plasmodium
5. Which microorganism causes tuberculosis?  
**Ans:** A) Mycobacterium
6. Which microorganism is used in nitrogen fixation?  
**Ans:** A) Rhizobium
7. Which disease is caused by a virus?  
**Ans:** A) Influenza
8. Which microorganism is used in bread-making?  
**Ans:** A) Yeast
9. Which microorganism causes dengue?  
**Ans:** A) Virus
10. Which microorganism is used in antibiotics production?  
**Ans:** A) Fungi
11. Which of the following is a fungal disease?  
**Ans:** A) Ringworm
12. Which microorganism causes leprosy?  
**Ans:** A) Mycobacterium
13. Which microorganism causes food poisoning?  
**Ans:** A) Bacteria
14. Which microorganism is responsible for AIDS?  
**Ans:** A) HIV
15. Which microorganism causes typhoid?  
**Ans:** A) Salmonella
16. Which microorganism is used in antibiotics like penicillin?  
**Ans:** A) Fungi
17. Which microorganism is responsible for the common cold?  
**Ans:** A) Virus
18. Which microorganism is used in baking?  
**Ans:** A) Yeast
19. Which microorganism helps in sewage treatment?  
**Ans:** A) Bacteria
20. Which microorganism causes rust of wheat?  
**Ans:** A) Fungi
21. Which microorganism is responsible for syphilis?  
**Ans:** A) Bacteria
22. Which microorganism is beneficial for soil fertility?  
**Ans:** A) Rhizobium
23. Which microorganism causes cholera?  
**Ans:** A) Vibrio cholerae
24. Which microorganism causes athlete's foot?  
**Ans:** A) Fungi
25. What is used to preserve pickles?  
**Ans:** C) Vinegar
26. Which microorganism is used in the fermentation of milk?  
**Ans:** A) Lactobacillus
27. Which microorganism is used in vaccines?  
**Ans:** A) Virus
28. Which microorganism is used for antibiotics?  
**Ans:** A) Streptomyces
29. Which microorganism is a protozoa?  
**Ans:** A) Amoeba
30. Which microorganism is responsible for polio?  
**Ans:** A) Virus
31. Which microorganism can survive extreme environments?  
**Ans:** A) Archaea
32. Which microorganism is used in making cheese?  
**Ans:** A) Bacteria
33. Which microorganism helps in the production of vitamin K in the human intestine?  
**Ans:** A) Bacteria
34. Which of the following is a harmful microorganism?  
**Ans:** A) Pathogen
35. Which of the following is an example of a bacterial disease?  
**Ans:** A) Cholera

## II. Say True or False:

- |                                           |                   |
|-------------------------------------------|-------------------|
| 1. Bacteria are unicellular organisms.    | <b>Ans:</b> True  |
| 2. Yeast is used in making bread.         | <b>Ans:</b> True  |
| 3. Viruses can grow outside a host.       | <b>Ans:</b> False |
| 4. Fungi can be both useful and harmful.  | <b>Ans:</b> True  |
| 5. Malaria is caused by bacteria.         | <b>Ans:</b> False |
| 6. Rhizobium helps in nitrogen fixation.  | <b>Ans:</b> True  |
| 7. Influenza is caused by a virus.        | <b>Ans:</b> True  |
| 8. Antibiotics kill viruses.              | <b>Ans:</b> False |
| 9. Protozoa cause diseases like malaria.  | <b>Ans:</b> True  |
| 10. Penicillin is made from fungi.        | <b>Ans:</b> True  |
| 11. Lactobacillus is used in making curd. | <b>Ans:</b> True  |
| 12. Microorganisms are always harmful.    | <b>Ans:</b> False |
| 13. Protozoa are multicellular organisms. | <b>Ans:</b> False |
| 14. Viruses are larger than bacteria.     | <b>Ans:</b> False |
| 15. Cholera is caused by Vibrio cholerae. | <b>Ans:</b> True  |
| 16. Algae can perform photosynthesis.     | <b>Ans:</b> True  |
| 17. Fungi cannot grow on dead matter.     | <b>Ans:</b> False |
| 18. Yeast helps in alcohol production.    | <b>Ans:</b> True  |
| 19. Polio is caused by bacteria.          | <b>Ans:</b> False |
| 20. Some bacteria live in our intestines. | <b>Ans:</b> True  |

## III. Match the following:

### Set 1:

- 1 - a (Yeast - Bread making)
- 2 - b (Rhizobium - Nitrogen fixation)
- 3 - c (Lactobacillus - Curd formation)
- 4 - d (Penicillium - Antibiotic production)
- 5 - e (Algae - Oxygen production)

### Set 2:

- 1 - a (Malaria - Plasmodium)
- 2 - b (Tuberculosis - Mycobacterium)
- 3 - c (Cholera - Vibrio cholerae)
- 4 - d (Polio - Virus)
- 5 - e (Ringworm - Fungi)

### Set 3:

- 1 - a (Bacteria - Unicellular)
- 2 - b (Virus - Non-living outside host)
- 3 - c (Fungi - Multicellular or unicellular)
- 4 - d (Protozoa - Causes malaria)
- 5 - e (Algae - Photosynthesis)

#### IV. Multi-correct answer type questions:

1. Which of the following are microorganisms?

**Ans:** A) Bacteria, B) Fungi, C) Virus

2. Which diseases are spread by mosquitoes?

**Ans:** A) Malaria, B) Dengue, C) Chikungunya

3. Which diseases are caused by bacteria?

**Ans:** A) Tuberculosis, B) Cholera, C) Typhoid

4. Which microorganisms are used in antibiotics?

**Ans:** A) Penicillium, B) Streptomyces, C) Bacillus

5. Which microorganisms help in nitrogen fixation?

**Ans:** A) Rhizobium, B) Azotobacter, C) Cyanobacteria

6. Which of the following are viral diseases?

**Ans:** A) Influenza, B) Dengue, C) Polio

7. Which of these are used in vaccine production?

**Ans:** A) Weakened virus, B) Bacterial toxins, C) Killed pathogens

8. Which microorganisms can be harmful?

**Ans:** A) Pathogens, B) Viruses, C) Some bacteria

9. Which of these cause plant diseases?

**Ans:** A) Fungi, B) Bacteria, C) Virus

10. Which are food preservation methods?

**Ans:** A) Freezing, B) Salting, C) Pasteurization

#### V. Reasoning Type Questions:

1. **Assertion:** Bacteria are used in making antibiotics.

