

# ICSE BIOLOGY-7

## CHAPTER 1. Tissues

### Check Point 1

1. Protoplasm 2. organic 3. unicellular 4. organs

### Check Point 2

1. Apical meristem 2. Collenchyma tissue 3. Xylem parenchyma  
4. Phloem

### Check Point 3

1. True 2. False 3. True 4. True 5. False

### TEST YOURSELF

- A. 1. more complex 2. food chain 3. Epithelial 4. dead; woody  
5. conducting 6. nerve
- B. 1. Organ 2. Plasma 3. Cuticle 4. Dendrites 5. Ecosystem  
6. Xylem parenchyma
- C. 1. **Collenchyma** tissue is formed of elongated, parenchymatous cells with their walls thick at the corners. It provides mechanical support to the young stems and leaves.  
**Sclerenchyma** tissue is formed of long, dead and fibre-like cells. It gives mechanical support to the plant.
2. **Cuboidal** epithelium is formed of cube-like cells, arranged in a single layer. It performs the function of absorption, secretion and forms gametes in testes and ovaries.  
**Squamous epithelium** is formed of flattened, scale-like cells. It protects the underlying tissues.
3. **Ligament** is formed of yellow elastic fibrous tissue. It connects two bones together at the joints.  
**Tendon** is formed of white nonelastic fibrous tissue. It joins skeletal muscles to the bones.
4. **Connective tissue** holds various tissues and organs together, and fills the space between the organs. It provides support to the body and body organs.  
**Muscular tissue** is a contractile tissue. It forms the flesh of the body. It helps in the movement of body parts and in locomotion.
5. **Meristematic tissue** is formed of actively dividing young cells. It helps in the growth of the plant.  
**Permanent tissue** is formed of nondividing and differentiated cells. These cells are specialised to carry out specific functions.

It protects and supports the plant body and transports materials from one part of the plant to the other part.

- D. 1.** Phloem **2.** Meristematic tissue **3.** Sclerenchyma tissue  
**4.** Skeletal tissue **5.** Connective tissue **6.** Muscular tissue (Cardiac muscles)
- E. 1.** Epidermis protects the underlying tissues.  
**2.** Sclerenchyma provides mechanical strength and rigidity to the plant body.  
**3.** Xylem vessels act as long pipes for the transport of water and minerals from roots up to the leaves.  
**4.** Adipose tissue stores fats in its cells.  
**5.** Cardiac muscles help in pumping blood to all parts of the body.  
**6.** Red blood cells (RBCs) supply oxygen to cells of the body.
- F. 1.** Different levels of organisation below organism level are molecular level, cellular level, tissue level, organ level and organ system level.  
**2.** When many organs work together to perform one major life function, they form an organ system. The different organ systems of body represent the organ system level of organisation. The organs of excretory system are kidneys, ureters, urinary bladder and urethra.  
**3.** Apical meristem is responsible for increase in the height of a plant. It is located at the tips of roots, shoots and branches.  
**4.** Different types of epithelial tissues and their functions are:  
(a) **Squamous epithelium:** It protects underlying tissues in the body.  
(b) **Cuboidal epithelium:** It helps in absorption and secretion, and in the formation of gametes in ovaries and testes.  
(c) **Columnar epithelium:** It helps in absorption and secretion.  
(d) **Ciliated epithelium:** Its ciliary movement makes the substances move in the cavity of organ.  
(e) **Glandular epithelium:** It secretes digestive juices, oil (sebum), tears and milk (in females).  
(f) **Sensory epithelium:** It collects sensory stimuli.
- 5.** Characteristic features of permanent tissue are as follows:  
(a) Permanent tissue is derived from the division of meristematic cells.  
(b) Its cells do not divide because they become differentiated.  
(c) Its cells may be alive or dead.  
(d) Its cells have different shapes related to the function they perform.

(d) Its cells have thick cell wall and large vacuole.

(e) The nucleus is displaced to one side because of the presence of vacuole in the centre of cell.

6. The tissue which provides support and strength to the body is called supporting tissue.

Supporting tissues in plants are of three types: Parenchyma, collenchyma and sclerenchyma.

Supporting tissue in animals is skeletal connective tissue.

7. Functional unit of nervous tissue is nerve cell called neuron.

- Axon receives impulses from cyton and passes them to other neurons.
- Dendrons receive impulses from axon endings of neighbouring neurons and bring them up to cyton.

8. The meristem which is located at the base of internodes and leaves is called intercalary meristem. It increases the length of organs and branches.

Lateral meristem is found as cambium in the vascular bundles of dicot stem and root, and as cork cambium in cortex region of tree trunks. It increases the girth of plant.

9. White blood cells (WBCs) fight and kill germs that enter the body. Therefore, they are called the soldiers of the body.

G. 1.-(c) 2.-(d) 3.-(f) 4.-(e) 5.-(a) 6.-(b)

H. 1. False; Permanent tissue is formed of **nondividing, differentiated** cells.

2. True

3. False; **Striated** muscles are voluntary muscles. (or Cardiac muscles are **involuntary** muscles.)

4. False; **Parenchyma** cells form ground tissue in plants.

5. False; Skin is connected with the body surface by **areolar** tissue.

6. True

7. False; Phloem is formed of long, tubular cells that transport **food**. (or **Xylem** is formed of long, tubular cells that transport water.)

