MATRIX OLYMPIAD

The Most Innovative Talent Recognition Exam

BIOLOGY

Class - VII

MATRIX

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Few words for the Readers

Dear Reader,

"*Matrix Olympiad is established to encourage school students to go a step further than their regular studies, and get a chance and exposure to competition on a wide scale. It also helps students enhance their learning of basic cognitive skills and deeper knowledge of subjects like Science, Mathematics, English, Mental Ability, Social Studies.“Matrix Olympiad helps students nurture their minds for higher targets of tomorrow and enables them to study School for JEE, NEET, CLAT, NDA, Olympiads , NSEJS, NTSE , STSE etc.*"

The above thought has been our guiding principle while designing and collating the study material for **Matrix Olympiad** . And hence, we hope that this particular material will be helpful towards your preparation for **Matrix Olympiad**.

Our team at **MATRIX** has put in their best efforts for making this particular module interesting and relevant for you. Additional efforts have been made to ensure that the content is easy to understand and error free to the extent possible. However, there might remain some inadvertent errors in answer keys and theoretical portion and we would welcome your valuable feedback regarding the same.

If there are any suggestions for corrections, please write to us at **smd@matrixacademy.co.in** and we would be highly grateful.

Finally, we would like to end this message by a famous quote by Ernest Hemingway - "*There is no friend as loyal as a book*." So, please give your study material the time and attention it deserves, and it will surely help you reach newer heights in your fight with competition examinations.

With love and best wishes !

Team MATRIX

CONTENTS

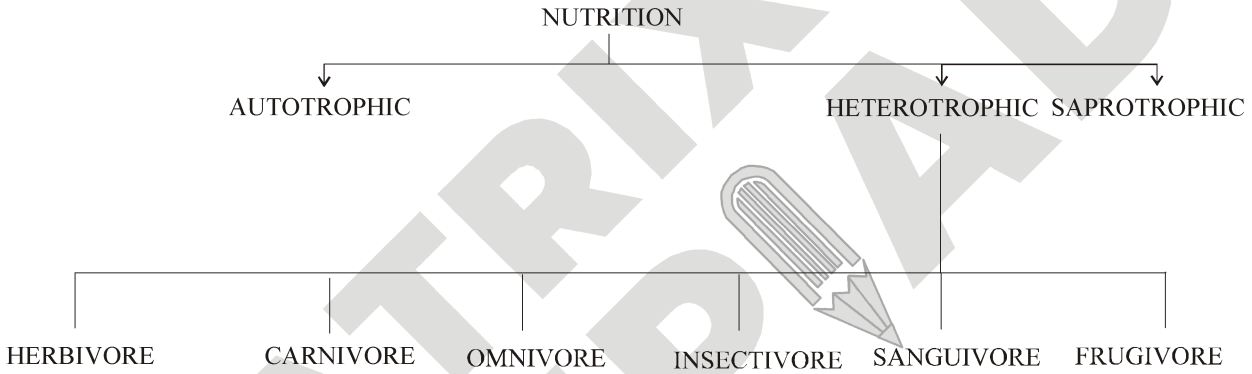
NUTRITION IN PLANTS 1

INTRODUCTION

- All organisms need food. They need food for obtaining energy and to get materials required for growth, development and repair of damaged cells and tissues. Though different organisms eat different kinds of food but one thing is common in all food types, that is, all food items contain nutrient.
- Nutrients are the substances that a body needs to live and grow. The energy from nutrients is the fuel that allows the body to carry out all functions — run, jump, walk and swim. Nutrients also provide material for the repair of tissues. They also keep the body healthy.

1. MODE OF NUTRITIONS

- There are several modes of nutrition on the basis of which organisms are classified as follows:



(a) Autotrophic : (Auto - self, trophic = food)

- It is a mode of nutrition in which organisms prepare their own food. Inorganic molecules like CO_2 & H_2O are converted into organic molecules like carbohydrates in the presence of sunlight & chlorophyll.
  E.g :- Green plants.

(b) Heterotrophic (Hetero - different ; trophic - food)

- It is a mode of nutrition in which organisms derive their food from some other animals or plants. They cannot prepare their own food
  E.g:- human being.

→ Heterotrophs are further categorized depending on the nature of food they consume:

- **Herbivores :** Animals which eat only plants, e.g. Cow, goat.
- **Carnivores :** They feed on flesh of other animals, e.g. Lion, Tiger.
- **Omnivores:** They feed on both plants and animals, e.g. Dog, human.
- **Detritivores :** Feed on detritus or dead organic remains, e.g. Earthworm.
- **Sanguivores:** Feed on blood, e.g. Leech, female mosquito.
- **Frugivoroes:** Feed on fruits, e.g. Parrot.
- **Insectivores :** Feed on insects, e.g. Bats, House sparrow, Pitcher plant, Venus flytrap.

Figure : Pitcher plants

Figure : Venus flytrap

Focus Point

- Cuscuta (Dodder/ Amarbel) is a parasitic plant which grows on other plant (Host). It wraps itself around the host plant and gets nutrition from it by using sucking apparatus
- **Symbiotic Association :** Two organism that live in close physical association and are of mutual benefit to each other, are called symbionts. This condition is known as symbiosis. The common example of symbionts are lichens (association between algae and fungi) and mycorrhiza (association between fungi and the roots of some higher plants).

Figure : Cuscuta

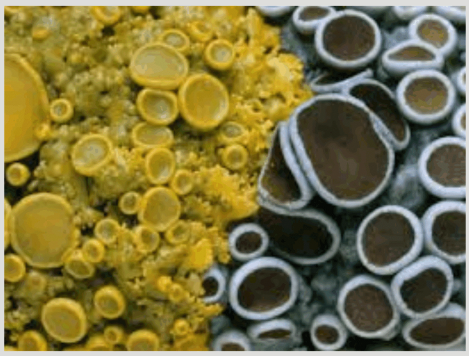


Figure : Lichen

1.1 PHOTOSYNTHESIS

(i) Definition : The synthesis of organic compounds like glucose from simple inorganic molecules like CO_2 and H_2O by the cells of green plants having chlorophyll in the presence of sunlight is called as photosynthesis.

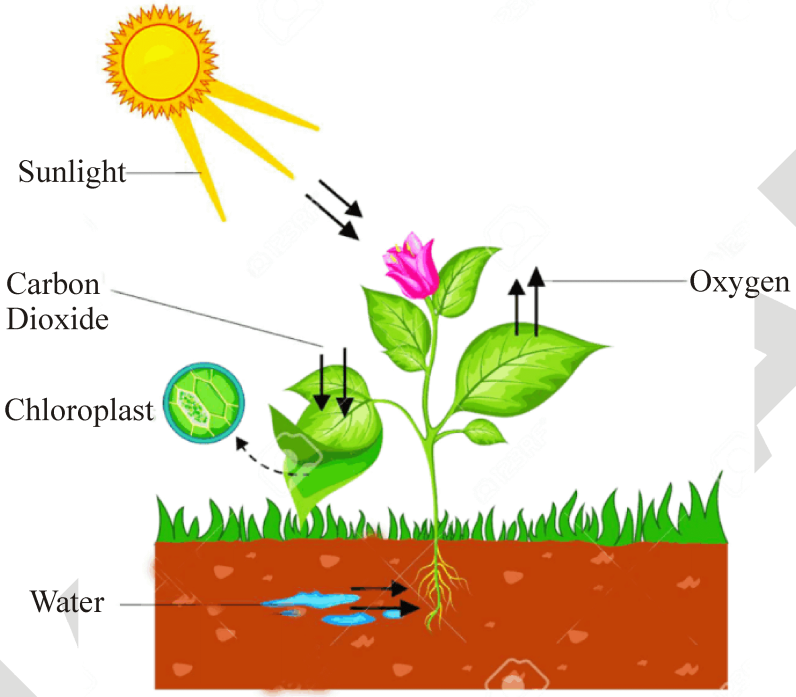


Figure : Photosynthesis

(ii) Equation of photosynthesis :

$$6CO_2 + 12H_2O \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} C_6H_{12}O_6 + 6O_2 + 6H_2O$$

(iii) Requirements for photosynthesis

- **Sunlight:** Sun is the ultimate source of energy for all living organisms.
- **Chlorophyll:** These are the green pigments present in chloroplast. They are found in green leaves in a maximum amount as well as in other green aerial parts of plant.

(iv) Site of photosynthesis : The site of photosyntesis is Chloroplast**.**

- Chloroplast is also called as green plastid.
- Chloroplast also have variable shapes, for example cup shaped, ribbon shaped etc. in algae while it is discoidal in higher plants.

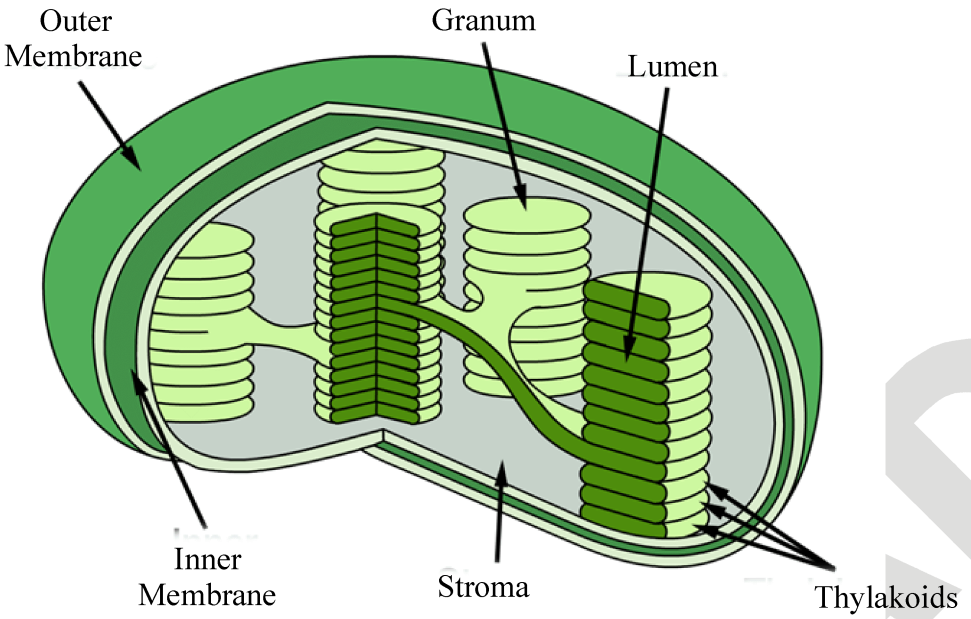


Figure : Ultra Structure of Chloroplast

Each chloroplast is double membranous cell organelle and consists of two parts :-

(a) Grana: It constitutes the lamellar system. These are bound layered on top of each other, these stacks are called as Grana. Grana are stacks of thylakoid membranes in chloroplasts that are essential for phosynthesis.

- Each granum of the chloroplast is formed by superimposed closed compartments called thylakoids.

(b) Stroma: It is a granular transparent substance present in chloroplast also called as matrix.Grana is embedded in it. Besides grana, they also contain lipid droplets, starch grains, ribosomes etc.

(v) Raw Materials of Photosynthesis :

- **Carbon dioxide:** Terrestrial plants obtain carbon dioxide from the atmosphere through the small openings present on leaves called as stomata. Stomata are the small pores present on the surface of leaves. They help in exchange of gases and water vapour. Stomatal opening is guarded by the presence of guard cells (kidney shaped).

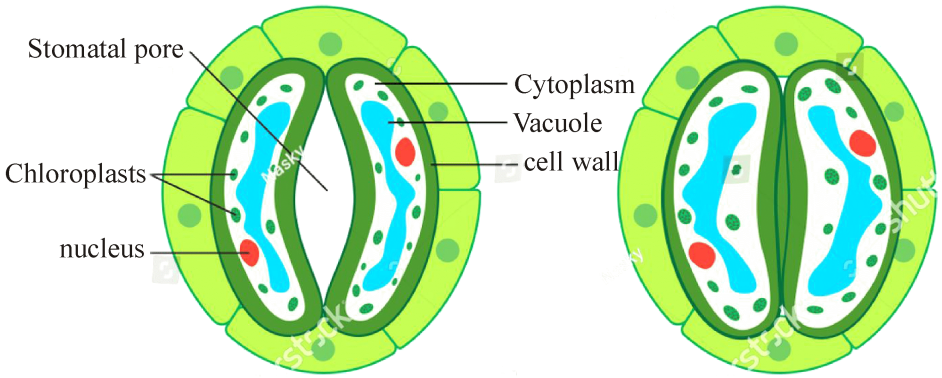


Figure : Structure of stomata

Aquatic plants obtain CO_2 dissolved in water through their general body surface so they perform more photosynthesis than terrestrial plants

- **Water:** Plants absorb water from the soil by the process of osmosis. This water is transported to leaves by a special type of tissue called as xylem.

(vi) Factors affecting photosynthesis:

- **Light:** Normally plants utilize sunlight but marine algae can perform photosynthesis even in the moon light. Plants can also perform photosynthesis in the artificial lights.
- **Temperature:** Optimum range 25° to 30° C are used for photosynthesis.
- **Carbon dioxide:** Concentration of CO_2 also affects the rate of photosynthesis.
- **Chlorophyll:** Chlorophyll content is directly proportional to rate of photosynthesis.

(vii) Significance of Photosynthesis:

- Production of food material.
- Atmospheric control and purification of air. .

LAB TIME
Let's Do & Learn

- **Aim:** Chlorophyll is necessary for photosynthesis.
- **Apparatus.** A destarched potted plant of Croton, Pathos (Money.Plant) or coleus having variegated leaves, (with green and non-green parts), rice paper, Soft pencil, Beakers, Petridishes, Burner or spirit lamp, spirit (or 70% alcohol), iodine solution, water, forceps.
- **Procedure:** Destarch a potted plant of Croton or Pothos Greon Part (Money Plant) having variegated leaves by keeping it in complete darkness for 2-3 days.Expose the destarched potted plant to sunlight for 2-6 hours. Pluck a variegated leaf. Place a rice paper over it. Draw the outline of green and :non-green areas. The green areas contain chlorophyll.The non-green areas are pale in colour and devoid of chlorophyll. Place the leaf in boiling water for 5-10 minutes.Boiling kills the leaf. Dip the leaf in spirit or alcohol kept at 50"-60° C with the help of a water bath. After 30-45 minutes, the leaf will be decolourised completely. Take out the decolourised leaf, dip in hot water for softening the same. Spread the leaf in a petri dish. Pour dilute iodine solution over the leaf. After 4-5 minutes, rise off excess iodine and observed.

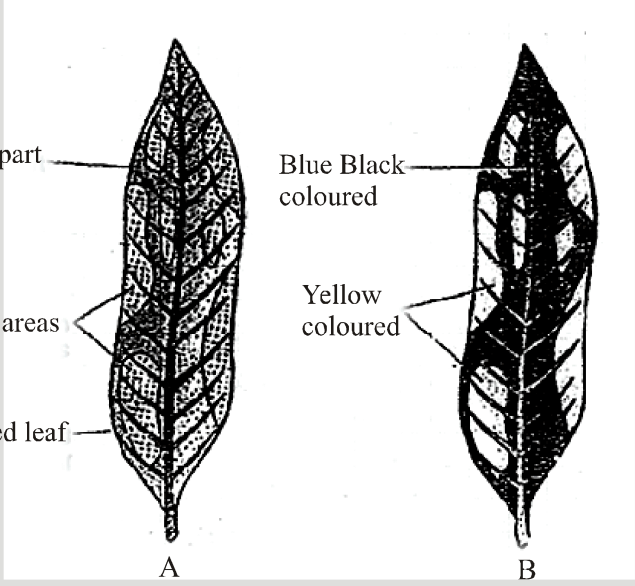


Figure : Chlorophyll is necessary for photosynthesis

- **Observation:**The leaf has two types of patches, bluish black and yellowish.The bluish black areas are the ones which have starch.The bluish black colour is due to reaction of iodine with starch.The yellow areas are without starch. Bluish black areas are the ones which were green previously while non-green areas remain pale coloured.

SOLVED EXAMPLES

SE. 1

Study the following table and select the correct words for A, B and C.

Name of the Plant	Presence/ Absence of Leaves	Mode of Nutrition
Mistletoe	**A**	Partially parasitic
Nepenthes	Present	**B**
Cuscuta	**C**	Completely parasitics

Ans. A = Present

B = Partially heterotrophic

C = Absent

SE. 2

If after putting iodine (I_2) solution over a leaf, colour of the leaf is yellow-brown, what can be interpreted about the leaf?

Ans. Yellow-brown colouration of leaf after putting I_2-solution indicates that starch is not present in the leaf.

SE. 3

Sun is the ultimate source of energy for all living organisms. Justify this statement.

Ans. Green plants, through the process of photosynthesis, convert sunlight energy into chemical energy of food. Hence, all the living organisms depend upon plants directly or indirectly for their food requirement and green plants get the energy to prepare food from the sun. Thus, sun is the ultimate source of energy for all living organisms.

SE. 4

Can insectivorous plants such as pitcher plant be considered as parasites? Why or why not?

Ans. No, insectivorous plants cannot be considered as parasites. An insectivorous plant first kills an insect and then absorbs N_2-nutrition from it. Thus, it acts as a predator for the insect. On the other hand, a parasitic plant does not at once kill its host organism. It derives its nutrition from a living host plant and deprives it of the valuable nutrients making it weaker.

SE. 5

Why our body cannot make food from carbon dioxide and water like plants do?

Ans. Our body cannot make food from carbon dioxide, and water like plants do because our body has no chlorophyll. Chlorophyll helps to capture the energy of the sunlight. This energy is used by plants to synthesize food from carbon dioxide and water through the process of photosynthesis.

SE. 6

How water and minerals absorbed by roots reach the leaves?

Ans. Water and minerals are transported to the leaves by the xylem vessels which run like pipes throughout the root, stem, branches and the leaves.

SE. 7

What is the significance of boiling the leaf in ethanol while testing it for the presence of starch?

Ans. Ethanol dissolves the green coloured pigment, chlorophyll of the leaf so that the leaf becomes colourless. This helps to observe the change in colour of the leaf when we pour iodine solution over it. If chlorophyll is not removed using ethanol, it will mark the change in colour of leaf after iodine test.

SE. 8

Differentiate between autotrophic nutrition and heterotrophic nutrition.

Ans.

	Autotrophic Nutrition	Heterotrophic Nutrition
(i)	It is the mode of nutrition in which organisms prepare their own food by themselves using simple inorganic raw materials.	It is the mode of nutrition in which organisms obtain readymade food from plants or other animals.
(ii)	Examples : Green plants prepare their food by photosynthesis	Examples : Animals, non green plants, fungi etc.

SE. 9

Fungi are both useful as well as harmful to human beings. Justify this statement.

Ans. Fungi have both useful and harmful effects on human beings. Uses of fungi :

(i) Some fungi, e.g., mushrooms are edible and form nutritious food.

(ii) Yeasts are used in baking industry and brewing industry for manufacturing of bread and alcohol respectively.

(iii) Fungi, being saprotrophic, help in recycling of nutrients in the biosphere.

(iv) Some fungi are used in the preparation of medicines e.g., Penicillium is used to prepare an antibiotic penicillin.

Harmful effects of fungi :

(i) Fungi (e.g., moulds) spoil our food, clothes, leather goods, wooden articles etc.

(ii) Fungi cause diseases in plants and spoil our food crops.

(iii) Fungi cause diseases in animals and human beings. Diseases caused by fungi are mostly communicable diseases.

SE. 10

In what form is the food prepared by plants during photosynthesis?

Ans. Food is prepared by plants in the form of simple carbohydrates i.e., glucose. After synthesis, glucose is converted into starch and stored in different plant parts.

SE. 11

How do the saprotrophic organisms such as fungi and many bacteria acquire nutrients?

Ans. These organisms secrete digestive juices on the dead and decaying organic matter and convert it into a solution. Then they absorb the nutrients from it.

SE. 12

Write a note on the symbiotic association between leguminous plants and Rhizobium bacteria.

Ans. Leguminous plants and Rhizobium bacteria share symbiotic relationship with each other. Rhizobium can take atmospheric nitrogen and convert it into a soluble form (soluble nitrogenous compounds) in the soil, that the plant can absorb. Rhizobium is a heterotroph and cannot make its own food. It there fore, lives in the roots of leguminous plants like beans, gram peas and moong where it gets food and shelter. In return, it provides the plant with nitrogen.

NS. 1

Why do organisms need to take food?

Ans. Food is needed by all living organisms for their survival. It has the following roles :

(i) Food provides energy for growth and maintenance of the body parts.

(ii) Food provides essential nutrients (carbohydrates, vitamins, minerals, proteins, fats, roughage and water) required by the body to carry out various life processes.

(iii) Food is also needed by living beings for replacement and repair of their damaged and worn out cells.

NS. 2

Distinguish between a parasite and a saprotroph.

Ans. Difference between a parasite and a saprotroph are given below :

	Parasite	**Saprotroph**
(i)	A parasite takes readymade food	A saprotroph secrets digestive juices on the organic matter, converts it into a solution and then absorbs it.
(ii)	A parasite feed on living organism	A saprotroph feeds on dead and decaying organisms.
(iii)	Examples: Cuscuta, tapeworm	Examples: Bread mould, many bacteria

NS. 3

How would you test the presence of starch in leaves?