**Reasoning:** Some bacteria have the ability to kill harmful microorganisms.

**Ans:** (a) Both correct; Reason explains Assertion.

2. **Assertion:** Lactobacillus helps in curd formation.

**Reasoning:** Lactobacillus converts milk sugar into lactic acid, which thickens the milk.

**Ans:** (a) Both correct; Reason explains Assertion.

3. **Assertion:** Viruses are considered living organisms.

**Reasoning:** Viruses can reproduce only inside a host cell.

**Ans:** (b) Both correct; Reason does not fully explain Assertion.

4. **Assertion:** Malaria is caused by a virus.

**Reasoning:** Malaria is transmitted by female Anopheles mosquitoes.

**Ans:** (d) Assertion incorrect (protozoan), Reason correct.

5. **Assertion:** Fungi can be beneficial to humans.

**Reasoning:** Fungi help in decomposition and antibiotic production.

**Ans:** (a) Both correct; Reason explains Assertion.

6. **Assertion:** Dengue is a waterborne disease.

**Reasoning:** Dengue is caused by a virus spread through mosquitoes.

**Ans:** (d) Assertion incorrect (mosquito-borne), Reason correct.

7. **Assertion:** Antibiotics are effective against viral infections.  
**Reasoning:** Antibiotics kill bacteria but do not affect viruses.  
**Ans:** (d) Assertion incorrect, Reason correct.
8. **Assertion:** Rhizobium bacteria help plants grow.  
**Reasoning:** Rhizobium fixes nitrogen in the roots of leguminous plants.  
**Ans:** (a) Both correct; Reason explains Assertion.
9. **Assertion:** Polio is caused by bacteria.  
**Reasoning:** Polio is a highly contagious disease affecting the nervous system.  
**Ans:** (d) Assertion incorrect (viral), Reason correct.
10. **Assertion:** Food poisoning is caused by microorganisms.  
**Reasoning:** Harmful bacteria and fungi can produce toxins in food.  
**Ans:** (a) Both correct; Reason explains Assertion.

#### VI. Choose the Odd Man Out:

1. **Ans:** D) Amoeba (protozoa; others are not protozoa)
2. **Ans:** D) Plasmodium (pathogen; others are beneficial)
3. **Ans:** C) Dengue (viral; others are bacterial)
4. **Ans:** A) Malaria (protozoan; others are bacterial)
5. **Ans:** C) Lactobacillus (not involved in nitrogen fixation)
6. **Ans:** D) Tuberculosis (bacterial; others are viral)
7. **Ans:** D) Salmonella (pathogen; others are antibiotic sources)
8. **Ans:** C) Fermentation (not a preservation method)
9. **Ans:** B) Virus (non-living; others are living)
10. **Ans:** D) Typhoid (bacterial; others are fungal)

#### VII. Answer the following Questions:

1. **Microorganisms:** Tiny organisms visible under a microscope (e.g., bacteria, fungi, viruses).
2. **Bacteria benefits:** Used in curd, antibiotics, sewage treatment, and nitrogen fixation.
3. **Yeast in baking/brewing:** Ferments sugar to produce CO<sub>2</sub> (bread rise) and alcohol (brewing).
4. **Rhizobium role:** Fixes atmospheric nitrogen in legume roots, enriching soil fertility.
5. **Viruses vs. Bacteria:** Viruses need a host to reproduce; bacteria are independent living cells.
6. **Nitrogen fixation:** Rhizobium converts atmospheric nitrogen into plant-usable nitrates.
7. **Antibiotics:** Medicines from microorganisms (e.g., penicillin) to kill bacteria.
8. **Vaccines:** Contain weakened pathogens to stimulate immunity against diseases.
9. **Decomposition:** Microorganisms break down dead matter, recycling nutrients.
10. **Food preservation:** Methods include pasteurization, salting, and freezing to prevent spoilage.
11. **Pasteurization:** Heating milk to kill harmful bacteria without altering taste.
12. **Fermentation:** Sugar conversion by microorganisms (e.g., yeast → alcohol).

## CHAPTER-4

### I. Choose the correct answer:

1. Which plant tissue is responsible for transporting water? **Ans:** A) Xylem
2. Phloem is responsible for transporting: **Ans:** C) Food
3. Xylem vessels are: **Ans:** A) Dead
4. Which of the following tissues is dead at maturity? **Ans:** A) Xylem
5. Which type of meristem is found at the tips of roots and shoots? **Ans:** B) Apical
6. Parenchyma cells are: **Ans:** B) Living
7. Which plant tissue stores food? **Ans:** C) Parenchyma
8. Sclerenchyma cells are: **Ans:** A) Thick-walled
9. Which type of plant tissue has sieve tubes? **Ans:** B) Phloem
10. What is the main function of collenchyma? **Ans:** B) Support
11. The vascular bundle in monocots is: **Ans:** C) Scattered
12. The outermost protective tissue in plants is: **Ans:** C) Epidermis
13. Which type of plant tissue provides mechanical support? **Ans:** A) Collenchyma
14. Phloem transports food in: **Ans:** B) Both directions
15. Xylem consists of which of the following components? **Ans:** A) Tracheids
16. The thickening in collenchyma cells is due to: **Ans:** B) Cellulose
17. Which plant tissue helps in wound healing? **Ans:** C) Parenchyma
18. Lateral meristem is responsible for: **Ans:** B) Secondary growth
19. Intercalary meristem is found in: **Ans:** B) Nodes
20. Which vascular tissue transports water and minerals? **Ans:** B) Xylem
21. Companion cells are associated with: **Ans:** B) Phloem
22. Tracheids are part of: **Ans:** B) Xylem
23. Phloem fibers provide: **Ans:** A) Strength
24. Which tissue makes up the bulk of a plant body? **Ans:** C) Ground tissue
25. Xylem and phloem together form: **Ans:** C) Vascular tissue
26. Which of the following has sieve plates? **Ans:** B) Phloem
27. The periderm replaces: **Ans:** B) Epidermis
28. Which type of parenchyma contains chloroplasts? **Ans:** C) Chlorenchyma
29. The waxy layer on leaves is called: **Ans:** A) Cuticle
30. Which type of vascular bundle is found in dicots? **Ans:** A) Open
31. In monocots, vascular bundles are: **Ans:** B) Scattered
32. Secondary growth occurs in: **Ans:** B) Dicots
33. The main component of phloem is: **Ans:** B) Sieve tubes
34. Stomata are present in: **Ans:** A) Epidermis
35. Lignin is found in: **Ans:** A) Xylem

