

HIGHLIGHTS IN REVIEW

- There are more than 15 lakh species of living organisms on the planet Earth.
- Living organisms, because of the enormous diversity, are grouped into categories, so as to make their study easier. This process is termed as classification.
- Species is the lowest category in classification.
- Classification is the grouping together of organisms on the basis of similarities and differences.
- In the beginning all living organisms were classified as either plants or animals.
- Due to the disputed position of organisms like *Euglena*, fungi and bacteria and the discovery of viruses, a better system of classification called Five Kingdom classification was proposed.
- The five kingdoms are Monera, Protista, Fungi, Plantae and Animalia. This classification is based on
 - (i) cell structure
 - (ii) mode of nutrition
 - (iii) body organisation

Exercises

1. Tick (✓) the correct choice.

1. The lowest category in classification is called
 - ☒ (a) Species
 - (b) kingdom
 - (c) group
 - (d) class
2. According to five-kingdom classification, the kingdoms are (in proper sequence) :
 - (a) Protista, Monera, Plantae, Fungi, Animalia
 - ☒ (b) Monera, Protista, Fungi, Plantae, Animalia
 - (c) Monera, Fungi, Protista, Plantae, Animalia
 - (d) Fungi, Protista, Monera, Animalia, Plantae

3. What is the name of the kingdom that contains single-celled eukaryotes?
 (a) Bacteria (b) Fungi (c) Protozoa ~~(d) Protista~~
4. Animals without vertebral column are called
 (a) Vertebrates (b) Mammals ~~(c) Invertebrates~~ (d) Fungi
5. Earthworm belongs to
 (a) Porifera (b) Arthropoda ~~(c) Annelida~~ (d) Mollusca
6. Pore-bearing animals belong to
 (a) Protozoa ~~(b) Porifera~~ (c) Coelenterata (d) Annelida
7. Tentacles are present in
~~(a) Hydra~~ (b) Paramecium (c) Snail (d) Tapeworm
8. Respiration through gills occurs in
~~(a) Pisces~~ (b) Aves (c) Mammals (d) Reptiles
9. Animals which can live both in water and on land belong to :
 (a) Mollusca ~~(b) Amphibia~~ (c) Aves (d) Mammals

II. Give one word for the following.

1. Small bones which make up the backbone. - vertebrae
2. Animals without backbone. - Invertebrates
3. Porous animals. - Porifera
4. Joint-footed animals. - Arthropoda
5. Animals with soft body and hard shell. - Mollusca
6. Warm-blooded animals with mammary glands. - mammals

III. Find the odd-one out. Give reason in support of your answer.

1. Amoeba, Euglena, Paramecium, Chlamydomonas - autotrophic but the rest are heterotrophic.
2. Tapeworm, roundworm, liver fluke, earthworm - others are parasitic
3. Starfish, brittle star, sea urchin, crab - belong to arthropoda & rest are echinodermata
4. Yeast, protozoa, mushroom - belong to protista, rest are fungi
5. Green algae, brown algae, blue-green algae - prokaryotic (Monera), rest are eukaryotic

IV. Name two organisms kept under the following kingdoms.

1. Monera
2. Protista
3. Fungi
4. Plantae
5. Animalia

V. Which of the following statements are true (T) and which ones are false (F)? Mark T or F.

Statements	T / F
1. Snail is an invertebrate animal.	<u>T</u>
2. Bat is a vertebrate animal.	<u>T</u>
3. Most Invertebrates have soft bodies.	<u>T</u>
4. Fungi do not contain chlorophyll.	<u>T</u>
5. Kingdom Monera contains prokaryotic organisms.	<u>T</u>
6. Reserve food material in fungi is starch.	<u>F</u>
7. Rod-shaped bacteria are called cocci.	<u>F</u>

VI. Give the differences between.

1. Invertebrate and Vertebrate animals

2. Warm-blooded and Cold-blooded animals
3. Coelenterata and Porifera
4. Monera and Protista
5. Protista and Fungi

VII. Match the items in Column A with those in Column B.

Column A	Column B
1. Bacterium	(i) An association between algae and fungi 3
2. Fungus	(ii) One-celled prokaryotic organism 1
3. Lichen	(iii) Green autotrophic plants 4
4. Algae	(iv) A plant with true nuclei but no chlorophyll 2

VIII. Define.

1. Classification
2. Species
3. Invertebrate animals
4. Vertebrate animals

IX. Answer the following.

1. Why has *Euglena* been classified as a plant as well as an animal?
2. Who proposed the five kingdom classification?
3. Name the five kingdoms proposed in the five kingdom classification.
4. Name the largest group of invertebrates.
5. Write the characters on the basis of which animals are classified into vertebrates and invertebrates.
6. Name the different major groups of invertebrates, giving two examples in each one.
7. Name the major groups of vertebrates giving two examples in each one.
8. Classify the following animals into their respective groups :
Snail, *Amoeba*, *Hydra*, earthworm, starfish, sea anemone, cockroach, roundworm, spider, sponge, butterfly, bat, whale, crocodile, frog, crow, cow, shark and prawn.
9. Give the harmful and useful effects of fungi.
10. List three harmful and three useful effects of bacteria.
11. Which bacteria help in curd making?

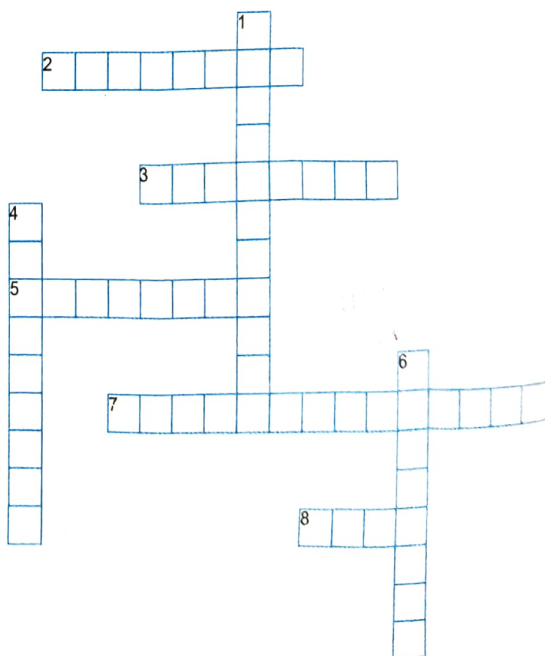
X. Crossword Puzzle

DOWN

1. Animals with backbone. **Vertebrates**
4. A group of vertebrate animals that can live in water as well as on land. **Amphibians**
6. An organism that derives food from the host. **Parasite**

ACROSS

2. Group of animals whose body is covered with scales and include snakes. **reptiles**
3. Segmented worms. **annelida**
5. Unicellular eukaryotic animals. **protista**
7. Grouping together of things based on similarities and differences. **classification**
8. A group of organisms that possess hollow bones. **Aves**



XI. Case Study Based Questions.

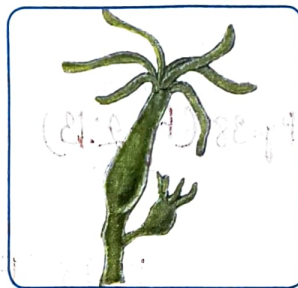
Read the given information carefully and answer the questions that follow.

Observe the animals around you. You see small worms, insects, butterflies, earthworms, frogs, lizards, peacock, monkey, elephant and so on. You can divide all these animals into two major groups by looking at their body designs. If you pick up a worm, it feels soft. It has no bones in its body. A frog feels hard. It has bones, all joined to a bone in its back, that keeps its body in shape. Animals, thus, can be divided into two big groups— invertebrates and vertebrates.

1. The animals which have no backbone are grouped under

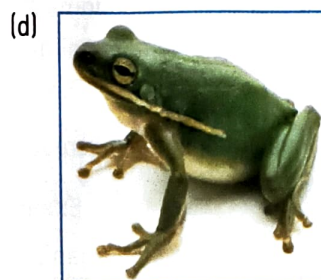
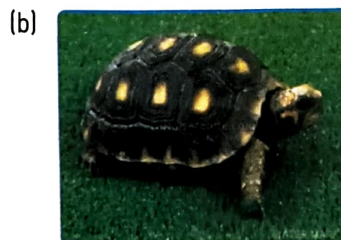
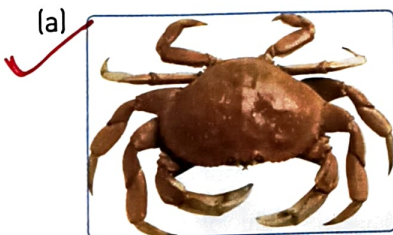
- (a) Plantae
- (b) Fungi
- (c) Vertebrates
- ☒ (d) ~~Invertebrates~~

2. The major group to which the following animals belong is



- (a) Amphibia
- (b) Pisces
- (c) Porifera
- ☒ (d) ~~Coelenterata~~

3. Which one is not a member of vertebrates?



4. The animals in which the body temperature remains constant are called

- (a) Cold blooded
- ☒ (b) ~~Warm blooded~~
- (c) Exothermic
- (d) None of these

XII. Assertion-Reason Type Questions:

In the questions given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.

- (a) Both A and R are true
- (b) Both A and R are false
- (c) A is true and R is false
- (d) A is false and R is true

1. **Assertion (A)** : The animal belonging to group pisces live in water. **T** (a)

Reason (R) : Fishes have streamlined body. **T**

2. **Assertion (A)** : Frog and fish are cold blooded animals. **T**

Reason (R) : They change their body temperature according to their surroundings. **T** (a)

3. **Assertion (A)** : Thallophytes include green, red and brown fungi. **F**

Reason (R) : All types of algae are grouped under thallophyta. **T** (d)

XIII. Art-Integration Based Question

Monera is a group of prokaryotic organisms. Learn about any two members of this group and show their features with the help of labelled diagrams.

XIV. Inquiry Based Question

Take a piece of bread or an orange. Put it in a humid, dark and warm place. Observe it after 3-4 days. Write your observation and draw its picture in your notebook. **Pgs 8 (Fig 2.13)**

XV. Life Skills

Classification helps in organizing the vast diversity of living beings, making it easier to study and understand them. For example, identifying harmful bacteria can prevent diseases, while recognising useful fungi can help in producing medicines like antibiotics. Think about how learning this concept can aid in making informed choices about hygiene, healthcare, and food safety. How can this knowledge be applied in everyday scenarios to improve living standards?

XVI. Competency-Focused Questions

1. The five kingdoms of living organisms, as proposed by Whittaker in 1969, are classified based on the following characteristics:

- i. Cell structure (prokaryotic or eukaryotic)
- ii. Mode of nutrition (autotrophic or heterotrophic)
- iii. Body organisation (unicellular or multicellular)

The correct sequence for the five kingdoms classification is:

- (a) Monera, Protista, Fungi, Plantae, Animalia
- (b) Monera, Protista, Plantae, Fungi, Animalia
- (c) Protista, Monera, Fungi, Animalia, Plantae
- (d) Animalia, Fungi, Plantae, Monera, Protista

2. Priya studied the Kingdom Monera and created the following table to match characteristics with examples:

Characteristic	Example
P	Prokaryotic organisms
Q	Autotrophic nutrition

Identify the correct pair of characteristic and example.

- (a) P - Mycoplasma, Q - Bacteria
- (b) P - Cyanobacteria, Q - Bacteria
- (c) P - Bacteria, Q - Blue-green algae
- (d) P - Blue-green algae, Q - Mycoplasma

3. During a practical exam, a student observed a rod-shaped microorganism under the microscope. The teacher asked the student to identify the type of bacteria based on its shape. Which of the following is the correct answer?

- (a) Cocci
- (b) ~~Bacilli~~
- (c) Spirilla
- (d) Vibrio

4. Which of the following statements about harmful bacteria is correct?

- (a) Black rot in cabbage is caused by *Salmonella typhi*
- (b) ~~Botulism~~ is caused by a poison-producing anaerobic bacterium in improperly canned foods.
- (c) *Mycobacterium tuberculosis* causes pneumonia in humans.
- (d) *Vibrio cholerae* is responsible for fire blight in pears.

5. Choose the incorrectly matched pair.

- (a) *Lactobacillus* - Formation of curd
- (b) *Acetobacter* - Production of vinegar
- (c) ~~Bacteria~~ in human intestine - Production of vitamin C
- (d) Bacteria in soil - Decomposition of dead plants and animals

6. A biology teacher asked her students to identify characteristics and functions related to Amoeba.

- I. Priya said: "Amoeba uses cilia for movement and has a definite shape."
- II. Ravi said: "Amoeba is unicellular, irregular in shape, and uses pseudopodia for locomotion."
- III. Simran said: "The exchange of gases in Amoeba takes place through the contractile vacuole by diffusion."
- IV. Ankit said: "Amoeba reproduces asexually by binary fission, where one parent cell divides into two daughter cells."

Who gave the correct statements?

- (a) ~~Ravi and Ankit~~
- (b) Priya and Simran
- (c) Ravi and Simran
- (d) Simran and Ankit

7. Consider the following statements about Kingdom Fungi:

- 1. Fungi are non-green, eukaryotic organisms that can be either unicellular or multicellular.
- 2. The cell wall of fungi consists of cellulose, similar to plants.
- 3. Most fungi are saprophytes, obtaining their food from dead organic matter.
- 4. Fungi can form symbiotic relationships with blue-green algae to form lichens.

Which of the following statements is/are correct?

- (a) ~~1, 3, and 4 only~~
- (b) 1, 2, and 4 only
- (c) 2, 3, and 4 only
- (d) 1, 2, 3, and 4

8. Given below are two statements:

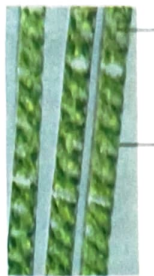
Statement I: Bread mould is saprophytic, deriving its nutrition from dead and decaying matter by secreting digestive juices on substrates like bread to convert starch into glucose, which is absorbed by the hyphae. **T**

Statement II: Yeast, a unicellular fungus from the genus *Saccharomyces*, reproduces asexually through budding and is used in food production due to its rich amino acid and protein content. **F**

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both Statement I and Statement II are correct.
- (b) Both Statement I and Statement II are incorrect.
- (c) ~~Statement I is correct, but Statement II is incorrect.~~
- (d) Statement I is incorrect but Statement II is correct.

9.



A.



B.

The given figures A and B represent

- (a) *Chlamydomonas*, Moss
(b) Rhizopus, Fern
(c) Yeast, Horsetail
(d) ☒ Spirogyra, Liverwort
10. Rohit is studying different types of plants and comes across a seed. He notices that the seed has two seed leaves. Based on this observation, which category does this plant belong to?
(a) Monocotyledonous plants
(b) ☒ Dicotyledonous plants
(c) Gymnosperms
(d) Algae
11. Animals can be classified into two major groups: invertebrates and vertebrates. Invertebrates lack a backbone, while vertebrates have a backbone composed of vertebrae. Examples of invertebrates include sponges, cockroaches, and earthworms. Vertebrates include animals like frogs, birds, and humans.
Which of the following correctly matches an animal group with its characteristic?
(a) Arthropoda – Soft-bodied animals
(b) ☒ Porifera – Porous animals
(c) Echinodermata – Hollow sac-like animals
(d) Nematoda – Spiny-skinned animals
12. Which of the following is correctly matched with its characteristics?
(i) Pisces: Live in water, cold-blooded, breathe through gills, covered with scales
(ii) Amphibia: Live both on land and in water, cold-blooded, slimy body, breathe through lungs and moist skin
(iii) Aves: Have wings, warm-blooded, covered with feathers, hollow bones for lightness
(iv) Mammals: Covered with hair, give birth to young ones, warm-blooded, have mammary glands
(a) (i), (ii), and (iii) only
(b) ☒ (i), (ii), (iii), and (iv)
(c) (i) and (iv) only
(d) (ii) and (iii) only

Know Your Scientist

Robert Whittaker (December 27, 1920 – October 20, 1980) was an American plant ecologist. He was the first to propose the five kingdom taxonomic classification of the world's living organisms. He was elected to the National Academy of Science in 1974. He also proposed the Whittaker Biome Classification, which categorised biome-types upon two abiotic factors, temperature and precipitation.