I. 1. Simple permanent tissue

2. Complex permanent tissue (xylem, phloem)

3. Adipose tissue 4. Skeletal tissue 5. Fibrous connective tissue

6. Nervous tissue 7. Muscular tissue (cardiac muscles)

J. 1. Cartilage; It is skeletal tissue, others are fluid connective tissues.

2. Epidermis; It is a protective tissue, others are supporting tissues.

3. Nerve fibre; It is a bundle of axons of several neurons, others are parts of a neuron.
4. Matrix; It is the ground substance of connective tissue, others are related to fluid connective tissues.
5. Cork cambium; It is a meristematic tissue, others are permanent tissues.

K. 1. (b) 2. (b) 3. (a) 4. (b) 5. (a) 6. (a)

L. 1. A- Cyton, B- Dendrites, C- Dendron, D- Axon

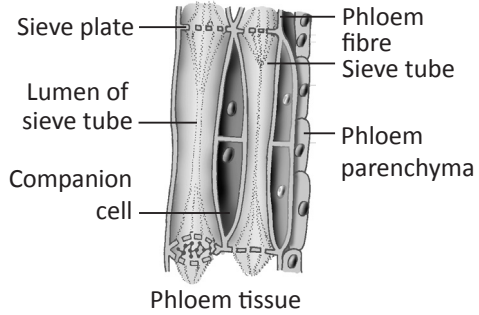
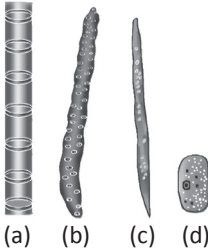
(a) Neuron

- (b) ● Part A-Cyton receives messages from dendrons and passes them to axon.  
 ● Part C-Dendron receives messages from adjacent neuron through dendrites and passes them to cyton.

(c) Nervous tissue

(d) In the brain and spinal cord.

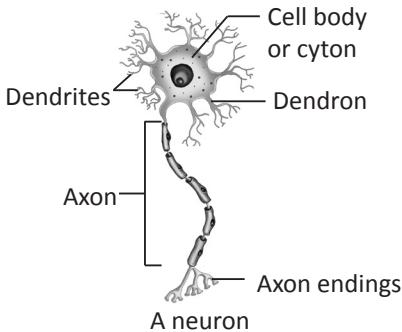
2. (a)



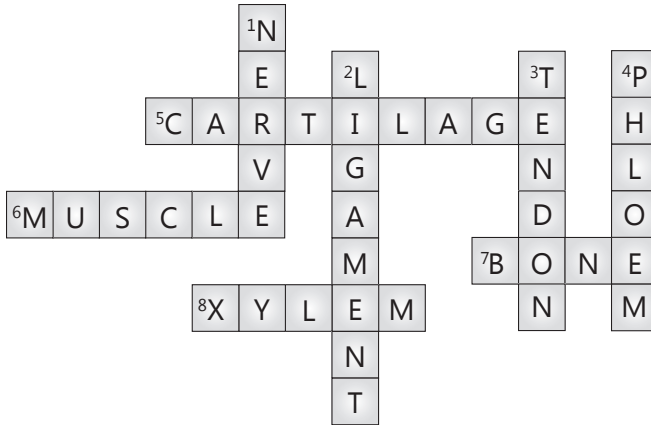
Cell types found in xylem tissue

- (a) xylem tracheid,  
 (b) xylem vessel,  
 (c) xylem fibre, and  
 (d) xylem parenchyma

(b)



M.



### THINK ZONE

- No living organism can survive in isolation because it interacts with other living and nonliving components of its environment for food, oxygen, shelter, reproduction, etc.
- Meristematic tissues are found at growing points because these tissues are formed of actively dividing cells due to which they increase the length of the parts of plant by adding new cells throughout the plant life.
- The cells of permanent tissues have a large vacuole in the centre which displaces the nucleus to one side.
- Myofibrils are formed of contractile proteins which enable them to contract and relax, and hence, are found in muscle cells.

## **CHAPTER 2. Kingdom Classification**

### Check Point 1

1. False 2. True 3. False 4. True 5. True

### Check Point 2

1. acellular 2. colonial 3. fungi 4. bryophyta 5. Bryophytes  
6. sori

### Check Point 3

1. False 2. True 3. True

### TEST YOURSELF

- A. 1. gymnosperms 2. sori 3. mushroom 4. Bryophytes (Mosses)  
5. gymnosperms

B. 1. Thallophytes 2. Fungi 3. Dicotyledonous plants or dicots

4. Rhizome 5. Thallophytes

C. 1.

Nonflowering Plants	Flowering Plants
<ul style="list-style-type: none"> <li>● Nonflowering plants do not bear flowers, seeds and fruits.</li> <li>● They are called cryptogams.</li> </ul> <p><b>Examples:</b> Algae, fungi, bryophytes (mosses) and pteridophytes (ferns).</p>	<ul style="list-style-type: none"> <li>● Flowering plants bear flowers, seeds and fruits.</li> <li>● They are called phanerogams.</li> </ul> <p><b>Examples:</b> Gymnosperms and angiosperms.</p>

2.