## II. Say True or False:

1. Xylem transports food in plants. **Ans: False**
2. Phloem transports water in plants. **Ans: False**
3. Xylem and phloem are ground tissues. **Ans: False**
4. Parenchyma cells are dead. **Ans: False**
5. Xylem vessels are dead at maturity. **Ans: True**
6. Root hairs increase water absorption. **Ans: True**
7. Sclerenchyma cells have thick walls. **Ans: True**
8. Meristematic cells are specialized. **Ans: False**
9. Apical meristem is found at root tips. **Ans: True**
10. Xylem and phloem form vascular tissue. **Ans: True**
11. Phloem transports food in one direction. **Ans: False**
12. Xylem helps in photosynthesis. **Ans: False**
13. Cuticle is a waxy layer on leaves. **Ans: True**
14. Epidermis is a protective tissue. **Ans: True**
15. Stomata are found in roots. **Ans: False**
16. Tracheids are present in phloem. **Ans: False**
17. Sclerenchyma cells are living. **Ans: False**
18. Chlorenchyma contains chloroplasts. **Ans: True**
19. Xylem fibers store food. **Ans: False**
20. Phloem transports minerals. **Ans: False**
21. Cambium is a type of meristem. **Ans: True**
22. Cork cells are living. **Ans: False**
23. Vascular bundles are scattered in dicots. **Ans: False**
24. Monocots have open vascular bundles. **Ans: False**
25. Periderm replaces the epidermis. **Ans: True**

## III. Match the following:

### Set 1:

- 1 - C (Xylem - Transport of water)
- 2 - A (Phloem - Transport of food)
- 3 - B (Collenchyma - Provides support)
- 4 - D (Parenchyma - Stores food)
- 5 - E (Sclerenchyma - Provides rigidity)

### Set 2:

- 1 - A (Guard cells - Gas exchange)
- 2 - B (Root hairs - Absorption of water)
- 3 - C (Sclerenchyma fibers - Mechanical support)
- 4 - D (Epidermal cells - Protection)
- 5 - E (Xylem vessels - Water conduction)

#### IV. Multi-correct answer type questions:

1. Which are components of xylem? **Ans:** A) Tracheids, B) Vessels
2. Which tissues are living? **Ans:** A) Parenchyma, B) Phloem
3. Which are types of meristematic tissue? **Ans:** A) Apical, B) Lateral
4. Which plant tissues are vascular? **Ans:** A) Xylem, B) Phloem
5. Which are dead tissues? **Ans:** A) Xylem vessels, B) Tracheids
6. Which help in mechanical support? **Ans:** A) Sclerenchyma, B) Collenchyma
7. Which tissues store food? **Ans:** A) Parenchyma
8. Which cells have thick walls? **Ans:** A) Collenchyma, B) Sclerenchyma
9. Which are simple permanent tissues? **Ans:** A) Parenchyma, B) Collenchyma
10. Which are complex tissues? **Ans:** A) Xylem, B) Phloem
11. Which tissues conduct water? **Ans:** A) Xylem vessels, B) Tracheids
12. Which cells are dead at maturity? **Ans:** A) Sclerenchyma, B) Xylem vessels

#### V. Reasoning Type Questions:

1. **Assertion:** Vascular tissues are absent in bryophytes.  
**Reason:** Bryophytes do not have true roots, stems, or leaves.  
**Ans:** (a) Both correct; Reason explains Assertion.
2. **Assertion:** Xylem transports water in plants.  
**Reason:** Xylem contains sieve tubes and companion cells.  
**Ans:** (c) Assertion correct, Reason incorrect.
3. **Assertion:** Phloem transports food in plants.  
**Reason:** Phloem consists of sieve tubes and companion cells.  
**Ans:** (a) Both correct; Reason explains Assertion.
4. **Assertion:** Cork cells are dead at maturity.  
**Reason:** Cork cells have suberin deposition in their walls.  
**Ans:** (a) Both correct; Reason explains Assertion.
5. **Assertion:** Sclerenchyma cells are dead at maturity.  
**Reason:** Their walls are thickened with lignin.  
**Ans:** (a) Both correct; Reason explains Assertion.
6. **Assertion:** Parenchyma helps in food storage.  
**Reason:** Parenchyma cells are thick-walled and dead.  
**Ans:** (c) Assertion correct, Reason incorrect.
7. **Assertion:** Xylem helps in mechanical support.  
**Reason:** Xylem contains thick-walled, lignified cells.  
**Ans:** (a) Both correct; Reason explains Assertion.
8. **Assertion:** Lateral meristem is responsible for secondary growth.  
**Reason:** It is present in leaves and flowers.  
**Ans:** (c) Assertion correct, Reason incorrect.

9. **Assertion:** Epidermis is a protective tissue.  
**Reason:** It prevents water loss and entry of pathogens.  
**Ans:** (a) Both correct; Reason explains Assertion.
10. **Assertion:** Stomata are found in roots.  
**Reason:** Stomata help in transpiration.  
**Ans:** (e) Both incorrect.

#### VI. Choose the Odd Man Out:

1. **Ans:** D) Sieve tubes (part of phloem; others are tissue types)
2. **Ans:** C) Sieve plates (part of phloem; others are xylem components)
3. **Ans:** D) Xylem (complex tissue; others are simple tissues)
4. **Ans:** C) Sieve tubes (conductive; others are protective/absorptive)
5. **Ans:** D) Phloem fibers (conductive; others are protective layers)
6. **Ans:** C) Lateral meristem (growth tissue; others are vascular tissues)
7. **Ans:** C) Cortex (ground tissue; others are protective layers)
8. **Ans:** D) Phloem vessels (conductive; others are for gas exchange/absorption)
9. **Ans:** C) Sclerenchyma (dead; others are living parenchyma types)
10. **Ans:** D) Sieve tubes (conductive; others are meristematic tissues)

#### VII. Answer the following Questions:

1. **Plant tissues:** Groups of cells performing specific functions.  
**Classification:** Meristematic (dividing) and Permanent (non-dividing).
2. **Meristematic vs. Permanent:**  
 Meristematic: Actively dividing, undifferentiated (e.g., apical meristem).  
 Permanent: Differentiated, specialized (e.g., xylem, phloem).
3. **Xylem and Phloem functions:**  
 Xylem: Transports water/minerals upward.  
 Phloem: Transports food bidirectionally.
4. **Parenchyma:**  
**Structure:** Thin-walled, living cells.  
**Function:** Food storage, photosynthesis (chlorenchyma), wound healing.
5. **Collenchyma:**  
**Structure:** Thickened cellulose walls, living.  
**Function:** Mechanical support in growing parts.
6. **Sclerenchyma:** Thick lignin walls make them rigid and non-living at maturity.
7. **Meristematic tissues:**  
 Apical (tips; primary growth), Lateral (cambium; secondary growth), Intercalary (nodes; regrowth).
8. **Epidermis:** Outermost layer; prevents water loss, protects against pathogens.

