SCIENCE

CLASS VII

NCERT

SCIENCE

TEXTBOOK FOR CLASS VII

पुध्ना International School
Shree Swaminarayan Gurukul, Zundal

CLASS – VII

SCIENCE

TEACHER'S COPY

Ch. 1 Nutrition in plant

Chapter explanation :-

1) Nutrients :-

The components of food like carbohydrates, fats, proteins vitamins and minerals are called nutrients.

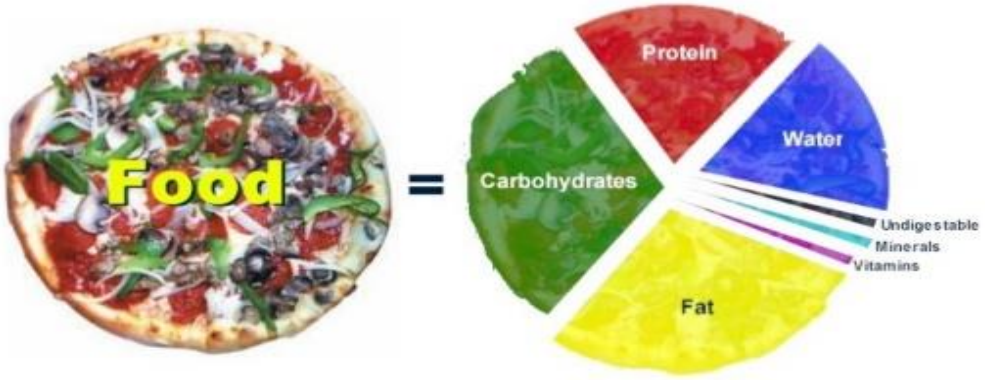
Nutrients help living organisms :-

i) To build their bodies.

ii) To grow.

iii) To repair the damaged parts of their bodies.

iv) To provide energy to carry out life processes.



2) Nutrition :-

The mode of taking food by an organism and its utilization in the body is called nutrition.

3) Modes of nutrition :-

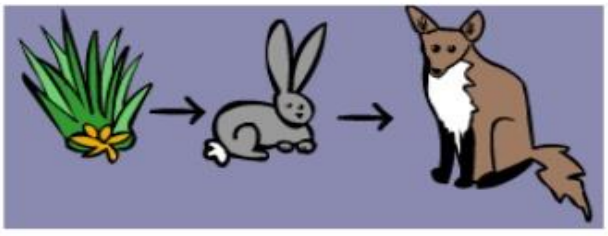
There are two main modes of nutrition in living organisms. They are autotrophic nutrition and heterotrophic nutrition.

i) Autotrophic nutrition :- is nutrition in which organisms can prepare their own food.

Organisms which can prepare their own food are called autotrophs.

ii) Heterotrophic nutrition :- is nutrition in which organisms get their food directly or indirectly from plants.

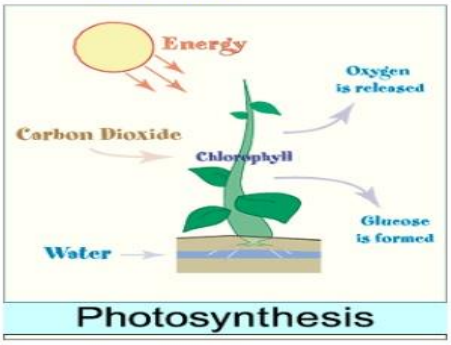
Organisms which get their food directly or indirectly from plants are called heterotrophs.



Chlorophyll uses the energy from sunlight to prepare food by using water and carbon dioxide. The food prepared is carbohydrate which is then converted into starch. During photosynthesis oxygen is released.

Equation of photosynthesis :-

$$\text{Carbon dioxide} + \text{Water} \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} \text{Carbohydrate} + \text{Oxygen}$$



4)Photosynthesis - Food making process in plants :-

Photosynthesis is the process by which plants prepare their on food by using sunlight, water, carbon dioxide and chlorophyll.

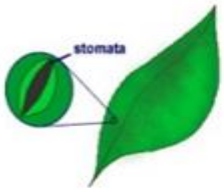
Photosynthesis take place in the leaves.

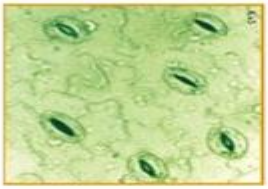
i) Sunlight is obtained from the sun.