Parasitic Plants	Saprotrophic Plants
<ul style="list-style-type: none"> <li>● Parasitic plants grow on other green plants without killing them.</li> <li>● They suck food and water from their host plant.</li> </ul> <p><b>Example:</b> <i>Cuscuta</i> (Dodder)</p>	<ul style="list-style-type: none"> <li>● Saprotrophic plants grow on dead and decaying organic matter (wood or garbage).</li> <li>● They absorb food from dead and decaying organic matter.</li> </ul> <p><b>Examples:</b> Bread mould, Indian pipe, etc.</p>

3.

Gymnosperms	Angiosperms
<ul style="list-style-type: none"> <li>● Seeds are not placed in an enclosed structure.</li> <li>● Bear male and female cones instead of flowers.</li> <li>● Do not bear fruits.</li> <li>● Either trees or bushes.</li> <li>● Are perennial.</li> </ul> <p><b>Examples:</b> Pine, fir, etc.</p>	<ul style="list-style-type: none"> <li>● Seeds are enclosed in fruits.</li> <li>● Bear male and female flowers.</li> <li>● Bear well-developed fruits.</li> <li>● May be trees, shrubs (bushes) or herbs.</li> <li>● Can be annual, biennial or perennial.</li> </ul> <p><b>Examples:</b> Mango, guava, etc.</p>

4.

Monocot Plants	Dicot Plants
<ul style="list-style-type: none"> <li>● They are angiosperms which bear seeds with single cotyledon.</li> </ul> <p><b>Examples:</b> Wheat, rice, maize, etc.</p>	<ul style="list-style-type: none"> <li>● They are angiosperms which bear seeds with two cotyledons.</li> </ul> <p><b>Examples:</b> Gram, bean, mango, pea, etc.</p>

- D. 1.** The need of classification of living organisms was felt to make their study easier and systematic. All living organisms are put into groups on the basis of their similar characteristics. By studying one member of a group in detail, one can learn much about the other members of that group.
2. Plants and animals are the two groups of living organisms.
3. Nonflowering plants are divided into three groups. They are Thallophyta, Bryophyta and Pteridophyta.
- Thallophyta
    - ◆ Bacteria: *Bacillus*, *Escherichia coli*, *Diplococcus pneumoniae*, etc.
    - ◆ Algae: *Chlamydomonas*, *Spirogyra*, *Volvox*, etc.
    - ◆ Fungi: Yeast, Bread moulds, Mushrooms, etc.
  - Bryophyta: Liverworts, Mosses, etc.
  - Pteridophyta: Ferns, Horsetails, etc.
4. *Morchella* and *Agaricus* are edible fungi. Fungi are preferred as food because they are rich source of proteins and vitamins.
5. Cholera and typhoid diseases are caused by bacteria.
6. Bacteria play an important role for mankind. There are harmful as well as useful bacteria. Harmful bacteria cause many diseases in man, e.g., pneumonia, tetanus, typhoid, etc. They also cause diseases in animals and plants. Bacteria spoil our cooked food, milk, fruits, etc.

On the other hand, useful bacteria help us in producing medicine, in agriculture, industries and maintaining a clean environment. Antibiotics, vaccines, etc. are obtained from many bacteria.

Bacteria are also used in the preparation of curd, cheese and vinegar; curing and ripening of tea and tobacco leaves; tanning of leather; retting of fibres; manufacturing of alcohol and acetone; formation of biogas from animal dung, etc. In agriculture, they play a key role in fixing nitrogen from air for plants and also in releasing nitrogen from animal and plant waste back into air.

7. Gymnosperms are primitive seed-bearing plants which do not have true flowers and their seeds are not placed in an enclosed structure. They have following features:
- (a) They do not produce true flowers.
  - (b) Their seeds are naked, i.e., not placed in a closed structure.
  - (c) They produce male and female cones for reproduction.
  - (d) They are mostly cone-shaped, hence, called conifers.
  - (e) They grow in cold climate on mountains.
  - (f) They are evergreen plants with needle-like leaves.

Examples: Pine, Fir, Cedar, *Cycas*, etc.

8. The two divisions of angiosperms are Monocotyledons and Dicotyledons.

(a) **Monocotyledons:** Wheat, Rice

(b) **Dicotyledons:** Gram, Pea

E. 1.-(e) 2.-(d) 3.-(b) 4.-(a) 5.-(c)

F. 1. True

2. False; All pulses are **dicot** plants.

3. False; **Bacteria** are the most primitive thallophytes.

4. False; **Gymnosperms** have needle-like leaves.

5. False; Ferns and **fungi** produce spores.

G. 1. (d) 2. (d) 3. (a) 4. (a) 5. (d) 6. (d) 7. (b) 8. (a)

### THINK ZONE

- Umbrella-shaped plants growing on decaying matter are called mushrooms. They are a kind of fungi. They are colourless because they do not contain chlorophyll. Therefore, being plants, they cannot make their own food. They get food from the decaying matter on which they grow.
- Mohan needs to visit cold mountainous areas because pine is a gymnosperm which grows in cold and mountainous areas.

## CHAPTER 3. Kingdom Animalia

### Check Point 1

1. Invertebrates 2. Poriferans or sponges

3. Flatworms or platyhelminths 4. Insects 5. Nephridia

### Check Point 2

1. True 2. False 3. False

### TEST YOURSELF

A. 1. Molluscs 2. arthropods 3. myriapods 4. Amphibians 5. Mammals

B. 1. Coelenterates 2. Insects 3. Invertebrates 4. Amphibians

C. 1.

Vertebrates	Invertebrates
1. Backbone is present.	1. Backbone is absent.
2. Internal bony skeleton is present.	2. Internal skeleton of bones is absent.
3. Tail is usually present.	3. Tail is absent.
4. Possess only two pairs of limbs. <b>Examples:</b> Fish, frog, snake, bird, dog, etc.	4. Limbs either absent or may occur as three, four or many pairs. <b>Examples:</b> <i>Amoeba</i> , sponges, insects, etc.