9. **Stomata:**

**Structure:** Two guard cells with a pore.

**Function:** Gas exchange ( $\text{CO}_2/\text{O}_2$ ) and transpiration.

10. **Secondary growth:** Thickening of stems/roots via lateral meristems (cork cambium, vascular cambium).

11. **Sieve tubes & companion cells:**

Sieve tubes transport food; companion cells regulate their metabolism.

12. **Xylem as complex tissue:** Composed of multiple cell types (tracheids, vessels, fibers, parenchyma).

## CHAPTER-5

### I. Choose the correct answer:

1. Which tissue is responsible for movement in animals? **Ans:** A. Muscular
2. The basic structural and functional unit of an animal body is: **Ans:** C. Cell
3. Which type of connective tissue connects muscles to bones? **Ans:** B. Tendon
4. The function of WBCs is: **Ans:** C. Immunity
5. Blood is a type of: **Ans:** B. Connective tissue
6. The hardest connective tissue in the body is: **Ans:** C. Bone
7. The primary function of nervous tissue is: **Ans:** B. Signal transmission
8. The structural unit of the nervous system is: **Ans:** B. Neuron
9. Which tissue stores fat in the body? **Ans:** A. Adipose
10. Which muscle type is found in the heart? **Ans:** B. Cardiac
11. Ligaments connect: **Ans:** B. Bone to bone
12. Which epithelial tissue has a cube-like shape? **Ans:** B. Cuboidal
13. Which tissue transports oxygen in the body? **Ans:** B. Blood
14. Cartilage is found in: **Ans:** B. Joints
15. Which part of the neuron receives signals? **Ans:** B. Dendrite
16. Which muscle type is striated and voluntary? **Ans:** A. Skeletal
17. Areolar tissue connects: **Ans:** A. Organs
18. Which tissue forms the outer covering of the body? **Ans:** B. Epithelial
19. The main function of nervous tissue is: **Ans:** C. Transmission of signals
20. The contractile proteins in muscles are: **Ans:** C. Both A and B
21. Which type of connective tissue joins bones? **Ans:** B. Ligament
22. The junction between two neurons is called: **Ans:** A. Synapse
23. The fluid matrix of blood is called: **Ans:** A. Plasma
24. The largest type of blood cell is: **Ans:** B. WBC
25. Epithelial tissue helps in: **Ans:** C. Both A and B
26. Which epithelial tissue has microvilli? **Ans:** C. Columnar
27. The connective tissue that transports nutrients is: **Ans:** A. Blood
28. Which cell is responsible for clotting blood? **Ans:** C. Platelet
29. The intercellular matrix is maximum in: **Ans:** B. Connective tissue
30. Which tissue provides insulation to the body? **Ans:** A. Adipose
31. Which muscle type is multinucleated? **Ans:** A. Skeletal
32. The main function of red blood cells is: **Ans:** B. Oxygen transport
33. The long part of a neuron is called: **Ans:** A. Axon
34. Which type of muscle is involuntary and non-striated? **Ans:** C. Smooth
35. The protein present in connective tissues like tendons is **Ans:** B. Collagen

## II. Say True or False:

- |                                             |                   |
|---------------------------------------------|-------------------|
| 1. Blood is a connective tissue.            | <b>Ans:</b> True  |
| 2. Neurons transmit signals in the body.    | <b>Ans:</b> True  |
| 3. Ligaments connect muscles to bones.      | <b>Ans:</b> False |
| 4. Cardiac muscles are voluntary.           | <b>Ans:</b> False |
| 5. Adipose tissue stores fat.               | <b>Ans:</b> True  |
| 6. Tendons are flexible and elastic.        | <b>Ans:</b> False |
| 7. Cartilage is harder than bone.           | <b>Ans:</b> False |
| 8. Epithelial tissue covers body surfaces.  | <b>Ans:</b> True  |
| 9. WBCs help in blood clotting.             | <b>Ans:</b> False |
| 10. Skeletal muscles are striated.          | <b>Ans:</b> True  |
| 11. Bone is a type of connective tissue.    | <b>Ans:</b> True  |
| 12. RBCs carry oxygen in the blood.         | <b>Ans:</b> True  |
| 13. Nerve cells regenerate quickly.         | <b>Ans:</b> False |
| 14. Smooth muscles are involuntary.         | <b>Ans:</b> True  |
| 15. Plasma is the solid part of blood.      | <b>Ans:</b> False |
| 16. Areolar tissue connects organs.         | <b>Ans:</b> True  |
| 17. Cardiac muscles are found in lungs.     | <b>Ans:</b> False |
| 18. Ligaments are made of collagen.         | <b>Ans:</b> True  |
| 19. Cuboidal epithelium is found in glands. | <b>Ans:</b> True  |
| 20. Tendons join bones to bones.            | <b>Ans:</b> False |
| 21. Neurons have long axons.                | <b>Ans:</b> True  |
| 22. Platelets transport oxygen.             | <b>Ans:</b> False |
| 23. Columnar epithelium has microvilli.     | <b>Ans:</b> True  |
| 24. Smooth muscles are striated.            | <b>Ans:</b> False |
| 25. Lymph transports nutrients.             | <b>Ans:</b> True  |

## III. Match the following:

### Set 1:

- 1 - A (RBCs - Transport oxygen)
- 2 - B (WBCs - Fight infections)
- 3 - C (Platelets - Help in clotting)
- 4 - D (Plasma - Fluid part of blood)
- 5 - E (Hemoglobin - Oxygen-carrying pigment)

### Set 2:

- 1 - A (Skeletal Muscle - Voluntary and striated)
- 2 - B (Smooth Muscle - Involuntary & non-striated)
- 3 - C (Cardiac Muscle - Found in the heart)
- 4 - D (Voluntary Muscle - Controlled by the brain)
- 5 - E (Involuntary Muscle - Works automatically)