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VI Give the difference between

1.

vertebrate

- (i) There are the animals with a backbone.
- (ii) These animals are divided into 5 groups.

Invertebrate

- The animals which do not have backbone are called invertebrates.
- (ii) These animals are divided into 8 groups.

2. Cold-blooded animals

- (i) In these animals the body temperature changes with changes in the temperature of the surroundings.

(ii) EX: Frog, fish
Amphibians, pisces & reptiles belong to this category

Warm blooded animals

- (i) In these animals, the body temperature remains constant and does not change with the change in environment.

(ii) EX: Birds & mammals belong to this category.

3. Coelenterata

- (i) Sac like body with only one opening i.e. mouth
- (ii) Can move with the help of tentacles and basal disc which work together with muscle fibre.
- (iii) EX: Hydra, Jellyfish

Porifera

- (i) Body is porous i.e. bears many tiny pores to draw water into the body cavity.
- (ii) Found attached to the bottom of sea, hence they do not move from place to place.
- (iii) EX: Sycon, Leucosolenia

(iv) Monera

It includes single-celled prokaryotic organism like bacteria.

protista

It includes single celled eukaryotic organisms like algae, protozoa & diatoms.

(v) Protista

(i) Mostly unicellular eukaryotes

(ii) Chlorophyll is present in many protists (algae)

(iii) Autotrophic nutrition in case of algae or heterotrophic in protozoa

Fungi

(i) Mostly multicellular (except yeast) eukaryotes.

(ii) Chlorophyll is absent.

(iii) Heterotrophic only, absorbs nutrients from organic matter.

VIII. Define.

1. Classification:

The process of grouping living organisms on the basis of their similarities and differences is called classification.

2. Species:

A species is a group of similar organisms that can interbreed and produce fertile offspring.

3. Invertebrate animals:

Animals that do not have a backbone (vertebral column) are called invertebrate animals.

4. Vertebrate animals:

Animals that have a backbone (vertebral column) are called vertebrate animals.

IX. Answer the following.

1. Why has Euglena been classified as a plant as well as an animal?

Answer: Euglena has chlorophyll and prepares its own food like a plant. It can also move from one place to another and feeds like an animal in the absence of light.

2. Who proposed the five kingdom classification?

Answer: The five kingdom classification was proposed by R. H. Whittaker in 1969.

3. Name the five kingdoms proposed in the five kingdom classification.

Answer:

Monera

Protista

Fungi

Plantae

Animalia

4. Name the largest group of invertebrates.

Answer: Arthropoda is the largest group of invertebrates.

5. Write the characters on the basis of which animals are classified into vertebrates and invertebrates.

Answer: Animals are classified on the basis of the presence or absence of a backbone (vertebral column). Animals with a backbone are called vertebrates, while those without a backbone are called invertebrates.

6. Name the different major groups of invertebrates, giving two examples in each one.

Answer:

Porifera: Sponge, Sycon

Cnidaria (Coelenterata): Hydra, Sea anemone

Platyhelminthes: Tapeworm, Liver fluke

Nematoda: Roundworm, Hookworm

Annelida: Earthworm, Leech

Arthropoda: Cockroach, Spider

Mollusca: Snail, Octopus

Echinodermata: Starfish, Sea urchin

7. Name the major groups of vertebrates giving two examples in each one.

Answer:

Pisces: Shark, Rohu

Amphibia: Frog, Toad

Reptilia: Crocodile, Snake

Aves: Crow, Pigeon

Mammalia: Cow, Whale

8. Classify the following animals into their respective groups:

Snail, Amoeba, Hydra, Earthworm, Starfish, Sea anemone, Cockroach, Roundworm, Spider, Sponge, Bat, Whale, Crocodile, Frog, Crow, Cow, Shark and Prawn.

Answer:

Protista: Amoeba

Porifera: Sponge

Cnidaria: Hydra, Sea anemone

Nematoda: Roundworm

Annelida: Earthworm

Arthropoda: Cockroach, Spider, Prawn

Mollusca: Snail

Echinodermata: Starfish

Pisces: Shark

Amphibia: Frog

Reptilia: Crocodile

Aves: Crow

Mammalia: Bat, Whale, Cow

9. Give the harmful and useful effects of fungi.

Answer:

Useful effects:

Used in making bread and medicines.

Help in the decomposition of dead organic matter.

Harmful effects:

Cause diseases in plants and animals.

Spoil food and clothes.

10. List three harmful and three useful effects of bacteria.

Answer:

Useful effects:

1. *Help in making curd.*
2. *Fix nitrogen in the soil.*
3. *Decompose dead plants and animals.*

Harmful effects:

1. Cause diseases such as cholera and typhoid.

2. Spoil food.

3. Damage crops and plants.

11. Which bacterium helps in curd making?

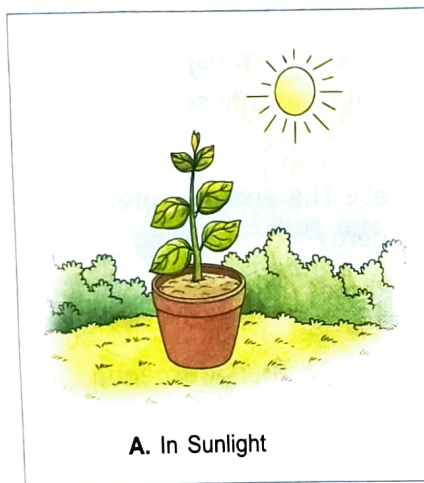
Answer: Lactobacillus helps in making curd by converting milk into curd through the production of lactic acid.

Exercises

CHAPTER-3 PHOTOSYNTHESIS

I. Tick (✓) the correct choice.

- The process, by which green plants prepare their own food is known as
 (a) ☒ Photosynthesis (b) Respiration (c) Symbiosis (d) None of these
- The green colour pigment in the leaves is
 (a) ☒ Chlorophyll (b) Anthocyanin (c) Protoplast (d) Chloroplast
- Tiny pores on the lower surface of leaf are
 (a) Lamina (b) ☒ Stomata (c) Chlorophyll (d) Leaf stalk
- Which of the following is a micronutrient?
 (a) Carbon (b) Nitrogen (c) ☒ Copper (d) Hydrogen
- The given experiment shows that
 (a) Chlorophyll is necessary for photosynthesis
 (b) ☒ Sunlight is necessary for photosynthesis
 (c) CO_2 is necessary for photosynthesis (d) None of these



- Which gas is involved in the process of photosynthesis?
 (a) Oxygen (b) ☒ Carbon dioxide (c) Carbon monoxide (d) Nitrogen
- Iodine test is performed on the leaves to test the presence of
 (a) Chlorophyll (b) Water (c) Carbon dioxide (d) ☒ Starch
- The mode of nutrition followed by the plants is
 (a) ☒ Autotrophic (b) Parasitic (c) Symbiotic (d) Saprophytic

II. Fill in the blanks.

- Green plants use CO_2 and water to prepare food.
- During photosynthesis, Oxygen gas is released.
- The presence of starch can be tested by using iodine solution.
- On testing with iodine, starch turns blue black in colour.
- The pigment Chlorophyll is present inside certain structures called Chloroplast in a leaf.
- The small pores present on the leaves through which carbon dioxide enters the leaf are called Stomata.

III. Which of the following statements are true (T) and which ones are false (F)? Mark T or F.

1. The chlorophyll pigment enables the plant to use sunlight.
2. If there were no plants, the amount of oxygen in the air would go on decreasing.
3. Green plants prepare their food by using oxygen and water.
4. Photosynthesis occurs only in chlorophyll containing parts of the plant.

[T]
[T]
[F]
[T]

IV. Name the following.

1. Gas used in photosynthesis.
2. Pigment which gives green colour to leaves.
3. Chemical used to test starch in leaves.
4. The nutrients required in less quantity in plants.

Carbon dioxide
Chlorophyll
Iodine
micronutrients

V. How do you test for.

1. The role of chlorophyll in photosynthesis. Pg 59 (Investigation 3.2)
2. The role of sunlight in photosynthesis. Pg 58 (Investigation 3.1)

VI. Answer the following questions.

1. From where does carbon dioxide enter a plant?
2. Do you think that photosynthesis is necessary for life to exist on Earth? Explain.
3. What is produced during photosynthesis?
4. Describe the role of stomata in photosynthesis.
5. Mention the different factors which affect the rate of photosynthesis.
6. Mention the significance of photosynthesis in living world.

VII. Case Study Based Questions:

Read the given information carefully and answer the questions that follow:

The process of photosynthesis requires different raw materials in order to convert light energy into chemical energy. The products of photosynthesis helps to sustain life on earth. In the absence of plants, animals would not be able to survive.

1. Among the listed options, which one is not formed during photosynthesis?
(a) Water (b) Oxygen (c) Carbon dioxide (d) Sugar
2. Leaves make food in the form of
(a) Lipids (b) Fats (c) Proteins (d) Carbohydrates
3. Raw material for photosynthesis is
(a) Oxygen (b) Carbon dioxide (c) Glucose (d) Starch
4. During photosynthesis, plants obtain gases through
(a) Roots (b) Stomata (c) Xylem (d) Phloem

VIII. Assertion-Reason Type Questions:

In the questions given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.

- (a) Both A and R are true
 - (b) Both A and R are false
 - (c) A is true and R is false
 - (d) A is false and R is true
1. **Assertion (A)** : The process of preparation of food in plants is called photosynthesis. **T**
Reason (R) : Food in plants is prepared in the presence of sunlight using simple organic substances. **F (C)**

2. **Assertion (A)** : Oxygen is released during photosynthesis.

Reason (R) : Oxygen is used by animals for respiration.

T (a)

3. **Assertion (A)** : Plants are the ultimate source of energy.

Reason (R) : Sun is the ultimate source of energy in the universe.

F
T (d)

IX. Problem-Solving Skills Based Question

Wild animals like tiger, wolf, lion and leopard do not eat plants. Does this mean that they can survive without plants? Provide a suitable explanation to justify your answer.

X. Inquiry Based Question

Look at the given structures. Find out where these are found and what is their importance for plants.



XI. Life Skills

Photosynthesis stores energy by converting sunlight into food, while respiration releases that energy for plants use. Learning about these processes shows how plants contribute to the oxygen-carbon dioxide cycle. Reflect how this understanding can encourage responsible environmental actions, like reducing pollution and protecting green spaces. How can individuals use this knowledge to address climate change and its effects?

XII. Integrated to Chemistry

The process of photosynthesis relies on chlorophyll to absorb light energy, while respiration involves breaking down glucose to release energy. How can understanding the chemical equations of these processes help explain the energy flow in ecosystems?

XIII. Competency-Focused Questions

1. During photosynthesis, chlorophyll ____ (P) ____ and stomata ____ (Q) ____.

(a) P - absorbs light, Q - absorbs oxygen

(b) P - helps in food production, Q - allows water to exit

☒ (c) P - captures light energy, Q - allows carbon dioxide to enter

(d) P - releases oxygen, Q - captures sunlight

2. Why is it important to destarch the potted plant before conducting the experiment on photosynthesis?

(a) To remove any starch produced during the day.

(b) To prevent the leaf from turning blue-black during the iodine test.

☒ (c) To ensure that any starch detected is produced only during the experiment.

(d) To ensure the leaf remains healthy throughout the experiment.

3. Given below are two statements:

Statement I: The rate of photosynthesis is affected by factors such as light intensity, carbon dioxide availability, temperature, water, chlorophyll, and inorganic mineral ions.

Statement II: Chlorophyll is not essential for photosynthesis; the process can still occur in the absence of chlorophyll.

In the light of the above statements, choose the correct answer from the options given below:

(a) Both Statement I and Statement II are correct.

(b) Both Statement I and Statement II are incorrect.

☒ (c) Statement I is correct, but Statement II is incorrect.

(d) Statement I is incorrect but Statement II is correct.

4. Which of the following statements is correct regarding the significance of photosynthesis?
- (a) Photosynthesis only helps plants produce food, with no effect on animals.
 - ☒ (b) Green plants are the primary source of oxygen used by other living organisms for respiration.
 - (c) The energy stored in fossil fuels is not related to photosynthesis.
 - (d) Micronutrients like carbon and hydrogen are required in higher quantities for photosynthesis.
5. Heena was conducting an experiment and observed that the green parts of the variegated leaf turn blue-black after performing the starch test, while the non-green parts remain unchanged. Based on her observation, what conclusion can she draw?
- (a) Chlorophyll is not necessary for photosynthesis
 - ☒ (b) Chlorophyll is needed for photosynthesis
 - (c) Only the non-green parts of the leaf can carry out photosynthesis
 - (d) Starch is not formed in leaves
6. Seema studied the raw materials required for photosynthesis and created the following table to match each material with its respective source:

Raw Material	Source
P	Absorbed through the leaf stomata
Q	Absorbed from the soil by the root system

Identify the correct pair of raw materials and their sources.

- (a) P - Water, Q - Carbon dioxide
- ☒ (b) P - Carbon dioxide, Q - Water
- (c) P - Chlorophyll, Q - Water
- (d) P - Water, Q - Chlorophyll

Know Your Scientist

Van Helmont (1579 – 1644), a Belgian scientist performed an experiment using a twig of a young willow plant. He weighed it and the plant was allowed to grow for 5 years. During this period, only water was supplied to the plant. After five years he again weighed the plant and noted that the plant gained weight from 5 pounds to about 200 pounds. He concluded that food of plants is derived from water. He was only partially correct in this supposition, as it is known that many other materials are required for photosynthesis to take place.



To get the Worksheet of this chapter scan this QR Code



QVI. Answer the following questions.

1. From where does carbon dioxide enter a plant?

Answer: Carbon dioxide enters the plant through tiny pores called stomata present mainly on the surface of leaves.

2. Do you think that photosynthesis is necessary for life to exist on Earth? Explain.

Answer: Yes, photosynthesis is necessary for life on Earth because it produces food for plants, releases oxygen needed for respiration, and helps maintain the balance of oxygen and carbon dioxide in the atmosphere.

3. What is produced during photosynthesis?

Answer: Glucose (food) and oxygen are produced during photosynthesis.

4. Describe the role of stomata in photosynthesis.

Answer: Stomata allow carbon dioxide to enter the leaf for photosynthesis and help release the oxygen produced during the process. They also regulate the exchange of gases.

5. Mention the different factors which affect the rate of photosynthesis.

Answer: The factors affecting the rate of photosynthesis are:

Light intensity

Carbon dioxide concentration

Temperature

Water availability

Chlorophyll content

6. Mention the significance of photosynthesis in the living world.

Answer:

It prepares food for plants, forming the base of the food chain.

It releases oxygen required for respiration.

It maintains the balance of oxygen and carbon dioxide in the atmosphere.

It stores solar energy as chemical energy in food, supporting life on Earth.

IX. Problem-Solving Skills Based Question

Question:

Wild animals like tiger, wolf, lion and leopard do not eat plants. Does this mean that they can survive without plants? Provide a suitable explanation to justify your answer.

Answer:

No, they cannot survive without plants. Herbivores depend on plants for food, and carnivores depend on herbivores. Thus, plants are the primary source of food and energy for all animals.

X. Inquiry Based Question

Question:

Look at the given structures. Find out where these are found and what is their importance for plants.

Answer:

These structures are stomata, found mainly on the lower surface of leaves. They help in the exchange of gases (carbon dioxide and oxygen) and control water loss through transpiration.

XI. Life Skills

Question:

Photosynthesis stores energy by converting sunlight into food, while respiration releases that energy for plant use. Learning about these processes shows how plants contribute to the oxygen-carbon dioxide cycle. Reflect on how this understanding can encourage responsible environmental actions, like reducing pollution and protecting green spaces. How can individuals use this knowledge to address climate change and its effects?