Ans. Presence of starch in leaves can be tested by iodine test. Iodine solution turns starch blue-black. The leaf to be tested is put in a test tube containing ethyl alcohol. It is heated gently in a water bath until alcohol begins to boil. The colourless leaf is removed from alcohol and washed thoroughly with water. Then the leaf is placed in a petridish and few drops of iodine solution are poured over it. If the leaf becomes blue-black after pouring few drops of iodine solution over it, then it indicates the presence of starch in it.

NS. 4

Give a brief description of the process of synthesis of food in green plants.

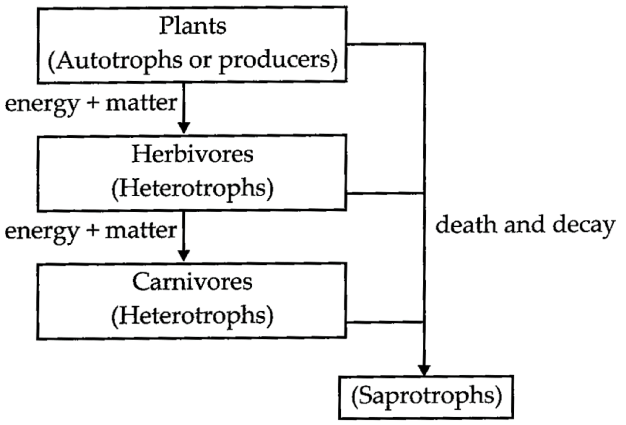
Ans. The process of synthesis of food in green plants is referred to as photosynthesis, which mainly occurs in leaves. The leaves have a green pigment called chlorophyll. It helps leaves to capture the energy of the sunlight. This energy is used to synthesize food from carbon dioxide and water. Thus, chlorophyll, sunlight, carbon dioxide and water help to carry out the process of photosynthesis. The solar energy captured by the leaves is stored in the plant in the form of chemical energy. Photosynthesis can be represented by the following equation :

$$\underset{\text{(Carbon dioxide)}}{6CO_2} + \underset{\text{(Water)}}{6H_2O} \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} \underset{\text{(Carbohydrates)}}{C_6H_{12}O_6} + \underset{\text{(Oxygen)}}{6O_2}$$

NS. 5

Show with the help of a sketch that the plants are the ultimate source of food.

Ans. The sketch to show that plants are ultimate source of food is as follows:



NS. 6

Fill in the blanks:

(a) Green plants are called _____ since they synthesize their own food.

(b) The food synthesized by the plants is stored as _____.

(c) In photosynthesis solar energy is captured by the pigment called _____

(d) During photosynthesis plants take in _____ and release _____.

Ans. (a) autotrophs, (b) starch,
(c) chlorophyll, (d) carbon dioxide, oxygen.

NS. 7

Name the following:

(i) A parasitic plant with yellow, slender and tubular stem.

(ii) A plant that has both autotrophic and heterotrophic modes of nutrition.

(iii) The pores through which leaves exchange gases.

Ans. (i) Cuscuta (ii) Insectivorous plant
(iii) Stomata

NS. 8

Tick the correct answer:

(a) Amarbel is an example of

(i) autotroph (ii) parasite (iii) saprotroph
(iv) host

Ans. (ii) parasite.

(b) The plant which traps and feeds on insects is:

(i) Cuscuta (ii) china rose
(iii) pitcher plant (iv) rose

Ans. (iii) pitcher plant.

NS. 9

Match the items given in Column I with those in Column II:

Column I	**Column II**
Chlorophyll	Bacteria
Nitrogen	Heterotrophs
Amarbel	Pitcher plant
Animals	Leaf
Insects	Parasite

Ans.

Column I	**Column II**
Chlorophyll	Leaf
Nitrogen	Bacteria
Amarbel	Parasite
Animals	Heterotrophs
Insects	Pitcher plant

NS. 10

Mark T if the statement is true and F if it is false:

(i) Carbon dioxide is released during photosynthesis. (T/F)

(ii) Plants which synthesize their food themselves are called saprotrophs. (T/F)

(iii) The product of photosynthesis is not a protein. (T/F)

(iv) Solar energy is converted into chemical energy during photosynthesis. (T/F)

Ans. (i) F : Oxygen is released during photosynthesis.

(ii) F : Plants which synthesize their food themselves are called autotrophs.

(iii) T : It is a Carbohydrate

NS. 10

Choose the correct option from the following:

Which part of the plant takes in carbon dioxide from the air for photosynthesis?

(i) Root hair (ii) Stomata

(iii) Leaf veins (iv)Sepals

Ans. (ii) Stomata

NS. 10

Choose the correct option from the following:

Plants take carbon dioxide from the atmosphere mainly through their:

(i) roots (ii) stem

(iii) flowers (iv) leaves

Ans. (iv) leaves

Space for Notes :

EXERCISE – I

ONLY ONE CORRECT TYPE

1. Raw materials for photosynthesis :
(A) Carbon dioxide (B) Water
(C) Sunlight (D) All of these

2. An example of an autotrophic plant is___.
(A) Mushrooom (B) Mould
(C) Dodder (D) Neem

3. An example of a saprophytic plant is _____.
(A) Dodder (B) Monotropa
(C) Mushroom (D) All of these

4. Which of these is not necessary for photosynthesis?
(A) Carbon dioxide (B) Chlorophyll
(C) Light (D) Nitrogen

5. Which of the following identify the carnivorous plant-
(A) Pitcher plant (B) Venus fly trap
(C) Both (A) & (B) (D) None of these

6. Grana refers to -
(A) Glycolysis of glucose
(B) By-product of photosynthesis
(C) Stacks of thylakoids
(D) Stacks of quantasomes

7. Autotrophic nutrition occurs in -
(A) Fungi
(B) Plants
(C) Some protists and prokaryotes
(D) Both B and C

8. Mushroom, Rhizopus and Yeast are-
(A) Chemosynthetic (B) Parasitic
(C) Holozoic (D) Saprophytic

9. Chlorophyll is present-
(A) In the grana of chloroplast
(B) On the surface of chloroplast
(C) In the stroma of chloroplast
(D) None of these

10. In bacterial photosynthesis, the hydrogen donor is -
(A) H_2O (B) H_2SO_4
(C) NH_3 (D) H_2S

11. Which of the following is the best equation representing photosynthesis?
(A) $6O_2 + H_2 \xrightarrow{\text{Chlorophyll}} C_5HO_{12} + 6O_2$
(B) $CO_2 + H_2O \longrightarrow CH_2O + O_2$
(C) $6\,CO_2 + 12H_2O \xrightarrow{\text{Chlorophyll / Light}} C_6H_{12}O_6 + 6H_2O + 6\,O_2$
(D) $12\,CO_2 + 6\,H_2O \xrightarrow{\text{Light / chlorophyll}} C_6H_{12}O_6 + 6H_2O + 6\,O_2$

12. The plant that feeds & traps on insects is -
(A) Drosera (B) Sunflower
(C) Cuscuta (D) Mango

13. The green pigment in the leaves is called -
(A) Chlorophyll (B) Anthocyanin
(C) Chloroplast (D) None

14. Which one of the following is a parasite ?
(A) Mushroom (B) Fungi
(C) Dodder (D) Pitcher's plant

15. Rhizobium is a good example of -
(A) Insectivorous (B) Symbiosis
(C) Parasitic (D) None of these

16. Cuscuta is an example of -
(A) Autotroph (B) Parasite
(C) Saprophyte (D) Host

17. Autotrophic nutrition found only in -
(A) Plants (B) Animals
(C) Both (A) & (B) (D) None of these

18. The plant that feeds and traps on insects is -
(A) Venus-fly trap (B) Cuscuta
(C) Sunflower (D) None of these

19. Association of two different organisms in which both are benefited is called -
(A) Symbiosis (B) Nutrition
(C) Saprophytic (D) Parasitic

20. Which of the following is a nutrient ?
(A) Protein (B) Fat
(C) Vitamin (D) All of these

21. Human beings can be categorised as :-
(A) Heterotrophs
(B) Autotrophs
(C) Parasites
(D) Saprotrophs

22. The food making process in plants is called as :-
(A) Glycolysis
(B) Photosynthesis
(C) Photolysis
(D) Chemosynthesis

23. Which part of the plant is called its food factory?
(A) Fruits (B) Seeds
(C) Leaves (D) Flowers

24. Green pigment present in the leaves is called.
(A) Haemoglobin
(B) Globulin
(C) Albumin
(D) Chlorophyll

25. The end products of photosynthesis are.
(A) Carbohydrates, oxygen
(B) Carbohydrates, hydrogen
(C) Carbohydrates, water vapours
(D) Carbohydrates, oxygen, water vapours

PARAGRAPH TYPE

PARAGRAPH # I

The process by which green palnts can prepare their own food is called photosynthesis. Green plants possess chlorophyll in thier leaf and utillises carbon dioxide (form air) water, minerals (from soil, through root) as raw material and sunlight as source of enrgy and convert light energy into chemical energy. The food thus synthesised is in the form of starch (carbohydrate).

26. The process by which green plants can prepare their own food is called :
(A) Photosynthesis (B) Chemosynthesis
(C) Autotrophs (D) Heterotrophs

27. Green plants posses _____ in their leaf.
(A) Magnesium (B) Chlorophyll
(C) Potassium (D) Phosphorous

28. What is final product of photosynthesis.
(A) Glucose (B) Oxygen
(C) Starch (D) Both (A) & (B)

PARAGRAPH # II

Leguminous plants provide food and shelter for the bacteria as Rhizobium cannot prepare its food. They, thus have as symbiotic relationship. this association is very inportant for the farmers, as they do not need to add nitrogen fertilisers to the soil in which leguminoius plants are grown.

29. Which element is required in crops to make proteins.
(A) Oxygen (B) Nitrogen
(C) Carbondioxide (D) Zinc

30. _____ bacteria live in the roots of leguminous plants.

(A) Rhizobium (B) Cyanobacteria

(C) Nostoc (D) Spirullina

31. Which kind of plant provides food to Rhizobium bacteria.

(A) Leguminous (B) Photosynthetic

(C) Both (A) & (B) (D) None of these

MATCH THE COLUMN

32.

Column A	**Column B**
(P) Amarbel	(i) Saprophytes
(Q) Rhizobium	(ii) Insectivorous
(R) Mushroom	(iii) Autotrophs
(S) Drosera	(iv) Stomata
(T) Green plants	(v) Symbiosis
	(vi) Parasite

(A) (P) → (vi), (Q) → (v), (R) → (i), (S) → (ii), (T) → (iii)

(B) (P) → (i), (Q) → (ii), (R) → (iii), (S) → (iv), (T) → (v)

(C) (P) → (vi), (Q) → (iv), (R) → (v), (S) → (ii), (T) → (iii)

(D) (P) → (vi), (Q) → (iv), (R) → (vi), (S) → (v), (T) → (iii)

33.

Column A	**Column B**
(P) Chloroplast	(i) Parrot
(Q) Photosynthesis	(ii) Tiger
(R) Carnivores	(iii) Chlorophyll
(S) Frugivorous	(iv) Cuscuta
(T) Parasite	(v) Stroma and Grana

(A) (P) → (v), (Q) → (iii), (R) → (ii), (S) → (i), (T) → (iv)

(B) (P) → (i), (Q) → (ii), (R) → (iii), (S) → (iv), (T) → (v)

(C) (P) → (v), (Q) → (ii), (R) → (iii), (S) → (i), (T) → (iv)

(D) (P) → (iv), (Q) → (ii), (R) → (iii), (S) → (i), (T) → (v)

ASSERTION & REASON TYPE

Directions :

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

34. **Assertion :** All plants are not autotrophic.

Reason : Insectivorous plant cannot synthesise their own food.

35. **Assertion :** Lichens are symbiotic association of algae and fungi.

Reason : In symbiosis algae helping photosynthesis and fungi provides water.

36. **Assertion :** Amarbel is example of parasite.

Reason : Pitcher plant is insectivorous plant.

EXERCISE – II

VERY SHORT ANSWER TYPE

1. What is the meaning of autotrophic nutrition ?
2. What is symbiotic relationship ?
3. What are producers ?
4. Which type of nutrition is found in Doddar ?
5. Write down the equation of photo synthesis ?
6. What is the meaning of 'nutrition' ?
7. How do algae & fungi benefit each other ?
8. What are insectivores ?
9. Write down the two examples of Sanguivorous ?
10. What are parasites ?

SHORT ANSWER TYPE

1. What is photosynthesis ?
2. What factors are essential for photosynthesis ?
3. How do plants exchange gases with the atmosphere ?
4. Name the 3 groups of animals on the basis of their eating habits ?
5. Write the meaning of following terms- herbivores, carnivores & omnivores.

LONG ANSWER TYPE

1. How do you show that chlorophyll is necessary for photosynthesis ?
2. Describe symbiotic mode of nutrition with an example.
3. How dodder takes their nutrients from the host?
4. Describe the methods of nutrition in non green plants ?
5. Draw the diagram of chloroplast and describe its parts ?

TRUE / FALSE TYPE

1. The air generally contains fungal spores which germinate under cold and dry conditions.
2. Certain N_2-fixing bacteria present in soil convert atmospheric nitrogen into soluble nitrogeneous compounds.
3. Bean, moong, peas, etc., are the crops which are grown to replenish nitrogen content of the soil.
4. The white cottony mass of fine threads that grows on stale breed, pickles, leather goods etc., is of fungus called mould.
5. Raffleisa has the largest flower and is a partial parasitic plant.

FILL IN THE BLANKS

1. _____ & _____ are insectivorous plants.
2. Green plants use _____, _____ & _____ to make food.
3. Lichen is the mutual combination of _____ & _____.
4. Doddar is an example of _____ .
5. Chlorophyll is present in _____ of the plant.

Answer Key

EXERCISE–I														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
D	D	C	D	C	C	D	D	A	D	C	A	A	C	B
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
B	A	A	A	D	A	B	C	D	A	A	B	D	B	A
31	32	33	34	35	36									
A	A	A	C	A	B									

EXERCISE – II

TRUE/FALSE

1. F 2. T 3. T 4. T 5. T

FILL IN THE BLANKS

1. pitcher plant, venus fly trap
2. CO_2, H_2O, Sunlight
3. fungi, algae
4. parasitic plant
5. Leaves

SELF PROGRESS ASSESSMENT FRAMEWORK

(CHAPTER : NUTRITION IN PLANTS)

CONTENT	STATUS	DATE OF COMPLETION	SELF SIGNATURE
Theory			
In-Text Examples			
Solved Examples			
NCERT Exercises			
Exercise I			
Exercise II			
Short Note-1			
Revision - 1			
Revision - 2			
Revision - 3			
Remark			

NOTES :

1. In the status, put "completed" only when you have thoroughly worked through this particular section.
2. Always remember to put down the date of completion correctly. It will help you in future at the time of revision.

Space for Notes :

TRANSPORTATION (LIFE PROCESS)

2

INTRODUCTION

- All organisms have a way of transporting substances like nutrients, water and oxygen from one part of the body to another.
- In single celled organisms, like Amoeba, Paramecium and some algae materials move by diffusion,
- In simple multicellular organisms, like Sponges, Hydra and multiceliular Algae and Fungi substances move by diffusion only.
- Complex animals and plants have a well-defined transport system. It transports:

→ Nutrients and Oxygen to every body cell.

→ Harmful excretory substances like carbon dioxide, ammonia or urea from body cells to the excretory organs.

1. TRANSPORT OF SUBSTANCES IN PLANTS

- Plants also have a well-developed transport system. It is called vascular system.
  It transports water and minerals dissolved in water from roots to all the aerial parts of plant.
- It transports the food synthestised in leaves to all other parts of the plant.
- Vascular system consists of pipe-like vessels arranged end to end. They run from the tips of roots to the tips of leaves passing through the stem. The vascular system is also called conducting tissue. Its cells are called vessels.

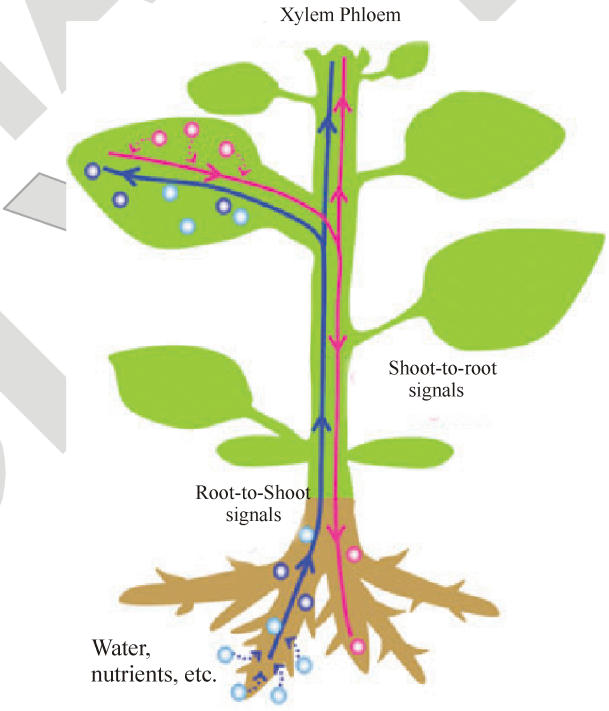


Figure : Transporation in Plants

- They are of two types: xylem vessels and phloem vessels.

(a) Xylem vessels :.

Xylem vessels transport water and dissolved minerals upwards from roots through stem to the tips of leaves against the force of gravity. This upward movement of water and minerals is called ascent of sap.

(b) Phloem vessels :

Phloem vessels carry food synthesised by the leaves downwards & upwards to all the parts of a plant.

1.1 TRANSPORT OF WATER AND MINERALS

(a) Transpiration :

- Transpiration is the loss of water from leaves and other aerial parts of a plant into the air in the form of vapours. It occurs through stomata in leaves and green herbacious stems. In old woody stems, it occurs through lenticels. Rate of transpiration is affected by different factors as follows:
- Temperature of air increases transpiration.
- Humidity decreases transpiration.
- Wind speed increases the rate of transpiration.
- Light causes stomata to open and increase in transpiration.
- Water is absorbed from soil by root hair. They are in close contact with water between the soil particles.
- Water and dissolved minerals move from root hair to the cells of root cortex and then to the xylem by the process of diffusion
- These vessels form a continuous network channels from roots, through the stem and branches up to the tips of the leaves.
- These vessels transport water and minerals to all the parts of a plant.

(b) Translocation of food:

- The transport of food from leaves to all other parts of plant is called translocation. The food is manufacture in the mesophyll cells of the leaf.
- From mesophyll cells, it enters into the phloem. It is then transported to all parts of the plant.

1.2 HUMAN CIRCULATORY SYSTEM

- Circulatory system is the life support system that provides our body cells with food and oxygen. It takes away waste products from the body cells.
- Circulatory system is a system of vessels which connects all the cells, tissues and organs of the body together: There are three main parts of the circulatory system-Blood, Blood vessels and Heart.

(a) BLOOD:

- Blood is a red-coloured viscous fluid. It flows in the blood vessels, Blood supplies food from intestine to every cell of body. It carries oxygen from lungs to body cells.

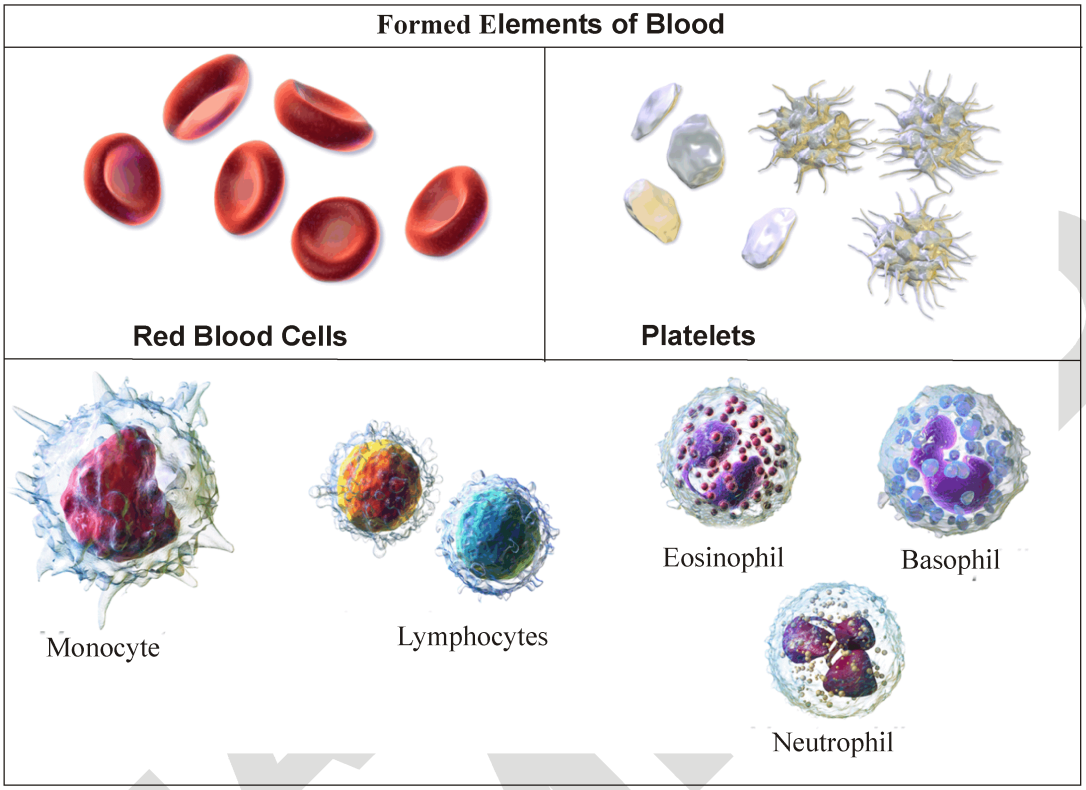


Figure : The element of blood

- It removes wastes from the cells. It helps in regulating body temperature.It protects body against infection.
- The blood has two components plasma and blood cells or corpuscles.
- Plasma is the non-living, liquid part of the blood. It is yellowish fluid which contain water (91 %), proteins (7%) and organic, inorganic substances(2-3%). It removes carbon dioxide from cells and transport it to lungs. It also carries urea from body cells to the kidneys.