#### IV. Multi-correct answer type questions:

1. Which are connective tissues? **Ans:** A. Blood, B. Bone, C. Cartilage
2. Which are types of muscle tissue? **Ans:** A. Skeletal, B. Cardiac, C. Smooth
3. Which are types of epithelial tissue? **Ans:** A. Squamous, B. Cuboidal, C. Columnar
4. Which are components of blood? **Ans:** A. RBC, B. WBC, C. Plasma
5. Which muscles are involuntary? **Ans:** A. Cardiac, B. Smooth
6. Which cells are present in nervous tissue? **Ans:** A. Neuron, B. Glial
7. Which tissues help in movement?  
**Ans:** A. Skeletal muscle, B. Smooth muscle, C. Cardiac muscle
8. Which are parts of a neuron? **Ans:** A. Axon, B. Dendrite, C. Cell body
9. Which tissues provide protection? **Ans:** A. Epithelial, B. Adipose
10. Which are functions of the skin? **Ans:** A. Protection, B. Temperature control, C. Sensation
11. Which are functions of the skeleton? **Ans:** A. Support, B. Movement, C. Protection
12. Which tissues store energy? **Ans:** A. Adipose, B. Bone marrow

#### V. Reasoning Type Questions:

1. **Assertion:** Neurons help in the transmission of signals.  
**Reasoning:** They have long axons to conduct impulses over distances.  
**Ans:** (a) Both correct; Reason explains Assertion.
2. **Assertion:** WBCs help in immunity.  
**Reasoning:** They produce antibodies to fight infections.  
**Ans:** (a) Both correct; Reason explains Assertion.
3. **Assertion:** Cardiac muscles are involuntary in nature.  
**Reasoning:** They contract rhythmically without fatigue.  
**Ans:** (a) Both correct; Reason explains Assertion.
4. **Assertion:** Blood is a connective tissue.  
**Reasoning:** It transports oxygen and nutrients in the body.  
**Ans:** (a) Both correct; Reason explains Assertion.
5. **Assertion:** Bone is a living tissue.  
**Reasoning:** It has cells that continuously remodel it.  
**Ans:** (a) Both correct; Reason explains Assertion.
6. **Assertion:** Adipose tissue helps in energy storage.  
**Reasoning:** It stores fat in the form of lipids.  
**Ans:** (a) Both correct; Reason explains Assertion.
7. **Assertion:** Epithelial tissues do not have blood supply.  
**Reasoning:** They obtain nutrients through diffusion from underlying tissues.  
**Ans:** (a) Both correct; Reason explains Assertion.
8. **Assertion:** Cartilage is more flexible than bone.  
**Reasoning:** Cartilage lacks a rigid calcium-based structure.  
**Ans:** (a) Both correct; Reason explains Assertion.

9. **Assertion:** Tendons are inelastic.

**Reasoning:** They provide strong attachment of muscles to bones.

**Ans:** (a) Both correct; Reason explains Assertion.

10. **Assertion:** Smooth muscles are involuntary.

**Reasoning:** They are found in the walls of internal organs like the intestine.

**Ans:** (a) Both correct; Reason explains Assertion.

## VI. Choose the Odd Man Out:

1. **Ans:** D. Neuron (nervous tissue; others are connective tissues)

2. **Ans:** D. Ligament (connective tissue; others are muscle types)

3. **Ans:** D. Nephron (kidney unit; others are blood components)

4. **Ans:** D. Myelin (nerve sheath; others are epithelial types)

5. **Ans:** D. Ligament (connective tissue; others are neuron parts)

6. **Ans:** D. Neuron (cell; others are organs)

7. **Ans:** D. Plasma (fluid; others are solid connective tissues)

8. **Ans:** D. Troponin (regulatory protein; others are contractile/structural)

9. **Ans:** D. Nephron (kidney unit; others are glands)

10. **Ans:** D. Nephron (kidney unit; others are skin layers)

## VII. Answer the following Questions:

1. **Four main types of animal tissues:**

**Epithelial:** Protection, absorption (e.g., skin).

**Connective:** Support, transport (e.g., blood, bone).

**Muscular:** Movement (e.g., skeletal, cardiac muscles).

**Nervous:** Signal transmission (e.g., neurons).

2. **Epithelial tissue:**

**Structure:** Tightly packed cells; forms linings.

**Function:** Protection (skin), absorption (intestines), secretion (glands).

3. **Voluntary vs. Involuntary muscles:**

**Voluntary:** Controlled consciously (e.g., skeletal muscles).

**Involuntary:** Unconscious control (e.g., cardiac, smooth muscles).

4. **Connective tissue role:**

Binds structures (ligaments), transports nutrients (blood), stores fat (adipose).

5. **Ligaments vs. Tendons:**

**Ligaments:** Bone-to-bone; elastic.

**Tendons:** Muscle-to-bone; inelastic.

6. **Blood composition & functions:**

**Components:** RBCs (O<sub>2</sub> transport), WBCs (immunity), platelets (clotting), plasma (nutrients).

7. **Nervous tissue importance:**

Transmits electrical impulses for coordination and response.

8. **Neuron structure:**

**Cell body:** Contains nucleus.

**Dendrites:** Receive signals.

**Axon:** Transmits signals.

9. **Cardiac muscle uniqueness:**

Striated, involuntary, branched; only in the heart.