Answer:

Individuals can plant more trees, reduce pollution, and protect forests to support photosynthesis. These actions help absorb carbon dioxide, release oxygen, and reduce the effects of climate change.

xii. Integrated to Chemistry

Question:

The process of photosynthesis relies on chlorophyll to absorb light energy, while respiration involves breaking down glucose to release energy. How can understanding the chemical equations of these processes help explain the energy flow in ecosystems?

Answer:

The equations show that photosynthesis stores solar energy as food, while respiration releases that stored energy. This explains how energy flows from plants to animals and through the entire ecosystem.

Photosynthesis - Short Answer Questions

1. Differentiate between macronutrients and micronutrients with examples.

Macronutrients	Micronutrients
Required by plants in large amounts.	Required by plants in very small amounts.
Help in growth and formation of plant tissues.	Help in enzyme activity and other metabolic processes.
Examples: Nitrogen (N), Phosphorus (P), Potassium (K), Calcium (Ca), Magnesium (Mg).	Examples: Iron (Fe), Zinc (Zn), Manganese (Mn), Copper (Cu), Boron (B).

2. Which part of the cactus plant prepares food and why?

The green stem of the cactus prepares food because the leaves are modified into spines to reduce water loss. The stem contains chlorophyll, which carries out photosynthesis.

3. What do you mean by destarching? Why is it required before performing an experiment based on photosynthesis?

Destarching is the process of keeping a plant in the dark for 24–48 hours so that all the stored starch is used up.

It is required before a photosynthesis experiment to ensure that any starch found after the experiment is produced only during the experiment, making the results accurate.

4. Why shouldn't you boil alcohol directly over the flame?

Alcohol should not be boiled directly over a flame because it is highly inflammable and can easily catch fire. Therefore, it is heated using a water bath for safety.

5. Define autotrophic nutrition.

Autotrophic nutrition is a type of nutrition in which organisms like green plants make their own food from inorganic substances.

6. Define heterotrophic nutrition.

Heterotrophic nutrition is a type of nutrition in which organisms depend on other organisms for their food.

Photosynthesis – Picture Based Questions and Answers

Part A: Picture-based Questions (Investigation 3.4)

1. What is the aim of this experiment?

To show that oxygen is released during photosynthesis.

2. Name the aquatic plant used in this experiment.

Hydrilla.

3. Name the apparatus used to collect the gas.

An inverted test tube placed over a glass funnel.

4. Which gas is collected in the test tube?

Oxygen.

5. Why is the experiment kept in sunlight?

Sunlight is necessary for photosynthesis.

6. What is observed during the experiment?

Bubbles of oxygen are released from the Hydrilla plant and collect in the test tube.

7. How do you confirm that the gas collected is oxygen?

A glowing matchstick rekindles, confirming the gas is oxygen.

8. Why is the test tube filled completely with water before inverting it?

To ensure only oxygen released during photosynthesis is collected.

9. Name the labelled parts of the apparatus.

Beaker, Water, Hydrilla plant, Glass funnel, Test tube, Oxygen bubbles.

10. Write the conclusion of the experiment.

Green plants release oxygen during photosynthesis.

Exercises

RESPIRATION (ch-4)

I. Tick (✓) the correct choice.

- The process in which food is oxidised and energy is released is called
 (a) Excretion (b) ☒ Respiration (c) Digestion (d) Transpiration
- The end products of respiration are
 (a) Only carbon dioxide (b) Carbon dioxide and water
 (c) ☒ Carbon dioxide, water and energy (d) Energy and carbon dioxide
- The process in which only exchange of gases takes place is called
 (a) Respiration (b) ☒ Breathing (c) Combustion (d) Internal respiration
- The end product of respiration in yeast is
 (a) Alcohol (b) Water (c) CO₂ (d) ☒ Alcohol + CO₂
- In plants, oxidation of each glucose molecule releases
 (a) 28 ATP (b) ☒ 38 ATP (c) 48 ATP (d) 18 ATP
- Aerobic respiration can be differentiated from anaerobic respiration as
 (a) ☒ Sugar is completely broken down in aerobic organisms but partially in anaerobic respiration.
 (b) 2 ATP molecules of energy is released in aerobic organisms but 38 ATP in anaerobic respiration.
 (c) Oxygen is not necessary for aerobic organisms but it is required for anaerobic respiration.
 (d) None of the above
- Which of the following is called the lung of the earth?
 (a) Soil (b) Atmosphere (c) ☒ Trees (d) Water source
- The respiratory organs of plants do not include
 (a) stomata (b) lenticels (c) ☒ nostrils (d) both (a) and (b)

II. Fill in the blanks.

- During respiration, when energy is released, CO₂ and water are also produced.
- Anaerobic respiration is carried out by Yeast / some bacteria
- The process by which energy is produced for use in various functions of the body is called respiration
- In plants, exchange of gases occurs by the process of diffusion.
- In yeast, respiration takes place in the absence of oxygen.

III. Give one word for the following.

- The process by which breakdown of food occurs into small molecules. to release energy (Respiration)
- Physical process in which exchange of gases takes place. (breathing)

IV. Write True (T) or False (F) in front of the statements given below.

Statements

- In respiration, oxygen is required and carbon dioxide is given out. T/F
[T]
- Diffusion of gases takes place through a small part of root surface. General surface of root [F]
- In anaerobic respiration, complete breakdown of food takes place. aerobic [F]

V. Define the following.

- Respiration
- Aerobic respiration
- Anaerobic respiration

VI. Differentiate between the following.

- Combustion and Respiration Pg 68 (Table 4.2)
- Aerobic and Anaerobic Respiration Pg 68 (Table 4.1)

VII. Answer the following questions.

- Name the end products of respiration.
- How does respiration occur in plants? Write a note on it.

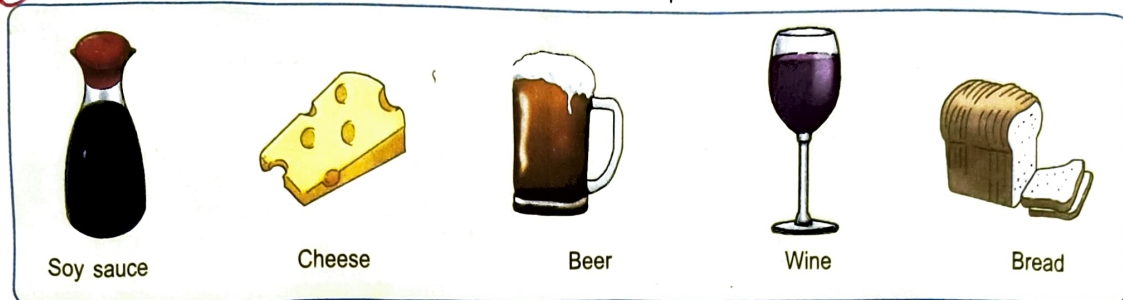
- Write in short about the process of respiration.
- What is the importance of respiration?
- Give at least four differences between photosynthesis and respiration.

Pg 71 (Table 4.3)

VIII. Case Study Based Questions.

Look at the given diagrams carefully and answer the following questions:

- The process through which the given beverages are manufactured is
 (a) ☒ Fermentation (b) Filtration (c) Evaporation (d) Distillation



- A given milk product is made with the help of
 (a) Bacteria (b) Fungi ☒ (c) Both (a) and (b) (d) Algae
- The small holes in bread and cheese are produced due to the production of _____ during anaerobic respiration.
☒ (a) CO_2 (b) O_2 (c) H_2O (d) N_2
- Alcohol is the product of
 (a) Human respiration (b) Aerobic respiration (c) Cellular respiration ☒ (d) Fermentation

IX. Assertion-Reason Type Questions.

In the questions given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.

- (a) Both A and R are true (b) Both A and R are false
 (c) A is true and R is false (d) A is false and R is true
- Assertion (A) :** The end products of plant respiration are energy and CO_2 . **F** (d)
Reason (R) : Food is broken down during respiration. **T**
 - Assertion (A) :** Germinating seeds also respire. **T**
Reason (R) : Heat is not released during respiration. **F** (c)

X. Art-Integration Based Question.

Observe the stem (trunk) of some old trees in your surroundings. Try to observe the pores found on them with the help of a hand lens. Now observe the back side of the leaves of the same trees with the hand lens. The pores you observe are their respiratory organs. Draw the structures of pores on the leaf and stem, in your notebook.

XI. Problem-Solving Based Question.

Every year during October to December, most of the metropolitan cities face higher level of air pollution. It causes many health related problems in the people of all age groups.

Suggest some preventive measures and possible solution to deal with such problems.

XV. Competency-Focused Questions.

- In respiration, glucose _____ (P) _____ and oxygen _____ (Q) _____
 (a) ☒ P - is broken down, Q - helps in oxidation
 (b) P - releases energy, Q - stores energy
 (c) P - combines with carbon dioxide, Q - is used to produce water
 (d) P - forms ATP, Q - releases carbon dioxide

2. Which of the following statements correctly identifies a difference between combustion and respiration?
 - (a) Combustion occurs at normal body temperature, whereas respiration occurs at high temperature.
 - (b) Combustion is a slow process, whereas respiration is fast.
 - ☒ (c) Combustion produces energy in the form of heat and light, while respiration release energy from chemical molecule.
 - (d) Combustion is catalysed by enzymes, while respiration is not.
3. Which of the following correctly describes the process of respiration in plants?

P - Oxygen is absorbed through stomata for the process of respiration.
 Q - Stored food (glucose) is oxidised to produce energy.
 R - Carbon dioxide and water are consumed during respiration.
 S - ATP molecules are produced during respiration.

 - (a) P and Q
 - (b) Q and S
 - (c) P and R
 - ☒ (d) P, Q and S
4. How many ATP molecules are produced from the oxidation of one glucose molecule in anaerobic respiration?
 - (a) 38
 - ☒ (b) 2
 - (c) 36
 - (d) 40
5. Sohan performed an experiment and after following the experimental procedure, he observed that the limewater turned milky. What conclusion can Sohan draw from this observation?
 - (a) Germinating seeds produce oxygen during respiration
 - ☒ (b) Germinating seeds produce carbon dioxide during respiration
 - (c) Limewater turns milky in the presence of oxygen
 - (d) Germinating seeds do not produce carbon dioxide
6. During a practical exam, a student used germinating seeds in one flask and boiled seeds in another flask. After leaving the flasks for 2-3 hours, the student observed a higher temperature reading in the flask with the germinating seeds. What conclusion can be drawn from this observation?
 - (a) Heat is absorbed during respiration.
 - (b) Germinating seeds do not carry out respiration.
 - ☒ (c) Heat is produced during respiration.
 - (d) The temperature is unaffected by respiration.
7. Seema conducted an experiment using germinating seeds. She followed the steps below:
 - I. Germinating seeds were placed in a sealed container.
 - II. The seeds produced alcohol and carbon dioxide as byproducts.

What conclusion can be drawn from this experiment?

 - (a) The seeds performed aerobic respiration.
 - (b) Oxygen was available for respiration in the sealed container.
 - ☒ (c) Anaerobic respiration occurred in the absence of oxygen.
 - (d) The seeds produced more energy as compared to aerobic respiration.
8. Choose the incorrectly matched pair.
 - (a) Photosynthesis - Occurs only in the presence of sunlight
 - ☒ (b) Respiration - Requires green pigment, chlorophyll
 - (c) Photosynthesis - Uses carbon dioxide and water
 - (d) Respiration - Uses food material (glucose) and oxygen
9. Which of the following best explains why anaerobic respiration produces less energy as compared to aerobic respiration?
 - (a) Anaerobic respiration occurs in the presence of oxygen, which slows down the process
 - ☒ (b) Glucose is not completely oxidised in anaerobic respiration, resulting in less energy
 - (c) Anaerobic respiration produces more ATP molecules as compared to aerobic respiration
 - (d) The absence of glucose leads to a reduced amount of energy production in anaerobic respiration



Chapter -4

VII. Answer the following questions.

Q1. Name the end products of respiration.

Answer:

The end products of respiration are carbon dioxide, water and energy (ATP).

Q2. How does respiration occur in plants? Write a note on it.

Answer:

Respiration in plants takes place as follows:

Oxygen is taken in from the atmosphere through stomata (small pores on the surface of leaves).

Stored food (glucose) is oxidised by the absorbed oxygen.

Energy (in the form of ATP molecules) is produced.

Carbon dioxide and water are produced as the end products of oxidation of food.

Q3. Write in short about the process of respiration.

Answer:

Respiration is the process in which food (glucose) is broken down with the help of oxygen to release energy. During this process, carbon dioxide and water are formed as by-products.

Q4. What is the importance of respiration?

Answer:

Respiration releases energy required for all life processes such as growth, repair, movement, reproduction and transport of substances. It is essential for the survival of all living organisms.

(v) Glucose and Starch [Solubility in water]

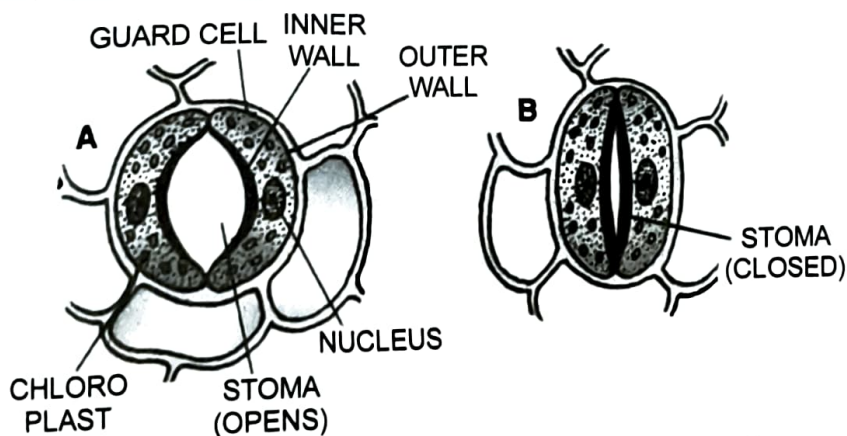
Ans.

Glucose	Starch
Glucose is soluble in water, binds with water and then takes up much space.	Starch is not soluble in water.

2. Draw a neat diagram of "opened and closed stomata" and answer the following questions :

(i) Label the following in the diagram : Guard cells, Stoma, Nucleus, Inner wall, Outer wall and Chloroplast.

Ans.



(ii) Mention the condition of guard cells during open and closed stomata.

Ans. When water enters the guard cells they become turgid. This result in opening of stomata pore. When water exists from the guard cells, they become flaccid.

(iii) Write the specific location of these structures in the plant body.

Ans. The stomata are most common green aerial parts of plants, particularly the leaves.

(iv) Name three important processes of plants in which the stomata are involved.

Ans. • Stomata are important portals for gaseous exchange in plants.

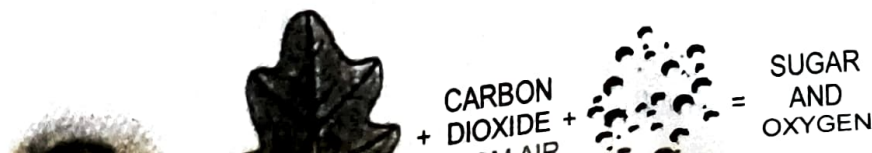
• It is associated with photosynthesis.

• It assists in monitoring the movement of water via transpiration.

(v) Are the stomata open or closed during the day and night respectively ?

Ans. In leaves, stomata open during the day time to favor CO_2 diffusion when light is available for photosynthesis and close at night to limit transpiration and save water.