2.	<b>Roundworm</b>	<b>Tapeworm</b>
	<ol style="list-style-type: none"> <li>1. Roundworm or <i>Ascaris</i> has long, cylindrical and unsegmented body.</li> <li>2. It lives as parasite inside the body of man and other animals.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tapeworm has thin, soft, flattened and segmented body.</li> <li>2. It is a parasite in the intestine of man which absorbs digested food from the intestine.</li> </ol>
3.	<b>Frog</b>	<b>Lizard</b>
	<ol style="list-style-type: none"> <li>1. It is an amphibian.</li> <li>2. Skin is soft, moist and slippery without scales.</li> <li>3. Lays eggs in water.</li> <li>4. Lives both on land and in water.</li> </ol>	<ol style="list-style-type: none"> <li>1. It is a reptile.</li> <li>2. Skin is dry and covered with scales.</li> <li>3. Lays eggs on land.</li> <li>4. Lives on land only.</li> </ol>
4.	<b>Bird</b>	<b>Bat</b>
	<ol style="list-style-type: none"> <li>1. It belongs to class Aves.</li> <li>2. Body is covered with feathers.</li> <li>3. Has wings for flying.</li> </ol>	<ol style="list-style-type: none"> <li>1. It is a flying mammal.</li> <li>2. Body is covered with hair.</li> <li>3. For flying, fold of skin on either side forms patagium and is attached both to forelimbs and hindlimbs.</li> </ol>

D. 1. Different classes of vertebrate animals are:

- Pisces (Fishes) – *Catla*
  - Amphibia – Frog
  - Reptilia – Snake
  - Aves – Pigeon
  - Mammalia – Giraffe
2. ● Fishes live in water and have fins for swimming, whereas amphibians live on land as well as in water. They have two pairs of limbs for locomotion on land.
- Fishes breathe through gills and take oxygen dissolved in water. Amphibians breathe through lungs when on land but through moist skin when in water.
3. Two features of mammals are:
- (a) Mammals have hair on their body.
  - (b) The females have mammary glands to nourish their young ones.
4. (a) Flatworms are the animals which have thin, soft and flattened body. They are without body cavity. Their body is divided into many segments. They mostly live as parasites inside the bodies of other animals which are called their hosts.

Examples: Liverfluke, *Planaria* and Tapeworm.

- (b) Arthropods are the animals which have body divided into head, thorax and abdomen. It is covered by a hard covering of exoskeleton. They have paired and jointed legs.

Examples: Prawn, cockroach, spider, centipede, millipede, etc.

- (c) Reptiles are mainly land vertebrates. Their skin is dry and covered with scales. They have two pairs of limbs. Each limb has five digits with claws. They breathe through lungs. They have three-chambered heart. Reptiles lay large leathery and yolky eggs on land.

Examples: Snake, crocodile, lizard and tortoise.

- (d) Mammals have their body covered with hair. They have external ears and two pairs of limbs. Their heart is four-chambered. The females give birth to young ones and have mammary glands to nourish them.

Examples: Giraffe, elephant, kangaroo, bat, tiger, cow, horse, dog, camel, monkey and human beings.

E. 1.-(b) 2.-(e) 3.-(a) 4.-(c) 5.-(d)

F. 1. False; Roundworm and earthworm belong to **different** groups.

2. True

3. False; Sponge is an example of **pore-bearing** animals.

4. True

5. True

6. False; Starfish is an **invertebrate**.

G. 1. Bacteria; Bacteria are grouped with plants while rest are animals.

2. Snake; Snake is a reptile while rest are mammals.

3. Frog; Frog is an amphibian while rest are birds.

4. Salamander; Salamander is an amphibian while rest are fishes.

5. Spider; Spider is an arachnid while rest are insects.

H. 1. Whales and Dolphins are grouped with mammals because:

(a) They both have mammary glands to nourish their young ones.

(b) They give birth to young ones.

(c) They have lungs for respiration.

(d) Their heart is four-chambered.

2. Female kangaroo gives birth to a premature young one. It cannot survive outside, so female kangaroo keeps it in a pouch, called the marsupium. This pouch has mammary glands and the young one is fed there.

3. The burrowing and soil feeding habits of earthworms make the soil porous which increases aeration and quick absorption of water. This makes the soil fertile. Due to this fact, earthworms are called the farmer's friends.

I. 1. (d) 2. (c) 3. (d) 4. (b) 5. (d) 6. (a)

### THINK ZONE

- The streamlined body of fish offers least resistance while swimming. This is an aquatic adaptation.
- Worms crawl on the surface of ground with the help of a special structure called parapodia or setae.
- Whales are placed in class mammalia because they give birth to young ones and have mammary glands to nourish them.
- The four-chambered heart in birds and mammals separates impure and pure blood in right half and left half respectively. This prevents the mixing of impure and pure blood. As a result, body cells receive more oxygen and release more energy.