10. **Epithelial types & locations:**

**Squamous:** Lungs (alveoli).

**Cuboidal:** Kidneys (tubules).

**Columnar:** Intestines (microvilli).

## EXERCISE-6

### I. Choose the correct answer:

1. Animals reproduce to ensure the \_\_\_\_\_ of their species. **Ans:** B. Survival
2. Fertilization in humans is generally \_\_\_\_\_. **Ans:** B. Internal
3. The male reproductive cell is called a \_\_\_\_\_. **Ans:** C. Sperm
4. The fusion of male and female gametes is known as \_\_\_\_\_. **Ans:** B. Fertilization
5. Fertilization in humans occurs in the \_\_\_\_\_. **Ans:** C. Fallopian tube
6. An embryo develops into a \_\_\_\_\_. **Ans:** B. Baby
7. The fertilized egg is called a \_\_\_\_\_. **Ans:** B. Zygote
8. Amoeba reproduces by \_\_\_\_\_. **Ans:** B. Binary fission
9. Frogs undergo \_\_\_\_\_ fertilization. **Ans:** B. External
10. Hydra reproduces by \_\_\_\_\_. **Ans:** A. Budding
11. In external fertilization, fertilization takes place \_\_\_\_\_ the body. **Ans:** B. Outside
12. The type of reproduction in which offspring inherit traits from two parents is called \_\_\_\_\_. **Ans:** B. Sexual
13. The process of growing a new plant or animal from part of the parent body is called \_\_\_\_\_. **Ans:** B. Budding
14. The female reproductive organ that produces eggs is called the \_\_\_\_\_. **Ans:** B. Ovary
15. The gestation period in humans is about \_\_\_\_\_ months. **Ans:** B. 9
16. The larval stage of a butterfly is called \_\_\_\_\_. **Ans:** A. Caterpillar
17. The process of development of an organism from a fertilized egg is called \_\_\_\_\_. **Ans:** C. Development
18. The male reproductive organ that produces sperm is the \_\_\_\_\_. **Ans:** B. Testis
19. Animals that lay eggs are called \_\_\_\_\_ animals. **Ans:** B. Oviparous
20. Which of the following is an example of an oviparous animal? **Ans:** C. Hen
21. In which type of reproduction is there no involvement of gametes? **Ans:** B. Asexual
22. Which of the following undergoes metamorphosis? **Ans:** C. Frog
23. The sperm and the egg are collectively called \_\_\_\_\_. **Ans:** A. Gametes
24. A tadpole transforms into a \_\_\_\_\_. **Ans:** B. Frog
25. Which organism reproduces by fragmentation? **Ans:** C. Planaria
26. The outer protective layer of an egg is called \_\_\_\_\_. **Ans:** A. Shell
27. Internal fertilization occurs in \_\_\_\_\_. **Ans:** C. Mammals
28. Which of the following animals is viviparous? **Ans:** C. Cow
29. The mode of reproduction in sponges is \_\_\_\_\_. **Ans:** A. Budding
30. Asexual reproduction is common in \_\_\_\_\_ organisms. **Ans:** C. Unicellular
31. An animal that gives birth to young ones is called \_\_\_\_\_. **Ans:** B. Viviparous
32. The process of formation of sperm and egg is called \_\_\_\_\_. **Ans:** B. Gametogenesis
33. Which one of the following is not a mode of asexual reproduction? **Ans:** C. Copulation
34. Which part of an egg stores nutrients for the embryo? **Ans:** B. Yolk
35. The number of chromosomes in human gametes is \_\_\_\_\_. **Ans:** A. 23

## II. Say True or False:

1. Fertilization occurs in the ovary. **Ans:** False
2. Amoeba reproduces by binary fission. **Ans:** True
3. Oviparous animals give birth to babies. **Ans:** False
4. Sperm and egg are types of gametes. **Ans:** True
5. Budding occurs in Hydra. **Ans:** True
6. A zygote develops into an embryo. **Ans:** True
7. Frogs reproduce by internal fertilization. **Ans:** False
8. Reproduction is necessary for survival. **Ans:** True
9. Metamorphosis happens in mammals. **Ans:** False
10. Sperm cells are larger than egg cells. **Ans:** False
11. External fertilization happens in fish. **Ans:** True
12. Testes produce sperm in males. **Ans:** True
13. Viviparous animals lay eggs. **Ans:** False
14. Amoeba reproduces by budding. **Ans:** False
15. Planaria reproduces by fragmentation. **Ans:** True
16. Humans reproduce sexually. **Ans:** True
17. The uterus produces eggs. **Ans:** False
18. Fertilization creates a zygote. **Ans:** True
19. Ovaries produce eggs in females. **Ans:** True
20. Butterflies undergo metamorphosis. **Ans:** True

## III. Match the following:

### Set 1:

- 1 - A (Amoeba - Binary fission)
- 2 - B (Hydra - Budding)
- 3 - C (Planaria - Fragmentation)
- 4 - D (Hen - Oviparous)
- 5 - E (Human - Viviparous)

### Set 2:

- 1 - A (Zygote - Fertilized egg)
- 2 - B (Embryo - Early development stage)
- 3 - C (Larva - Tadpole stage)
- 4 - D (Pupa - Butterfly development)
- 5 - E (Adult - Fully developed organism)

## IV. Multi-correct answer type questions:

1. Which of these are asexual reproduction types?  
**Ans:** A. Budding, B. Binary fission, C. Fragmentation
2. Which of these produce eggs?  
**Ans:** A. Ovaries, B. Ovum, C. Female gonads

3. Which are male reproductive organs?

**Ans:** A. Testes, B. Penis, C. Vas deferens

4. Which organisms reproduce by budding?

**Ans:** A. Hydra, B. Yeast, C. Sponges

5. Which of these are oviparous animals?

**Ans:** A. Hen, B. Frog, C. Lizard

6. Which of these undergo metamorphosis?

**Ans:** A. Butterfly, B. Frog, C. Silkworm

7. Which of these are fertilization types?

**Ans:** A. Internal, B. External, C. Artificial

8. Which animals are viviparous?

**Ans:** A. Human, B. Dog, C. Cow

9. Which organisms reproduce by fragmentation?

**Ans:** A. Planaria, B. Spirogyra, C. Starfish

10. Which of these are stages of reproduction?

**Ans:** A. Fertilization, B. Embryo formation, C. Birth

11. Which of these produce sperm?

**Ans:** A. Testes, B. Seminiferous tubules, C. Epididymis

12. Which of these are asexual organisms?

**Ans:** A. Amoeba, B. Hydra, C. Yeast

## **V. Reasoning Type Questions:**

1. **Assertion:** Fertilization leads to the formation of a zygote.

**Reasoning:** A zygote is formed by the fusion of gametes.

**Ans:** (a) Both correct; Reason explains Assertion.

2. **Assertion:** Hydra reproduces by budding.

**Reasoning:** Budding is a type of asexual reproduction.

**Ans:** (a) Both correct; Reason explains Assertion.

3. **Assertion:** Internal fertilization occurs in mammals.

**Reasoning:** In mammals, fertilization occurs inside the female body.

**Ans:** (a) Both correct; Reason explains Assertion.

4. **Assertion:** Viviparous animals lay eggs.

**Reasoning:** Viviparous animals give birth to young ones directly.

**Ans:** (d) Assertion incorrect, Reason correct.

5. **Assertion:** Oviparous animals give birth to live young ones.

**Reasoning:** Oviparous animals lay eggs, which later hatch into young ones.

**Ans:** (d) Assertion incorrect, Reason correct.

6. **Assertion:** Sperm cells are larger than egg cells.