3. The figures given below represents a process in plants. Study the same and answer the following questions :



(v) **Glucose and Starch [Solubility in water]**

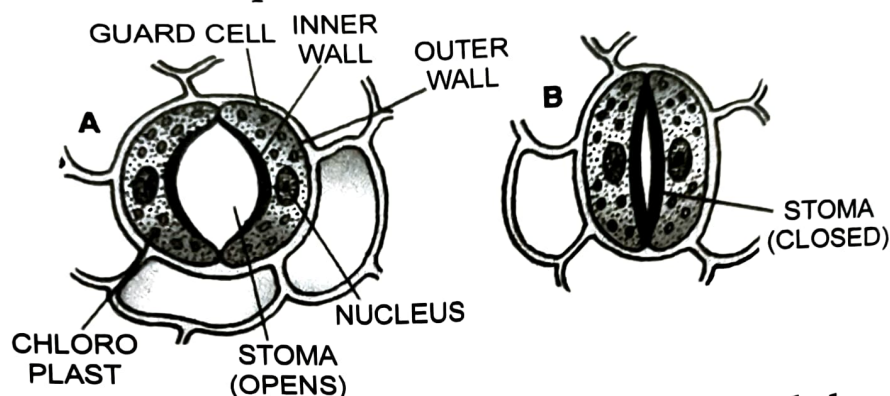
Ans.

Glucose	Starch
Glucose is soluble in water, binds with water and then takes up much space.	Starch is not soluble in water.

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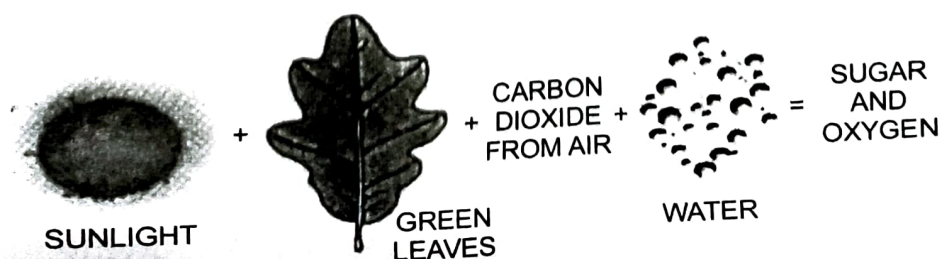
• It is associated with photosynthesis.

• It assists in monitoring the movement of water via transpiration.

(v) Are the stomata open or closed during the day and night respectively ?

Ans. In leaves, stomata open during the day time to favor CO_2 diffusion when light is available for photosynthesis and close at night to limit transpiration and save water.

3. The figures given below represents a process in plants. Study the same and answer the following questions :



(i) Identify the process and define it.

Ans. The process is photosynthesis. During photosynthesis, water is combined with carbon dioxide in the presence of light and chlorophyll to produce glucose and oxygen.

(ii) Write balanced equation depicting the entire process.

Ans. Carbon dioxide + water
Sunlight ↓ Chlorophyll
Glucose + Oxygen

(iii) Name the organelle and pigment responsible for the process.

Ans. Photosynthesis occurs in the chloroplast of the leaf cells. Chloroplast contains the green pigment called chlorophyll.

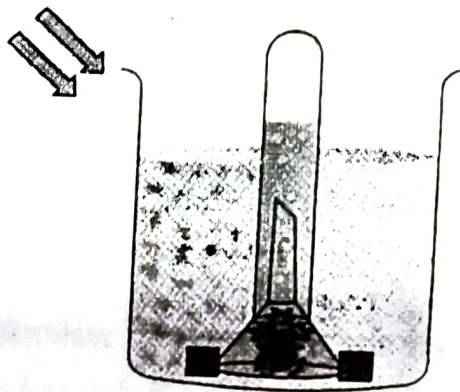
(iv) Mention two by-products of the process.

Ans. Two by-products of this process are glucose and oxygen.

(v) What is the significance of the process? State two points.

Ans. • It helps in the synthesis of organic compounds from inorganic compounds.
• It fixes and balances the amount of carbon dioxide by plants exhaling oxygen and animals and humans exhaling carbon dioxide.

4. The experimental set-up shown alongside represents a process in plants. Study the same and answer the following questions :



(i) What is the aim of this experiment?

Ans. Aim of this experiment : To show that oxygen is given out during photosynthesis.

(ii) Name a suitable plant which can be used for the experiment. What is the habitat of this plant mentioned by you?

Ans. Hydrilla plant is used in this experiment. Hydrilla is an aquatic plant.

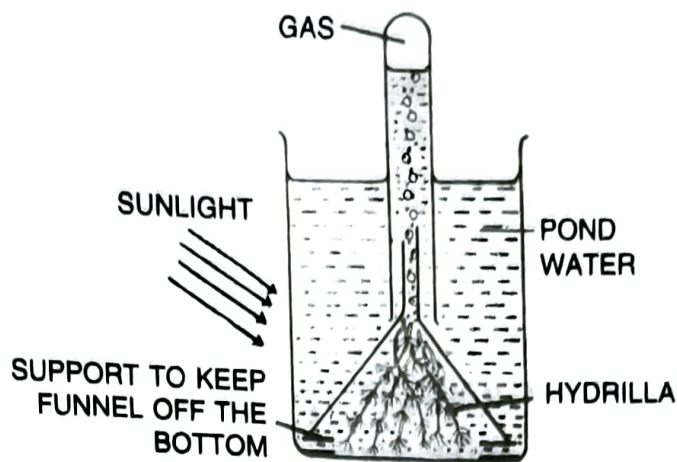
(iii) What is importance of the gas formed, shown by the bubbles, for us?

Ans. The gas formed is Oxygen. The oxygen given out is utilized by humans and other animals for carrying out their own cellular functions.

(iv) How would you confirm the presence of the gas in the test tube?

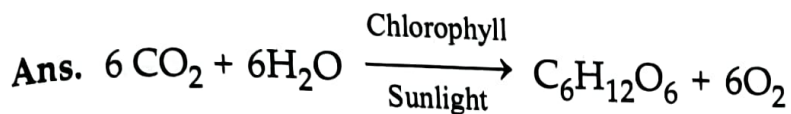
Ans. Gas produced can be seen as bubbles in the test tube. A glowing matchstick starts burning confirms that the gas produced is oxygen.

(v) Draw a neat and labelled diagram of the same experiment in its 'initial stage'.
 Ans.

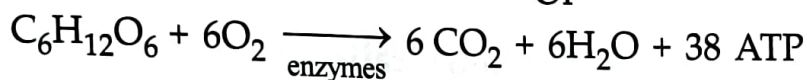
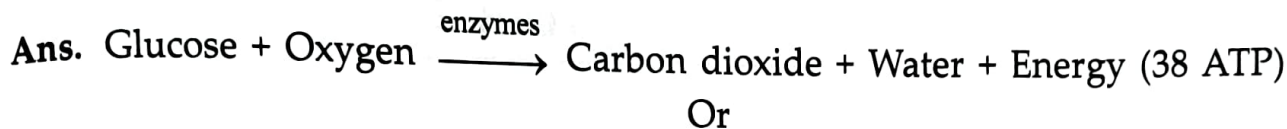


5. Write balanced equations for each of the following :

(i) Photosynthesis.

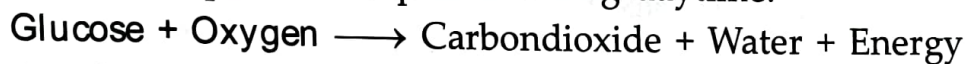


(ii) Aerobic respiration in animals.



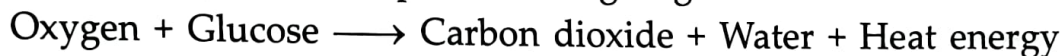
(iii) Aerobic respiration in plants during daytime.

Ans. Aerobic respiration in plants during daytime.



(iv) Aerobic respiration in plants during night.

Ans. Aerobic respiration in plants during Night.



(v) Anaerobic respiration in plants.

Ans. Anaerobic respiration in plants.



3. photosynthesis and respiration.

Ans.

Photosynthesis	Respiration
1. It is an anabolic process. 2. It takes place in the presence of sunlight. 3. Oxygen is released as the by product. 4. It takes place in the green parts of the plant that is green leaves, young green stems. 5. Food is synthesised by plants using CO_2 and H_2O	It is a catabolic process. Sunlight is not necessary for the respiration. Carbon dioxide is released as the by product. It takes place in all the parts of a plant. Food is oxidized using oxygen to release energy.

F. Answer the following in short.

1. Define respiration.

Ans. The process of conversion of glucose molecules in food into energy rich molecules, carbon dioxide and water with the help of oxygen is known as respiration.

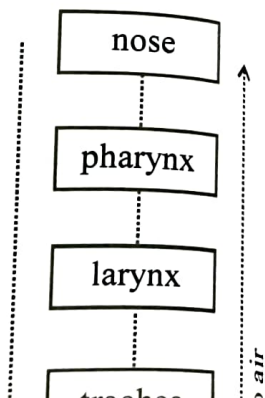
2. What is the full form of ATP ?

Ans. ATP is the energy currency of cell. Its full form is Adenosine Triphosphate.

3. What is respiratory tract ?

Ans. The path through which the air travels to the lungs and back to the atmosphere in humans is called the respiratory tract.

4. Define cutaneous respiration ?



Exercises

RESPIRATION (ch-4)

I. Tick (✓) the correct choice.

- The process in which food is oxidised and energy is released is called
 (a) Excretion (b) ☒ Respiration (c) Digestion (d) Transpiration
- The end products of respiration are
 (a) Only carbon dioxide (b) Carbon dioxide and water
 (c) ☒ Carbon dioxide, water and energy (d) Energy and carbon dioxide
- The process in which only exchange of gases takes place is called
 (a) Respiration (b) ☒ Breathing (c) Combustion (d) Internal respiration
- The end product of respiration in yeast is
 (a) Alcohol (b) Water (c) CO₂ (d) ☒ Alcohol + CO₂
- In plants, oxidation of each glucose molecule releases
 (a) 28 ATP (b) ☒ 38 ATP (c) 48 ATP (d) 18 ATP
- Aerobic respiration can be differentiated from anaerobic respiration as
 (a) ☒ Sugar is completely broken down in aerobic organisms but partially in anaerobic respiration.
 (b) 2 ATP molecules of energy is released in aerobic organisms but 38 ATP in anaerobic respiration.
 (c) Oxygen is not necessary for aerobic organisms but it is required for anaerobic respiration.
 (d) None of the above
- Which of the following is called the lung of the earth?
 (a) Soil (b) Atmosphere (c) ☒ Trees (d) Water source
- The respiratory organs of plants do not include
 (a) stomata (b) lenticels (c) ☒ nostrils (d) both (a) and (b)

II. Fill in the blanks.

- During respiration, when energy is released, CO₂ and water are also produced.
- Anaerobic respiration is carried out by Yeast / some bacteria
- The process by which energy is produced for use in various functions of the body is called respiration
- In plants, exchange of gases occurs by the process of diffusion.
- In yeast, respiration takes place in the absence of oxygen.

III. Give one word for the following.

- The process by which breakdown of food occurs into small molecules. to release energy (Respiration)
- Physical process in which exchange of gases takes place. (breathing)

IV. Write True (T) or False (F) in front of the statements given below.

Statements

- | | |
|---|------------|
| 1. In respiration, oxygen is required and carbon dioxide is given out. | T/F |
| 2. Diffusion of gases takes place through a <u>small part</u> of root surface. <u>General surface of root</u> | [T]
[F] |
| 3. In <u>anaerobic</u> respiration, complete breakdown of food takes place. <u>aerobic</u> | [F]
[F] |

V. Define the following.

- Respiration
- Aerobic respiration
- Anaerobic respiration

VI. Differentiate between the following.

- Combustion and Respiration Pg 68 (Table 4.2)
- Aerobic and Anaerobic Respiration Pg 68 (Table 4.1)

VII. Answer the following questions.

- Name the end products of respiration.
- How does respiration occur in plants? Write a note on it.

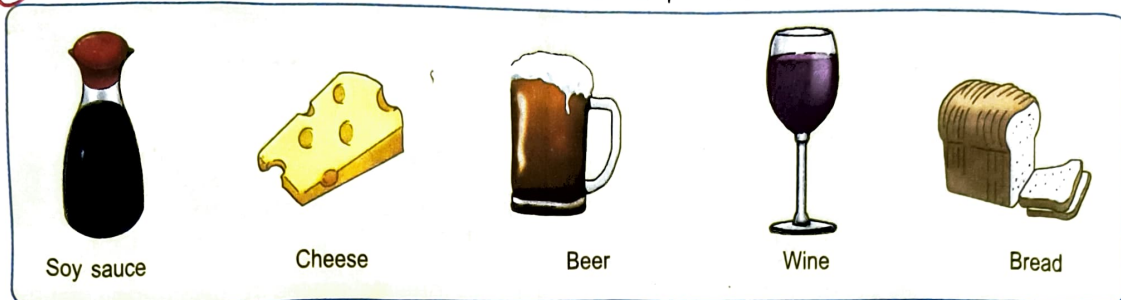
- Write in short about the process of respiration.
- What is the importance of respiration?
- Give at least four differences between photosynthesis and respiration.

Pg 71 (Table 4.3)

VIII. Case Study Based Questions.

Look at the given diagrams carefully and answer the following questions:

- The process through which the given beverages are manufactured is
 (a) ☒ Fermentation (b) Filtration (c) Evaporation (d) Distillation



- A given milk product is made with the help of
 (a) Bacteria (b) Fungi ☒ (c) Both (a) and (b) (d) Algae
- The small holes in bread and cheese are produced due to the production of _____ during anaerobic respiration.
☒ (a) CO_2 (b) O_2 (c) H_2O (d) N_2
- Alcohol is the product of
 (a) Human respiration (b) Aerobic respiration (c) Cellular respiration ☒ (d) Fermentation

IX. Assertion-Reason Type Questions.

In the questions given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.

- (a) Both A and R are true (b) Both A and R are false
 (c) A is true and R is false (d) A is false and R is true
- Assertion (A) :** The end products of plant respiration are energy and CO_2 . **F** (d)
Reason (R) : Food is broken down during respiration. **T**
 - Assertion (A) :** Germinating seeds also respire. **T**
Reason (R) : Heat is not released during respiration. **F** (c)

X. Art-Integration Based Question.

Observe the stem (trunk) of some old trees in your surroundings. Try to observe the pores found on them with the help of a hand lens. Now observe the back side of the leaves of the same trees with the hand lens. The pores you observe are their respiratory organs. Draw the structures of pores on the leaf and stem, in your notebook.

XI. Problem-Solving Based Question.

Every year during October to December, most of the metropolitan cities face higher level of air pollution. It causes many health related problems in the people of all age groups.

Suggest some preventive measures and possible solution to deal with such problems.

XV. Competency-Focused Questions.

- In respiration, glucose _____ (P) _____ and oxygen _____ (Q) _____.
 (a) ☒ P - is broken down, Q - helps in oxidation
 (b) P - releases energy, Q - stores energy
 (c) P - combines with carbon dioxide, Q - is used to produce water
 (d) P - forms ATP, Q - releases carbon dioxide

2. Which of the following statements correctly identifies a difference between combustion and respiration?
 - (a) Combustion occurs at normal body temperature, whereas respiration occurs at high temperature.
 - (b) Combustion is a slow process, whereas respiration is fast.
 - ☒ (c) Combustion produces energy in the form of heat and light, while respiration release energy from chemical molecule.
 - (d) Combustion is catalysed by enzymes, while respiration is not.
3. Which of the following correctly describes the process of respiration in plants?

P - Oxygen is absorbed through stomata for the process of respiration.
 Q - Stored food (glucose) is oxidised to produce energy.
 R - Carbon dioxide and water are consumed during respiration.
 S - ATP molecules are produced during respiration.