## CHAPTER 4. Photosynthesis

### Check Point

1. False 2. True 3. False 4. False 5. True

### TEST YOURSELF

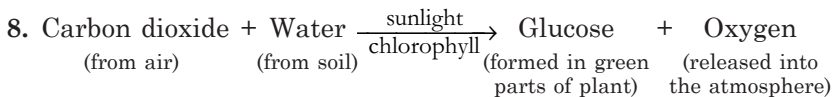
- A. 1. sunlight 2. Saprotrophic 3. starch 4. iodine solution
- B. 1. Autotrophs 2. Stomata 3. Photolysis of water  
4. Glucose 5. Starch test
- C. 1. Protein; others are carbohydrates.  
2. Starch; Starch is a carbohydrate, others are laboratory chemicals.  
3. Sulphur; others are related to photosynthesis.  
4. Roots; others are related to photosynthesis.
- D. 1. Glucose is converted into starch immediately after its formation in the cells because starch is a condensed-form carbohydrate which takes less space for storage. Also, accumulation of glucose in the cells will slow down the rate of photosynthesis.  
2. Too much bright light destroys chlorophyll and at high temperature above 40°C, the enzymes get denatured. As a result, the rate of photosynthesis slows down.  
3. In the process of photosynthesis, water molecules break into H<sup>+</sup> ions and OH<sup>-</sup> ions by using the energy of the sun. The OH<sup>-</sup> ions release oxygen into the air, whereas H<sup>+</sup> ions combine with carbon dioxide and form glucose.

Thus, during photosynthesis, water releases oxygen and carbon dioxide takes part in the formation of glucose.

4. Chlorophyll absorbs light energy from the sun, which is essential for photosynthesis. Photosynthesis does not occur in the absence of chlorophyll or sunlight.

Sunlight provides energy for photosynthesis. Light of low intensity slows down photosynthesis, whereas too much bright light destroys chlorophyll and thus, hampers photosynthesis.

5. Green plants are called autotrophs because they can make their food using raw materials by the process of photosynthesis.  
 6. The 'photo' in term photosynthesis represents 'light' because green plants synthesise food in the presence of sunlight.  
 7. Carbon dioxide, water, chlorophyll and sunlight are the raw materials needed for photosynthesis.



9. Light energy is utilised by chlorophyll. The light energy is converted into chemical energy during photosynthesis and is stored in glucose.

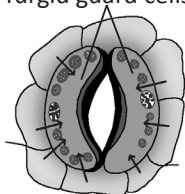
E. 1.-(c) 2.-(e) 3.-(a) 4.-(b) 5.-(d)

- F. 1. False; **cells of green parts of plant** carry out photosynthesis.  
 2. False; Oxygen, during photosynthesis is released from **water**.  
 3. True  
 4. False; Optimum temperature for photosynthesis is **20°C–30°C**.  
 5. True

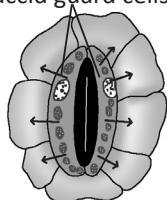
G. 1. (b) 2. (a) 3. (c) 4. (b) 5. (a)

- H. 1. (a) 1. Midrib 2. Vein 3. Lamina 4. Petiole  
 (b) Leaf gets carbon dioxide from air through stomata.  
 (c) Chloroplasts

2. Turgid guard cells                      Flaccid guard cells



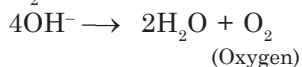
(a) Open stomata



(b) Closed stomata

3. (a) Release of oxygen during photosynthesis can be demonstrated in the form of bubbles in water only. Therefore, aquatic plant like *Hydrilla* is used in the experiment.

- (b) These bubbles have appeared as a result of photosynthesis due to generation of oxygen.
- (c) Oxygen is evolved due to the splitting of water by the solar energy trapped by chlorophyll as follows:



## I. 1. STARCH 2. STOMATA 3. CHLOROPHYLL 4. IODINE

### THINK ZONE

- In the absence of sunlight, chloroplasts start changing their form giving yellow colour to the leaves. Therefore, leaves become yellow when plant is kept in dark.
- Photosynthesis slows down above 40°C because at high temperature, i.e., 40°C or above, the enzymes required for photosynthesis get destroyed.
- We say starch is formed during photosynthesis because some glucose is converted into starch immediately after its formation in cells and is taken to different parts of plant for storage.

## CHAPTER 5. Respiration

### TEST YOURSELF

- A. 1. stomata 2. Anaerobic 3. carbon dioxide gas 4. air; cells  
5. Oxygen; carbon dioxide
- B. 1. Fermentation 2. Aerobic respiration 3. Muscle cramps  
4. Mitochondria 5. Lenticels
- C. 1. Differences between breathing and cell respiration

Breathing	Cell respiration
1. Breathing is a mechanical process.	1. Cell respiration is a biochemical process.
2. It is pumping of air into and out of the lungs.	2. It involves splitting (oxidation) of foodstuff to release energy.
3. It provides oxygen to the body cells for aerobic respiration.	3. It provides energy to the body cells for various life activities.
4. It occurs in lungs outside the cells.	4. It occurs within the cells.
5. Enzymes are not needed.	5. Enzymes are needed.
6. Energy is used in breathing movements.	6. Energy is released during cell respiration.