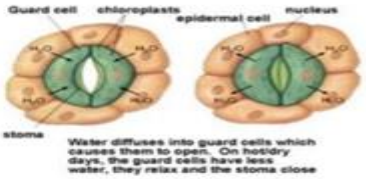
ii) Water is absorbed by the roots and transported to the leaves.

iii) Carbon dioxide is taken from the air through small pores in the leaves called stomata.

iv) Chlorophyll are the green pigments present in the leaves.







5) Synthesis of proteins :-

The soil has some bacteria which convert nitrogen from the air into usable nitrogen in the soil. Farmers also add fertilisers containig nitrogen into the soil. Plants absorb this nitrogen from the soil along with water and other constituents to prepare proteins and fats.

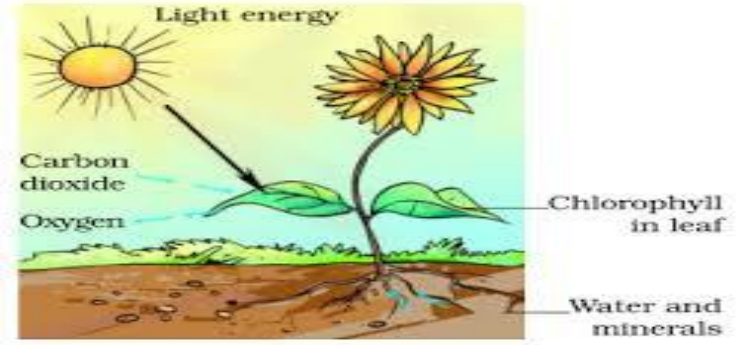
- **ii) Insectivorous plants :-** are plants which feed on insects. Eg:- Pitcher plant. The leaf of the pitcher plant is modified into a pitcher. The end of the pitcher has a lid which can open and close. When an insect enters the pitcher, the lid closes. The insect is then digested by digestive juices inside the pitcher.

- **iii) Saprotrophs :-** are plants which do not have chlorophyll and cannot prepare their on food. They get their food from dead and decaying organic matter. Eg :- mushroom, bread mould etc. They produce digestive juice on the dead and decaying organic matter and convert it into a solution and then absorb the nutrients from the solution.

iv) Symbiotic relationship :- Some plants live together and share shelter and nutrients. Eg :- lichens. In lichens, an alga and a fungus live together. The fungus provides shelter, water and minerals to the alga. The alga provides food to the fungus which it prepares by photosynthesis.

CHAPTER – 1
Nutrition in plants

- **Key words :-**
- **Nutrition:** It is the mode of taking food by an organism and its utilization by the body.
- **Nutrients:** The components of food that provide nourishment to the body.
- **Photosynthesis**: Green plants prepare their own food with the help of **chlorophyll (found in green plants),** carbon dioxide and water taken from the environment in presence of sunlight . This process is known as photosynthesis.



- All parasitic plants feed on other plants as either:
  (i) **Partial Parasites:** Obtain some of their nutrition from the host, e.g. painted cup
  (ii) **Total Parasites:** dependent completely on the host for nutrition, e.g. mistletoe.

- **Saprophytic:** Organisms that obtain nutrition from dead and decaying plant and animal matter.

- **Insectivorous Plants:** Green plants which obtain their nourishment partly from soil and atmosphere and partly from small insects. Example: pitcher plant, bladderwort, and venus fly trap.

- **Symbiosis:** Mode of nutrition in which two different individuals associate with each other to fulfil their requirement of food.
- Lichens found on tree trunks is the association between algae and fungus. Algae obtains water from fungus and it in turn obtains food from algae.

EXTRA QUESTION ANSWERS

VERY SHORT QUESTION:-

1. Organisms which prepare food for themselves using simple naturally available raw materials are referred to as

Ans. Organisms which prepare food for themselves using simple naturally available raw materials are referred to as autotrophs (auto = self; trophos = nourishment).

2. In the absence of which pigment photosynthesis not occur in leaves?

Ans. The leaves have a green pigment called chlorophyll. It helps leaves to capture the energy of the sunlight. This energy is used to synthesise (prepare) food from carbon dioxide and water.

3. The term that is used for the mode of nutrition in yeast, mushroom and bread-mould is

Ans. Fungi secrete digestive juices on dead and decaying materials and convert them into a solution from which they absorb the nutrients. This mode of nutrition is known as saprophytic nutrition.