**Reasoning:** Egg cells store nutrients for early embryo development.

**Ans:** (d) Assertion incorrect, Reason correct.

7. **Assertion:** Frogs undergo external fertilization.  
**Reasoning:** External fertilization occurs when eggs and sperm meet outside the female body.  
**Ans:** (a) Both correct; Reason explains Assertion.
8. **Assertion:** Metamorphosis is seen in butterflies and frogs.  
**Reasoning:** Metamorphosis is the process of drastic body change after birth or hatching.  
**Ans:** (a) Both correct; Reason explains Assertion.
9. **Assertion:** Sexual reproduction leads to genetic variation.  
**Reasoning:** Genetic variation is caused by the fusion of gametes from two parents.  
**Ans:** (a) Both correct; Reason explains Assertion.
10. **Assertion:** Binary fission is a type of asexual reproduction.  
**Reasoning:** In binary fission, a single cell splits into two identical daughter cells.  
**Ans:** (a) Both correct; Reason explains Assertion.

#### VI. Choose the Odd Man Out:

1. **Ans:** D. Dog (viviparous; others reproduce asexually)
2. **Ans:** D. Kidney (not a reproductive organ)
3. **Ans:** C. Fertilization (not asexual reproduction)
4. **Ans:** C. Gamete (pre-fertilization; others are post-fertilization stages)
5. **Ans:** D. Dog (viviparous; others are oviparous)
6. **Ans:** D. Ovary (organ; others are reproductive cells/stages)
7. **Ans:** D. Human (viviparous; others are oviparous)
8. **Ans:** D. Uterus (female organ; others are male reproductive parts)
9. **Ans:** D. Cow (multicellular; others are unicellular)
10. **Ans:** C. Dog (does not undergo metamorphosis)

#### VII. Answer the following Questions:

1. **Reproduction:** The biological process by which organisms produce offspring.  
**Importance:** Ensures species survival, maintains ecological balance, and promotes genetic diversity.
2. **Asexual vs. Sexual reproduction:**  
**Asexual:** Single parent; offspring are clones (e.g., Hydra budding).  
**Sexual:** Two parents; genetic variation (e.g., humans).
3. **Fertilization:** Fusion of sperm and egg.  
**Internal:** Occurs inside the body (e.g., mammals).  
**External:** Occurs outside the body (e.g., frogs).
4. **Binary fission:** A single cell divides into two identical cells (e.g., Amoeba).
5. **Reproductive organs:**  
**Male:** Testes (sperm), penis.      **Female:** Ovaries (eggs), uterus.
6. **Frog life cycle:** Egg → Tadpole → Froglet → Adult frog.
7. **Budding in Hydra:** A small outgrowth forms on the parent, detaches, and grows into a new individual.

## EXERCISE-7

### I. Choose the correct answer:

1. The primary excretory product in humans is: **Ans: A) Urea**
2. The functional unit of the kidney is called: **Ans: A) Nephron**
3. The process of urine formation involves: **Ans: A or B or C**
4. The main nitrogenous waste in birds is: **Ans: A) Uric acid**
5. Bowman's capsule is a part of: **Ans: A) Nephron**
6. Which nitrogenous waste is highly toxic? **Ans: A) Ammonia**
7. Which of the following excretes uric acid? **Ans: A) Birds**
8. The outermost layer of the kidney is called: **Ans: A) Cortex**
9. Which of the following is a non-excretory organ? **Ans: C) Heart**
10. The presence of glucose in urine is called: **Ans: A) Glycosuria**
11. The Bowman's capsule surrounds the: **Ans: A) Glomerulus**
12. Which part of the nephron is involved in filtration? **Ans: A) Glomerulus**
13. Which of the following is a waste product of protein metabolism? **Ans: A) Urea**
14. Which organ converts ammonia into urea? **Ans: A) Liver**
15. The process of eliminating metabolic waste from the body is called: **Ans: A) Excretion**
16. Urine is temporarily stored in the: **Ans: A) Bladder**
17. The basic filtration unit in the kidney is: **Ans: A) Nephron**
18. The presence of ketone bodies in urine is called: **Ans: A) Ketonuria**
19. The descending limb of Henle's loop is permeable to: **Ans: A) Water**
20. Which of the following helps in pH regulation in the blood? **Ans: C) Both A and B**
21. The primary function of the loop of Henle is: **Ans: A) Water conservation**
22. The yellow color of urine is due to: **Ans: A) Urochrome**
23. The excretory product in bony fishes is: **Ans: A) Ammonia**
24. Which hormone controls sodium absorption in the kidneys? **Ans: A) Aldosterone**
25. The network of capillaries inside the Bowman's capsule is called: **Ans: A) Glomerulus**
26. Which structure carries urine from the kidneys to the bladder? **Ans: A) Ureter**
27. Which of the following is a major excretory organ? **Ans: A) Kidney**
28. Which part of the kidney collects urine before passing it to the ureter?  
**Ans: A) Renal pelvis**
29. Which nitrogenous waste requires the least water for excretion? **Ans: A) Uric acid**
30. Which of the following is NOT a function of the kidney? **Ans: A) Digestion**
31. Which of the following is a metabolic waste product? **Ans: A) Carbon dioxide**
32. Which organ is responsible for osmoregulation in humans? **Ans: A) Kidney**
33. Which ion is actively reabsorbed in the kidney tubules? **Ans: A) Sodium**
34. Which organ also functions as an excretory organ by exhaling CO<sub>2</sub>? **Ans: A) Lungs**
35. The structural and functional unit of excretion in insects is: **Ans: A) Malpighian tubules**

## II. Say True or False:

- |                                                  |                   |
|--------------------------------------------------|-------------------|
| 1. Humans excrete urea as the main waste.        | <b>Ans:</b> True  |
| 2. Nephron is the functional unit of the kidney. | <b>Ans:</b> True  |
| 3. Lungs help in excreting carbon dioxide.       | <b>Ans:</b> True  |
| 4. Birds excrete urea as their main waste.       | <b>Ans:</b> False |
| 5. Filtration occurs in the glomerulus.          | <b>Ans:</b> True  |
| 6. Skin does not play a role in excretion.       | <b>Ans:</b> False |
| 7. Liver converts ammonia into urea.             | <b>Ans:</b> True  |
| 8. ADH hormone reduces water loss in urine.      | <b>Ans:</b> True  |
| 9. Urine is stored in the urethra.               | <b>Ans:</b> False |
| 10. Loop of Henle is found in the nephron.       | <b>Ans:</b> True  |
| 11. Kidneys help in maintaining blood pH.        | <b>Ans:</b> True  |
| 12. Renal artery carries blood to the kidney.    | <b>Ans:</b> True  |
| 13. Ureters connect kidneys to the bladder.      | <b>Ans:</b> True  |
| 14. Bladder produces urine in humans.            | <b>Ans:</b> False |
| 15. Sweat glands help in excretion.              | <b>Ans:</b> True  |
| 16. The renal pelvis stores urine permanently.   | <b>Ans:</b> False |
| 17. Glycosuria indicates glucose in urine.       | <b>Ans:</b> True  |
| 18. Nephrons help in filtering blood.            | <b>Ans:</b> True  |
| 19. Reabsorption happens in the nephron tubules. | <b>Ans:</b> True  |
| 20. Bile pigments are excreted by the liver.     | <b>Ans:</b> True  |