## 2. Differences between aerobic and anaerobic respiration

<b>Aerobic respiration</b>	<b>Anaerobic respiration</b>
1. Occurs in the presence of oxygen.	1. Occurs in the absence of oxygen.
2. Glucose is completely oxidised.	2. Glucose is incompletely oxidised.
3. End-products are carbon dioxide and water.	3. End-products are either ethyl alcohol and carbon dioxide or lactic acid.
4. More energy is produced.	4. Very little energy is produced.
5. Occurs in most of the plants and animals.	5. Occurs in yeast, some bacteria, parasitic flatworms and skeletal muscles of man.

3. **Respiration** is the process of breaking down of food molecules into simpler substances with the release of energy. It occurs in all living organisms.

**Photosynthesis** is the process by which green parts of plants make food from carbon dioxide and water with the help of chlorophyll and energy from sunlight. During this process, glucose is formed as food and oxygen is released.

- D. 1. Plants do not have breathing organs because each part of plant can independently take in oxygen from the surrounding air and give out carbon dioxide. Also, different parts of a plant have different methods of obtaining oxygen and releasing carbon dioxide.
2. Unlike aerobic respiration, glucose is oxidised incompletely during anaerobic respiration. This causes very little energy to produce.
3. Plants do respire during daytime but they do not take in oxygen and give out carbon dioxide because they carry out photosynthesis, which uses up carbon dioxide and produces oxygen. A part of the oxygen released during photosynthesis is used in respiration and the carbon dioxide released during the respiration is consumed in the process of photosynthesis.
4. Sprouted seeds do not photosynthesise and hence, they do not use carbon dioxide produced during respiration. If we take a green plant instead of sprouted seeds, then it will use all the carbon dioxide in the process of photosynthesis and the result will not be positive for carbon dioxide.

- E. 1. Carbon dioxide and water are the end-products of aerobic respiration.
2. Glucose  $\xrightarrow[\text{oxygen}]{\text{In the presence of}}$  Carbon dioxide + Water + Energy
3. The oxygen released by the process of photosynthesis is the source of oxygen for respiration in plants during daytime. A part of this oxygen is utilised by the plants for respiration.
- F. 1.–(d) 2.–(e) 3.–(a) 4.–(b) 5.–(c)
- G. 1. False; The air that is breathed out is rich in **carbon dioxide**.  
(Or The air that is breathed **in** is rich in oxygen).
2. True
3. False; Plants carry out photosynthesis only during daytime and respiration **all the time**.
4. True
5. False; Root cells obtain oxygen from **air spaces present between the soil particles**.
- H. 1. (c) 2. (c) 3. (d) 4. (c) 5. (a) 6. (a)

### THINK ZONE

- We get muscle cramps during vigorous muscular activities, like fast running, brisk walking, etc. due to accumulation of lactic acid in muscles. Lactic acid is formed as a result of incomplete oxidation of glucose in the lack of oxygen.
- Green plants do not need to breathe in oxygen during daytime because they utilise a part of the oxygen produced during the process of photosynthesis.
- The limewater will not turn milky because the setup is placed in the sunlight. The green plant will photosynthesise and utilise carbon dioxide released during respiration in the process of photosynthesis.

## CHAPTER 6. Excretory System

### Check Point

1. Excretion
2. Renal artery
3. Glomerulus
4. Diabetes
5. Sphincter

## TEST YOURSELF

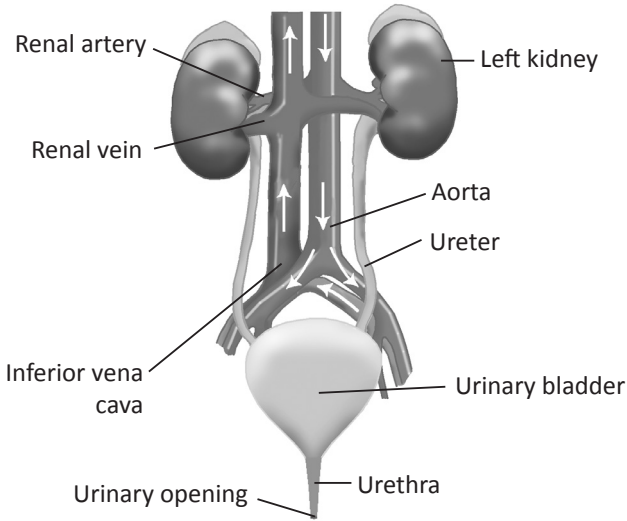
- A.** 1. kidney  
2. nitrogenous wastes  
3. nephron or uriniferous tubule  
4. nitrogenous wastes  
5. cooling  
6. lungs
- B.** 1. Kidneys 2. Ureters 3. Urinary bladder 4. Skin 5. Liver
- C.** 1. The process of removing harmful or unwanted metabolic wastes from the body is called excretion.  
2. Nephron is the functional unit of kidney where urine formation takes place.  
3. The process of maintaining water balance and salt concentration in the blood is called osmoregulation.  
4. The waste which is produced by the metabolism of nitrogenous compounds such as proteins, etc. and also contains nitrogen is called nitrogenous waste.  
5. Ultrafiltration is the process of removal of nitrogenous wastes and water from the blood when it passes through the capillaries of glomerulus.  
6. UTI refers to Urinary Tract Infection which is bacterial infection of kidneys, ureters, urinary bladder and urethra.
- D.** 1. Excretion is the process of removing harmful or unwanted metabolic wastes from the body.  
2. Following are the excretory organs and their excretory products in human body:

<b>Organs</b>	<b>Excretory Products</b>
1. Kidneys	Water, urea and uric acid (nitrogenous waste), and excess of salts as urine
2. Skin (sweat glands)	Excess of water, salts (like sodium chloride), and urea in the form of sweat
3. Lungs	Carbon dioxide and water vapour in exhaled air (gaseous waste)
4. Liver	Bile pigments, toxins, urea (produced in the liver and transported to the kidneys for excretion)

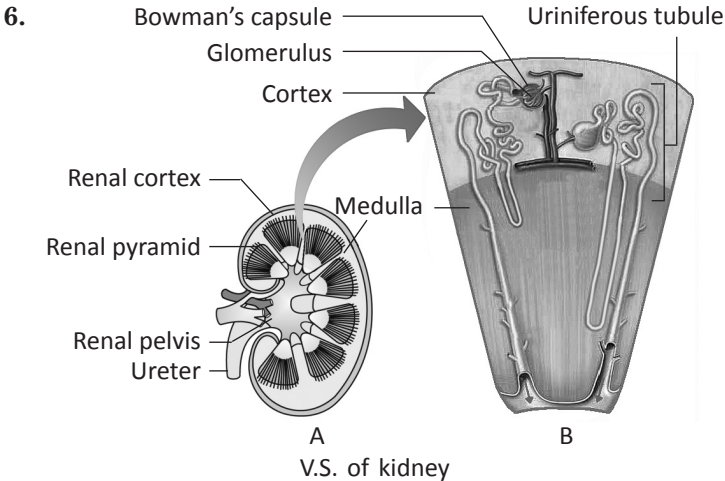
3. Ultrafiltration, reabsorption and secretion are the three steps involved in urine formation.



4. Nephrons are the excretory units of kidney. They are the site of urine formation. In each unit, blood is filtered under pressure to remove wastes from it.
- 5.



Renal excretory system of man



7. Strong and frequent urge for urination, pain and burning sensation while urination are the symptoms of urinary tract infection.
8. Various metabolic wastes are required to be excreted because if they accumulate in the cells, they:
- may prove harmful to the cells.
  - will change the internal environment of the cells.

(c) will disturb ionic balance within the cells.

9. Waste products are unusable or unwanted substances produced during various metabolic processes in the body of living beings, whereas the metabolic wastes which are eliminated from the body and cannot be stored inside the cells are called excretory products.

E. 1. -(d) 2. -(e) 3. -(a) 4. -(c) 5. -(b)

F. 1. True

2. False; Urea from body is excreted by sweat glands and **kidneys**.

3. False; Sweat contains salt, water **and urea**.

4. False; **Nephrons** are long, coiled tubes in kidneys.

G. 1. (c) 2. (b) 3. (a) 4. (b)

### THINK ZONE

- In summer, we perspire a lot so our body needs to conserve water, therefore, for osmoregulation, kidneys absorb less water from blood and less urine is formed. Therefore, we excrete less volume of urine. On the other hand in winter, we do not perspire and thus, our kidneys absorb more water from blood and form large amount of urine.
- In our body, ammonia is produced by the breakdown of amino acids in the liver cells.

## CHAPTER 7. Nervous System

### Check Point

1. True 2. False 3. False 4. False

### TEST YOURSELF

A. 1. nervous; endocrine 2. cerebrum 3. neuron 4. skin

5. cerebrum 6. peripheral 7. medulla oblongata

B. 1. Neuron 2. Myelin sheath 3. Sensory fibres 4. Reflex action

5. Cerebrum 6. Meninges 7. Autonomic nervous system 8. Axon

C. 1. Stimulus is any change in the environment of an organism that evokes a response.

2. Receptor is a nerve cell or sensory cell which is stimulated by changes in the surroundings to generate sensory nerve impulse.

3. The point of contact between terminal branches of axon and dendrites of adjacent neuron is called synapse.

4. The folds and grooves in the layer of gray matter of the cerebrum are called gyri and sulci respectively.

5. Neuron is the structural and functional unit of nervous system.

D. 1.

Cerebrum	Cerebellum
1. The largest and the most highly developed part of the brain.	1. Much smaller than cerebrum and is called little brain.
2. It is the seat of intelligence, memory, thinking, learning, instincts, feelings, etc.	2. It coordinates voluntary movements and balance of the body during walking, swimming, jumping, etc.

2.

Gray matter	White matter
1. Gray matter is grayish in colour.	1. White matter is glistening white.
2. Gray matter forms the outer layer of brain.	2. White matter in the brain lies inside gray matter.
3. Gray matter is mainly formed of cell-bodies of neurons.	3. White matter is formed of axons which join to form nerves.

3.

Sensory nerve	Motor nerve
1. Sensory nerve is formed of sensory nerve fibres.	1. Motor nerve is formed of motor nerve fibres.
2. Sensory nerve brings sensory impulses or stimuli from sense organs or receptors to the brain and spinal cord.	2. Motor nerve carries impulses from brain or motor neurons to the effector organ.