 - (a) P and Q
 - (b) Q and S
 - (c) P and R
 - ☒ (d) P, Q and S
4. How many ATP molecules are produced from the oxidation of one glucose molecule in anaerobic respiration?
 - (a) 38
 - ☒ (b) 2
 - (c) 36
 - (d) 40
5. Sohan performed an experiment and after following the experimental procedure, he observed that the limewater turned milky. What conclusion can Sohan draw from this observation?
 - (a) Germinating seeds produce oxygen during respiration
 - ☒ (b) Germinating seeds produce carbon dioxide during respiration
 - (c) Limewater turns milky in the presence of oxygen
 - (d) Germinating seeds do not produce carbon dioxide
6. During a practical exam, a student used germinating seeds in one flask and boiled seeds in another flask. After leaving the flasks for 2-3 hours, the student observed a higher temperature reading in the flask with the germinating seeds. What conclusion can be drawn from this observation?
 - (a) Heat is absorbed during respiration.
 - (b) Germinating seeds do not carry out respiration.
 - ☒ (c) Heat is produced during respiration.
 - (d) The temperature is unaffected by respiration.
7. Seema conducted an experiment using germinating seeds. She followed the steps below:
 - I. Germinating seeds were placed in a sealed container.
 - II. The seeds produced alcohol and carbon dioxide as byproducts.

What conclusion can be drawn from this experiment?

 - (a) The seeds performed aerobic respiration.
 - (b) Oxygen was available for respiration in the sealed container.
 - ☒ (c) Anaerobic respiration occurred in the absence of oxygen.
 - (d) The seeds produced more energy as compared to aerobic respiration.
8. Choose the incorrectly matched pair.
 - (a) Photosynthesis - Occurs only in the presence of sunlight
 - ☒ (b) Respiration - Requires green pigment, chlorophyll
 - (c) Photosynthesis - Uses carbon dioxide and water
 - (d) Respiration - Uses food material (glucose) and oxygen
9. Which of the following best explains why anaerobic respiration produces less energy as compared to aerobic respiration?
 - (a) Anaerobic respiration occurs in the presence of oxygen, which slows down the process
 - ☒ (b) Glucose is not completely oxidised in anaerobic respiration, resulting in less energy
 - (c) Anaerobic respiration produces more ATP molecules as compared to aerobic respiration
 - (d) The absence of glucose leads to a reduced amount of energy production in anaerobic respiration



Chapter -4

VII. Answer the following questions.

Q1. Name the end products of respiration.

Answer:

The end products of respiration are carbon dioxide, water and energy (ATP).

Q2. How does respiration occur in plants? Write a note on it.

Answer:

Respiration in plants takes place as follows:

Oxygen is taken in from the atmosphere through stomata (small pores on the surface of leaves).

Stored food (glucose) is oxidised by the absorbed oxygen.

Energy (in the form of ATP molecules) is produced.

Carbon dioxide and water are produced as the end products of oxidation of food.

Q3. Write in short about the process of respiration.

Answer:

Respiration is the process in which food (glucose) is broken down with the help of oxygen to release energy. During this process, carbon dioxide and water are formed as by-products.

Q4. What is the importance of respiration?

Answer:

Respiration releases energy required for all life processes such as growth, repair, movement, reproduction and transport of substances. It is essential for the survival of all living organisms.



Q1. What is the aim of this experiment?

Answer: To show that carbon dioxide is produced during respiration.

Q2. Which gas is produced by germinating seeds during respiration?

Answer: Carbon dioxide (CO_2) is produced.

Q3. Why is lime water used?

Answer: Lime water tests carbon dioxide and turns milky in its presence.

Q4. What change is observed?

Answer: The lime water turns milky.

Q5. What is the conclusion?

Answer: Germinating seeds produce carbon dioxide during respiration.

Investigation 4.2 (pg-69)

Q1. What is the aim of this experiment?

Answer: To show that heat is released during respiration.

Q2. Why are boiled seeds kept in flask B?

Answer: They act as a control because they do not respire.

Q3. Which flask shows a rise in temperature?

Answer: Flask A shows a rise in temperature because germinating seeds release heat.

Q4. Which instrument is used?

Answer: A thermometer.

Q5. What is the conclusion?

Answer: Respiration releases heat energy.

Investigation 4.3 (pg-70)"

Q1. What is the aim of this experiment?

Answer: To show anaerobic respiration in germinating seeds.

Q2. Which metal is used in the test tube?

Answer: Mercury.

Q3. What gas is produced?

Answer: Carbon dioxide (CO_2).

Q4. What happens after 24 hours?

Answer: The mercury level falls.

Q5. Why does the mercury level fall?

Answer: Carbon dioxide released by the seeds pushes the mercury level down.

Q6. What happens when KOH is added?

Answer: KOH absorbs carbon dioxide, so the mercury level rises again.

Q7. What does this prove?

Answer: It proves that carbon dioxide is produced during anaerobic respiration.

Q8. What is the conclusion?

Answer: Germinating seeds respire in the absence of oxygen and release carbon dioxide.

Exercises

I. Tick (✓) the correct choice.

1. The process of removal of waste products from the body is called
(a) Transpiration (b) Evaporation ☒ (c) Excretion (d) Respiration
2. The structures in kidney which act as filters are
(a) Alveoli ☒ (b) Nephrons (c) Villi (d) None of these
3. The urinary bladder opens into
☒ (a) Urethra (b) Nephron (c) Ureter (d) Neuron
4. The excretory organs for removing excess water, salt and urea are
(a) Lungs ☒ (b) Kidneys (c) Liver (d) Skin
5. Each kidney consists of a large number of coiled tubes called
☒ (a) Nephrons (b) Ureters (c) Uterus (d) Urethra
6. Urethra acts as an outlet passage for
(a) Sweat ☒ (b) Urine (c) Waste food (d) Blood

II. Fill in the blanks.

1. Getting rid of waste materials is called excretion.

2. Skin helps in the excretion of water and salt.
3. In humans, carbon dioxide is excreted through lungs.
4. Kidneys are made up of a number of filters called nephrons.
5. Kidneys are connected to the urinary bladder by long tubes called ureters.

III. Give one word for the following.

1. Coiled tubes that act as filters and are present in the kidneys. Nephrons
2. Organ for the removal of drugs from the blood. liver

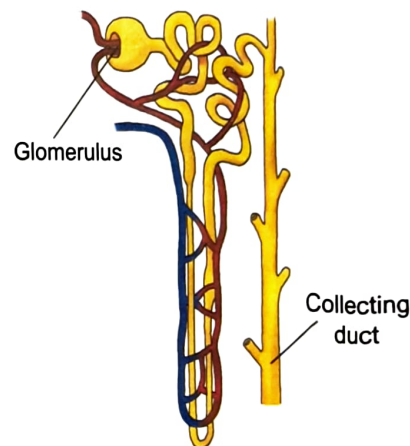
IV. Answer the following questions.

1. Name the various organs of excretion in humans. lungs, skin, large intestine, kidneys, liver
2. Name the different excretory products produced by the body in humans. urea & uric acid, bile pigment
3. Draw a labelled diagram of excretory system in humans. CO₂, extra vitamin & salt.
4. Explain: (i) Urinary Tract Infection (ii) Kidney Stone

V. Case Study Based Questions.

Read the given information carefully, and answer the questions.

Each kidney is made up of about a million of filtering units called nephrons. Each nephron is made up of a glomerulus and a long tubule. The blood which enters the nephron contains unwanted waste materials along with some useful substances. The nephrons remove the waste substances from the blood and carry it as the fluid waste i.e., urine.



1. Nephrons, the coiled tubes in the kidneys, function as
 (a) Reservoirs of urine (b) Passage tubes for urine
~~(c) Filters~~ (d) Site of urine formation
2. In urine, the content of water is about
 (a) 25% (b) 50% (c) 70% ~~(d) 95%~~
3. The collecting duct is a part of
 (a) Ureter ~~(b) Nephron~~ (c) Bowman's capsule (d) Urinary bladder
4. The correct sequence of urine formation and its passage in urinary tract is
~~(a) Glomerulus → Collecting duct → Ureter → Urinary bladder~~
 (b) Collecting duct → Ureter → Glomerulus → Urinary bladder
 (c) Urinary bladder → Ureter → Glomerulus → Collecting duct
 (d) Ureters → Glomerulus → Urinary bladder → Collecting duct

VI. Assertion-Reason Type Questions

In the questions given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.

- (a) Both A and R are true
- (b) Both A and R are false
- (c) A is true and R is false
- (d) A is false and R is true

1. **Assertion (A)** : Urinary bladder is a muscular bag-like structure. **T**

Reason (R) : Urine is collected and stored in urinary bladder. **T** (a)

2. **Assertion (A)** : Kidneys are tube-like structures located above the stomach. **F**

Reason (R) : Each kidney consists of a number of nephrons. **T** (d)

VII. Art-Integration Based Question

Draw an outline of human body and show where our kidneys are located. Show the path of water starting from our mouth upto the urethra, with the help of small arrows.

VIII. Life Skills

The excretory system removes waste products and toxins from the body through organs like the kidneys and sweat glands. When this system fails, it can lead to issues like kidney stones or urinary tract infections (UTIs). Reflect on how staying hydrated, eating a balanced diet, and avoiding harmful substances can help maintain the excretory system. How can this awareness lead to healthier lifestyle choices?

IX. Integrated to Health Education

Kidneys play a vital role in filtering blood and removing waste. How can knowledge of the renal system help individuals make healthier dietary and lifestyle choices to avoid conditions like kidney stones?

X. Competency-Focused Questions

1. A person suffering from kidney failure may experience increased levels of urea and creatinine in the bloodstream. How does this condition directly impact the human body's excretion process?
 - (a) The lungs take over the function of urea excretion.
 - (b) The skin compensates by releasing excess uric acid through sweat.
 - ☒ (c) The kidneys no longer filter harmful waste products from the blood.
 - (d) The large intestine begin excreting urea.

2. Consider the following statements:

- (i) Diabetes is a condition in which the sugar level in the blood increases significantly and is excreted through urine.
- (ii) Drinking sufficient water every day can help to prevent the formation of kidney stones.
- (iii) In cases of kidney failure, dialysis is used to filter and clean the blood artificially.
- (iv) The artificial kidney increases level of urea in blood.

Which of the following statements is/are correct?

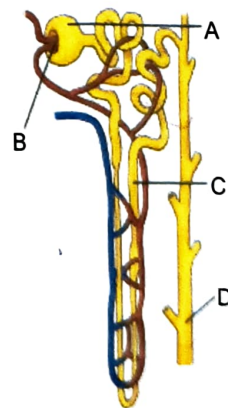
- ☒ (a) (i), (ii), and (iii) only
- (b) (i), (ii), and (iv) only
- (c) (ii), (iii), and (iv) only
- (d) (i), (ii), (iii), and (iv)

3. During excretion, urea is ____ (P) ____ and bile pigments are ____ (Q) ____.

- ☒ (a) P - excreted by ~~liver~~ ^{kidney}, Q - excreted by liver
- (b) P - removed through sweat, Q - excreted through urine
- (c) P - expelled through urine, Q - broken down in liver
- (d) P - removed by liver, Q - excreted by kidneys

4. Refer to the given picture and choose the correct option.

- ☒ (a) B- High pressure helps to remove the waste substances from the blood
- (b) C- Contains clean and filtered blood
- (c) A- Part of large intestine that protrudes out and joins the nephron
- (d) D- Delivers clean blood directly to heart through vena cava



5. During intense physical activity, the human body produces more heat and uses more oxygen. How does this affect the excretion process?

- (a) The skin excretes less water to conserve body heat.
- (b) More carbon dioxide is released through the skin rather than the lungs.
- ☒ (c) The body produces more sweat, and the lungs work harder to excrete carbon dioxide.
- (d) The large intestine increases its function to remove excess heat.

6. Choose the incorrectly matched pair:
- (a) Kidneys - Removal of waste products and regulation of water balance
 - (b) Ureters - Transport urine from the kidneys to the urinary bladder
 - (c) Urinary Bladder - Storage of urine before excretion
 - ☒ (d) Urethra - Carries urea from the urinary bladder to the kidneys

7. Given below are two statements:

Statement I: The kidney contains about a million nephrons that filter blood.

Statement II: The kidney only removes waste products like urea and uric acid from the blood and has no role in maintaining the salt and water balance in the body.

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both Statement I and Statement II are correct.
 - ☒ (b) Both Statement I and Statement II are incorrect.
 - ☒ (c) Statement I is correct, but Statement II is incorrect. ✓
 - (d) Statement I is incorrect but Statement II is correct.
8. Ravi studied the causes and symptoms of urinary system disorders and created the following table:

Disorder	Cause/Symptom
P	Presence of bacteria in the urinary tract leading to infection
Q	Formation of crystals like calcium oxalate, blocking urine flow

Identify the correct pair of disorder and its cause.

- ☒ (a) P - Urinary Tract Infection, Q - Kidney Stones
 - (b) P - Kidney Stones, Q - Urinary Tract Infection
 - (c) P - Kidney Infection, Q - Urethritis
 - (d) P - Urethritis, Q - Kidney Infection
9. Different substances are excreted from the body. Urea, bile pigments, extra vitamins, and extra salts are excreted, but each follows a different process. Which of the following is true regarding the excretion of nitrogenous wastes like urea and uric acid?
- (a) Nitrogenous wastes like urea and uric acid are excreted mainly through the skin.
 - (b) Nitrogenous wastes like urea and uric acid are produced due to the breakdown of carbohydrates in the liver.
 - ☒ (c) Nitrogenous wastes like urea and uric acid are excreted through the kidneys after being formed from the breakdown of amino acids (proteins).
 - (d) Nitrogenous wastes like urea and uric acid are excreted through the lungs as part of the respiratory process.
10. A person drinks excessive water, which leads to increased urine production. How does the body adjust to maintain homeostasis in this situation?
- ☒ (a) The kidneys reabsorb more water from the tubules to reduce urine output.
 - (b) The kidneys excrete more sodium to increase water retention.
 - (c) The glomerulus increases pressure to filter out more waste.
 - (d) The bladder reabsorbs water before the urine is expelled.

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Chapter - 5

VIII. Life Skills

Question:

The excretory system removes waste products and toxins from the body through organs like the kidneys and sweat glands. When this system fails, it can lead to issues like kidney stones or urinary tract infections (UTIs). Reflect on how staying hydrated, eating a balanced diet, and avoiding harmful substances can help maintain the excretory system. How can this awareness lead to healthier lifestyle choices?

Answer:

Staying hydrated, eating a balanced diet, and avoiding harmful substances help the kidneys remove wastes efficiently and prevent kidney stones and UTIs. This awareness encourages healthy habits that keep the excretory system and the whole body healthy.

IX. Integrated to Health Education

Question:

Kidneys play a vital role in filtering blood and removing waste. How can knowledge of the renal system help individuals make healthier dietary and lifestyle choices to avoid conditions like kidney stones?

Answer:

Knowledge of the renal system helps people drink enough water, eat a balanced diet, reduce excess salt, and avoid unhealthy habits. These healthy choices help prevent kidney stones and keep the kidneys functioning properly.

Urinary Tract Infection (UTI)

UTI is caused by bacteria which gain entry into the urinary tract. Most bacteria that enter the urinary tract are expelled during urination. If the bacteria begin to multiply in the urinary tract, infection of kidneys, ureter or urethra may develop.

Symptoms of UTI :

- Strong and frequent urge to urinate.
- Cloudy, bloody or strong smelling urine.
- Pain or burning sensation while urinating.

HIGHLIGHTS IN REVIEW

- Basic unit of nervous system is a nerve cell or neuron.
- A nerve cell consists of cell body, dendrites, and axon.
- The nervous system consists of central nervous system and peripheral nervous system.
- The central nervous system consists of brain and spinal cord.
- The peripheral nervous system consists of cranial and spinal nerves.
- The brain is the main controlling centre of the nervous system.
- Voluntary actions are under the control of the brain. Reflex actions are controlled by the spinal cord.
- Reflex actions are automatic actions which do not involve brain.