→ **Blood cells or corpuscles :**

Blood cells are of three types :-

(i) **Red Blood Corpuscles (RBCs):** They are also known as Erythrocytes.These are biconcave disc like structure. Number of R.B.C. in human blood is 4.5 to 5.5 million/Cubic mm of blood. These are non nucleated structures. They have a life span of **120 days**. These have oxygen carrying pigment called haemoglobin. It gives red colour to the corpuscles (blood corpuscles). It binds with oxygen to form oxyhaemoglobin, which transports oxygen to all the body cells.

(ii) White Biood Corpuscles (WBCs): They are also known as Leucocytes.These are white coloured amoeboid shaped structures. Number of W.B.C. in human is 6000 to 11000/Cubic mm. These are of two types Granulated and Agranulated. These defend the body against infection. They fight against germs and also provide immunity against infection. The white blood corpuscle are called **soldiers of the body**.

(iii) Blood Platelets: They are also known as Thrombocytes.These are very minute cells present in the blood. These do not contain nucleus. Number of platelets in human body is 1,50,000 to 4,50,000 ml of blood. Their life span is **7 days**. They help to stop bleeding by clotting the blood.

(b) Blood vessels :

- Blood flows through a system of tubes called blood vessels. There are three kinds of blood vessels -

→ **Arteries:** Arteries have thick and muscular wall.

- They carry oxygenated blood from the heart to body organs but pulmonary arteries carry deoxygenated blood from right auricle to lungs.
- The force of heart pumping keeps the blood flowing through arteries.
- The blood in arteries is bright red in colour, because it contains a lot of oxygen (oxyhaemoglobin is bright red in colour).
- In arteries, blood flows with jerks and under great force.
- Pulse rate represents the number of heartbeats per minute.
- Pulse rate in a healthy person at rest ranges between 72-80 times per minute.

LAB TIME
Let's Do & Learn

- **Aim:** To feel own pulse and find the pulse rate.
- **Procedure:** Place the index and middle fingers of the right hand on the inner side of the wrist of your left hand. Press lightly and feel the throbbing movements.
- **Observation and Conclusion:** This throbbing is called pulse. The number of pulses or throbs produced per minute is called pulse rate which ranges between 72-80 beats per minute.
  The largest artery in the body is called aorta. It arises from the left ventricle of heart. This branches out into arteries. On entering some body organ, each artery is divided into smaller and smaller vessels which end Into fine capillaries.

→ **Veins :** Veins bring blood from body organs to the heart. They have thin walls.

- The valves present inside the veins make the blood to flow only towards the heart.
- The flow of blood in veins is not jerky and the blood is deoxygenated but pulmonary veins carry oxygenated blood from lungs to left auricle of heart.

- Veins begin as capillaries. They join and rejoin to form large veins that open into the right auricle of heart.

→ **Capillaries:** Capillaries are the finest blood vessels. They connect arteries with veins.

- The capillaries have very thin walls (only one cell thick).
- The capillaries at the end join with the veins collect carbon dioxide and waste from the cells and carry the blood to veins.

DIFFERENCES BETWEEN ARTERIES AND VEINS

S.No	Artery	Veins
1.	Carry blood away from the heart.	Carry blood towards the heart.
2.	In the arteries, blood flows with jerks & high pressure.	In the veins, blood flows very smoothly with low pressure.
3.	They always carry oxygen-rich blood	They always carry carbon dioxide-rich blood.
4.	Valves are absent.	Valves are present.
5.	They have elastic, thick & muscular walls.	They have non-elastic, thin and fibrous walls.

1.3 HEART

- Heart is a muscular organ. It is located in the thoracic or chest cavity between the lungs. It is tilted slightly towards the left.
- Heart is of the size of a fist and is some what cone-shaped. It has thick walls formed of cardiac muscles. These contract and relax throughout life and never get tired. Therefore, heart beats continuously and pumps blood into the whole body.
- Our heart is four-chambered. It has two auricles or atria and two ventricles. The heart is divided into two halves by a thick muscular septum. Each half has an auricle above and a ventricle below. The right half of the heart has deoxygenated blood while the left half has pure or oxygenated blood. The septum prevents mixing of deoxygenated and oxygenated blood present in the right and left halves of the heart.

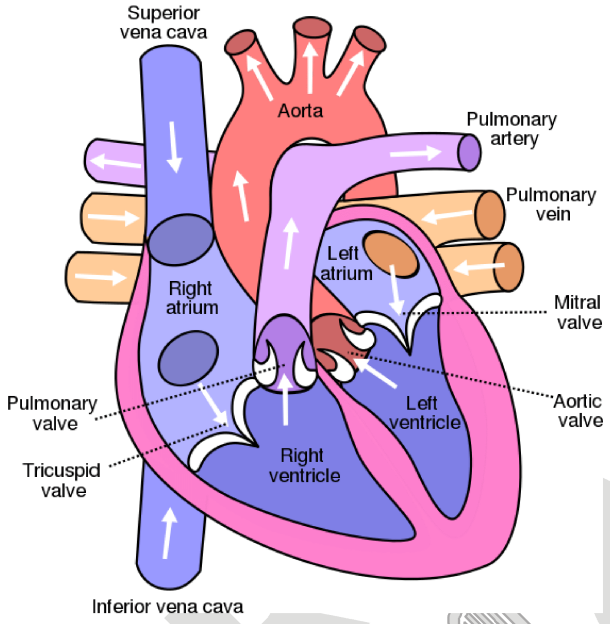


Figure : Heart

(a) Auricles (Atria) :

- Auricles are the receiving chambers of the heart. Their walls are thinner than those of ventricles. The right auricle receives deoxygenated blood from the whole body while the left auricle receives oxygenated blood from lungs.

(b) Ventricles :

- These are distributing chambers of the heart. Their walls are thick.
- The right ventricle receives deoxygenated blood from right auricle and pumps it to the lungs for oxygenation.
- The left ventricle is the largest heart chamber and has the thickest walls. It receives oxygenated blood from left auricle and pumps it to the whole body.
- There are valves in the heart. They prevent the back flow of blood in the heart and the blood vessels. They open and close about 1,00,000 times a day.

(c) Mechanism of heart:

- When both atria and ventricles are relaxed, both the atria get filled with blood. The right atrium receives deoxygenated blood from various parts of the body from vena cava and the left atrium receives oxygenated blood from lungs by pulmonary veins.
- Now both atria contract simultaneously and their cuspid valves open up. Blood from left atrium comes in the left ventricle and from right atrium into right ventricle. Both the atria relax and ventricles contract.
- The cuspid valves between the auricles and ventricles are shut and semilunar valves between left ventricle and aorta open up.

- Oxygenated blood from left ventricle is pumped into aorta and is distributed to all body parts by arteries. Deoxygenated blood from right ventricle is pumped into the pulmonary aorta and is transported to lungs by the pulmonary arteries for oxygenation.

1.4 HEARTBEAT AND HEART SOUNDS

- The rhythmic contraction and relaxation of auricles and ventricles is known as heartbeat. Human heart beats about 72 times per minute. One heartbeat includes :-
- A phase of relaxation of heart muscles and general pause is called Diastole and a phase of contraction of heart muscles is called Systole. During diastole, heart receives blood and during systole, first atria contract to push the blood into ventricles and then ventricles contract to pump blood into blood vessels.
- Thus, contraction of atrial chambers and then ventricular chambers are the two phases of a heartbeat.
- These two phases of heartbeat can be heard as lub and dub sounds. The sound of heartbeat is caused by the contraction of muscles and shutting down of valves. In the lub phase, the ventricles contract and cuspid valves close. In the dub phase, the pulmonary and aortic valves close.
- Doctors use a stethoscope to hear this lub-dub sound.

LAB TIME
Let's Do & Learn

- **Aim:** To find out whether rate of heartbeat remains unchanged.
- **Procedure:** Count the number of heartbeats in one minute when you are resting or sitting and relaxing. Then run for about 4 -5 minutes and record the rate of heartbeat. Compare the two observations. Repeat these observations with your friends also.
- **Observation and Conclusion:** The rate of heartbeat increases after running. This shows that the rate of heartbeat does not remain unchanged.

1.5 EXCRETION IN ANIMALS

- Numerous biochemical reactions occur round the clock in all living cells, They produce a variety of waste products like carbon dioxide, ammonia and other nitrogenous compounds. If they accumulate in the body, they prove to be toxic.
- The process of removing toxic wastes from the body is called excretion and the organs that remove these toxic wastes are called excretory organs.

1.6 EXCRETORY SYSTEM IN HUMAN BEINGS

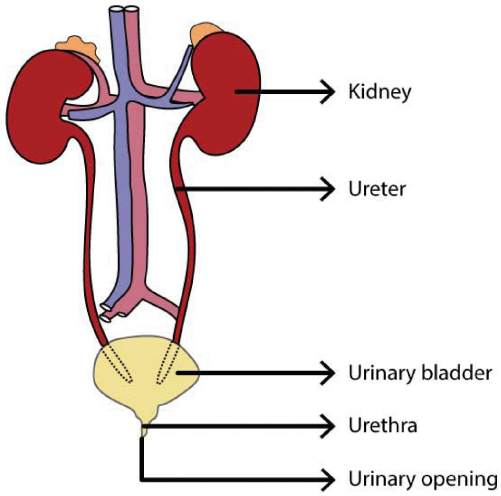


Figure : Kidney

→ Human has a pair of kidneys, a pair of ureters, a urinary bladder and a urethra

- Kidneys are brown-coloured bean-shaped organs present in the abdominal cavity one on either side of backbone.
- Each kidney has a large number of long coiled tubules, called nephrons. These are structural as well as functional units of kidneys.They act as filters.
- They remove nitrogenous waste and water from blood while it passes through kidneys.
- The renal artery brings blood to the kidneys and renal vein takes it away.
- In kidneys excess of water and nitrogenous wastes are removed in the form of urine.
- The urine is removed from the kidneys by a pair of tubes called ureters.
- It is collected and stored in the urinary bladder and is finally disposed off through urinary opening located at the end of urethra. The urethra is a muscular tube.

Focus Point

- The presence of sugar in urine indicates that the person is suffering from diabetes. Sugar level increases in blood due to low level of insulin as body cells are not able to utilise sugar and it is excreted out in urine. Excess of urea and uric acid is an indication of malfunctioning of kidneys.

(b) Dialysis :

- Dialysis is the separation of larger molecules from smaller ones in their solution with the help of a semipermeable membrane.
- Human beings have two kidneys. If one kidney is damaged, the other kidney fulfills the excretory needs. But if both the kidneys are damaged, the person cannot survive because of the accumulation of toxic wastes in the body. Therefore, the nitrogenous wastes from the blood are periodically removed by artificial kidney or the dialysis machine (dialyser). The removal of nitrogenous wastes from blood with the help of a machine is called artificial dialysis.

LAB TIME
Let's Do & Learn

- **Aim:** To test the presence of glucose in urine.
- **Materials Required:** Sample of urine, test tube, dropper, Benedict's solution, and burner.
- **Procedure:** Take a small sample of urine in a test tube. Add a few drops of the blue-coloured Benedict's solution to it. Warm the mixture and observe the changed colour if any.
- **Observation and Conclusion:** If a green precipitate appears which turns orange or brick-red, the presence of glucose in urine is confirmed. (Repeat the same test with the urine samples of your friends).

(c) Other organs for excretion:

→ **Skin:** Sweat glands in the skin remove water, salts, urea etc. from the blood flowing through blood capillaries in the skin. They open on the surface of skin by tiny pores. The fluid that comes out of the body through these pores is called sweat.

→ **Sweating:** A means to remove water and salts from blood and control body temperature In summer when we feel hot due to external heat, sweating and evaporation of sweat makes the body cool. Sweat evaporates from the body surface. Evaporation needs heat which is obtained from the body. So we sweat in summer and also feel more thirsty.

- **Lungs:** They remove carbon dioxide from blood during respiration.
- **Liver:** Liver cells convert ammonia into urea which is less toxic. Urea is removed by kidneys.

(d) Kidney Transplantation:

Diseased kidney may be replaced with healthy one by kidney transplantation. To lead a normal life, one healthy kidney is more than enough. Therefore, a healthy person can donate his one kidney to a patient who has both kidneys failure.

SOLVED EXAMPLES

SE. 1

Why do we breathe faster and why does our heart beat faster while exercising?

Ans. When we exercise, our muscle cells work harder and therefore, we require more oxygen, which is obtained by breathing faster. At the same time, our heart beats faster, so as to pump more blood and hence more oxygen to the working muscles.

SE. 2

Do all animals require a transport system for transporting food and oxygen? Give example.

Ans. No, animals such as sponges and hydra do not have a transport system for transporting food and oxygen. In such animals, the water (in which they live) brings food and oxygen into their bodies. The waste materials from their bodies are also removed by water.

SE. 3

Different chambers of the heart are separated from each other by muscular septa. What happens if the muscular septa are absent?

Ans. Human heart consists of four chambers. The upper two chambers are called atria while the lower two chambers are called ventricles. These chambers are separated by muscular walls (muscular septa) that prevent the mixing up of oxygenated (oxygen-rich) and deoxygenated (carbon dioxide-rich) blood. So, in the absence of muscular septa, the oxygenated and deoxygenated blood would get mixed up.

SE. 4

What makes RBCs red in colour and WBCs colourless?

Ans. RBCs (Red blood cells) contain a red coloured pigment called haemoglobin. It is the presence of this haemoglobin in RBCs that makes them red in colour. On the contrary, white blood cells are colourless, because of the absence of haemoglobin.

SE. 5

Differentiate between arteries, veins and capillaries.

Ans. Differences between arteries, veins and capillaries are as follows :

1. Arteries :

They are thick walled vessels with narrow lumen.

They carry blood away from the heart.

They are situated in the deeper regions of the body.

Walls of arteries are impermeable to gases and other substances.

Arteries carry oxygenated blood, except the pulmonary artery.

2. Veins :

They are thin walled vessels with wide lumen.

They bring blood towards the heart.

Veins are superficial in nature.

Walls of veins are also impermeable.

Veins carry deoxygenated blood, except the pulmonary vein.

3. Capillaries :

They are thin walled vessels with a small lumen.

They deliver blood to the body cells.

Capillaries are placed very deep.

Walls of capillaries are permeable to gases and other substances.

Capillaries carry both oxygenated and deoxygenated blood.

SE. 6

What do you understand by vascular system of plants?

Ans. Higher plants possess a well developed transport system called vascular system. It consists of vascular tissues i.e. xylem and phloem. Xylem contains xylem vessels which are joined together to form long tubes. They transport water and minerals from roots to all other parts of the plant. Phloem tissue comprises of sieve tubes which are also joined together to form long tubes. They transport food synthesized by leaves to the various plant parts.

SE. 7

Sometimes doctors inject medicines directly to our bloodstream. Where do you think they inject - in artery or in vein?

Ans. The doctors inject medicines directly into the veins, because veins are superficially placed and can be easily located. Secondly, the medicine which is injected needs to be transported to all the parts of the body. Through veins, the medicine reaches the heart, from where it is then pumped all over the body.

SE. 8

(a) What is heart beat ? Name the instrument used by doctors to check heart beat of the patient.

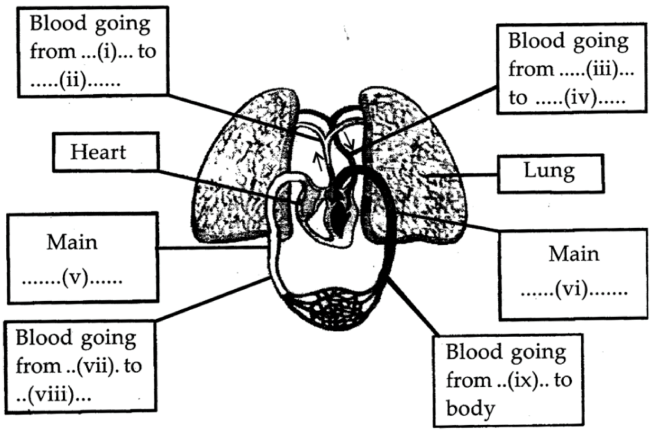
(b) How does water enter into the root hair cells from the soil ?

Ans. (a) One complete contraction and relaxation of the heart is called one heart beat. The instrument used to check heart beat of the patient is stethoscope.

(b) Water enters into the root hair cells from the soil by the process of osmosis. Osmosis is the passage of water across a semipermeable membrane, from an area where there are more water molecules to an area where there are less water molecules. The root hair are in close contact with the water surrounding the soil particles. Normally, the number of water molecules are more outside the root hair than inside. So, they move into the root hair by osmosis. Then, these water molecules move through the root tissues to the xylem of the root.

SE. 9

Study the figure given below and write down the correct words for labels (i) to (x).



Ans. (i) heart (ii) lungs (iii) lungs (iv) heart (vi) artery (vii) body (viii) heart (ix) heart

SE. 10

What happens if kidneys fail to function properly?

Ans. Kidney is the main excretory organ of human body. It removes the waste material out of the body. Hence, if kidneys fail to function properly, the wastes will keep on accumulating in the body, which in turn, would damage the internal organs of the body. This can even lead to the death of the person.

SE. 11

How does sweating regulate body temperature?

Ans. Sweating helps in the removal of water and mineral salts from the body. The water given out through sweating evaporates and produces a cooling effect. Thus, the process of sweating regulates body temperature.

SE. 12

The process of removing waste materials from the body of an animal depends on the availability of water. Explain.

Ans. The way by which waste chemicals are removed from the body of the animal depends on the availability of water. Most aquatic animals like bony fish, crocodiles etc. excrete cell waste as ammonia which directly dissolves in water. Some land animals like birds, lizards, snakes etc. with less water availability excrete a semi-solid, white coloured compound i.e. uric acid. Some animals convert ammonia to urea in the liver and excrete urea as a waste product e.g. frogs, toads, marine and all other mammals.

SE. 13

What is the function of urinary bladder?

Ans. The urinary bladder temporarily stores urine until it is eliminated through urethra.

NS. 1

Match structures given in Column I with functions given in Column II.

	Column I		Column II
(i)	Stomata	(a)	Absorption of water
(ii)	Xylem	(b)	Transpiration
(iii)	Root hairs	(c)	Transport of food
(iv)	Phloem	(d)	Transport of water
		(e)	Synthesis of carbohydrates

Ans. (i) - (b), (ii) - (d), (iii) - (a), (iv) - (c)

NS. 2

Fill in the blanks.

(i) The blood from the heart is transported to all parts of the body by the _____ .

(ii) Haemoglobin is present in _____ cells.

(iii) Arteries and veins are joined by a network of _____ .

(iv) The rhythmic expansion and contraction of the heart is called _____

(v) The main excretory product in human beings is _____ .

(vi) Sweat contains water and _____.

(vii) Kidneys eliminate the waste materials in the liquid form called _____.

(viii) Water reaches great heights in the trees because of suction pull caused by____.

Ans. (i) arteries (ii) red blood (iii) capillaries (iv) heart beat (v) urea (vi) salts (vii) urine (viii) transpiration

NS. 3

Choose the correct option:

(a) In plants, water is transported through

(i) Xylem (ii) Phloem

(iii) Stomata (iv) root hair

Ans. (i) Xylem

(b) Water absorption through roots can be increased by keeping the plants

(i) in the shade

(ii) in dim light

(iii) under the fan

(iv) covered with a polythene bag

Ans. (iii) under the fan

NS. 4

Why is transport of materials necessary in a plant or in an animal? Explain.

Ans. Transport of materials is necessary in plants and animals because

(i) Every cell needs a regular supply of nutrients and oxygen to release energy through respiration.

(ii) These nutrients and oxygen need to be transported to all the cells of the body, through a transport system, so that they can produce energy,

(ii) Waste products generated by cells need to be transported to the excretory organs, because accumulation of these waste products causes harmful effects on the organism's body.

NS. 5

What will happen if there are no platelets in the blood?

Ans. Platelets are responsible for clotting of blood. If there are no platelets, then blood would not clot in case of an injury. This will lead to excessive blood loss, and finally death of the person.

NS. 6

What are stomata? Give two functions of stomata.

Ans. Stomata are tiny pores that are mainly present on the surface of leaves. The functions of stomata are:

(i) During photosynthesis and respiration, stomata help in exchange of gases (carbon dioxide and oxygen).

(ii) Stomata help in evaporation of water from the leaf surface during the process of transpiration.

NS. 7

Does transpiration serve any useful function in the plants? Explain.

Ans. Transpiration is an essential process for the plants because :

(i) It creates a suction pull (transpiration pull) due to which water and minerals rise high up in the tall trees. Thus, it helps in ascent of sap.

(ii) Transpiration helps to cool the plant, due to evaporation of water.

NS. 8

What are the components of blood?

Ans. The main components of blood are — plasma and blood cells (or blood corpuscles).