E. 1. Nerve is a bundle of nerve fibres wrapped in a sheath of connective tissue.

In human body, following three types of nerves are found:

- (a) **Sensory nerves:** They contain sensory nerve fibres and bring impulses from sense organs to brain or spinal cord, e.g., optic nerve of the eye.
  - (b) **Motor nerves:** They are formed of motor nerve fibres and carry impulses from brain or spinal cord to effector organs, e.g., nerves supplying eye muscles and muscles of tongue.
  - (c) **Mixed nerves:** They have both sensory and motor nerve fibres, e.g., nerves going to lower jaw, face, neck and salivary glands.
2. Human nervous system is made up of following three divisions:
- (a) **Central nervous system (CNS):** It includes brain and spinal cord.
  - (b) **Peripheral nervous system (PNS):** It is formed of all the nerves arising from brain and spinal cord. It connects central nervous system with different body parts through nerves.

(c) **Autonomic nervous system (ANS):** It is formed of paired chains of ganglia connected to spinal cord.

These three parts of nervous system work in coordination. The peripheral and autonomic nervous systems take the impulses from body organs and send them towards central nervous system. From central nervous system, they carry impulses to the body organs.

3. Cerebrum controls our reasoning, thinking, learning, memory, etc. It is also responsible for sensory perceptions such as hearing, sight, taste, smell, pain, touch, etc.
  4. We detect the taste of different types of food with the help of taste buds located in different regions of the tongue. The sensory nerve cells or receptors in taste buds receive the stimulus of taste from food and change it into electrical nerve impulses. They transmit these nerve impulses to brain. In brain, these impulses are converted into motor impulses and are sent to effector organ for proper body response, i.e., to salivary glands for salivation.
  5. The peripheral nervous system includes all the nerves that arise from brain and spinal cord. These nerves connect the central nervous system to all parts of the body. The peripheral nervous system consists of 12 pairs of cranial nerves which arise from brain and 31 pairs of spinal nerves which arise from spinal cord.
- F. 1. False; Spinal cord is part of **central** nervous system.  
2. False; Response to a stimulus is reflected by an **effector**.  
3. False; The gray matter is formed of **cell bodies (cytons)** of nerve cells.
- G. 1. Receptor; It is a sensory neuron, others are parts of a neuron.  
2. Hypothalamus; It is an endocrine gland, others are parts of brain.
- H. 1. (c) 2. (b) 3. (b) 4. (b) 5. (a) 6. (c) 7. (b) 8. (a)
- I. 1. (a) Dendrite (b) Cyton (c) Axon (d) Synaptic knob

**Passage of nerve impulse:**

Dendrite → Cyton → Axon → Synaptic knob  
(a) (b) (c) (d)

2. (a) 1. Cerebrum  
2. Hypothalamus  
3. Pituitary  
4. Cerebellum  
5. Medulla
- (b) Cerebrum controls reasoning, instinct, thinking, learning, etc. It is responsible for sensory perception of sight, taste, hearing, smell, pain, touch, etc.

## THINK ZONE

- In myelinated nerve fibre, nerve impulse jumps from one node of Ranvier to the other. Therefore, speed of nerve impulse is more in myelinated nerve fibre.
- The cerebrum is the largest part of human brain. Therefore, it contains a large number of neurons in it.

## CHAPTER 8. Allergy

### Check Point

1. Allergy 2. rhinitis 3. allergy 4. shots

### TEST YOURSELF

- A. 1. Allergens 2. Immune system 3. Allergic asthma  
4. Anaphylaxis or Anaphylactic attack
- B. 1. Anaphylaxis, also called anaphylactic attack, is the most dangerous allergic reaction in which large amount of histamine is released by mast cells. This results in the development of rashes on the skin; swelling of face, lips and tissue around mouth and tongue instantly; low blood pressure and shortness of breath which leads to sudden death.
2. Hyperactivity is the over-reaction of immune system to certain substances which are harmless to most normal people. In this state, the person is said to be allergic to that particular substance.
3. Immune system is the system of our body which defends the body against all types of microbes and toxic substances.
- C. 1. Seasonal allergies cause sneezing, coughing, runny nose, itchy and watery eyes and general body ache.
2. Seasonal allergy appears only during specific season and goes with season. It may be spring allergy, summer allergy, fall allergy, winter allergy or hay fever. It is caused by pollen grains of grasses and weeds, moulds and dust mites. On the other hand, perennial allergy can appear at any time the year round. It may be caused due to dust, moulds, cockroaches, feathers, pet dander, insect bite or by some food.
3. Following two methods are used to identify the causative allergen:
- (a) **Skin-prick test or prick testing or puncture testing:**  
In this test, small amounts of suspended allergens or their extracts are injected under the patient's skin and their inflammatory reactions are observed.

- (b) **Blood test:** It involves measuring the concentration of specific IgE antibodies in the blood. Higher is its value, the greater is the likelihood of symptoms.
4. Mouth, nose and skin are the three entry routes of allergens in human body.
  5. The substances that trigger allergic reaction in the body are called allergens. Milk, egg and fish are the allergens responsible for food allergy.
- D.**
1. False; **Sensitisation** is a basic reaction to a simple allergen.
  2. True
  3. True
  4. False; Pollen is responsible for **both seasonal and perennial allergies.**
  5. False; Allergies are mainly diagnosed by **allergy tests.**
  6. False; Cosmetic allergy is a **perennial allergy.**
- E.** 1. (a) 2. (b) 3. (b) 4. (a) 5. (c) 6. (a)
- F.** 1. POLLEN 2. HAY FEVER