Exercises

I. Tick (✓) the correct choice.

- The message that travels along a nerve is called
(a) ☒ impulse (b) stimulus (c) response (d) none of these
- Stimuli may be
(a) external only (b) internal only (c) ☒ external and internal (d) chemically controlled
- Nervous system in humans consists of
(a) Brain and Nerves (b) Brain and Cerebrum
(c) ☒ Brain, Spinal cord and Nerves (d) None of these
- Memory and intelligence are controlled by
(a) ☒ Cerebrum (b) Medulla oblongata (c) Cerebellum (d) Spinal cord
- Heartbeat and breathing are controlled by
(a) Cerebrum (b) Spinal cord (c) Cerebellum (d) ☒ Medulla oblongata
- A point of contact between two neurons is called
(a) Junction (b) ☒ Synapse (c) Joint (d) Synapsis
- Which one of the following is a reflex?
(a) ☒ Knee jerk (b) Riding a bicycle (c) Writing (d) Playing guitar
- The maintenance of posture is controlled by
(a) Cerebrum (b) ☒ Cerebellum (c) Pons (d) Thalamus
- The cranial nerves in the human brain are
(a) 31 pairs (b) 16 pairs (c) 22 pairs (d) ☒ 12 pairs
- The white matter and grey matter are found in
(a) ☒ Spinal cord (b) Head (c) Bones (d) Liver

II. Fill in the blanks.

- Basic structural unit of the nervous system is the neurons.
- Central nervous system consists of brain and spinal cord.
- A neuron consists of cell body, axon and dendrites.
- The neurons carrying impulses from the brain to the muscles are called motor neurons.
- Peripheral nervous system consists of spinal nerves & cranial nerves.

III. State whether the following statements are true (T) or false (F).

Statements

- Each neuron consists of three parts called cell body (cyton) and axon. *dendrites.*
- The largest part of the brain is cerebrum.
- Cerebellum maintains the balance of the body.
- There are 31 pairs of cranial nerves. *Spinal*

T/F
[F]
[T]
[T]
[F]

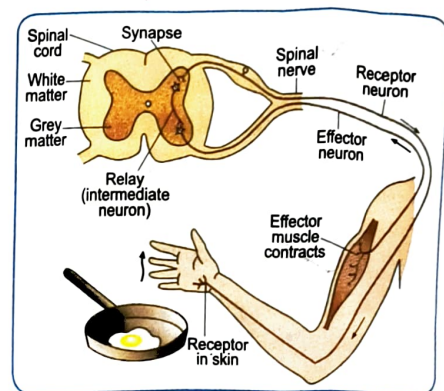
IV. Answer the following questions.

- Mention three stimuli and their responses which you come across in your day-to-day life.
- Imagine you have to pick up a peanut using a pair of forceps. Write down all the things you think your nervous system would have to do in order to achieve this task.
- Describe any two parts of the nervous system.
- What are nerves? Mention the types of nerves found in humans.
- Explain the structure of brain.
- Differentiate between voluntary actions and reflex action. *(Pg 88 - Table 6.1)*

V. Case Study Based Question

Look at the given diagram and answer the questions.

- The path that an impulse takes in a reflex action is called
 - voluntary action
 - reflex
 - ☒ reflex arc
 - none of these
- A reflex action is
 - riding a bicycle
 - playing a guitar
 - chewing food
 - ☒ pulling away of hand from a hot object
- The physiologist who first investigated the above action was
 - ☒ Ivan Pavlov
 - G.J. Mendel
 - Robert Hooke
 - Whittaker
- Which of the action will lead to a reflex action?
 - Writing on a paper
 - Cooking food
 - ☒ Dust entering in nose
 - Chopping vegetables



VI. Assertion-Reason Type Questions

In the questions given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.

- Both A and R are true
 - Both A and R are false
 - A is true and R is false
 - A is false and R is true
- Assertion (A) :** Neuron is the structural and functional unit of nervous system. *T (c)*
Reason (R) : There are 12 pairs of spinal nerves in humans. *F*
 - Assertion (A) :** Cerebellum is the uppermost and largest part of the brain. *F (d)*
Reason (R) : Cerebellum maintains balance of our body. *T*

VII. Life Skills

The spinal cord acts as a bridge between the brain and the body, while nerves transmit signals for movement and reflexes. Damage to these can lead to serious mobility issues. Reflect on how protecting the nervous system through good posture, regular exercise, and avoiding harmful habits can support daily activities and overall well-being.

VIII. Integrated to Physics

The nervous system relies on electrical impulses to transmit signals between the brain and body. How can understanding these signals help in the development of technologies like prosthetics or advanced medical treatments?

IX. Competency-Focused Questions

1. Which of the following pairs is correctly matched?

- ☒ (a) Stimulus - Hormone secretion by glands
- (b) Spinal nerves - 60 pairs
- (c) Cranial nerves - 8 pairs
- (d) Coordination - Independent organ functioning

2. Meena prepared a table to identify the roles of different neurons:

Neuron	Role
P	Carries impulses from sensory organs to the brain
Q	Connects sensory and motor neurons in the spinal cord

Identify the correct pair of neurons and their roles.

- (a) P - Motor neuron, Q - Sensory neuron
 - ☒ (b) P - Sensory neuron, Q - Association neuron
 - (c) P - Association neuron, Q - Sensory neuron
 - (d) P - Motor neuron, Q - Association neuron
3. Seema is performing a task that requires precise hand-eye coordination, such as writing. After a few minutes, she starts to feel clumsy and finds it difficult to control her hand movements. Based on her experience, which part of her nervous system is most likely responsible for regulating the coordination of her movements?
- (a) Cerebrum, which controls voluntary movements and higher functions
 - (b) Spinal cord, which transmits signals to and from the brain
 - ☒ (c) Cerebellum, which coordinates balance and voluntary movements
 - (d) Peripheral nervous system, which links the central nervous system to the limbs
4. In the example of pulling your hand away from a hot plate, what are the receptor and effector, respectively?
- (a) Skin and brain
 - ☒ (b) Skin and muscles
 - (c) Brain and spinal cord
 - (d) Muscles and nerves
5. Which of the following is an example of an external stimulus?
- (a) Secretion of digestive enzymes in the stomach.
 - (b) Release of hormones in response to stress.
 - ☒ (c) Pulling your hand away from a hot object.
 - (d) Secretion of acids in response to food in the stomach.
6. Which of the following is not a correct feature of neurons in the human nervous system?
- (a) Axons may be covered with a myelin sheath for faster signal transmission.
 - ☒ (b) Dendrites are responsible for transmitting signals to muscles.
 - (c) The cell body contains the nucleus and cytoplasm.
 - (d) Neurons form long nerve fibres by joining end to end.

7. Given below are two statements:

Statement I: The brain is the main control centre of the nervous system and is protected by the bony shell of the cranium. It consists of three main parts: cerebrum, cerebellum, and brain stem.

Statement II: The cerebrum is the smallest part of the brain and controls involuntary actions of the body such as heartbeat and digestion.

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both Statement I and Statement II are correct.
 - (b) Both Statement I and Statement II are incorrect.
 - ☒ (c) Statement I is correct, but Statement II is incorrect.
 - (d) Statement I is incorrect but Statement II is correct.
8. Choose the incorrectly matched pair:
- ☒ (a) Cranial nerves - Emerge from the spinal cord
 - (b) Spinal nerves - Emerge from the spinal cord
 - (c) Motor nerves - Carry impulse from brain to effector organs
 - (d) Sensory nerves - Carry impulse from sensory organs to brain

9. Consider the following statements:

- (i) Voluntary actions are controlled by the spinal cord.
- (ii) Reflex actions are quick, automatic responses to stimuli without involving the brain. **T**
- (iii) In voluntary actions, the brain plays a key role in controlling the actions. **T**
- (iv) Reflex actions are slower than voluntary actions.

Which of the following statements is/are correct?

- ☒ (a) (ii) and (iii) only
 - (b) (i) and (iv) only
 - (c) (ii), (iii), and (iv) only
 - (d) (i), (ii), and (iii) only
10. In the peripheral nervous system, cranial nerves ____ (P) ____ and spinal nerves ____ (Q) ____.
- (a) P - emerge from the spinal cord, Q - emerge from the brain
 - (b) P - have 31 pairs, Q - have 12 pairs
 - (c) P - are involved in brain functions, Q - carry messages to and from the spinal cord
 - ☒ (d) P - emerge from the brain, Q - emerge from the spinal cord

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Chapter -6 Nervous System

IV. Answer the following questions

1. Mention three stimuli and their responses which you come across in your day-to-day life.

Stimulus

Response

Bright light

Closing or blinking of eyes

Touching a hot object

Pulling the hand away immediately

Smell of tasty food

Salivation (mouth waters)

2. Imagine you have to pick up a peanut using a pair of forceps. Write down all the things you think your nervous system would have to do in order to achieve this task.

The eyes see the peanut and send messages to the brain through sensory neurons. The brain processes the information and sends signals through motor neurons to the hand muscles. The muscles move the hand and fingers to hold the forceps and carefully pick up the peanut.

3. Describe any two parts of the nervous system.

(i) Central Nervous System (CNS): It consists of the brain and spinal cord. It controls and coordinates all the activities of the body.

(ii) Peripheral Nervous System (PNS): It consists of all the nerves that arise from the brain (cranial nerves) and spinal cord (spinal nerves). It carries messages between the CNS and different parts of the body.

4. What are nerves? Mention the types of nerves found in humans.

Nerves are bundles of nerve fibres enclosed in a tubular medullary sheath that carry messages between the brain, spinal cord, and different parts of the body.

Types of nerves:

Sensory nerves

Motor nerves

Mixed nerves

5. Explain the structure and function of the brain.

The brain is the control centre of the nervous system. It is protected by the skull (cranium), three membranes called meninges, and cerebrospinal fluid (CSF). It has three main parts:

Cerebrum: The largest part of the brain. It controls thinking, memory, intelligence, emotions, sense organs, and voluntary actions.

Cerebellum: It maintains balance, posture, and coordinates muscular movements.

Medulla oblongata (Brain stem): It connects the brain to the spinal cord and controls involuntary activities such as breathing, heartbeat, and swallowing.

1. Distinguish between the following pairs on the basis of the words indicated in the brackets [].

- (i) Sensory neuron and Motor neuron. [Function]
(ii) Cerebrum and Cerebellum. [Location]
(iii) Cranial and Spinal nerves. [Structure of origin]
(iv) Sympathetic and Parasympathetic nervous system. [Function]
(v) Motor and Mixed nerves [Kind of neurons]

Ans. (i)

Sensory neuron	Motor neuron
Sensory neurons carry impulses from the sensory cells or sense organs to the spinal cord or brain.	Motor neurons carry messages from the brain or spinal cord to the effector the gland or muscle.

(ii)

Cerebrum	Cerebellum
It is located at the front and top of our skull (forebrain).	It is located at the back of the head (hindbrain)

(iii)

Cranial nerves	Spinal nerves
Cranial nerves are those that emerge directly from the brain.	Spinal nerves emerge directly from the spinal cord.

(iv)

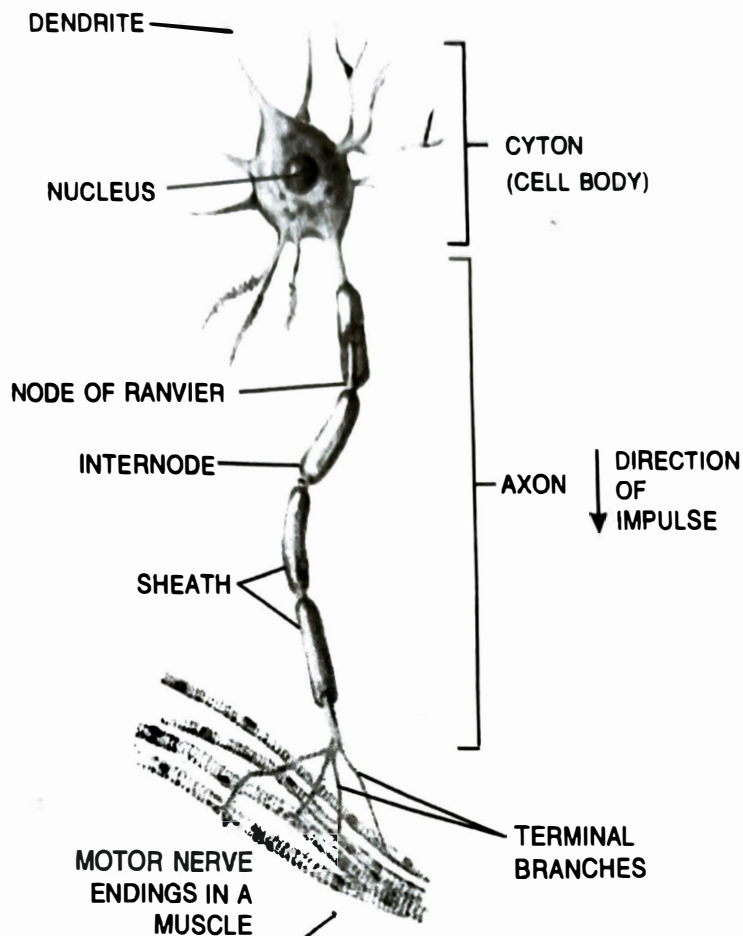
Sympathetic nervous system	Parasympathetic nervous system
Sympathetic nervous system prepares the body for violent action against abnormal conditions.	Parasympathetic nervous system is more concerned with reestablishing normal conditions after the violent act is over.

(v)

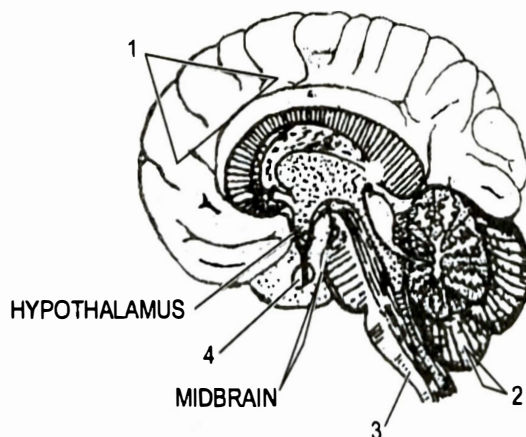
Motor nerves	Mixed nerves
Motor nerve contains only motor neurons.	Mixed nerve is the one which carries both sensory and motor neurons.

2. Draw a neat and labelled diagram of a nerve cell.

Ans.



3. Given below is the figure of a median section of an organ. Study the same and answer the following questions :



- Name the organ and write its location in our body.
- Label the guidelines 1 to 4.
- Write one important function of hypothalamus.
- Which of the structures from 1 to 4 is considered as the master gland of the body ?

(v) Mention the basic structural unit of the organ shown in the figure and the organ system to which it belongs.

Ans. (i) This is a Human brain. The brain is housed inside the bony covering called the Cranium.

(ii) 1 — Cerebral hemisphere

2 — Cerebellum

3 — Medulla oblongates

4 — Pituitary

(iii) The hypothalamus helps manage our body temperature, hunger and thirst.

(iv) Pituitary is known as the "Master gland of the body."

(v) The basic structural unit of the brain is neuron. Brain is belong to central nervous system.

4. A part of our nervous system is shown alongside. Study the same and answer the following questions :



(i) Identify the figure and name it.

(ii) Define the structure shown.

(iii) Label the part shown as X.

(iv) Write the name of the protective, tubular covering of the structure shown.

(v) Mention the names of the three kinds of the structure that is shown in the figure.

Ans. (i) The figure is showing 'Nerve fibres grouped into a nerve.'

(ii) **Nerve** : A nerve is formed of a bundles of axons (nerve fibres) enclosed in a tubular medullary sheath.

(iii) X – Nerve fibres.

(iv) 'Medullary sheath is the protective tubular covering the nerve.

(v) Three kinds of nerves are :

(a) Sensory nerve.

(b) Motor nerve

(c) Mixed nerve

Arund 101

5. Briefly describe the structure of the cerebrum in human brain and mention its functions.

Ans. **Cerebrum** : The cerebrum is the largest part of the brain. The left and right cerebral hemispheres are the two halves that the cerebrum is divided into longitudinally by a deep fissure. The outer surface of the hemisphere is folded with ridges and grooves which increase the surface of the brain so as to accommodate a large number of neurons.