Plasma is the fluid part of blood in which the blood cells are suspended. The plasma contains water, minerals, nutrients, proteins etc.

Blood cells are of three types — RBCs (Red blood cells), WBCs (White blood cells) and blood platelets.

NS. 9

Why is blood needed by all the parts of a body?

Ans. Blood is an important part of our transport system. It is needed by all parts of our body because it performs following important functions :

(i) It transports digested food from small intestine to all parts of the human body.

(ii) It carries oxygen from lungs to the heart, and then to the body cells.

(iii) It carries carbon dioxide (a waste product) from the body cells to the lungs via heart.

(iv) It carries nitrogenous wastes from the body cells to the kidneys for excretion.

(v) Blood helps to fight against disease causing germs and infections.

(vi) Blood helps to regulate the body temperature.

NS. 10

What makes the blood look red?

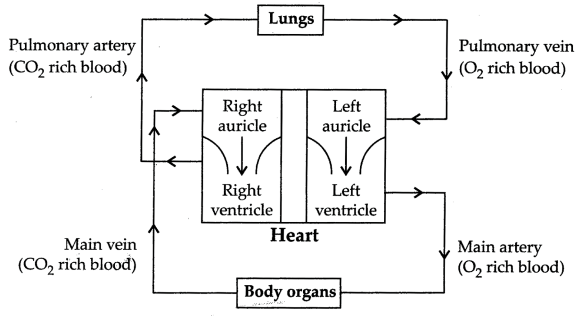
Ans. Presence of haemoglobin, a red-coloured pigment, in the RBCs of blood, makes blood appear red in colour.

NS. 11

Describe the function of the heart.

Ans. The heart has four chambers—two upper chambers are called auricles and two lower chambers are called ventricles. The left chambers of the heart are completely separated from right chambers of the heart, to prevent the mixing of oxygen-rich and carbon dioxide rich blood. The vena cava (main veins) bring deoxygenated blood from all parts of the body to the right atrium. The right atrium pumps this blood into the right ventricle, which then pumps it into the pulmonary artery. This artery takes the blood to the lungs for oxygenation. The oxygenated blood is received by the left atrium through the pulmonary veins (one each from the right and left lungs). It is then pumped into the left ventricle, which in turn, pumps the blood into the aorta (main artery), through which it is supplied to all parts of the body.

The circulation of blood can be illustrated by the following flow chart :



NS. 12

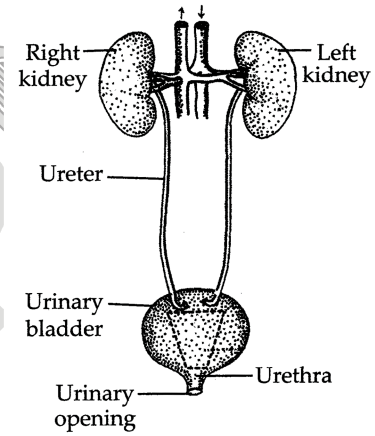
Why is it necessary to excrete waste products?

Ans. Waste products produced by our body such as urea, carbon dioxide, salts etc. are toxic in nature. If accumulated, they can damage our body parts, and hence prove fatal. Therefore, waste products are necessary to be excreted out.

NS. 13

Draw a diagram of the human excretory system and label the various parts.

Ans. The labelled diagram of the human excretory system is as follows :



EXERCISE – I

ONLY ONE CORRECT TYPE

1 Arteries carry oxygenated blood except :
(A) Pulmonary (B) Cardiac
(C) Hepatic (D) Systemic

2. Which of the following has the thickest walls ?
(A) Right ventricle (B) Left ventricle
(C) Right auricle (D) Left auricle

3. Contraction of right ventricle pumps blood into :
(A) Dorsal aorta (B) Pulmonary artery
(C) Pulmonary vein (D) Coronary artery

4. The heart of a healthy man beats normally per minute:
(A) 85-90 times (B) 80-90 times
(C) 70-80 times (D) 60-70 times

5. The instrument used to hear heart sound is :
(A) Electrocardiograph (B) Sphygmomanometer
(C) Stethoscope (D) Haemometer

6. In adult man, normal BP is
(A) 100/80 mm Hg (B) 120/80 mm Hg
(C) 100/120 mm Hg (D) 80/120 mm Hg

7. The instrument by which BP of man is determined :
(A) Ultrasound (B) BP meter
(C) Stethoscope (D) Sphygmomanometer

8. William Harvey is known for discovery of :
(A) Blood circulation (B) Blood clotting
(C) Respiration (D) Digestion

9. Mammals are said to have double circulation. It means:
(A) Blood vessels are paired
(B) There are two types of blood vessels attached to every organ
(C) There are two systems, one from the heart to the lungs and back to the rest of the body.
(D) The blood circulates twice through the heart

10. In mammals, veins differs from arteries in having :
(A) Thicker walls
(B) Deeply present
(C) Carry blood away from heart
(D) Internal valves

11. Oxygenated blood returns from lungs to the heart through :
(A) Coronary vein (B) Pulmonary vein
(C) Coronary artery (D) Pulmonary artery

12. Which one of the following is connected with transport of water in plants ?
(A) Phloem (B) Xylem
(C) Epidermis (D) Cambium

13. If the cut end of a tree is put in eosin solution :
(A) Leaves remain fresh but ascent of sap stops
(B) Phloem gets coloured because of ascent of sap
(C) Xylem elements get stained showing ascent of sap through them
(D) Ascent of sap stops

14. The principal pathways by which water is translocated in angiosperms is :
(A) Xylem vessel system
(B) Xylem and phloem
(C) Sieve tubes members of phloem
(D) Sieve cells of phloem

15. The transpiration in plants will be lowest :
(A) When there is high humidity in the atmosphere
(B) There is excess of water in the cell
(C) Environmental conditions are very dry
(D) High wind velocity

16. Which side of the heart receives oxygenated blood?
(A) Right (B) Left
(C) All parts (D) None of the parts

17. What is the name of the main artery?
(A) Pulmonary artery (B) Pulmonary vein
(C) Aorta (D) Vena cava

18. Which blood vessels deliver oxygen and nutrients to the heart itself?
(A) Pulmonary arteries
(B) Coronary arteries
(C) Vena cava
(D) None of the above

19. Which part of the blood is mainly water?
(A) Red blood cells (B) White blood cells
(C) Platelets (D) Plasma

20. Where does the aorta take the blood?
(A) To the lungs
(B) Towards the body
(C) To the heart
(D) To the veins

21. Why is the human circulation called a double circulation?
(A) The blood passes through the heart twice
(B) The blood travels twice as fast as in other circulations
(C) The blood takes twice as long as other circulations
(D) The blood passes through each part of the body twice

22. Which cells of the body do not have a nucleus?
(A) Red blood cells
(B) White blood cells
(C) Sperm cells
(D) All cells have a nucleus

23. Which side of the heart carries deoxygenated blood?
(A) Right
(B) Both sides
(C) Neither side
(D) Left

24. Human Heart is-
(A) 3 - Chambered
(B) 2 - Chambered
(C) 4 - Chambered
(D) None of these

25. Which of the following is the main circulatory fluid in our body ?
(A) Plasma (B) Lymph
(C) Blood (D) All

PARAGRAPH TYPE

PARAGRAPH # I

Human have two major organs that perform transport of materials. Organ 'A' is beanshaped and dark red in colour lie just above the waist. It helps in'removal of 'Q', a waste material from blood. The organ 'S' is the opening at the end of the urinary bladder through which the waste material is eliminated.

Organ 'B' lies in the chest cavity slightly titted towards the left side. It pumps continuously.

26. Which organ that perform transport of minerals.
(A) Kidney and heart (B) Brain and kidney
(C) Lungs and liver (D) Skin and lungs

27. The symbol 'B' represents.
(A) Kidney (B) Lungs
(C) Heart (D) Blood

28. Which of the following is waste material from blood.
(A) Glucose (B) Urea
(C) Iron (D) Starch

PARAGRAPH # II

Priya's grandfather was taken to the hospital as he was unable to perform excretory processes. Priya heard a nurse talking to her father tha her grandfather's has kidney failure and needs to undergo dialysis. Priya later asked her father as to what is dialysis process and why does grandpa needs it. Her father smiles and tells her all the facts associated with this process.

29. The process used for cleaning of blood by separating the waste products in artificial medium is called :

(A) Dialysis (B) Electroporesis

(C) Pace maker (D) None of these

30. Which is the excretory product of human.

(A) Uric acid (B) Ammonia

(C) Urea (D) Glucose

31. On damage of which _____ organ dialysis occurs :

(A) Kidney (B) Liver

(C) Heart (D) Lungs

MATCH THE COLUMN TYPE

32.

Column A	**Column B**
(P) RBC	(i) 5000-11000-cc.
(Q) WBC	(ii) 5,5 million /. cc
(R) Platelets	(iii) 0.15 - 0.45 million/cc
(S) Platelets life span	(iv) 120 days
(T) RBC life span	(v) 7 days

(A) P → ii, Q → i, R → iii, S → v, T → iv

(B) P → i, Q → ii, R → iii, S → iv, T → v

(C) P → ii, Q → iii, R → iv, S → v, T → i

(C) P → iii, Q → iv, R → i, S → v, T → ii

33.

Column A	**Column B**
(P) WBC	(i) Absence of valves
(Q) Veins	(ii) Erythrocytes
(R) Lub-dub sound	(iii) Presence of valves
(S) RBC	(iv) Leucocytes
(T) Artery	(v) Stethoscope

(A) P → i, Q → iii, R → iv, S → ii, T → v

(B) P → iv, Q → iii, R → v, S → ii, T → i

(C) P → iv, Q → ii, R → v, S → iii, T → i

(D) P → v, Q → ii, R → iv, S → i, T → iii

ASSERTION & REASON TYPE

Directions :

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

34. **Assertion :** Heart is tissue which acts as a pump.
Reason : Heart is Roughly the size of your fist.

35. **Assertion :** Animals like sponges and hydra do not posses any fluid like blood.
Reason : Sponges and hydra lack a circulatory system.

36. **Assertion :** Veins carry blood from different parts of the body to the heart.
Reason : Arteries have no muscular wallks.

EXERCISE – II

VERY SHORT ANSWER TYPE

1. Name the two tissues of plants which transport materials
2. What are the main constituents of urine?
3. What are the lower chambers of the heart called?
4. Where are nephrons found in human body?
5. Which gaseous products are excreted by plants?
6. Name the liquid part of the blood.
7. Where is the dirty blood of our body filtered?
8. In plants which part performs transpiration
9. What is dialysis ?
10. What is the function of Arteries ?

SHORT ANSWER TYPE

1. What will happen if there are no platelets in the blood?
2. Why is blood needed by all parts of the body?
3. How is water transported in plants?
4. List the human excretory organs.
5. State two vital functions of kidney

LONG ANSWER TYPE

1. State four functions of blood.
2. What are capillaries? Why do they have thin walls?
3. What are advantages and disadvantages of transpiration in plants?
4. Describe the transportation process of water, minerals and food in plants with the help of a diagram
5. Explain the mechanism of excretion in humans.

TRUE / FALSE TYPE

1. Human heart contains three chambers.
2. Sinoatrial node is present in left auricle.
3. Nephron is the Structural and functional unit of kidney.
4. Xylem transports food.
5. Is urea a nitrogenous waste.

FILL IN THE BLANKS

1. Arteries carry oxygenated blood & vein carry _____ blood.
2. Sweat contain waste, salt & _____ .
3. Kidney is made up of tiny structure called _____.
4. The liquid part of the blood is called _____.
5 The liquid which leaves the kidney is called _____.

Answer Key

EXERCISE–I														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	B	B	C	C	B	D	A	D	D	B	B	C	A	A
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
B	C	B	D	B	A	A	A	C	C	A	C	B	A	C
31	32	33	34	35	36									
A	A	B	D	A	C									

EXERCISE – II

TRUE/FALSE

1. F 2. F 3. T 4. F 5. T

FILL IN THE BLANKS

1. deoxygenated 2. lactic acid 3. nephron 4. plasma
5. urine

SELF PROGRESS ASSESSMENT FRAMEWORK

(CHAPTER : TRANSPORTATION)

CONTENT	STATUS	DATE OF COMPLETION	SELF SIGNATURE
Theory			
In-Text Examples			
Solved Examples			
NCERT Exercises			
Exercise I			
Exercise II			
Short Note-1			
Revision - 1			
Revision - 2			
Revision - 3			
Remark			

NOTES :

1. In the status, put "completed" only when you have thoroughly worked through this particular section.
2. Always remember to put down the date of completion correctly. It will help you in future at the time of revision.

Space for Notes :

RESPIRATION IN ORGANISMS

3

Concepts

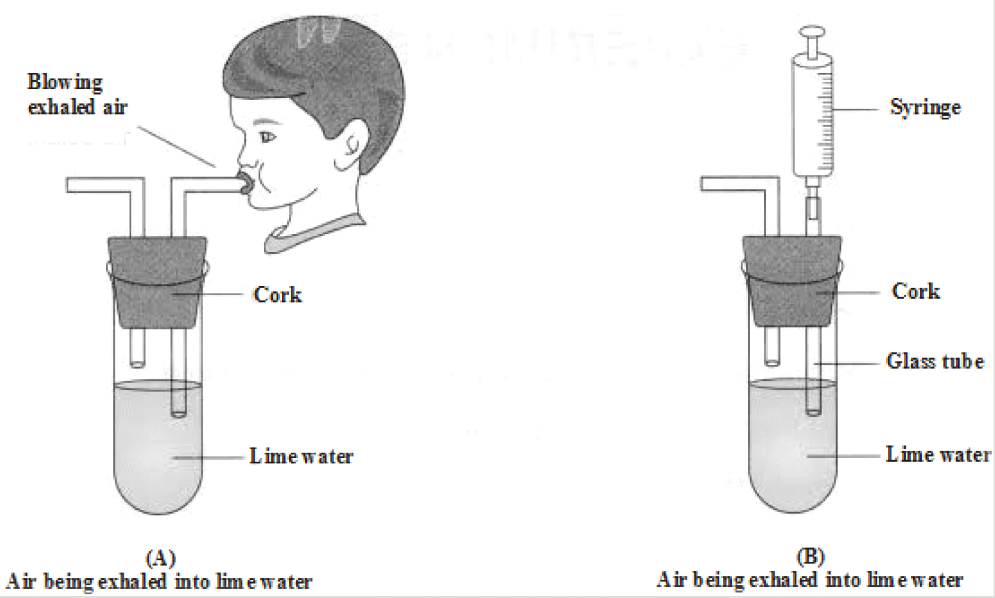
INTRODUCTION

- Respiration is a multistep, enzyme mediated, biochemical process of oxidative breakdown of organic compounds inside living cells releasing small packets of energy at various steps. It is therefore, a catabolic and exothermic process.

1. RESPIRATION

- The process of taking oxygen into cells utilizing it for releasing of energy and removing the waste products like carbon dioxide and water is known as respiration.

LAB TIME
Let's Do & Learn



(A) Air being exhaled into lime water

(B) Air being exhaled into lime water

Materials required	–	Test tube, lime water
Procedure	–	Make a hole in its lid.
		Pour some freshly prepared lime water in the test tube.
		Insert a plastic straw.
		Blow air in it.
Observation	–	Lime water turns milky.
Conclusion	–	Exhale air consists of CO_2 which turns lime water milky.

(A) Types of Respiration :

(i) Aerobic : When oxidation of food takes place in presence of molecular oxygen

$$\text{Food} \xrightarrow{\text{Glycolysis}} \text{Pyruvic acid} \xrightarrow[\text{Kreb cycle in mitochondria}]{\text{In presence of } O_2} 6CO_2 + 6H_2O + 38ATP$$

It is called aerobic respiration.

(ii) Anaerobic respiration : When oxidation of food material does not require molecular oxygen or it occurs in absence of molecular oxygen, It is called anaerobic respiration.

Glucose ⟶ Lactic Acid + Energy

Fermentation: It is the process of oxidation of organic molecules in the absence of oxygen and produce alcoholic beverages.

Glucose ⟶ Ethanol + Carbon Dioxide + Energy

1.1 RESPIRATION IN PLANTS

(a) EXCHANGE OF GASES IN PLANTS :

- Like other living organisms, plants also exchange gases with their environment. However, plants do not possess any transport system for the gases.
- Different parts of plants exchange gases independently.
- The gases move entirely by diffusion. Intercellular spaces are abundant and occur throughout the plant body. They help in passage of air to even deep seated cells.
- In plants exchange of gases takes place from leaves, stems and roots individually.
- Exchange of gases in plants occurs by simple diffusion.
- Being fixed in nature, the energy requirement and hence the rate of respiration of plants is slow as compared to animals.
- Different parts of the plants respire at different rates.
- Respiration is rapid in meristematic regions (stem tips, root tips, cambia), floral buds, growing fruits and germinating seeds. It is slower in mature regions.

(i) RESPIRATION IN ROOTS :

- In young roots, the epidermal cells are extended to form root hair.
- These root hair remain direct in contact with the air present in between the soil particles.
- The oxygen from this air enters into the root hair by simple diffusion and reaches to other cells of root for respiration.

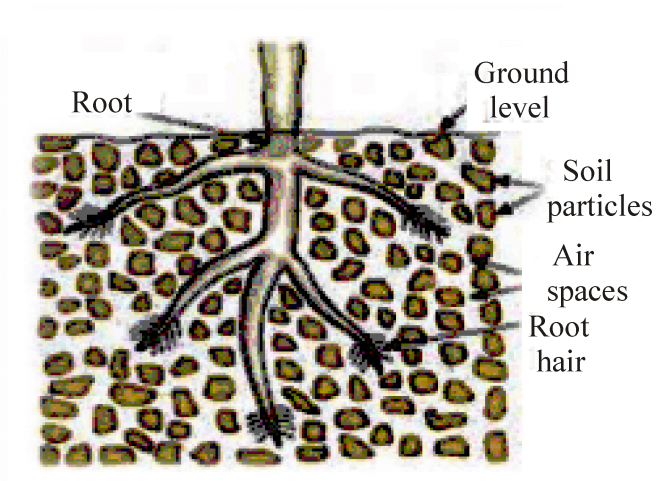


Figure : Respiration in Root

(ii) RESPIRATION IN LEAVES :

- Surface of leaves possess numerous tiny pores called as stomata in their epidermal cells, exchange of gases takes place through stomata and when CO_2 concentration in cell increases stomata opens and CO_2 is released out. Leaves and young stems are ideally suited to quick exchange of gases. The organs have a covering of nearly impermeable epidermis for reducing loss of water.
- The epidermis bears a number of aerating pores called stomata. Each aerating or stomatal pore is bordered by a pair of guard cells. In most of the plants, the guard cells are kidney or bean shaped with inner walls being thicker and less elastic than the outer walls. Guard cells contain chloroplasts which are absent in other epidermal cells. Opening and closing of stomata are regulated by guard cells.

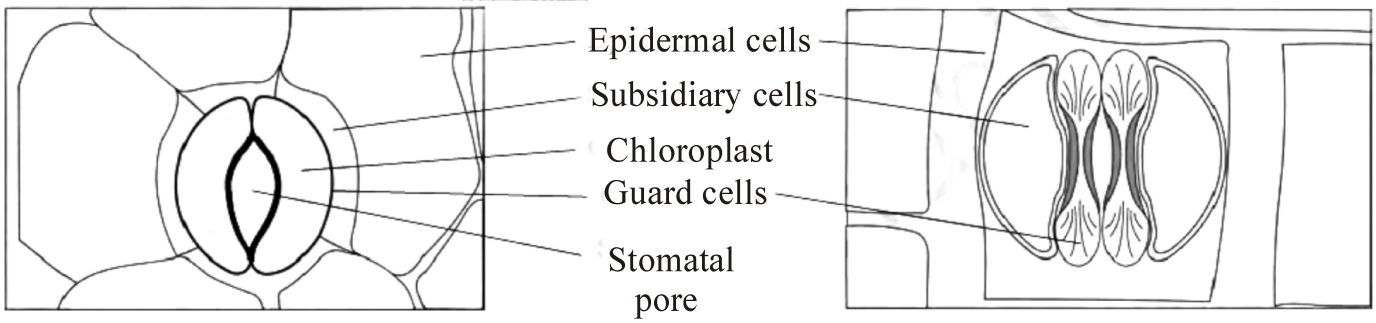


Figure : Respiration in Leaves (Stomata)

1.2 RESPIRATION IN ANIMALS

BUILD THE CONCEPT

S. No.	TYPES OF RESPIRATION	ORGANISM	EXAMPLE
1.	Cell surface respiration	General body surface	Amoeba, Paramecium
2.	Tracheal respiration	Trachea & tracheoles	Insects
3.	Branchial respiration	Gills	Fishes
4.	Cutaneous respiration	Skin	Frog
5.	Pulmonary respiration	Lungs	Amphibians, reptiles, birds
6.	Buccal respiration	Buccal cavity	Frog

→ Some important characteristics of respiratory organs of animals are:

- They have large surface area to get enough oxygen.
- They have thin walls for easy diffusion and exchange of gases.
- They have rich blood supply for transport of respiratory gases.

(a) Respiration in Earthworm :

- In organisms like earthworm and leech exchange of gases occurs through their skin as their skin is very thin and moist.

(b) Respiration in Fish :

- In fish exchange of gases occurs through gills so the respiration is said to be branchial. Gills are present on both the sides of its head, they are covered by gill covers.