## III. Match the following:

### Set 1:

- 1 - A (Ammonia - Fish)
- 2 - B (Urea - Humans)
- 3 - C (Uric acid - Birds)
- 4 - D (Bile pigments - Liver)
- 5 - E (Sweat - Skin)

### Set 2:

- 1 - A (Kidney stones - Severe pain)
- 2 - B (Diabetes - Glucose in urine)
- 3 - C (Gout - Uric acid accumulation)
- 4 - D (Nephritis - Kidney inflammation)
- 5 - E (Hematuria - Blood in urine)

### Set 3:

- 1 - A (Ammonotelic - Fish)
- 2 - B (Ureotelic - Humans)
- 3 - C (Uricotelic - Birds)
- 4 - D (Perspiration - Humans (Skin))
- 5 - E (Defecation - All vertebrates)

#### IV. Multi-correct answer type questions:

1. Which are nitrogenous wastes?

**Ans:** A) Urea, B) Ammonia, C) Uric acid

2. Which are excretory organs in humans?

**Ans:** A) Kidney, B) Skin, C) Lungs

3. Which structures are part of a nephron?

**Ans:** A) Glomerulus, B) Loop of Henle, C) Bowman's capsule

4. Which are excretory products of the liver?

**Ans:** A) Bile pigments, B) Urea

5. Which are parts of the kidney?

**Ans:** A) Cortex, B) Medulla, C) Pelvis

6. Which hormones regulate kidney function?

**Ans:** A) ADH, B) Aldosterone

7. Which ions are excreted by the kidney?

**Ans:** A) Sodium, B) Potassium, C) Hydrogen

8. Which animals excrete uric acid?

**Ans:** A) Birds, B) Reptiles, C) Insects

9. Which parts help in urine concentration?

**Ans:** A) Loop of Henle, B) Collecting duct

10. Which blood vessels supply the kidney?

**Ans:** A) Renal artery, B) Renal vein, C) Afferent arteriole

#### V. Reasoning Type Questions:

1. **Assertion:** Kidney stones are formed due to the accumulation of calcium oxalate.

**Reason:** Dehydration and high salt intake contribute to kidney stone formation.

**Ans:** (a) Both correct; Reason explains Assertion.

2. **Assertion:** Kidneys help in osmoregulation.

**Reason:** Kidneys regulate water and electrolyte balance in the body.

**Ans:** (a) Both correct; Reason explains Assertion.

3. **Assertion:** Ammonia is the most toxic nitrogenous waste.

**Reason:** Ammonia requires a large amount of water for excretion.

**Ans:** (a) Both correct; Reason explains Assertion.

4. **Assertion:** The glomerulus is involved in the filtration of blood.

**Reason:** The glomerulus is a network of capillaries present in Bowman's capsule.

**Ans:** (a) Both correct; Reason explains Assertion.

5. **Assertion:** Humans are ureotelic organisms.

**Reason:** Humans excrete urea as the main nitrogenous waste.

**Ans:** (a) Both correct; Reason explains Assertion.

6. **Assertion:** Uric acid is the least toxic nitrogenous waste.

**Reason:** Uric acid is excreted in solid form by birds and reptiles.

**Ans:** (a) Both correct; Reason explains Assertion.

7. **Assertion:** ADH (Antidiuretic Hormone) controls urine formation.  
**Reason:** ADH increases water reabsorption in the collecting ducts.  
**Ans:** (a) Both correct; Reason explains Assertion.
8. **Assertion:** The liver is an excretory organ.  
**Reason:** The liver converts ammonia into urea through the urea cycle.  
**Ans:** (a) Both correct; Reason explains Assertion.
9. **Assertion:** Dialysis is used in patients with kidney failure.  
**Reason:** Dialysis removes waste products from the blood artificially.  
**Ans:** (a) Both correct; Reason explains Assertion.
10. **Assertion:** Aldosterone helps in sodium retention.  
**Reason:** Aldosterone promotes sodium reabsorption in kidney tubules.  
**Ans:** (a) Both correct; Reason explains Assertion.

#### VI. Choose the Odd Man Out:

1. **Ans:** D) Glucose (not a nitrogenous waste)
2. **Ans:** C) Heart (not an excretory organ)
3. **Ans:** C) Stomach (not an excretory organ)
4. **Ans:** C) Hemoglobin (not a nitrogenous waste)
5. **Ans:** D) Glomerulus (not a blood vessel)
6. **Ans:** B) Liver (not directly involved in urine formation)
7. **Ans:** C) Digestion (not a kidney function)
8. **Ans:** C) Ureter (not part of nephron)
9. **Ans:** D) Large intestine (not involved in osmoregulation)
10. **Ans:** D) Tuberculosis (not a urinary disease)

#### VII. Answer the following Questions:

1. **Main excretory products in humans:** Urea, carbon dioxide, water, salts, and bile pigments.
2. **Structure and function of nephron:**  
**Structure:** Glomerulus, Bowman's capsule, proximal tubule, loop of Henle, distal tubule, collecting duct.  
**Function:** Filters blood, reabsorbs nutrients, secretes waste, and concentrates urine.
3. **Role of liver in excretion:** Converts toxic ammonia into urea, excretes bile pigments, and detoxifies harmful substances.
4. **Role of ADH:** Regulates water reabsorption in kidneys to control urine concentration and maintain water balance.
5. **Difference between ammonia, urea, and uric acid:**  
**Ammonia:** Highly toxic, excreted by aquatic animals (e.g., fish).  
**Urea:** Less toxic, excreted by mammals (e.g., humans).  
**Uric acid:** Least toxic, excreted as solid by birds and reptiles.