Functions :

- The cerebrum is the seat of intelligence, consciousness and will power.
- It controls all the voluntary activities.

• Best preventive method is to identify the allergy and then take steps to reduce the exposure to that allergen.

Exercises

I. Tick (✓) the correct choice.

1. Which of the following is a skin allergy?
(a) Hay fever ☒ (b) Eczema (c) Asthma (d) All of these
2. Substances that cause allergy are called
☒ (a) Allergens (b) Antibodies (c) Antigens (d) Catalysts
3. One of the following that cannot act as an allergen is
☒ (a) Pure water (b) Pollen (c) Dust (d) Sea food
4. A serious form of allergy is
(a) Heart failure (b) High blood pressure ☒ (c) Anaphylaxis (d) Blisters
5. Hypersensitivity to an allergen is due to
(a) Lifestyle (b) Food habit (c) Environment ☒ (d) Weak immune system
6. An allergic response is
(a) AIDS ☒ (b) Hay fever (c) Cholera (d) Yellow fever

II. Fill in the blanks.

1. An over-reaction of the immune system to a substance that has no effect on most other people is called allergy.
2. Diagnosis of allergy can be done by scratch test.
3. Entry routes of allergens include mouth, nose and skin.
4. Bronchodilators are given to individual suffering from asthma.

III. Name the following.

1. The substance that causes allergy. allergen
2. The term used to describe an over-reaction of the immune system to a substance that in most other people have no effect. allergy
3. An air-borne allergen. - pollens & dust
4. An example of seasonal allergy. Hay fever

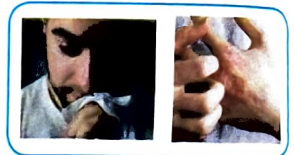
IV. Answer the following questions.

1. Define the following terms : (a) Allergy (b) Allergens
2. List the symptoms caused by allergens.
3. Name five common allergens.
4. How can you diagnose allergy?
5. List a method of preventing allergy.

V. Case Study Based Questions

Observe the given pictures and read the text to answer the questions that follows

It is believed that heredity plays a major role in deciding who will be allergic. However there are reports to the contrary as well. In many cases, no other member of the family has been found to be allergic.



1. The common allergens do not include
(a) Mites (b) Dust (c) ~~Bacteria~~ (d) Pollen grains
2. The air-borne allergens are
(a) ~~Dust and pollens~~ (b) Mites and sunlight
(c) Insects and seafood (d) Cosmetics
3. If a child of a family is allergic to a substance, it means
(a) All the other members are also allergic (b) ~~Not necessarily that other members are allergic~~
(c) The parents must also be allergic (d) None of these
4. An allergy in which people find it difficult to breathe in, is
(a) Rashes (b) Oedema (c) Hives (d) ~~Asthma~~

VI. Assertion-Reason Type Questions.

In the questions given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.

- (a) Both A and R are true
 - (b) Both A and R are false
 - (c) A is true and R is false
 - (d) A is false and R is true
1. **Assertion (A)** : Consumption of certain food causes skin allergy. (a)
Reason (R) : Eczema is a common skin allergy.
 2. **Assertion (A)** : Bronchodilators give instant relief from wheezing. (a)
Reason (R) : Many asthma sufferers carry an inhaler.

VII. Competency-Focused Questions

1. Given below are two statements:

Statement I: Allergy is a highly sensitive reaction of the immune system to substances that are harmless to most people. These substances are called allergens, and they can cause reactions such as rashes and sneezing.

Statement II: The word "allergy" was first used by Clemens von Pirquet in 1906, and it is always inherited through family genes, meaning only those with a family history of allergies will develop them.

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both Statement I and Statement II are correct.
 (b) Both Statement I and Statement II are incorrect.
 (c) Statement I is correct, but Statement II is incorrect.
 (d) Statement I is incorrect, but Statement II is correct.
2. Allergens can enter the body through different routes. Match the following routes of entry with their respective examples.

Column A (Entry Route)	Column B (Examples)
1. Mouth	a. Insect bite allergy, cosmetic allergy
2. Nose	b. Dust allergy, pollen allergy
3. Skin	c. Milk allergy, fish allergy

- (a) 1-a, 2-b, 3-c (b) 1-c, 2-a, 3-b (c) 1-c, 2-b, 3-a (d) 1-b, 2-c, 3-a
3. A person experiences sneezing and coughing every spring due to pollen in the air but remains unaffected the rest of the year. This condition is most likely an example of:
- (a) Perennial allergy (b) Seasonal allergy (c) Food allergy (d) Insect bite allergy
4. Neha created a table to analyse the sequence of events during an allergic reaction:

Step	Event
P	Allergens combine with antibodies and bind to white blood cells
Q	Release of a chemical that cause allergic symptoms

Identify the correct sequence of events leading to an allergic reaction.

- (a) P - Sensitisation, Q - Release of antibodies
 (b) P - Allergen - antibody, complex, Q - Histamine release
 (c) P - Histamine release, Q - Sensitisation
 (d) P - Antibody formation, Q - Digestive breakdown of allergens
5. During winter, pollutants like sulphur dioxide and nitrogen dioxide are more prevalent in the air due to smog. How might this affect individuals prone to allergies?
- (a) They will experience food-related allergies more frequently.
 (b) Seasonal allergies like hay fever might worsen due to the increased presence of these pollutants.
 (c) Perennial allergies like eczema will cease temporarily.
 (d) Pollen allergies will be triggered more frequently in winter.
6. Consider the following statements regarding allergy symptoms:
- (i) Histamine is released in response to allergens and contributes to nasal congestion and sneezing.
 (ii) Increased mucus production in the lungs is a symptom of allergic rhinitis.
 (iii) People with allergies experience fluid leakage from capillaries due to the action of histamine.
 (iv) Allergic rhinitis is caused by coughing and wheezing due to bronchial constriction.

Which of the following statements is/are correct?

- (a) (i) and (iii) only (b) (i) and (iv) only (c) (i), (ii), and (iii) only (d) (i), (ii), (iii), and (iv)

7. Rohit has been sneezing frequently and has watery eyes every morning when he jogs near a park filled with blooming flowers. Which treatment or prevention method would best address his condition?
- (a) Avoid eating strawberries and eggs before jogging
 - ☒ (b) Use antihistamine pills for temporary relief from symptoms
 - (c) Apply a topical ointment to treat the skin irritation
 - (d) Increase protein intake to strengthen the immune system
8. Which of the following conditions is most likely classified as a perennial allergy?
- (a) Sneezing during spring due to pollen
 - (b) Dryness and itchy skin in winter
 - ☒ (c) Asthma triggered by dust mites in a household
 - (d) Coughing caused by smog in winter
9. Ravi learned about two different allergy testing methods and created the following table to match their features with their names:

Feature	Testing Method
P	Identifies allergens through skin response
Q	Measures specific antibodies in the blood

Which of the following pairs correctly matches the features to their respective methods?

- (a) P - Blood Test, Q - Skin-Prick Test
 - ☒ (b) P - Scratch Test, Q - Blood Test
 - (c) P - Skin-Prick Test, Q - Scratch Test
 - (d) P - Blood Test, Q - Scratch Test
10. Mohan notices red, itchy patches on his skin after wearing a new shirt. The patches worsen after he uses a strong detergent to wash the shirt. Which of the following is the most likely cause of his skin reaction?
- (a) Hay fever caused by exposure to pollen
 - ☒ (b) Eczema caused by sensitivity to the dye or detergent
 - (c) Nettle rash caused by consuming certain foods
 - (d) A viral infection unrelated to external factors

To get the Worksheet of this chapter scan this QR Code



CODE-RZMG

Chapter 7 (Allergy)

IV. Answer the following questions.

1. Define the following terms:

(a) Allergy: Allergy is an over-reaction of the body's immune system to a substance that is harmless to most other people.

(b) Allergens: Allergens are substances that cause an allergic reaction in some people.

2. List the symptoms caused by allergens.

Answer: The common symptoms caused by allergens are:

Sneezing

Runny or blocked nose

Itching of the eyes, nose or skin

Skin rashes

Watery eyes

3. Name five common allergens.

Answer: Five common allergens are:

Dust

Pollen

Dust mites

Certain foods (such as peanuts or seafood)

Pet dander (animal hair)

4. How can you diagnose allergy?

Answer: Allergy can be diagnosed by a doctor through a physical examination, medical history, and allergy tests such as scratch test or a blood test.

5. List a method of preventing allergy.

Answer: Allergies can be prevented by:

Avoiding contact with allergens

Keeping the surroundings clean and dust-free

Wearing a mask in dusty places

Eating only foods that do not cause allergy

Taking medicines as advised by a doctor

OBJECTIVE TYPE QUESTIONS :

1. Put a tick (✓) against the most appropriate alternative in the following statements.

(i) As a response to allergens, the body produces a chemical called :

- (a) Histones (b) Antigen (c) Histamine (d) Antibody

Ans. (c) Histamine

(ii) The kind of proteins produced in our body against the allergens are called as:

- (a) Antigens (b) Immunoglobulins
(c) Both (a) and (b) (d) Neither (a) nor (b)

Ans. (d) Neither (a) nor (b)

(iii) Which of the following is not an allergic reaction ?

- (a) Asthma (b) Anaemia (c) Skin rashes (d) Dermatitis

Ans. (b) Anaemia

(iv) A systemic allergic response is termed as :

- (a) Prophylaxis (b) Asphyxiation (c) Anaphylaxis (d) Hypoxia

Ans. (c) Anaphylaxis

(v) Which of the following is not the entry route of allergens?

- (a) Skin (b) Nose (c) Mouth (d) Ears

Ans. (d) Ears

2. Name the following :

(i) The scientist who coined the term 'allergy'.

Ans. 'Clemens Von Pirquet'

(ii) The allergic reaction/disease in which the lining of the nasal cavity becomes sensitive and inflamed.

Ans. Hay fever

(iii) The term used for an exaggerated reaction of the immune system to a substance that most other people do not react to.

Ans. Allergy

(iv) The kind of allergic disease in which the muscular walls of the bronchioles contract and get narrower.

Ans. Asthma

(v) The inflammatory chemical which upon its release shows allergic symptoms such as inflammation, skin rash and constriction of bronchioles.

Ans. Histamine

3. Match the terms given in column A with those of column B :

Column A

- (i) Food allergens
- (ii) Winter seasonal allergy
- (iii) Dust allergy
- (iv) Allergic reaction
- (v) Diagnosis of allergy

Column B

- (a) Penicillin and Aspirin
- (b) Skin prick test, blood test
- (c) Hay fever, asthma
- (d) Milk and sea food
- (e) Sulphur dioxide and nitrogen dioxide

Ans.

Column A

- (i) Food allergens
- (ii) Winter seasonal allergy
- (iii) Dust allergy
- (iv) Allergic reaction
- (v) Diagnosis of allergy

Column B

- (d) Milk and sea food
- (e) Sulphur dioxide and nitrogen dioxide
- (a) Penicillin and Aspirin
- (c) Hay fever, asthma
- (b) Skin prick test, blood test

4. Fill in the blanks :

- (i) allergy mainly occurs in the spring season.
- (ii) A weak system makes our body prone to allergies.
- (iii) Our body produces a chemical called as a response to allergens.
- (iv) Milk-protein allergies are most common in
- (v) Bloating and vomiting are the symptoms of allergy.

Ans. (i) Pollen (ii) Immune (iii) histamine (iv) children (v) food allergy

5. Unjumble the following words :

- (i) ALERLEGSN
- (ii) ATGNINE
- (iii) PLNOLE
- (iv) ARGLEYE
- (v) HVSIE
- (vi) HSMAITNEI
- (vii) AAHILANPYXS
- (viii) AAMHTS
- (ix) IYINUMTM
- (x) IONITMANAFLM

Ans.

- (i) ALLERGENS
- (ii) ANTIGEN
- (iii) POLLEN
- (iv) ALLERGY
- (v) HIVES
- (vi) HISTAMINE
- (vii) ANAPHYLAXIS
- (viii) ASTHMA
- (ix) IMMUNITY
- (x) INFLAMMATION

SHORT ANSWER QUESTIONS

1. Define the term "allergy".

Ans. Allergies, also known as allergic diseases, are a number of conditions caused by hypersensitivity of the immune system to something in the environment that usually causes no adverse effects to most people. These diseases include hay fever, dermatitis, asthma, food allergies, etc.

2. What are allergens ? Name any three allergens.

Ans. The substances that cause allergies are called allergens.

(i) Dust particles

(ii) Nuts

(iii) Pollen

3. Which test is mostly favoured for testing allergy, prick test or blood test ? Why ?

Ans. Blood test is mostly favoured for testing allergy.

Blood Testing : A sample of the patient's blood is sent to a laboratory for analysis. Multiple allergence can be detected with a single blood sample.

The test measures the concentration of specific antibodies in the blood. The quantitative allergy blood result can help determine what a patient is allergic to, help predict and follow the disease development, estimate the risk of a severe reaction, and explain cross-reactivity.

LONG ANSWER QUESTIONS (Write the answers in your notebook):

1. Name any three routes by which allergens normally enter in our body.

Ans. (i) Skin : Substances that come into contact with the skin, such as latex, are also common causes of allergic reactions, known as contact dermatitis or eczema.

(ii) Mouth : A wide variety of foods can cause allergic reactions, but 90% of allergic responses to foods are caused by cow's milk, soya, eggs, wheat, peanuts, tree nuts, fish and shellfish.

(iii) Nose : Pollen, spores, dust particles and certain chemicals find entry through the nose.

Find the odd one out. Give Reasons.

1. **itching, sleeping, rashes, swelling**
s. **sleeping** ; because sleeping is not a symptom of allergy, rest all are symptoms of allergy.
2. **water, milk, perfume, dust**
s. **water** ; because milk, perfume and dust are allergen whereas water is not an allergen.
3. **surgery, scratch test, blood test, skin test.**
s. **surgery** ; because others are the test used to diagnosis an allergy.
4. **hay fever, insect bite, nettle rash, eczema**
s. **hay fever** ; because it is caused due to pollen grains.
5. **hay fever, insect bite, asthma, eczema**
s. **asthma** ; because it is a long-term lung disease.

1. Give a comparative account of seasonal and perennial allergies.

Ans.	Seasonal allergies	Perennial allergies
	Allergies that occur regularly during a particular season are called seasonal allergies. Allergies caused by pollen grains are one example. These allergies occur only during the season that pollen is dispersed. Hay fever, also known as allergic rhinitis, is an example of seasonal allergy.	Allergies that are not caused due to seasonal factors and may occur throughout the year are called perennial allergies. Most allergies, such as food allergy, dust allergy, and allergy to pet fur are perennial allergies.

2. Differentiate between Allergy and Allergen.

Ans.	Allergy	Allergen
	Your body develops a defence mechanism to certain substances that triggers some reactions to protect you. This sensitivity to such substances is known as allergy.	The substance that causes allergic reactions is called allergen. Some of the common allergens are strong sunlight, dust, mites, pollen grains, fur of animals such as dogs, cats.

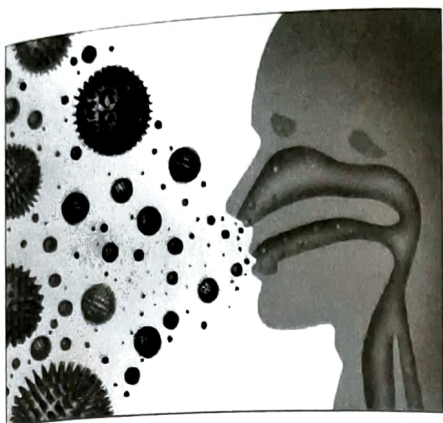
3. Differentiate between Seasonal and Perennial allergy.

Ans.	Seasonal	Perennial allergy
	When the allergy occurs at a particular time of the year, it is called seasonal allergy. For example, regular sneezing and coughing during winter indicates seasonal allergy.	Perennial allergies are not linked to any particular season and can occur at any time of the year. Allergy to dust, insect bites, food substances and mites are perennial allergies.