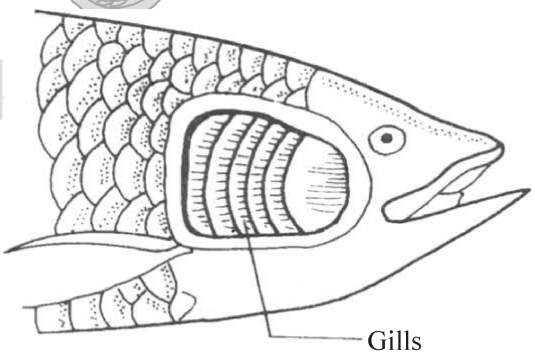


Figure : Branchial respiration

(c) Respiration in Insects :

- In insects there occurs a system of tiny holes and air tubes all over the body, these tiny holes or openings are called as spiracles. This whole system facilitates the exchange of gases and it is called as tracheal system.

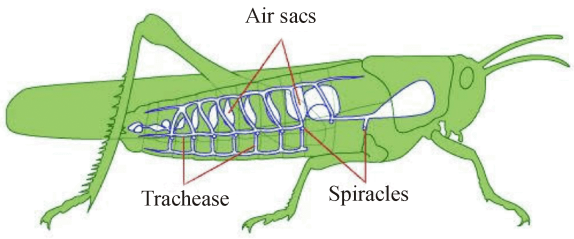


Figure : Grass spiracles

- During breathing oxygen of air enters the spiracle and reaches to each and every part of insects body through trachea and tracheoles and carbon dioxide produced during respiration is carried back by trachea and tracheoles to the spiracles and is expelled out of the body of insect.
- The same mechanism is followed in other insects like houseflies, mosquitoes, bees etc.

1.3 RESPIRATION IN HUMANS

(a) Human respiratory tract : It is composed.

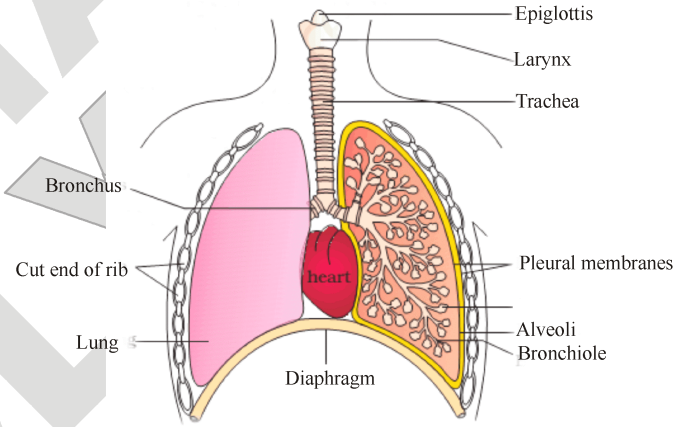


Figure : Human Respiratory tract

(i) External nostrils : First part of respiratory system. It opens into nasal cavity and is meant for inhalation of air from outside.

(ii) Nasal cavity : This cavity is separated from oral cavity by means of a hard and bony palate, it is lined by **ciliated columnar epithelial cells** that are rich in mucus, it brings about warming, moistening and sterilization of air. It contains hair and mucus which entrap the dust particles.

(iii) Pharynx : It is a common part between both alimentary canal and respiratory system.

(iv) Larynx : It is an enlarged part of trachea which is also called as 'Voice box'. It produces voice by passage of air between vocal cords, it contains four different types of cartilages among them.

(v) Trachea: It is also called wind pipe. It is 10-12 cm long tube. It's walls are supported by 16 - 20 'c' shaped cartilagenous rings which prevent them to collapse when air is absent in them.

(vi) Bronchi : Trachea is branched into two bronchi left and right each of which enters into the lungs.

(vii) Lungs : These are two light weight spongy pouches covered by a membrane called Pleura. Bronchi are further branched into several bronchioles, at the end of bronchioles alveoli are present which are rich in blood capillaries and thin walled.

(viii) Diaphragm: It is a sheet of muscles that lies below the lungs and separates thoracic cavity from abdominal cavity.

LAB TIME
Let's Do & Learn

(b) Experiment showing breathing process :

- Take a wide plastic bottle and remove the bottom. Get a Y-shaped glass or plastic tube. Make a hole in the lid so that the tube may pass through it. To the forked end of the tube fix two deflated balloons. Introduce the tube into the bottle as shown in figure. Now cap the bottle and seal it to make it airtight. To the open base of the bottle tie a thin rubber or plastic sheet using a large rubber band. To understand the expansion of the lungs, pull the rubber sheet from the base downwards we see air fill up in the balloons. Next, push the rubber/plastic sheath up and air get discharge from balloons.

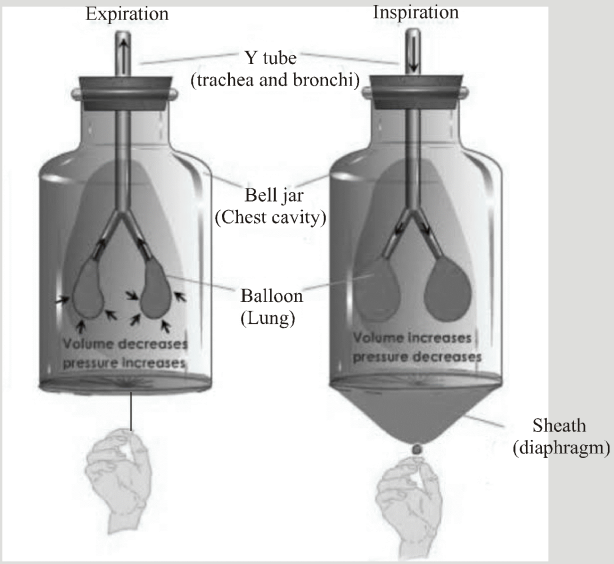


Figure : Model to show mechanism of breathing

1.4 MECHANISM OF BREATHING

(a) Inhalation : When thoracic volume increases, air rushes into the lungs through trachea and nostrils.

(b) Exhalation : When air volume gets reduced and CO_2 is pushed out from lungs into the air through trachea and nostrils.

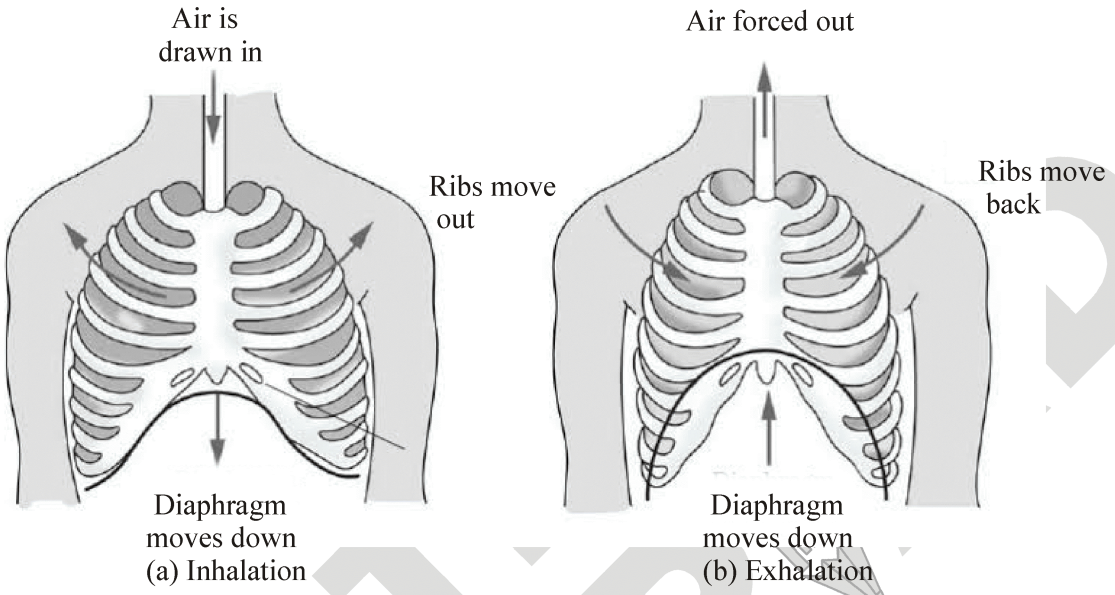


Figure : Mechanism of respiration

Focus Point

- Diaphragm becomes flat during inspiration and becomes dome shape during expiration.
- Vital Capacity is more in athletes, mountain dewellers, non smokers.
- In humans, the breathing rate is 15 to 18 times in a minute.
- Blood is the medium for the transport of oxygen from the respiratory organ to the different tissues and carbon dioxide from tissues to the respiratory organs.
- A normal person has about 15 grams of haemoglobin per 100 ml of blood.
- Carbon-dioxide is transported from the tissues to the lungs in the form of bicarbonates dissolved in blood plasma.
- Carbon-monoxide binds with haemoglobin about 230 times more readily than oxygen.
- When a person inhales carbon-monoxide, it binds to haemoglobin forming carboxyhaemoglobin. So,the amount of haemoglobin available for oxygen transport is reduced. The resulting deficiency of oxygen causes headache, dizziness, nausea and even death.

Focus Point

DIFFERENCES BETWEEN RESPIRATION & COMBUSTION

S. N.	RESPIRATION	COMBUSTION
1.	It is a biological process.	It is a chemical process.
2.	It takes place at normal temperature.	It takes place at high temperature
3.	Respiration is a slow process completed in severalsteps. Thus the energy is also liberated in several steps and remain stored in the form of ATP.	Combustion is fast process in which the energy is liberated only in one step resulting in increase in temperature and production of fire.

SOLVED EXAMPLES

SE. 1

Use the following information to answer the accompanying questions.

In an experiment, Mohit took a flask filled three-fourths with water. Then he added about 2-3 teaspoonfuls of sugar and little amount of yeast powder into it. The flask was then shaken well, so as to dissolve the yeast powder completely into the solution. He covered the flask, and kept it aside for about 4-5 hours in a warm place. After five hours, he smelt the solution and felt the smell of alcohol.

(i) Why did Mohit feel the smell of alcohol from the flask? Explain.

(ii) Name the process involved in converting sugar into alcohol by yeast.

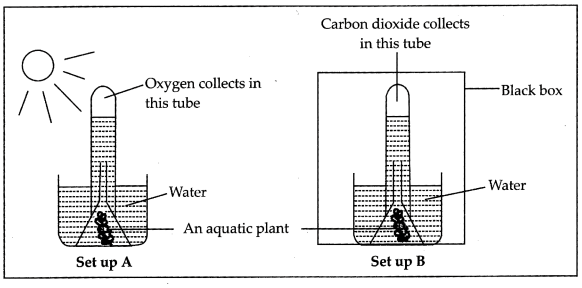
Ans. (i) Since yeast was added to the solution and yeast shows anaerobic respiration, it converted sugar into ethyl alcohol (ethanol) and carbon dioxide. Due to the production of ethyl alcohol, Mohit felt the smell of alcohol.

$$\text{Glucose} \xrightarrow[\text{oxygen}]{\text{Absence}} \text{Ethanol} + CO_2 + \text{Energy}$$

(ii) Fermentation is the process involved in converting sugar into alcohol and carbon dioxide with the help of yeast.

SE. 2

Study the given experimental set ups.



Why are different gases produced in the given set ups A and B?

Ans. In set up A, oxygen gas collects in the tube. This is because in the presence of sunlight, photosynthesis occurs, during which the plant uses carbon dioxide and water to produce oxygen. In set up B, the apparatus is covered with a black box, therefore photosynthesis cannot occur in the absence of sunlight. Here, the plant is undergoing respiration during which it uses oxygen and produces carbon dioxide and water.

Although the process of respiration is also taking place in set up A, but the rate of photosynthesis is much more than the rate of respiration, so that net result is release of oxygen.

SE. 3

What happens when you blow gently into the glass of lime water with the help of straw?

Ans. When we blow gently into the glass of lime water with the help of straw, the lime water turns milky. This is because while blowing, we exhale carbon dioxide gas which turns lime water milky.

SE. 4

How can you differentiate between external respiration and internal respiration?

Ans. Differences between external respiration and internal respiration are:

S.No.	External respiration	Internal respiration
1.	It is physical process, exchange of gases which involves inhalation and exhalation.	It is the exchange of gases between the blood and the body cells. It is a chemical process that involves oxidation of food.
2.	It takes place outsite the body cells.	It takes place inside the body cells.
3.	There is no release of energy.	There is release of energy.

SE. 5

Under what conditions does anaerobic respiration occur in human beings?

Ans. Anaerobic respiration occurs in the skeletal muscles of human beings during strenuous activity such as heavy exercise, fast running etc. At this time, more energy is required by the body Therefore, demand for oxygen increases, but oxygen supply to muscles remains unchanged. Under this temporary shortage of oxygen, skeletal muscles respire anaerobically and glucose is part in all broken down into lactic acid releasing small amount of energy.

$$\text{Glucose} \xrightarrow[\text{absence of oxygen}]{\text{In the}} \text{Lactic acid} + \text{energy}$$

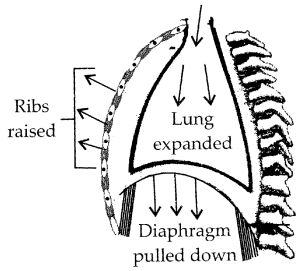
SE. 6

What is the use of oxygen supplied to the cells of living organisms?

Ans. Oxygen supplied to the cells of living organisms during aerobic respiration helps in the oxidatior (breakdown) of food (glucose) to release carbon dioxide, water and energy. This energy is used by the cells to carry out various life processes such as digestion, transport, excretion, reproduction etc.

SE. 7

Study the given figure and answer the accompanying questions.



(i) Which breathing process has been shown in the given figure — inhalation or exhalation

(ii) What changes take place during this process?

Ans. (i) Inhalation has been shown in the given figure.

(ii) During inhalation, the ribs move upward and outward, and the diaphragm moves down. This increases the volume of thoracic cavity. The lungs, being elastic, also increase in size, and air pressure in the lungs decreases. Air from atmosphere having higher pressure rushes into the lungs through the respiratory passage. Hence, the lungs get filled with fresh air.

SE. 8

Breathing and respiration are not the same. Justify this statement.

Ans. Respiration is a chemical process which involves breaking down of food to release energy.

Breathing is a mechanical process in which air rich in oxygen is taken into the body (inhalation) and air rich in carbon dioxide is given out (exhalation).

Breathing is a part of respiration.

SE. 9

How does exchange of gases take place in fish?

Ans. Exchange of gases in fish takes place by gills. As water enters through the mouth of the fish, it flows over the gills, which are richly supplied with blood capillaries. Oxygen dissolved in water diffuses into the blood capillaries, while carbon dioxide present in capillary blood diffuses into water. The oxygenated blood from capillaries is taken to heart and pumped to different parts of the body, while the carbon dioxide rich blood from body tissues is taken to gills for the exchange of gases.

SE. 10

It is usually advised not to sleep under the tree at night. Why?

Ans. During respiration, plants take in oxygen and give out carbon dioxide. Although respiration takes place all the time, the rate of photosynthesis during the day is much higher than the rate of respiration. Thus, the oxygen released by plants during photosynthesis is much more than the oxygen consumed during respiration. During the night, however, photosynthesis does not take place, due to the absence of sunlight. Only respiration takes place during the night. Plants therefore take in oxygen and release only carbon dioxide at night. That is the reason, it is advised not to sleep under the tree at night.

SE. 11

Write down the reactions for aerobic respiration and anaerobic respiration.

Ans. **Chemical reaction for aerobic respiration is:**

$$\underset{\text{(Glucose)}}{C_6H_{12}O_6} + \underset{\text{(Oxygen)}}{6O_2} \longrightarrow \underset{\text{(Carbondioxide + Water)}}{6CO_2 + 6H_2O} + \text{Energy}$$

Chemical reaction for anaerobic respiration (in yeast) is :

$$C_6H_{12}O_6 \xrightarrow[\text{absence of oxygen}]{\text{In the}} \underset{\text{(Ethylalcohol)}}{2C_2H_5OH} + \underset{\text{(Carbondioxide)}}{2CO_2} + \text{Energy}$$

SE. 12

Trace the path of oxygen in humans during inhalation by completing the following blanks :

Nostrils → _____ → _____ → _____ → _____ → _____ → Alveoli

Ans. Nostrils → Nasal cavity → Pharynx → Trachea → Bronchi → Bronchioles → Alveoli

SE. 13

Answer the following:

(i) When does a person need artificial respiration?

(ii) From where can the person get supply of oxygen for artificial respiration?

(iii) Does the person need to be kept on artificial respiration temporarily or permanently?

Ans. (i) During emergency conditions (e.g.fatal accidents, lungs failure etc.), when lungs do not function normally, artificial respiration is required.

(ii) The person gets oxygen through an instrument called ventilator, which acts as an artificial lung.

(iii) The person is kept on artificial respiration temporarily. When a person regains his health and starts breathing naturally, artificial respiration is no longer required.

SE. 14

Name the animal exhibiting dual breathing.

Ans. Frogs exhibit dual breathing. Inside water, they breathe through their skin. When on land, they breathe through their lungs or through buccopharyngeal cavity.

SE. 15

How do plants respire?

Ans. Plants respire through the following ways:

1.Through stomata present on the surface of leaves.

2.Through lenticels present on the bark of stem.

3.Through root cells which take up air via spaces present between the soil particles.

SE. 16

Describe the functioning of ribs and diaphragm during breathing?

Ans. Movements of the diaphragm and ribs help in breathing activity.

During inhalation, ribs move upwards and outwards, and diaphragm moves down. This movement increases space in our chest cavity and decreases air pressure in the lungs. Due to this, air rushes into the lungs. The lungs get filled with fresh air.

During exhalation, ribs move downwards and inwards, while diaphragm moves up to its former position. This reduces the size of the chest cavity and increases air pressure in the lungs. Due to this, air is pushed out of the lungs.

SE. 17

Why do frogs have thin and moist skin?

Ans. Thin and moist skin helps frog in gaseous exchange. Because of thin skin, gases can be exchanged easily. Moist surface also helps gases to dissolve and diffuse into and out of skin cells.

Space for Notes :

NS. 1

Why does an athlete breathe faster and deeper than usual after finishing the race?

Ans. Our body needs energy for all activities, which is provided by oxidation of food during respiration. During intense physical activities like running, there is larger demand of energy to perform these activities. Hence, more oxygen is required to meet this extra demand of energy. Therefore, an athlete breathes faster and deeper than usual after finishing the race so as to provide extra oxygen and hence extra energy to the body.

NS. 2

List the similarities and differences between aerobic and anaerobic respiration.

Ans. Similarities : In both the types of respiration, food (glucose) is broken down and energy is released. Differences between aerobic and anaerobic respiration are:

S.No.	Aerobic Respiration	Anaerobic Respiration
1.	Occur in the pressure of oxygen.	Occur in the absence of oxygen.
2.	Glucose is completely oxidised.	Glucose is broken down incompletely.
3.	End products are carbon dioxide and water.	End products are either ethyl alcohol and carbon dioxide or lactic acid.
4.	More energy is produced.	Very little energy is produced.
5.	Occurs is most of the plants and animals.	Occurs in fungi & germinating seed

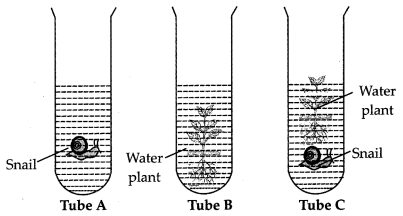
NS. 3

Why do we often sneeze when we inhale a lot of dust-laden air?

Ans. When we inhale dust-laden air, dust particles are captured by the hair of the nostrils. Sometimes, they get pass the nostril hair in the nasal cavity, and irritate the lining of the cavity. As a result we sneeze. Sneezing expels these foreign particles from the inhaled air so that dust free, clean air enters our body.

NS. 4

Take three test-tubes. Fill 3/4-th of each with water. Label them A, B and C. Keep a snail in test-tube A, a water plant in test-tube B and in C, keep snail and plant both. Which test-tube would have the highest concentration of CO_2?



Ans. Test tube A will have highest concentration of carbon dioxide. The experiment shows the relationship between plants and animals with respect to gaseous exchange. During breathing, the snail in test tube A, inhales dissolved oxygen from water and releases carbon dioxide. The water plant in test tube B performs another important function of photosynthesis along with respiration. During photosynthesis, water plant absorbs carbon dioxide, prepares food and releases oxygen. In test tube C, carbon dioxide released by snail during respiration is absorbed by plant during photosynthesis. Therefore, tubes B and C have less amount of carbon dioxide concentration as compared to test tube A.

NS. 5

Tick the correct answer :

(a) In cockroaches, air enters the body through

(i) lungs (ii) gills (iii) spiracles

(iv) skin

Ans. (iii) spiracles

(b) During heavy exercise, we get cramps in the legs due to the accumulation of

(i) carbon dioxide (ii) lactic acid

(iii) alcohol (iv) water

Ans. (ii) lactic acid

(c) Normal range of breathing rate per minute in an average adult person at rest is

(i) 9-12 (ii) 15-18 (iii) 21-24

(iv) 30-33

Ans. (ii) 15-18

(d) During exhalation, the ribs

(i) move outwards (ii) move downwards

(iii) move upwards (iv) do not move at all

Ans. (ii) move downwards

NS. 6

Match the items in Column I with those in Column II:

	Column I		**Column II**
(a)	Yeast	(i)	Earthworm
(b)	Diaphragm	(ii)	Gills
(c)	Skin	(iii)	Alcohol
(d)	Leaves	(iv)	Chest cavity
(e)	Fish	(v)	Stomata
(f)	Frog	(vi)	Lungs and skin
		(vii)	Tracheae

Ans. (a)- (iii), (b)-(iv), (c)-(i), (d)-(v), (e)-(ii), f-(vi)

NS. 7

Mark T if the statement is true and 'F' if it is false:

(i) During heavy exercise the breathing rate of a person slows down.