4. Which of the following raw material is available in the air for photosynthesis?

Ans. Carbon-dioxide present in air is required for photosynthesis.

5. Potato and ginger are both underground parts that store food. Where is the food prepared in these plants?

Ans. In both the plants, shoot system and leaves lie above ground where the entire process of photosynthesis takes place and the final food is transported to the underground parts for storage.

6. Nitrogen is an essential nutrient for plant growth. But farmers who cultivate pulse crops like green gram, Bengal gram, black gram, etc. do not apply nitrogenous fertilizers during cultivation. Why?

Ans. Roots of pulses (leguminous plants) have a symbiotic association with a bacterium called Rhizobium. The bacterium can take atmospheric nitrogen and convert it into a soluble form. But Rhizobium cannot make its own food. So it lives in the roots of these legumes and provides them with nitrogen accomplishing the symbiosis. Hence farmers need not apply nitrogenous fertilizers during the cultivation of legumes.

7**. Wheat dough if left in the open, after a few days, starts to emit a foul smell and becomes unfit for use. Give reason.**

Ans. Carbohydrates in wheat dough encourage growth of yeast and other saprophytic fungi which break down carbohydrates, and emit a foul smell.

8. Sunlight, chlorophyll, carbon dioxide, water and minerals are raw materials essential for photosynthesis. Do you know where they are available? Fill in the blanks with the appropriate raw materials.

(a) Available in the plant: _____

(b) Available in the soil: _____, _____

(c) Available in the air: _____

(d) Available during day: _____

Ans. (a) chlorophyll (b) Water, minerals (c) Carbon dioxide (d) Sunlight

LONG ANSWER QUESTIONS

1. Wild animals like tiger, wolf, lion and leopard do not eat plants. Does this mean that they can survive without plants? Can you provide a suitable explanation?

Ans. It is true that these animals do not eat plants. They hunt and eat herbivorous animals like deer, gaur, bison, zebra, giraffe, etc. which are dependent on plants for food. If there are no plants, herbivorous animals will not survive in which case animals like tiger, wolf, lion and leopard will have nothing to eat. So, indirectly carnivorous animals are also dependent on plants for their survival.

EXERCISE QUESTION ANSWERS:-

Question 1. Why do organisms need to take food?

Answer: Organism needs food to
(i) Get energy to do work.
(ii) Build body
(iii) Repair damage in the body
(iv) Maintain the functions of the body

Question 2. Distinguish between a parasite and saprophyte.

Answer:

Parasite	Saprotroph
The organism that grows on the body of another organism and derives nutrients from it is known as a parasite	The organism that obtains nutrients from the dead or decaying organic matter is called saprotroph.
They directly feed on living organisms for their nutrition.	They feed on dead and decaying organism.
They take the readymade food from the host.	They take the digested and decayed food.

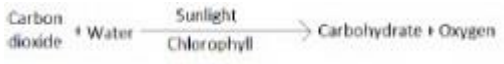
Examples: Cuscuta and orchids	Examples: Fungi and some bacteria.

Question 3. How would you test the presence of starch in leaves?

Answer: Steps to test the presence of starch in leaves :
Step 1: A fresh leaf is taken.
Step 2: The leaf is boiled in water for few minutes to kill the cells in the leaf.
Step 3: Now, dip this leaf in iodine solution.
Step 4: The color of the leaf will changes into blue black color when iodine is added to it which shows the presence of starch in it.

Question 4. Give the brief description of the process of synthesis of food in green plants.

Answer: Photosynthesis is the process synthesis of food in the plants with the help of chlorophyll and carbon dioxide in the presence of sunlight. Water and minerals present in the soil are absorbed by the roots and transported to the leaves by the vessels.
Carbon dioxide from air is taken through stomata present in leaves. Leaves are the food factories of the plants which capture the energy of the sunlight with the help of chlorophyll. This energy is used to synthesize food from carbon dioxide and water.



Question 5. Show with the help of a sketch that the plants are ultimate source of food.

Answer:

Question 6. Fill in the blanks:

(a) Green plants are called ---------- since they synthesise their own food.
(b) The food synthesised 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 ----------.