4. Differentiate between Hay fever and Eczema.

Ans.	Hay fever	Eczema
	- Hay fever is the most common type of allergy. It causes runny nose, sore throat, coughing and asthma. - This is caused by the pollen grains produced by any plant. In addition to pollen grains, hay fever can also be caused by the hairs of pet animals, dust, mites and moulds.	Eczema is a common skin allergy. It causes itching of skin leading to redness. This develops due to sensitivity to a particular substance in contact with the skin or to a particular food item. Substances that cause eczema can be certain cosmetics, soap, washing powders and cheap dyes. It is also caused by stress.

1.



(a) Identify the type of route of allergens shown in the picture.

Ans. The nose is shown as a route of allergens in the picture.

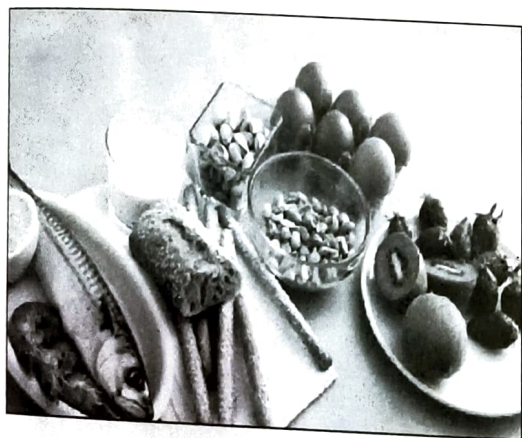
(b) Also identify the allergen. What category does this allergen fall into?

Ans. The allergen shown is pollen grains. This allergen falls into the non-food allergen category.

(c) Describe the common symptoms that can result due to this route.

Ans. It may occur as sneezing, coughing, runny nose, and nose congestion.

2.



(a) What are allergens?

Ans. The substances that trigger the allergic reaction are called allergens.

(b) Identify and name the different allergens shown in the picture. What category do these allergens fall into?

Ans. The different allergens shown in the picture are fruits, milk, fish, eggs, bread, and nuts. They are all examples of food allergens.

(c) Name the other category of allergens. Give two examples of these.

Ans. The other category of allergens is non-food allergens. Pollen grain and dust are two examples of this category.

3.



(a) Identify the symptom shown in the picture.

Ans. Coughing and sneezing are the symptoms shown in the picture.

(b) What could be the possible causative agent for this allergy?

Ans. The picture shows a woman possibly suffering from hay fever. Thus the possible causative agent for this allergy could be pollen grains.

(c) Do you think this allergy is seasonal? Give your reasons.

Ans. This allergy is seasonal, and it occurs only when plants release pollen grains.

(d) Mention any two symptoms, other than the one shown here, that the person could suffer from.

Ans. Other than the one shown here, the person could also be suffering from blocked nose and headaches.

F. Assertion-Reason Type Questions

In the question given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.

(a) If both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation of Assertion (A).

(b) If both Assertion (A) and Reason (R) are correct but Reason (R) is NOT the correct explanation of Assertion (A).

(c) If Assertion (A) is true, but Reason (R) is false.

(d) If Assertion (A) is false but Reason (R) is true.

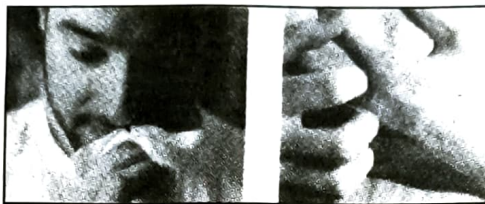
1. Assertion (A) : Consumption of certain food causes skin allergy.
Reason (R) : Eczema is a common skin allergy.
2. Assertion (A) : Bronchodilators give instant relief from wheezing.
Reason (R) : Many asthma sufferers carry an inhaler.

- Ans.** 1. (a) Both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation of Assertion (A).
2. (a) Both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation of Assertion (A).

G. Case Study Based Questions

Observe the given pictures and read the text to answer the questions that follows:

It is believed that heredity plays a major role in deciding who will be allergic. However there are reports to the contrary as well. In many cases, no other member of the family has been found to be allergic.



1. The common allergens do not include

- | | |
|--------------|-------------------|
| (a) Mites | (b) Dust |
| (c) Bacteria | (d) Pollen grains |

Ans. (c) Bacteria

2. The air-borne allergens are

- | | |
|-------------------------|------------------------|
| (a) Dust and pollens | (b) Mites and sunlight |
| (c) Insects and seafood | (d) Cosmetics |

Ans. (a) Dust and pollens

3. If a child of a family is allergic to a substance, it means

- (a) all the other members are also allergic
- (b) not necessarily that other members are allergic
- (c) the parents must also be allergic
- (d) None of these

Ans. (b) not necessarily that other members are allergic

4. An allergy in which people find it difficult to breathe in, is

- | | |
|------------|------------|
| (a) rashes | (b) oedema |
| (c) hives | (d) asthma |

Ans. (d) asthma



6. Nephron

Ans. Inside the kidney, there are millions of microscopic tubes called renal tubules or nephrons. It is the structural and functional unit of kidney.

7. Osmoregulation

Ans. The process of regulation of osmotic pressure of an organism's body fluids.

8. Nitrogenous waste

Ans. Any metabolic waste product that contains nitrogen like urea and uric acid.

9. Ultrafiltration

Ans. The nitrogenous wastes and water from blood are filtered when blood passes through the capillaries of glomeruli.

B. Short Type Based Questions

1. Name the different excretory organs of the human body.

Ans. The different excretory organs of the human body are the lungs, skin, and kidneys.

2. List different wastes produced in human beings.

Ans. The different wastes produced in human beings are carbon dioxide and water vapour (excreted by lungs), water, salts, and urea in the form of sweat and oil (excreted by sweat and oil glands present in the skin), and nitrogenous wastes such as urea, uric acid, ammonia, and inorganic salts and water collectively in the form of urine (excreted by kidneys).

3. Where in the urinary system do the following processes take place ?

(i) Urine formation :

(ii) Transport of urine away from kidney :

(iii) Temporary storage of urine :

Ans. (i) Urine formation : kidneys.

(ii) Transport of urine away from kidney : urethra.

(iii) Temporary storage of urine : urinary bladder.

4. Why is excretion necessary in living beings ?

Ans. The excretion is necessary because the toxic products if allowed to be retained in the body

act as poison and cause great harm to the body. If they exceed the threshold, they may even cause death.

5. What is meant by osmoregulation ?

Ans. The process of maintaining accurate concentration of water and salts in the body is called **osmoregulation**.

This is done by the kidneys.

6. What are the two ways by which a person can get relief in case of kidney failure ?

Ans. The two ways by which a person can get relief in case of kidney failure are :

(a) Dialysis : This is a method in which an artificial machine cleans and filters the blood.

(b) The patient can undergo kidney transplant.

7. How are kidney stones formed ?

Ans. Kidney stones are formed when crystal forming substances such as calcium oxalate, calcium phosphate and uric acid are more than the fluid in the urine. When these chemicals start sticking together, they form crystals, commonly called kidney stones. They may be formed and cause severe pain.

8. What are the symptoms of an urinary tract infection ?

Ans. Common symptoms include a strong and frequent urge to urinate, and a painful and burning sensation while urinating.

9. Why do we need to remove waste products from our body from time to time ?

Ans. The waste products produced inside the body of living organisms need to be removed from time to time because the materials may become toxic or poisonous if allowed to accumulate inside the body.

10. What are the two distinct regions shown in the longitudinal section of a kidney ?

Ans. Each kidney in longitudinal section shows two distinct regions — an outer dark region called cortex and an inner lighter region called medulla.

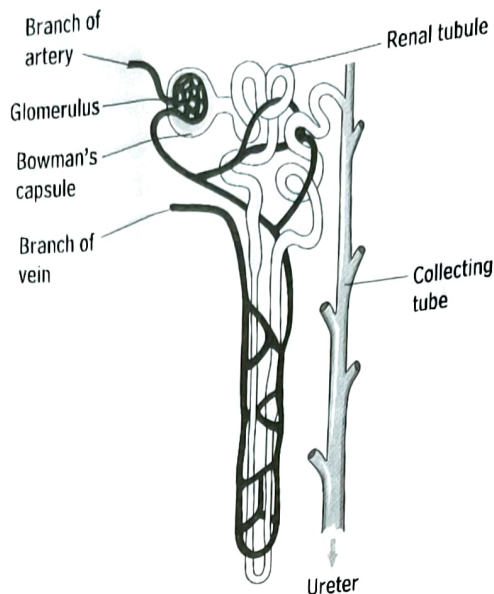
11. What is a urinary tract infection ?

Ans. A urinary tract infection (UTI) is an infection that occurs in the urinary system. Urinary tract infections usually occur when bacteria such as E. coli enter the urinary tract.

13. Draw the structure of a nephron. Explain its role in urine formation.

Ans. The nephron is the structural and functional unit of the kidney. Each kidney has about a million nephrons. Each nephron consists of a cup-shaped structure called the Bowman's capsule and a long tubule called the renal tubule. Within the 'cup' of the Bowman's capsule is a network of capillaries called the glomerulus. Each kidney receives blood from a renal artery. The renal artery branches and re-branches, and the finest of the branches form the glomeruli (plural of glomerulus). As blood flows through each glomerulus, the waste substances in it filter out into the capsule. Clean blood flows out of the glomerulus and ultimately leaves each kidney through a renal vein. The wastes collected in

the Bowman's capsule pass through the renal tubule, which
of the filtrate from the capsule.



Structure of a nephron

D. Differentiate them

1. Differentiate between Kidneys and Urinary bladder.

Ans.	Kidneys	Urinary bladder
	1. These are a pair of reddish-brown, bean-shaped structures that are located just above the waist on either side of the backbone.	It is a pouch-like muscular structure.
	2. They filter the impure blood and produce urine.	It stores urine temporarily.

2. Differentiate between Ureter and Urethra.

Ans.	Ureter	Urethra
	1. It is a tube that leads out from each kidney.	It is a tube like opening at the bottom of the urinary bladder.
	2. These tubes carry urine from the kidneys of the urinary bladder.	This opening excretes urine out of the body.
	3. There are two ureters.	There is only one urethra.

3. Differentiate between Bowman's capsule and Glomerulus.

Ans.	Bowman's capsule	Glomerulus
	1. Each nephron of kidney consists of a cup-shaped structure at one end called the Bowman's capsule.	Glomerulus is a network of blood capillaries present inside the Bowman's capsule.

4. Differentiate between Filtration and Reabsorption.

Filtration

1. During filtration, the renal artery brings the blood containing waste material to the kidneys. It then enters the glomerulus under high pressure. Water and small solutes are filtered in the Bowman's capsule.

Reabsorption

During reabsorption, the filtrate passes through the thin walls of the Bowman's capsule into the urinary or renal tubule. As it passes through the tubule, water and many useful substances are reabsorbed by the renal blood capillaries.

5. Differentiate between Secretion and Excretion.

3. Describe the process of urine formation.

Ans. The process of urine formation takes place in the following steps :

- (i) **Glomerular filtration** : Blood containing waste material enters the kidneys through the renal artery. It then enters the glomerulus under high pressure. Water and small solutes are filtered in the Bowman's capsule.
- (ii) **Tubular reabsorption** : Filtrate passes through the thin walls of the Bowman's capsule into the urinary or renal tubule. As it passes through the tubule, water and many useful substances are reabsorbed by the renal blood capillaries.
- (iii) **Tubular secretion** : The remaining liquid, along with wastes such as urea, uric acid, etc is called urine and is collected in the urinary bladder.
- (iv) **Excretion** : Urine leaves the kidneys and passes into the urinary bladder through the ureters. When the urinary bladder is full, urine is passed out through the urethra.

4. How do skin and lungs help in excretion ?

Ans. Skin : excretes excess water, urea, salts and other metabolic wastes in the form of sweat. These waste products are carried by the blood from all body parts to sweat glands in the skin.

Lungs : Eliminate carbon dioxide produced as a result of respiration through the nose.

Evaporation of sweat from skin has effect.

cool

In humans, carbon dioxide is excreted by

lungs

Getting rid of waste materials in living beings is called

excretion

Skin helps in the excretion of water and

salts (urea)

Kidneys are connected to the urinary bladder by long tubes called

ureters

..... is the process of removal of wastes from the body.

Excretion

The lungs help us to get rid of carbon dioxide

The sweat glands are situated in the (epidermis) of the skin.

The are the major excretory organs of the body.

kidneys

Each nephron has a cup-shaped structure called the

Bowman's capsule.

Blood enters a kidney through a

renal artery

Urine passes out of the bladder through the

urethra

Escherichia is the most common cause of urinary tract infection.

coli

Match the following

1. Match the columns.

Column A

Column B

1. Excretion

(a) Loss of salt

2. Uriniferous tubule

(b) Sugar in urine

3. Sweat gland

(c) During summer

4. Excessive sweat

(d) Kidney

5. Diabetes

(e) Ultrafiltration

Ans. Column A

1. Excretion

2. Uriniferous tubule

3. Sweat gland

4. Excessive sweat

5. Diabetes

Column B

(d) Kidney

(e) Ultrafiltration

(a) Loss of salt

(c) During summer

(b) Sugar in urine

2. Match the columns.

Column A

Column B

1. Glomerulus

(a) Expels urine from the urinary bladder

2. Kidneys

(b) Spleen and liver

3. Ureter

(c) Uric acid

4. Sweat glands

(d) Main excretory organs

5. Urethra

(e) Carries urine to the urinary bladder

6. Kidney stones

(f) Capillaries

7. Urea

(g) Skin

8. Dead red blood cells

(h) Excreted in urine and sweat

Ans. Column A

1. Glomerulus

2. Kidneys

3. Ureter

4. Sweat glands

5. Urethra

6. Kidney stones

7. Urea

8. Dead red blood cells

Column B

(f) Capillaries

(d) Main excretory organs

(e) Carries urine to the urinary bladder

(g) Skin

(a) Expels urine from the urinary bladder

(c) Uric acid

(h) Excreted in urine and sweat

(b) Spleen and liver

E. Find the odd one out. Give Reasons.

1. ureter, kidney, urinary bladder, lung, urethra

Ans. lung, because all others are organs of excretory system and it is a respiratory organ.

2. skin, heart, lung, liver, kidney

Ans. Heart because it helps to pump blood in our body and the rest helps in excretion.

3. urea, salts, blood, carbon dioxide, bile

Ans. blood; Urea, salts, carbon dioxide and bile are types of excretory products whereas blood is not an excretory product.

4. **filtration, respiration, secretion, excretion, reabsorption**

Ans. Respiration; Filtration, secretion, excretion and reabsorption are steps of urine formation whereas respiration is not one of the steps of urine formation.

Name the following (one word)

1. **The structures in the kidney where blood is filtered**

Ans. Nephrons

2. **Straw-coloured liquid that is removed from kidneys**

Ans. Urine

3. **An organ that stores urine temporarily before it is released**

Ans. Urinary bladder

4. **Removal of nitrogenous wastes from body**

Ans. Excretion

5. **The artery that supplies blood to kidney**

Ans. Renal artery

6. **The bunch of capillaries inside the cup of kidney tubules**

Ans. Glomerulus

7. **Presence of glucose (sugar) in the urine represents**

Ans. Diabetes

8. **Ring of circular muscles around the opening of urethra.**

Ans. Circular involuntary muscles

9. **Ultrafiltration and formation of urine**

Ans. Bowman's capsule

10. **Transport of urine from kidney**

Ans. Ureters

11. **Temporary storage of urine**

Ans. Urinary bladder

12. **Formation of sweat**

Ans. Sweat glands/skin

13. **Formation of urea**

Ans. Liver

14. **Coiled tubes acting as filters and present in kidney.**

Ans. Nephrons

15. **Organ for removal of wastes from the blood.**

Ans. Kidneys

16. **Name the blood vessel that brings blood to the kidneys.**

Ans. Renal Artery