(ii) Plants carry out photosynthesis only during the day and respiration only at night.

(iii) Frogs breathe through their skins as well as their lungs.

(iv) The fishes have lungs for respiration.

(v) The size of the chest cavity increases during inhalation.

Ans. (i) F - During heavy exercise, more oxygen is required to meet extra demand of energy. Therefore, breathing rate increases.

(ii) F - Photosynthesis occurs in the presence of sunlight and thus takes place only during the day. Respiration is a continuous process and occurs all the time (day and night).

(iii) T

(iv) F - Fishes breathe through gills.

(v) T

NS. 8

Given below is a square of letters in which are hidden different words related to respiration in organisms. These words may be present in any direction— upwards, downwards, or along the diagonals. Find the words for your respiratory system. Clues about those words are given below the square.

S	V	M	P	L	U	N	G	S
C	Z	G	Q	W	X	N	T	L
R	M	A	T	I	D	O	T	C
I	Y	R	X	Y	M	S	R	A
B	R	H	I	A	N	T	A	Y
S	T	P	T	B	Z	R	C	E
M	I	A	M	T	S	I	H	A
S	P	I	R	A	C	L	E	S
N	E	D	K	J	N	S	A	T

Clues:

(i) The air tubes of insects.

(ii) Skeletal structures surrounding chest cavity.

(iii) Muscular floor of chest cavity.

(iv) Tiny pores on the surface of leaf.

(v) Small openings on the sides of the body of an insect.

(vi) The respiratory organs of human beings.

(vii) The openings through which we inhale.

(viii) An anaerobic organism.

(ix) An organism with tracheal system.

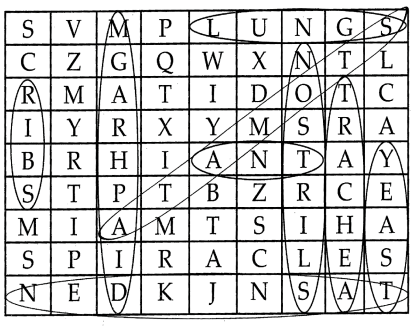
Ans. (i) Trachea (ii) Diaphragm

(iii) Stomata (iv) Stomata

(v) Spiracles (vi) Lungs

(vii) Nostrils (Viii) Yeast

(ix) Nostrils



NS. 9

The mountaineers carry oxygen with them because:

(a) At an altitude of more than 5 km there is no air.

(b) The amount of air available to a person is less than that available on the ground.

(c) The temperature of air is higher than that on the ground.

(d) The pressure of air is higher than that on the ground.

Ans. (b) The amount of air available to a person is less than that available on the ground.

EXERCISE – I

ONLY ONE CORRECT TYPE

1. The air sacs at the end of the smallest air tubes inside the lungs are called :-
(A) Alveoli (B) Bronchi
(C) Bronchioles (D) Larynx

2. Glucose is oxidised to ethyl alcohol in -
(A) Aerobic respiration
(B) Anaerobic respiration
(C) Fermentation
(D) None of these

3. The form of energy released in respiration is -
(A) Chemical energy (B) Electrical energy
(C) Mechanical energy (D) Radiant energy

4. Which one is anabolic process?
(A) Respiration (B) Digestion
(C) Photosynthesis (D) Ascent of sap

5. A catabolic process is -
(A) Absorption of minerals
(B) Ascent of sap
(C) Respiration
(D) Assimilation

6. What is wrong about respiration –
(A) It does not occur in cell
(B) Oxidation occurs without the use of enzymes
(C) Energy is released in one step quickly
(D) All the above

7. In aerobic respiration :
(A) O_2 is taken in (B) O_2 is given out
(C) CO_2 is taken in (D) CO_2 is given out

8. Stomata open during day time because the guard cells :
(A) Are thin walled (B) Are bean shaped
(C) Have to help in gaseous exchange
(D) Photosynthesize and produce osmotically active sugars or organic acids

9. Identify X in the given equation of aerobic respiration :
Glucose + X $\rightarrow$ CO_2 + H_2O + energy
(A) Water (B) Oxygen
(C) Ethyl alcohol (D) Nitrogen

10. The following word equation shows a chemical process that take place in an organism Y.
Glucose $\rightarrow$ Ethyl alcohol + carbon dioxide
What is organism Y?
(A) Algae (B) Protozoan
(C) Yeast (D) Hydra

11. Vocal cords occur in –
(A) Pharynx (B) Glottis
(C) Bronchii (D) Larynx

12. In man, which of the following structures is analogous to the spiracles of cockroach?
(A) Alveoli (B) Lungs
(C) Bronchioles (D) Nostrils

13. Which of the following prevents collapsing of trachea?
(A) Diaphragm (B) Ribs
(C) Cartilaginous discs (D) Muscles

14. What will happen when diaphragm relaxes and curves upwards?
(A) Air is forced out of the lungs
(B) The rib cage goes up and outward
(C) The volume of the thoracic cavity increases
(D) Air pressure inside the thoracic cavity decreases

15. Lungs have a large number of alveoli for –
(A) Having spongy texture and proper shape
(B) More surface area for diffusion of gases
(C) More space for increasing volume of inspired air
(D) More nerve supply

16. When we inhale, we breathe in air into the lungs. What do we breathe out when we exhale?
(A) Only oxygen gas
(B) Only hydrogen gas
(C) Air that has more oxygen than inhaled air
(D) Air that has more carbon dioxide than inhaled air

17. Which one of the following structures closes the respiratory passage during ingestion of food?
(A) Larynx (B) Epiglottis
(C) Hard palate (D) Soft palate

18. The covering of lungs is called –
(A) Pericardium (B) Pleural membrane
(C) Perichondrium (D) Peritoneum

19. The narrowest and most numerous tubes of lungs are termed as –
(A) Bronchus (B) Alveoli
(C) Bronchioles (D) Hilum

20. The exchange of gases in a mammal takes place in –
(A) Trachea (B) Bronchioles
(C) Bronchii (D) Alveoli

21. A person having high fever may be breathing faster than normal. The reason for this faster breathing is due to –
(A) Additional need of O_2
(B) Mental worry of the patient
(C) High temperature of body
(D) Loss of appetite

22. When diaphragm of man is completely dome shaped it shows
(A) End of expiration and beginning of inspiration
(B) Beginning of expiration and end of inspiration
(C) Increased rate of breathing
(D) Decreased rate of breathing

23. What is the function of the hair in the nose?
(A) To secrete mucus
(B) To trap dust particles
(C) To protect the mucus glands
(D) To prevent germs from entering the lungs

24. Which one of the following binds with haemoglobin irreversibly?
(A) Carbon dioxide (B) Carbon monoxide
(C) Ethane (D) Nitrogen

25. The type of respiration in mammals is called :
(A) Gill respiration
(B) Tracheal respiration
(C) Cutaneous respiration
(D) Pulmonary respiration

PARAGRAPH TYPE

PARAGRAPH # I

Palak wants to be a great cyclist. She cycles daily for about 2 hours follwed by some exercises. Today, She thought she will fcycle for longer and managed it for 4 hours 30 min. Now she is feeling cramped up and her breathing is disturbed. he mother took her to hospital where the doctor examined and told her not to push herself more than necessary. Palak understood and promised herself to move show and steadily.

26. Why did palak had cromps in legs :
(A) Due to lactic acid farmation
(B) Due to glucose formation
(C) Both (A) & (B)
(D) None of these

27. Anaerobic respiration occurs in _____.
(A) Presence of oxygen
(B) Absence of CO_2
(C) Absence of oxygen
(D) All of these

28. In which part of body anaerobic respiration starts.
(A) Bones (B) Muscles
(C) Heart (D) Kidney

PARAGRAPH # II

The fishes have special type of organs of respiration called gills. These gills absorbs oxygen dissolved in water and through blood vessles, this oxygen is passed to all the parts of the body. If we add warm water, to the aquarium the dissolved oxygen will dissociate and move into the atmosphere again, leaving the least percentage of oxygen into the water.

29. The place where fishes are kept in their away form natural habitat.
(A) Aquarium (B) Botanical park
(C) Zoo (D) Both (A) & (B)

30. In Fishes _____ are present for respiration.
(A) Lungs (B) Gills
(C) Spores (D) All of these

31. Why rate of breathing is high in aquatic animals.
(A) Due to less dissolved oxygen
(B) Due to high dissolved oxygen
(C) Both (A) & (B)
(D) None of these

MATCH THE COLUMN TYPE

32.

Column-A	Column-B
(P) Stomata	(i) Earthworm
(Q) Gills	(ii) Man
(R) Tracheal tubes	(iii) Plants
(S) Lungs	(iv) Fish
(T) Skin	(v) Cockroach
	(vi) Amoeba

(A) P → iii, Q → iv, R → v, S → ii, T → i
(B) P → i, Q → ii, R → iii, S → iv, T → v
(C) P → iii, Q → ii, R → i, S → iv, T → v
(D) P → ii, Q → iv, R → iii, S → v, T → i

33.

Column-A	Column-B
(P) Respiration	(i) $C_6H_{12}O_6$
(Q) Combustion	(ii) 15-18 times
(R) Aerobic Respiration	(iii) Chemical process
(S) Normal breathing Rate/min	(iv) Biological process
(T) Glucose	(v) Presence of oxygen

(A) P → iii, Q → iv, R → v, S → ii, T → i

(B) P → iv, Q → iii, R → v, S → ii, T → i

(C) P → iii, Q → ii, R → i, S → iv, T → v

(D) P → ii, Q → iv, R → iii, S → v, T → i

ASSERTION & REASON TYPE

Directions :

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

34. **Assertion :** The fishes have lungs for respiration.
Reason : Frogs breathe through skin as well as lungs.

35. **Assertion :** Breathing in and out is a simple physical process.
Reason : Breathing occurs only in animals and not in plants.

36. **Assertion :** Roots breathe in air from air spaces in the soil.
Reason : Plants have special organs of respiration called tracheae.

Space for Notes :

EXERCISE – II

VERY SHORT ANSWER TYPE

1. How do unicellular organisms exchange gases with the environment?
2. Name the respiratory organs present in the leaves and woody stems.
3. Why do body cells require oxygen?
4. What brings oxygen to all parts of our body?
5. Which organ do earthworms use for gaseous exchange?
6. Name the process by which energy is released from the digested food.
7. Show the process of respiration through a word equation.
8. What happens to your breathing rate when you exercise?
9. Name the respiratory organs of human's respiratory system.
10. Name one bad habit which can cause lung cancer.

SHORT ANSWER TYPE

1. List two ways in which we make use of anaerobic respiration.
2. How do insects respire?
3. Name the breathing organs of
   (i) Frog
   (ii) Cockroach
   (iii) Fish
   (iv) Amoeba
4. Under what conditions does anaerobic respiration take place in humans?
5. What is the importance of nostrils during breathing?

LONG ANSWER TYPE

1. Give a brief account of the various modes of respiration found in animals.
2. Draw a neat labelled diagram of respiratory system of human.
3. Give four differences between aerobic and anaerobic respiration.
4. What is the role of stomatal apparatus in plant respiration?
5. What is the difference between respiration and breathing?

TRUE / FALSE TYPE

1. During inhalation diaphragm moves down and ribs moves out.
2. Larynx is also called as voice box.
3. Trachea is 5cm long tube with 11-12 C shaped cartilaginous ring
4. Fishes respire through gills.
5. In cellular respiration reduction of food takes place.

FILL IN THE BLANKS

1. All living organisms use _____ to perform life functions.
2. During respiration _____ is taken in and _____ is given out.
3. The first phase of respiration is known as _____.
4. Carbon dioxide turns lime water _____.
5. Fermentation occurs in the _____ of oxygen.

Answer Key

EXERCISE–I														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	B	A	C	C	D	A	D	B	C	D	C	C	A	B
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
D	B	B	C	D	C	A	B	B	D	A	C	B	A	B
31	32	33	34	35	36									
A	A	B	D	B	C									

EXERCISE – II

TRUE/FALSE

1. T 2. T 3. F 4. T 5. F

FILL IN THE BLANKS

1. O_2 2. O_2, CO_2 3. inspiration 4. white 5. absence

SELF PROGRESS ASSESSMENT FRAMEWORK

(CHAPTER : RESPIRATION IN ORGANISMS)

CONTENT	STATUS	DATE OF COMPLETION	SELF SIGNATURE
Theory			
In-Text Examples			
Solved Examples			
NCERT Exercises			
Exercise I			
Exercise II			
Short Note-1			
Revision - 1			
Revision - 2			
Revision - 3			
Remark			

NOTES :

1. In the status, put "completed" only when you have thoroughly worked through this particular section.
2. Always remember to put down the date of completion correctly. It will help you in future at the time of revision.

Space for Notes :

NUTRITION IN ANIMALS 4

Concepts

INTRODUCTION

- In unicellular organisms a single cell is responsible for carrying out all the vital activities.
- In multicellular organisms a well develop digestive system is present.

→ Digestion in animals consist of following steps :

(i) Ingestion : The process of intake of food.

(ii) Digestion : It is the breakdown of large and complex molecules into simple, smaller and soluble forms.

(iii) Absorption : Taking up of the digested food through intestinal wall to blood.

(iv) Assimilation : In this process absorbed food is taken by body cells.

(v) Egestion : The process by which undigested matter is expelled out.

1. NUTRITION IN AMOEBA

- It is a unicellular organism living in water.
- Mode of nutrition is holozoic.
- The process of obtaining food is by phagocytosis (cell eating)

→ Steps involved in digestion of amoeba are :

(i) Ingestion : Since it is unicellular animal so a single cell is responsible for carrying out all the vital activities. Food is ingested with the help of pseudopodia. Amoeba engulfs the food particle lying near it by forming pseudopodia around it and forming a food vacuole which is considered as its temporary stomach.

(ii) Digestion: The enzymes from surrounding cytoplasm enter the food vacuole and break down the food into smaller & soluble form.

(iii) Absorption: The digested food is now absorbed by cytoplasm by simple diffusion and then food vacuole disappears.

(iv) Assimilation: The food absorbed in amoeba is used to obtain energy from respiration for its growth and developement.

(v) Egestion : Undigested food is thrown out from the body.

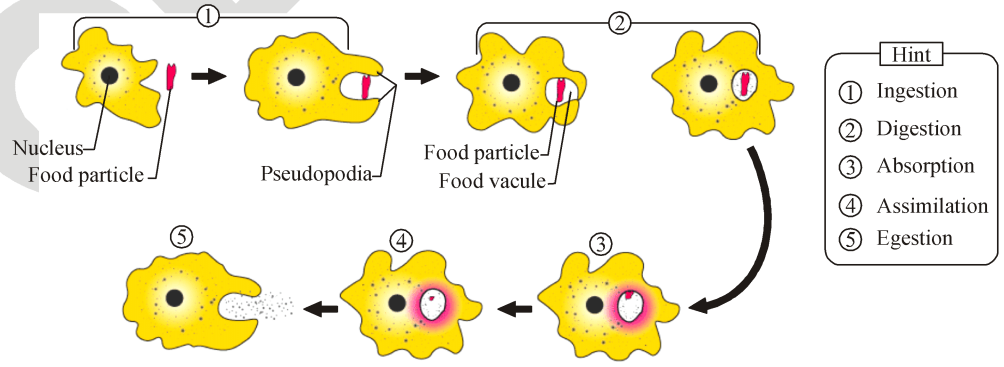


Figure : Digestion in Amoeba

Focus Point

- **Carbohydrates :** The term carbohydrate refers to any one of a huge group of compounds that contain the elements carbon (C), oxygen (O) and hydrogen (H) and have the general formula $C_x(H_2O)_y$. Examples of carbohydrates include sugars and starch. It is the main energy source of living organisms.
- **Proteins:** Protein are a category of compounds formed from the elements carbon (C), hydrogen (H), Oxygen (O) and Nitrogen, and in some cases also Sulphur (S) and Phosphorus (P).
- **Peptones:** Peptones are large protein fragments that result from the action of enzymes on proteins in the initial stages of breaking-up proteins.
- **Enzyme:** Enzymes are proteinaceous that increase the rate of biological reactions without being used-up in the reactions themselves. That is enzymes can act as catalysts.Enzymes form within living cells and may act either within the cell or outside it.
- Starfish feeds on animals covered by hard shells of calcium carbonate. After opening the shell, the starfish pops out its stomach through its mouth to eat the soft animal inside the shell. The stomach then goes back into the body and the food is slowly digested.

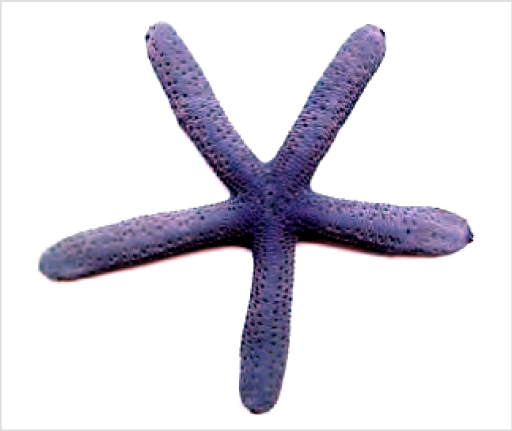


Figure : Starfish

2. NUTRITION IN HUMANS

- Humans have highly evolved and complicated digestive system consisting of an alimentary canal & different types of digestive glands.

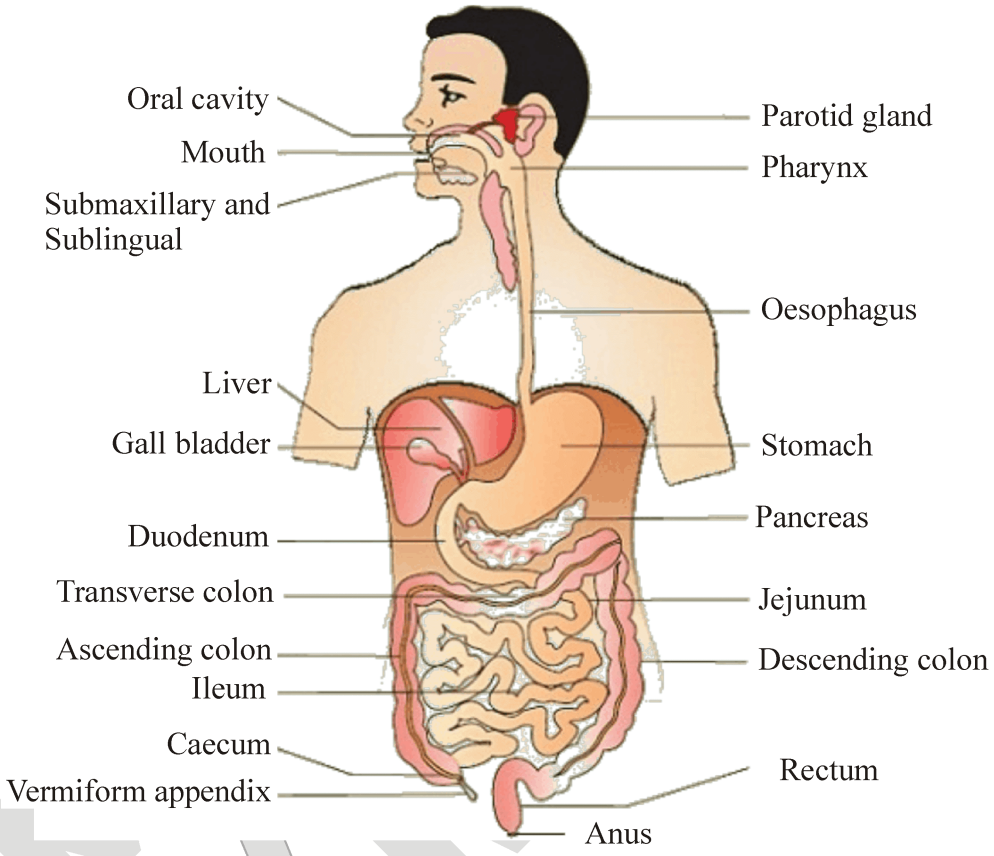


Figure : Digestive system of human

2.1 ALIMENTARY CANAL

- Long, hollow, tubular structure consisting of various organs for digestion
- Alimentary canal consists of following organs :

(A) Mouth :

- It is a small slit through which food is ingested.

(B) Buccal Cavity :

- Mouth opens into a chamber called as buccal cavity. Root of buccal cavity is called hard palate. At the floor of this cavity thick muscular structure is present called tongue. It helps in chewing, swallowing, and speaking. Human tongue having taste buds for taste of food.

→ **SALIVARY GLANDS :**

- Three pairs of salivary glands are found in mouth cavity.
- They secrete an enzyme called salivary amylase or ptyalin.
- It helps in digestion of starch.

→ **TONGUE :**

- Tongue helps in mixing of food with saliva as well as it helps in recognizing taste of food.
- It has different taste buds.

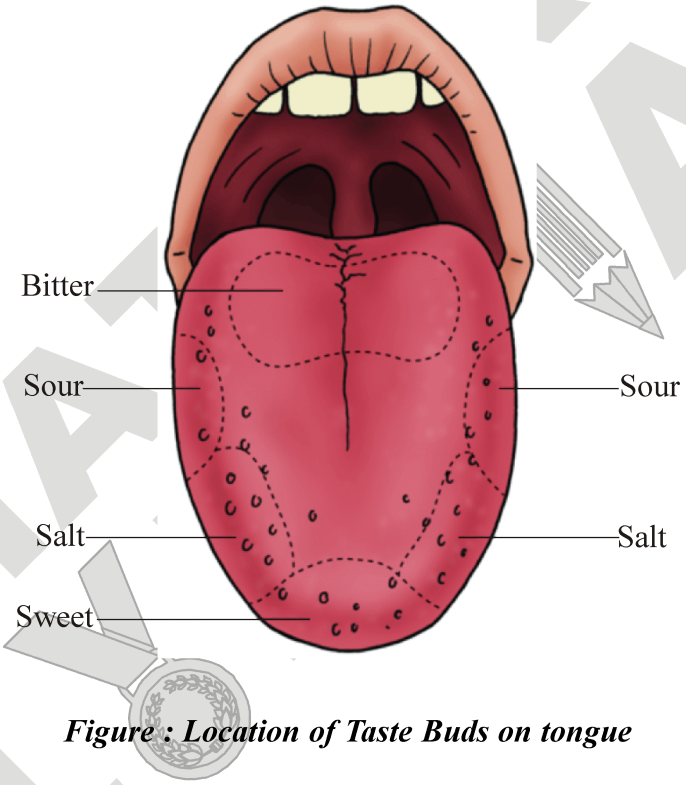


Figure : Location of Taste Buds on tongue

→ **TEETH**

- These are hard bony structure which helps in chewing. Human have four different types of teeth which are fixed in jaw.
- Jaws present in buccal cavity are provided with four different types of teeth :

(i) Incisors	:	For cutting of food
(ii) Canines	:	For tearing of food
(iii) Premolars	:	For grinding of food
(iv) Molars	:	For grinding of food

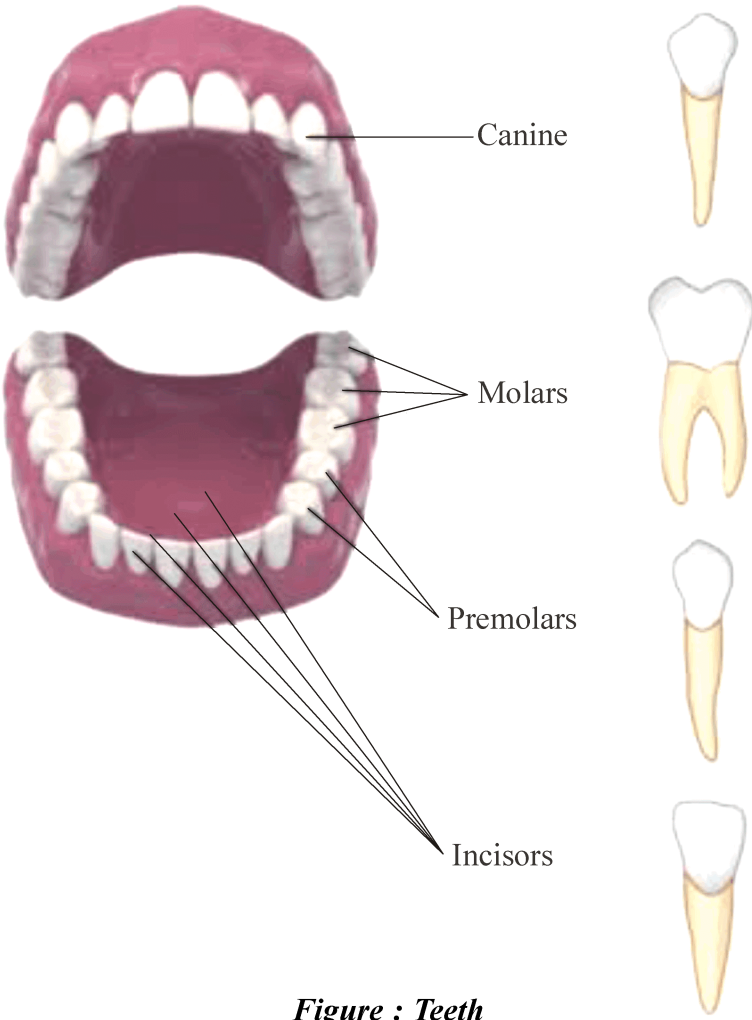


Figure : Teeth

- **DENTAL FORMULA OF HUMANS :**

(i) Milk teeth :

- These are temporary, arise at 6 – 11 month age, 20 in number.
- Premolar absent in milk teeth :

(ii) Permanent teeth :

- arise at 6 – 12 years, 32 in number.

BUILD THE CONCEPT

SWEETS AND TOOTH DECAY

Normally bacteria are present in our mouth but they are not harmful to us. However, if we do not clean our teeth and mouth after eating, many harmful bacteria also begin to live and grow in it. These bacteria break down the sugars present from the left over food and release acids.The acids gradually damage the teeth This is called tooth decay. If it is not treated in time, it causes severe tooth ache and in extreme cases results in tooth loss. Chocolates, sweets, soft drinks and other sugar products are the major culprits of tooth decay.

Therefore, one should clean the teeth with a brush or datun and dental floss (a special strong thread which is moved between two teeth to take out trapped food particles) at least twice a day and rinse the mouth after very meal. Also, one should not put dirty fingers or any unwashed object in the mouth.

Sometimes when you eat in a hurry, talk or laugh while eating, you may cough, get hiccups or a choking sensation. This happens when food particles enter the windpipe. The windpipe carries air from the nostrils to the lungs. It runs adjacent to the foodpipe. But inside the throat, air and food share a common passage. Then how is food prevented from entering the windpipe? During the act of swallowing a flap-like valve closes the passage of the windpipe and guides the food into the foodpipe. If, by chance, food particles enter the windpipe, we feel choked, get hiccups or cough.

Figure : The stage of tooth decey

(D) Pharynx

- It is the part where mouth and nose meets in buccal cavitiy.
- It is a common part of digestive system and respiratory system

(E) Oesophagus / Esophagus :

- It is also called as food pipe. It leads the food from mouth to stomach. Oesophagus has highly muscular walls, no digestion occurs here.

(F) Stomach :

- Stomach is a muscular organ located on left side of the upper abdomen. The stomach receive food from the oesophagus.
- It is a 'J' shaped bag present on left side of abdomen. It contains several glands present on the inner surface of its wall, which secrete gastric juice.

(G) Intestine : It is a 7.5 metre long. Intestine divide into two parts-

(a) Small Intestine :

- It is a coiled and narrow tube-which is 6 m long having 3 regions :

  (i) Duodenum

  (ii) Jejunum

  (iii) Ileum

- On the inner wall of small intestine numerous finger like projections are found which are called as villi, they increase the surface area for absorption.

(b) Large Intestine :

- Small intestine opens into large intestine which is wider and shorter and is above 1.5 m in length. From here the undigested food material is passed to anus through rectum. It is divided into three parts :

  (i) Caecum

  (ii) Colon

  (iii) Rectum

(H) Anus : Last part of digestive system which is helpful in egestion.

2.2 DIGESTIVE GLANDS

- They secrete enzymes / hormones which help in digestion.

(a) Gastric glands : Present in stomach. They secrete hydrochloric acid, protein digesting enzymes and mucus.

(b) Liver : It is the largest gland, secretes bile into the small intestine. Bile contains bile juice and bile pigments, which in absorption of fats in gall bladder.

(c) Pancreas : It lies just below the stomach. It secretes pancreatic juice into small intestine. Pancreatic juice contains **trypsin and pancreatic amylase** which is released into the duodenum by a common duct along with bile. Besides these two enzymes pancreas secretes two hormones also i.e glucagon, insulin so it has both exocrine as well as endocrine functions.

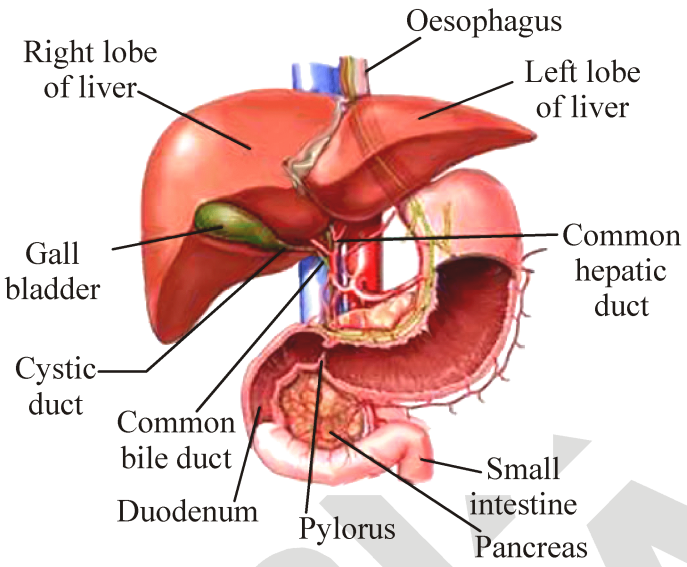


Figure : Liver and pancreas

3. PHYSIOLOGY OF DIGESTION IN HUMAN BEING

(a) INGESTION :

- Intake of food is done through mouth, food is then chewed and masticated and sent to oesophagus through pharynx by swallowing.

(b) DIGESTION :

- Saliva secreted in buccal cavity starts digestion of starch into maltose. This partially digested food is then passed to stomach by oesophagus through peristaltic movement. Food is churned in stomach for about three hours and broken down into smaller pieces. Due to presence of hydrochloric acid (HCl), medium of stomach becomes acidic. In acidic medium protein digesting enzyme pepsin break down proteins into peptones,Gastric lipase is also secreted here which partially break down lipids.
- Duodenum receives the secretion from liver and pancreas through a common duct they are bile and pancreatic juice, and alkaline in nature. So the digestion and emulsification of fats occurs at this place.
- Here in the duodenum fats are emulsified by bile, remaining proteins are digested by trypsin and starch digest by pancreatic amylase.
- This partially digested food now enters in the ileum where intestinal juice i.e. "Succus entericus" is secreted. At this place digestion is completed.

Carbohydrates ⟶ Glucose

: Proteins ⟶ Amino acids .

Fats ⟶ Fatty acids and glycerol

(c) ABSORPTION OF DIGESTED FOOD :

(i) ABSORPTION OF FOOD IN SMALL INTESTINE:

- The digested food is absorbed mainly in small intestine. For efficient absorption of nutrients, the intestine has the following features:
- Intestine is very long.
- The lining of intestine is thin to allow rapid entry of substances.
- The inner wall of intestine contains numerous finger-like projections called villi (Sing : viilus).
- The villi increase surface area of intestine to about five times for the absorption of digested food.
- Each vilius is supplied with an arteriole, a vein and blood capillaries, a lymph vessel or lacteal and lymph capillaries.

(ii) ABSORPTION IN LARGE INTESTINE:

- Large intestine is about 1.5 metres long. It absorbs water and some salts from undigested food.

(d) ASSIMILATION OR THE FATE OF ABSORBED NUTRIENTS OF FOOD :

- The absorbed nutrients are passed into the blood vessels and transported to different parts of the body. Inside the body cells, these nutrients are utilised for different activities. This is called assimilation. The future of absorbed nutrients is as follows;
- Glucose is used as a source of energy by the body, it is burned (oxidised) to release energy inside the cells. Excess of glucose is stored in the cells of liver as glycogen.
- The amino acids are used to build new living material of the cells.
- Fats are stored in the fatty tissues in various parts of the body.

(e) EGESTION OF UNDIGESTED FOOD OR EGESTION :

- The undigested food is then collected in large intestine where water is absorbed and remaining waste is eliminated out or egested through anus. The semi-solid undigested food is pushed out of the anus.This is called egestion or defecation. The undigested food residue that enters the rectum from large intestine is faeces. This faeces defecate out by anus.

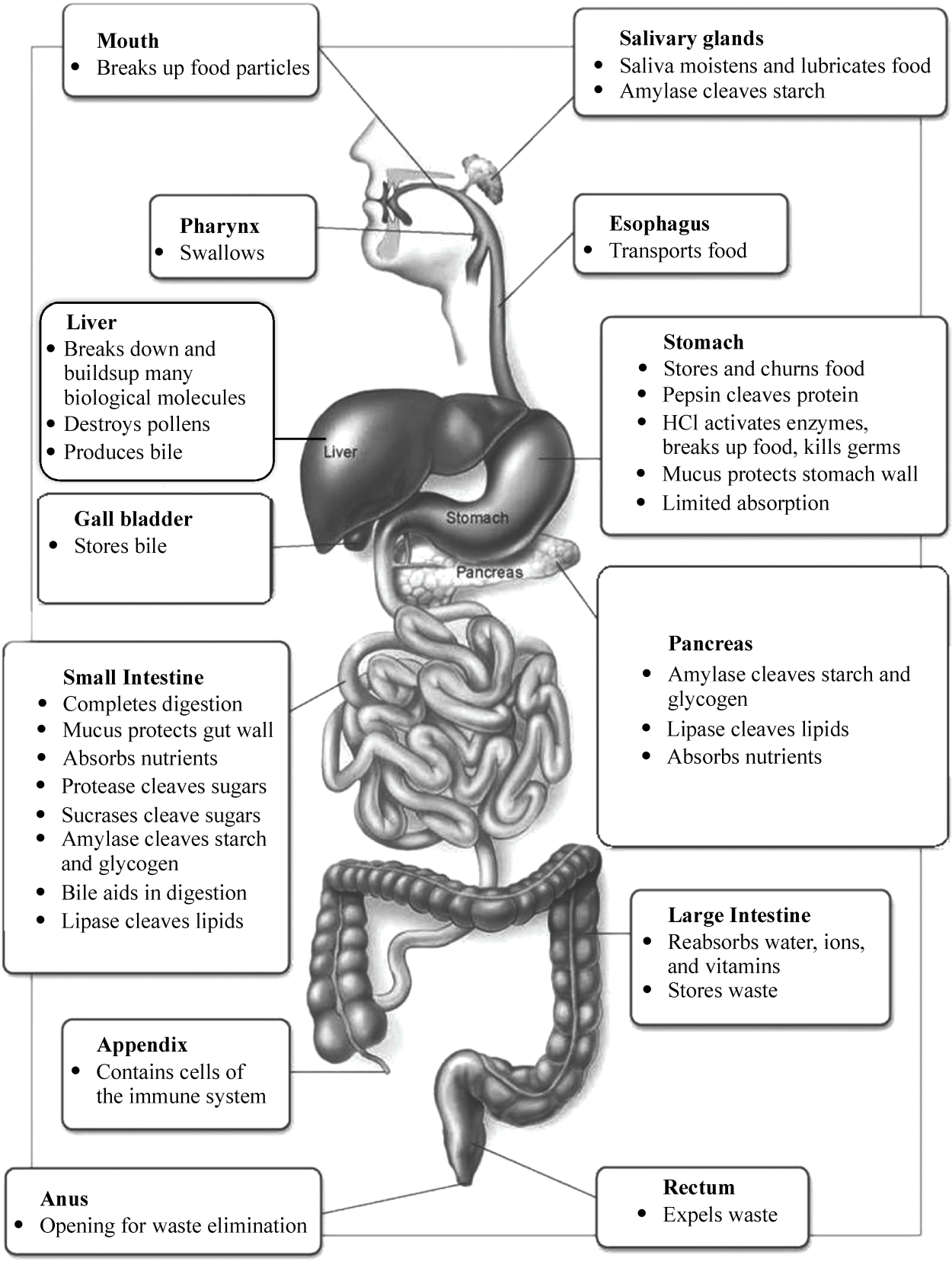


Figure : Process of Digestion

4. RUMINANTS DIGESTIVE SYSTEM

- Ruminants are mammals that are able to acquire nutrients from plant-based food by fermenting it in a specialized stomach prior to digestion, principally through microbial actions. The process typically requires the fermented ingesta (known as cud) to be regurgitated and chewed again.The process of rechewing the cud to further break down plant matter and stimulate digestion is called rumination.
- The word "ruminant" comes from the Latin ruminare, which means "to chew over again" The primary difference between a ruminant and non-ruminant is that ruminants have a four-compartment stomach. The four parts are the rumen, reticulum, omasum, and abomasum, While non-ruminants have a single chambered stomach.
- In the first two chambers,the rumen and the reticulum, the food is mixed with saliva and separates into layers of solid and liquid material. Solids clump together to form the cud or bolus,
- The cud is then regurgitated and chewed to completely mix it with saliva and to break down the particle size.
- Fibre,especially cellulose and hemicellulose, is primarily broken down in these chambers by microbes (mostly bacteria, as well as some protozoa, fungi and yeast) into in small and non-structural carbohydrate (pectin, sugars, and starch) are also fermented.

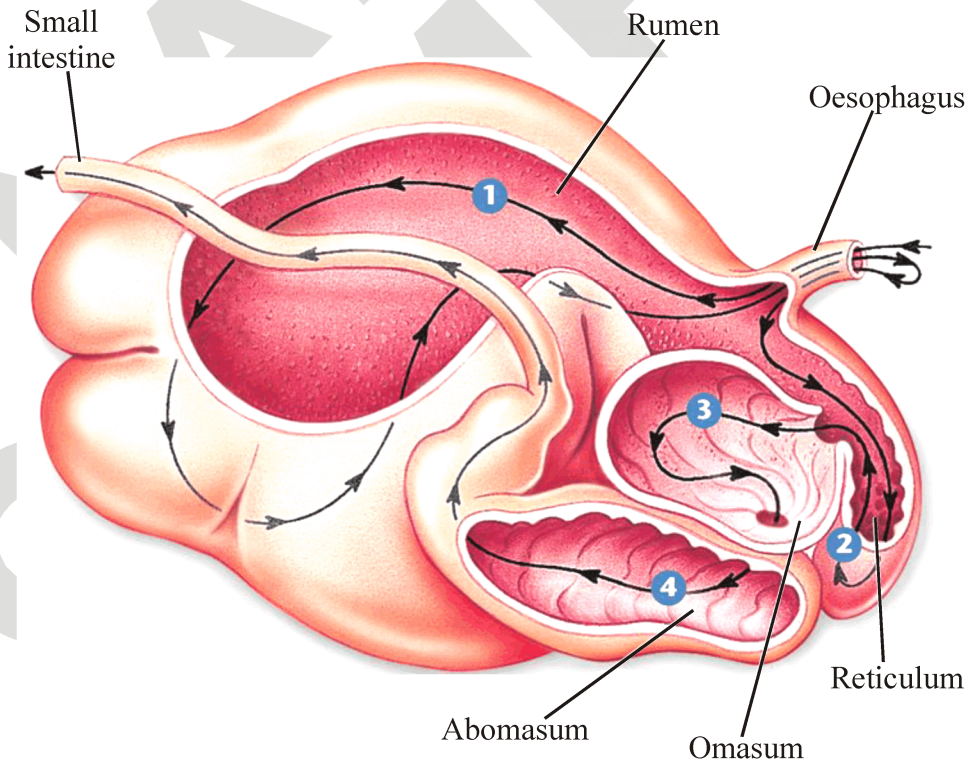


Figure : Stomach of ruminant (cow)

5. DISEASE RELATED TO DIGESTIVE SYSTEM

5.1 DIARRHOEA

- Sometime you may have experienced the need to pass watery stool frequently. This condition is known as diarrhoea. It may be caused by an infection, food poisoning or indigestion. It is very common in India, particularly among children. Under severe conditions it can be fatal. This is because of the excessive loss of water and salts from the body. Diarrhoea should not be neglected. Even before a doctor is consulted the patient should be given plenty of boiled and cooled water with a pinch of salt and sugar dissolved in it. This is called Oral Rehydration Solution (ORS).

5.2 VOMITING

- It is the ejection of stomach contents through the mouth. This reflex action is controlled by the vomit centre in the medulla. A feeling of nausea precedes vomiting.

5.3 CONSTIPATION

- In constipation, the faeces are retained within the colon as the bowel movements occur irregularly.

5.4 INDIGESTION

- In this condition, the food is not properly digested leading to a feeling of fullness. The causes of indigestion are inadequate enzyme secretion, anxiety, food poisoning, over eating, and spicy food.

Focus Point

- **Peristalsis :** Peristalsis is a wave-like movement (motion) that progresses along some of the hollow tubes of the body that have circular and longitudnal muscles, such as the intestines. Peristalsis happens involuntarily.
- **Emulsification :** The process in which bile juice mix with fat to convert into small droplets, so that its easier to digest by the action of lipase.

SOLVED EXAMPLES

SE. 1

Write short notes on the following :

(i) Mastication

(ii) Functions of tongue

(iii) Large intestine

Ans. **(i) Mastication –** The process of chewing food which involves movement of jaws and teeth is called mastication. It breaks down the food into small particles and allows the mixing of saliva with it.

(ii) Functions of tongue:

– The tongue helps us to taste the food.

– It moves food in our mouth between the teeth for chewing.

– It mixes saliva with food while chewing.

– It helps us to swallow the food.

(iii) Large intestine – Large intestine is about 1.5 m in length. It is wider and shorter than small intestine. It's functions are

– To absorb water and some salts from the undigested food coming from small intestine

– To eliminate waste matter in the form of faeces through anus.

SE. 2

Cows and buffaloes are usually seen chewing continuously even when they are not grazing. Explain.

Ans. Cows and buffaloes are ruminants. These animals, during grazing, quickly swallow a large amount of food without much chewing. This partially chewed food is then sent to rumen (a part of stomach) where partial digestion of food takes place. This partially digested food is called cud and is brought back into the mouth in small lumps and animal chews it further. Thus, whenever we see a cow or buffalo sitting and chewing, at that time they are actually chewing the cud.

SE. 3

How does the digestion of food take place in stomach?

Ans. In stomach, mechanical digestion of food occurs by alternate contraction and expansion of stomach wall. The thick muscular walls of stomach contract to churn the food and mix it with digestive juice, then chemical digestion of food starts during which digestive enzymes break down proteins into simpler forms (i.e., amino acids). Partial digestion of food takes place in stomach and this partly digested food then enters small intestine.

SE. 4

Why is the fibre-rich diet important for digestive system?

Ans. Fibre-rich diet contains roughage (or fibre) which helps to stimulate waves of peristalsis along the alimentary canal especially in the region of small intestine. It results in pushing of food along the alimentary canal and facilitates removal of undigested waste matter from the body, there by helping to reduce the chances of constipation.

SE. 5

What are the products of fat digestion?

Ans. Products of fat digestion are fatty acids and glycerol.

SE. 6

The basic process of digestion and release of energy is the same in almost all animals. Justify this statement.

Ans. Although modes of feeding are different in different animals, but almost all the animals secrete digestive juices to digest the food i.e., to breakdown food into simple absorbable form. In the cells, absorbed food is then broken down into still simpler compounds with the release of energy through the process of respiration. Thus, the basic process of digestion and release of energy is the same in almost all animals.

SE. 7

Why small intestine is considered as the major site for digestion and absorption of nutrients?

Ans. Small intestine receives bile from liver, pancreatic juice and releases intestinal juice of its own. Small intestine completes the digestion of all the components of food. Carbohydrates are broken down into simple sugars such as glucose, fats into fatty acids and glycerol and proteins into amino acids. About 90% of all absorption of nutrients occurs in small intestine. Thus, small intestine is the major site for digestion and absorption of nutrients.

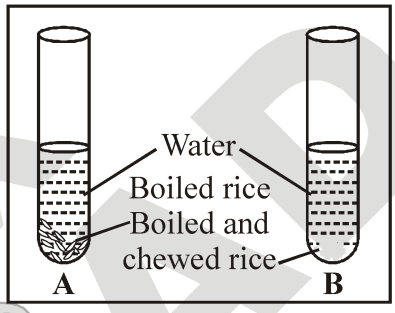
SE. 8

What causes tooth decay?

Ans. If we do not maintain oral hygiene and do not eat healthy food, then bacteria and food components accumulate on our teeth in the form of plaque. These bacteria break down the sugars present in the left over food and release acids. The acids gradually the teeth and result in tooth decay.

SE. 9

Study the given experimental set-up. The tube A contains boiled rice + 3-4 ml water, test tube B contains boiled and chewed rice + 3-4 ml water. What will you observe after pouring 2-3 drops of iodine solution in each test tube?



Ans. After pouring iodine solution in test tube A it turns blue-black due to the presence of starch in boiled rice. In test tube B, there was no change in colour on adding iodine solution because starch has been converted into simple sugars during chewing by the action of salivary amylase.

SE. 10

What are villi? What role do they play in absorption of food?

Ans. Villi are small finger-like projections present on the inner walls of small intestine. These increase the surface area for absorption of digested food. Each villi has a network of thin and small blood vessels close to its surface. Surface of villi absorbs the digested food materials.

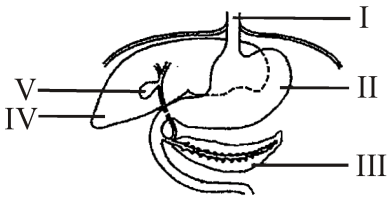
SE. 11

What do you understand by enamel?

Ans. Enamel is the white substance that covers the tooth. It is the hardest substance of human body.

SE. 12

Refer the given diagram which shows various parts of the human digestive system labelled as I, II, III, IV and V and answer the following questions.



(a) The labels I, II and III represent ____, _____ and _____ respectively.

(b) Name the secretion produced by organ IV and explain how does it help in fat digestion.

(c) What is the function of organ V in human digestive system?

Ans. (a) Oesophagus, stomach, pancreas

(b) Organ IV is liver which produces bile. Bile is sent to small intestine where it gets mixed with fats present in food and converts them into small fat droplets. The later are then digested and absorbed in small intestine.

(c) Organ V is gall bladder which stores the bile temporarily.

SE. 13

Name the different components i.e., nutrients present in food.

Ans. The different nutrients present in food are carbohydrates, fats, proteins, minerals, vitamins etc.

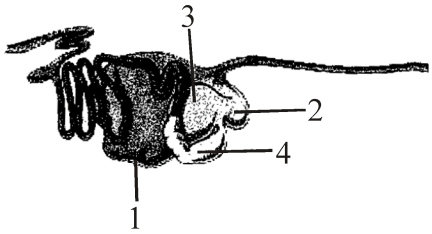
SE. 14

How does food move in the opposite direction during vomiting?

Ans. Food is pushed down by contraction and relaxation of the walls of the food pipe. This movement, called peristalsis takes place throughout the alimentary canal and pushes the food downwards. But when our stomach is completely full or even after eating stale food, the food is not accepted by our stomach, therefore, it is pushed in the opposite direction and vomited out. Direction of peristaltic movements is reversed during vomiting.

SE. 15

Refer the given diagram of a ruminant stomach and identify the parts labelled as 1, 2, 3 and 4.



Ans. 1 - Rumen,

2 - Reticulum,

3 - Omasum,

4 - Abomasum

NS. 1

Fill in the blanks :

(a) The main steps of nutrition in humans are _____ _____ _____ _____ and _____.

(b) The largest gland in the human body is _____ .

(c) The stomach releases hydrochloric acid and ___

(d) The inner wall of the small intestine has many finger - like outgrowths called _____.

(e) Amoeba digests its food in the _____.

Ans. (a) ingestion, digestion, absorption, assimilation, egestion

(b) liver

(c) digestive enzyme

(d) villi

(e) food vacuole

NS. 2

Mark 'T' if the statement is true and 'F' if it is false :

(a) Digestion of starch starts in the stomach.

(b) The tongue helps in mixing food with saliva.

(c) The gall bladder temporarily stores bile.

(d) The ruminants bring back swallowed grass into their mouth and chew it for some time.

Ans. (a) F. Digestion of starch starts in mouth by the action of salivary amylase.

(b) T (c) T (d) T

NS. 3

Match the items of Column I with those given in Column II :

Column-I	Column-II
Food components	Product (s) of digestion
Carbohydrates	Fatty acids and glycerol
Proteins	Sugar
Fats	Amino acids

Ans.

Column-I	Column-II
Food components	Product (s) of digestion
Carbohydrates	Sugar
Proteins	Amino acids
Fats	Fatty acids and glycerol

NS. 4

What are villi ? What is their location and function?

Ans. Villi are small finger-like projection located in the inner wall of small intestine. Villi increase the surface area of intestine for the absorption of digested food. Each villi has a network of thin and small blood vessels close to its surface. The surface of the villus absorbs the digested food materials. The absorbed substances are tranported via the blood vessels to different organs of the body.

NS. 5

Where is the bile produced? Which component of the food does it help to digest?

Ans. Bile is produced by the liver and is stored temporarily in the gall bladeer. The bile plays an important role in the digestion of fats.

NS. 6

Name the type of carbohydrate that can be digested by ruminants by not by humans? Give the reason also.

Ans. Cellulose is a type of carbohydrate that can be digested by ruminants but not by humans. The cellulose of the food is digested by the action of certian bacteria and other microbes which are present in the stomach of ruminants but not in humans, So, human body cannot digest cellulose.

NS. 7

Why do we get instant energy from glucose?

Ans. Glucose is the simplest from of sugar. It can be directly absorbed by intestine and easily transported by blood to various cells of the body where it is oxidized with the help of oxygen and releases carbon dioxide, water and energy. In this way, we get instant energy from glucose. On the other hand, carbohydrates, proteins etc. First need to broken down into simpler substances before absorption. Thus, it requires extra time for them to produce energy.

NS. 8

Which part of the digestive canal is involved in :

(i) absorption of food ____

(ii) chewing of food _____

(iii) killing of bacteria _____

(iv) complete digestion of food

(v) formation of faeces_____

Ans. (i) Small intestine (ii) Mouth

(iii) Stomach (iv) Small intestine

(v) Large intestine

NS. 9

Write one similarity and one difference between the nutrition in Amoeba and human beings.

Ans. **Similarity -** The basic process of digestion of food and release of energy is the same in Amoeba as well as in human beings. In Amoeba, digestive juices are secreted in the food vacuole, which act on the food and break it down into simpler form. Gradually, the food is absorbed. In the same way, in human beings, digestive juices secreted by various body organs (e.g., mouth, stomach, intestine, etc.) act on food and break it down into simpler substances which are then absorbed.

Difference - The process of digestion is simple in Amoeba whereas it is comparatively a complex process in human beings. Processes of ingestion and egestion are also different in the two types of organisms. Amoeba engulfs its food with the help of pseudopodia, stores food in food vacuole and eliminates the undigested food outside through food vacuole. On the other hand, in human beings, food is ingested (taken in) through mouth. The food then undergoes a complex process of digestion and absorption, finally the undigested food is eliminated in the form of faeces through anus.

NS. 10

Match the items of Column I with suitable items in Column II.

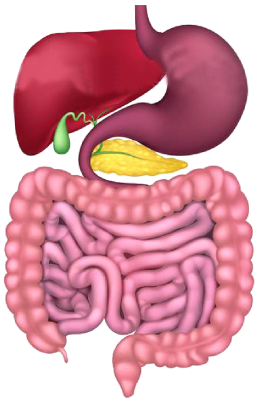
Column I	Column II
(a) Salivary gland	(i) Bile juice secretion
(b) Stomach	(ii) Storage of undigested food
(c) Liver	(iii) Saliva secretion
(d) Rectum	(iv) Acid release
(e) Small intestine	(v) Small intestine
(f) Large intestine	(vi) Absorption of water
	(vii) Release of faeces

Ans. (a) - (iii), (b) - (iv), (c) - (i),

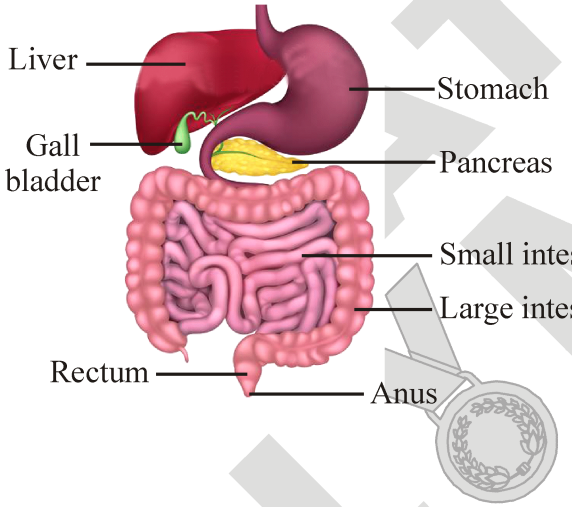
(d) - (ii), (e) - (v), (f) - (vi)

NS. 11

Label the figure of the digestive system.



Ans. The labelled figure of digestive system is as follows:



NS. 12

Can we survive only on raw, leafy vegetables/grass? Discuss.

Ans. Our body has different digestive glands which secrete digestive juices to digest the different components of the food. For example, the saliva produced by salivary glands breaks down the starch into sugars, the digestive juice present in the stomach helps to break down the proteins into amino acids, the bile secreted by the liver plays an important role in the digestion of fats, etc. Raw, leafy vegetables/ grass contain a complex carbohydrate, cellulose. Our body does not have the enzymes or digestive juices to digest cellulose. Hence, cellulose cannot serve as an energy source to our body. Therefore, we cannot survive only on raw, leafy vegetables/grass.

EXERCISE – I

ONLY ONE CORRECT TYPE

1. The end product of fat digestion is -
   (A) Glucose
   (B) Fatty acids & glycerol
   (C) Amino acids
   (D) Alkaloids

2. The action of bile can be called -
   (A) Oxidation (B) Emulsification
   (C) Esterification (D) Dehydrogenation

3. Which set is mixed with the food in small intestine?
   (A) Saliva, gastric juice, bile
   (B) Gastric juice, bile, pancreatic juice
   (C) Bile, pancreatic juice, succus entericus
   (D) Bile, pancreatic juice and saliva

4. A good source of lipase is -
   (A) Saliva (B) Gastric juice
   (C) Bile (D) Pancreatic juice

5. Enzymes required for digestion of fat is -
   (A) Amylase (B) Trypsin
   (C) Pepsin (D) Lipase

6. Ptyalin is an enzyme present in -
   (A) Gastric juice
   (B) Pancreatic juice
   (C) Intestinal juice
   (D) Saliva

7. Which one does not produce any digestive enzyme?
   (A) Pancreas (B) Liver
   (C) Stomach (D) Duodenum

8. The number of salivary glands present in human beings is -
   (A) 5 pairs (B) 4 pairs
   (C) 3 pairs (D) 2 pairs

9. Largest gland in the body is -
   (A) Liver (B) Pancreas
   (C) Gastric gland (D) Adrenal

10. Which of the following has no digestive enzyme?
    (A) Saliva (B) Bile
    (C) Gastric juice (D) Intestinal juice

11. The main organ for digestion and absorption of food is -
    (A) Large intestine (B) Small intestine
    (C) Stomach (D) Liver

12. Liver helps in -
    (A) Digestion of food
    (B) Detoxification
    (C) Secretion
    (D) All of these

13. Food pipe is the another name of -
    (A) Oesophagus (B) Bile duct
    (C) Salivary gland (D) Pancreatic duct

14. Total number of cannines in permanent dental set of human is -
    (A) 4 (B) 6
    (C) 2 (D) 12

15. Starch is digested by -
    (A) Peptidase (B) Amylase
    (C) Lipase (D) Proteinase

16. Bile is produced by -
(A) Stomach (B) Liver
(C) Gall bladder (D) Pancreas

17. The liver stores food in the form of
(A) Glucose (B) Glycogen
(C) Albumen (D) ATP

18. Vermiform appendix is a part of
(A) Alimentary canal (B) Nervous system
(C) Vascular system (D) Reproductive system

19. Absorption of food occurs in -
(A) Stomach (B) Large intestine
(C) Liver (D) Small intestine

20. Wisdom teeth in man are
(A) Incisor (B) Canine
(C) Last molars (D) All of these

21. Digestion is
(A) Conversion of large food particles into small food particles
(B) Conversion of small food particles into large food particles
(C) Conversion of food into protoplasm
(D) Conversion of non-diffusible food particles into diffusible food

22. Muscular contractions of alimentary canal are
(A) Circulation (B) Deglutition
(C) Peristalsis (D) Churning

23. Which of the following regions of the alimentary canal of man does not secrete a digestive enzyme?
(A) Oesophagus (B) Stomach
(C) Duodenum (D) Mouth

24. The incisor tooth is meant for
(A) Biting and cutting
(B) Chewing
(C) Munching and chewing
(D) Munching

25. A bolus is
(A) A mass of crushed food moistened with saliva
(B) The semi-solid material resulting from partial digestion in the stomach
(C) The milky emulsified fat absorbed from small intestine
(D) Indigestible materials that helps in movement and absorption

PARAGRAPH TYPE

PARAGRAPH # I

Jaya returned from school and found that grandmother was scolding her maid, Rani as she did not come yesterday. The maid told that his son was passing watery stools frequently that's why she didn't come Jays's mother who was listening the discussion came to them and told Rani not to come for coming 3-4days. She also suggested her to give his son a solution of sugar and salt in clean water, many times a day for fast recovery. Jaya was surprised. She rushed to her mother and asked the scientific reason for it.

26. Diarrhoea occure due to :
(A) Infection
(B) Food poisoning
(C) Indigestion
(D) All of these

27. Select the solution help in diarrhoea.
(A) ORS (B) Cough syrup
(C) Banana juice (D) All of these

28. Diarrohea is related to which system.
(A) Respiration (B) Digestion
(C) Excretion (D) Nervous

PARAGRAPH # II

Bile juice is stored in a sac called, gall bladder, located near its organ of secretion, liver. The gall bladder releases the bile juice into the small intestine whenever food reaches there, Though bile juice is deveoid of any digestive enzymes, it is required for the digestion of fats. the fats cannot be digested easily because they are insoluble in water and are present as large globules.

29. Bile juice is stored in _____.
(A) Lungs (B) Gall bladder
(C) Kidney (D) Stomach

30. In which part of body fats are digested.
(A) Stomach (B) Small intestine
(C) Caecum (D) Rectum

31. Fats are _____.
(A) Soluble in water
(B) Insoluble in oil
(C) Insoluble in water
(D) None of these

MATCH THE COLUMN TYPE

32.

Column-A	Column-B
(P) Starch	(i) Rennin
(Q) Milk	(ii) Liver
(R) Fats	(iii) Amylase
(S) HCl	(iv) Bile juice
(T) Bile juice	(v) Gastric gland

(A) (P) → (iii), (Q) → (i), (R) → (iv), (S)→(v), (T) → (ii)
(B) (P) → (i), (Q) → (ii), (R) → (iii), (S)→(iv), (T) → (v)
(C) (P) → (iii), (Q) → (i), (R) → (iv), (S)→(ii), (T) → (v)
(D) (P) → (iii), (Q) → (i), (R) → (ii), (S)→(v), (T) → (iv)

33.

Column-A	Column-B
(P) Small intestine	(i) For tearing of food
(Q) Canines	(ii) Caecum
(R) Liver	(iii) for grinding of food
(S) Molar	(iv) Ileum
(T) Large intestine	(v) Largest gland

(A) (P) → (iii), (Q) → (i), (R) → (iv), (S)→(v), (T) → (ii)
(B) (P) → (i), (Q) → (ii), (R) → (iii), (S)→(iv), (T) → (v)
(C) (P) → (iv), (Q) → (i), (R) → (v), (S)→(c), (T) → (ii)
(D) (P) → (iii), (Q) → (i), (R) → (ii), (S)→(v), (T) → (iv)

ASSERTION & REASON TYPE

Directions :

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

34. **Assertion :** Tongue is a fleshy muscular organ.
Reason : Tongue is used for talking.

35. **Assertion :** The small intestine is about 6m long and highly coiled.
Reason : It is smaller as compared to large intestine.

36. **Assertion :** Liver secreates a juice called bile juice.
Reason : Bile juice helps in digestion of fats.

Space for Notes :

EXERCISE – II

VERY SHORT ANSWER TYPE

1. Name the organs that make the alimentary canal.
2. Mention the various steps involved in the process of nutrition.
3. Which type of carbohydrate cannot be digested by humans ?
4. What is the role of hydrochloric acid in the stomach ?
5. Why do we call animals heterotrophs ?
6. Name the type of nutrition in amoeba.
7. Which organs help to sense the different taste ?
8 Differentiate between ingestion and egestion.
9 What is the function of villi ?
10. What is Digestion ?

SHORT ANSWER TYPE

1. What happens to digested food after absorption ?
2. How does an amoeba capture its food ?
3. What are villi ? What is their location and function ?
4. What is the juice secreted by the liver called ? What does it do ?
5. What is pancreas and where is it located ?

LONG ANSWER TYPE

1. Draw a diagram of the tongue to show the location of various taste buds.
2. Give an account of the various modes in which animals obtain food.
3. Draw a labelled digram of the alimentary canal of humans.
4. What are digestive glands ? Name three such glands that are present in the human body. What are their secretions called ?
5. What happens to the food in the small intestine ?

TRUE / FALSE TYPE

1. Villi are small projections in the inner wall of small intestine that help in absorption of food.
2. Bile juice is produced by gall bladder.
3. Tongue helps in mixing of saliva with food.
4. Mastication is the chewing of food to break it into smaller pieces.
5. Wisdom teeth in man are canines.

FILL IN THE BLANKS

1 Salivary amylase works on ..... .
2. Incisor teeth help in ..... the food.
3. The liver and ..... are used for procuring food.
4. In amoeba ..... are used for procuring food.
5. There are ..... number of teeth in a temporary set of teeth.

Answer Key

EXERCISE–I														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B	B	C	D	D	D	B	C	A	B	B	D	A	A	B
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
B	B	A	D	C	A	C	A	A	A	D	A	B	B	B
31	32	33	34	35	36									
C	A	C	B	C	A									

EXERCISE – II

TRUE/FALSE

1. T 2. F 3. T 4. T 5. F

FILL IN THE BLANKS

1. Starch
2. Bitting and cutting
3. Pancreas
4. Pseudopodia
5. 20

SELF PROGRESS ASSESSMENT FRAMEWORK

(CHAPTER : NUTRITION IN ANIMALS)

CONTENT	STATUS	DATE OF COMPLETION	SELF SIGNATURE
Theory			
In-Text Examples			
Solved Examples			
NCERT Exercises			
Exercise I			
Exercise II			
Short Note-1			
Revision - 1			
Revision - 2			
Revision - 3			
Remark			

NOTES :

1. In the status, put "completed" only when you have thoroughly worked through this particular section.
2. Always remember to put down the date of completion correctly. It will help you in future at the time of revision.

Space for Notes :