Answer: Fill in the blanks:
(a) Green plants are called **autotrophs** since they synthesise their own food.
(b) The food synthesised by the plants is stored as **starch**.
(c) In photosynthesis solar energy is captured by the pigment called **chlorophyll**.
(d) During photosynthesis plants take in **carbon dioxide** and release **oxygen**.

Question 7. Name the following:
(a) A parasitic plant with yellow, slender and tubular stem.

(b) A plant that has both autotrophic and heterotrophic mode of nutrition.
(c) The pores through which leaves exchange gases.

Answer: (i) Cuscuta
(ii) Insectivorous plants
(iii) Stomata

Question 8. Tick the correct answer:
(a) Amarbel is an example of :
(i) Autotroph
(ii) Parasite
(iii) Saprophyte
(iv) Host

(b) The plant which traps and feeds on insects is:
(i) Cuscuta
(ii) China rose
(iii) Pitcher plant
(iv) Rose

Answer:(a) (ii) parasite (b) (iii) Pitcher plant

Question 9. Match the item in given column I with those in column II.

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

Answer:

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

Question 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 synthesis 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)

Answer: (i) F (ii) F (iii) T (iv) T

Question 11. Choose the correct option from the following:
Which part of plant takes in carbon dioxide from the air for photosynthesis?

(i) Root hair
(ii) Stomata
(iii) Leaf veins
(iv) Sepals

Answer: (ii) Stomata

Question 12. 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

Answer: (iv) leaves

Ch.2 Nutrition in Animals

Chapter explanation :-

1) Animal nutrition :-

The mode of taking food by an organism and its utilisation in the body is called nutrition.

Animals get their food directly or indirectly from plants.

Animal nutrition :- includes nutrient requirement, mode of taking food and its utilisation in the body.

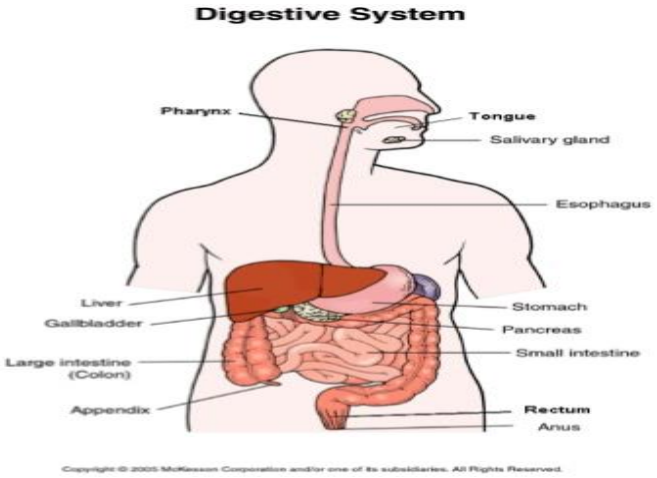
Digestion :- The process by which complex food substances are broken down into simpler substances is called digestion.

2) Different ways of taking food :-

Name of animal	Kind of food	Mode of feeding
Snail	Grass	Chewing
Ant	Insects	Scrapping
Eagle	Flesh	Swallowing
Humming bird	Nectar	Sucking
Lice	Blood	Sucking
Mosquito	Blood	Sucking
Butterfly	Nectar	Sucking
House fly	Decaying matter	Brewing

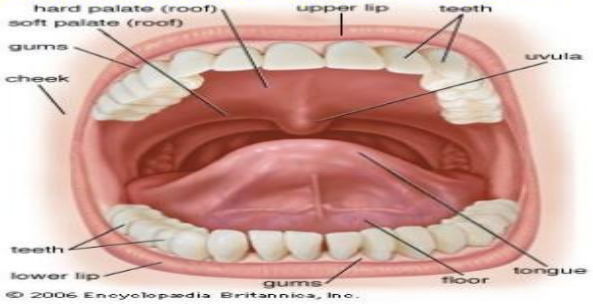
3) Digestion in humans

The main parts of the alimentary canal are :- buccal cavity (mouth), oesophagus (food pipe), stomach, small intestine, large intestine, rectum and anus. The main glands are :- salivary glands, liver and pancreas. The alimentary canal and the glands together is called the digestive system.



i) The mouth and buccal cavity :-

Food is taken into the body through the mouth. This process is called ingestion. In the mouth the food is broken down into smaller pieces by the teeth. The mouth has salivary glands which secrete saliva. The saliva breaks down starch into sugars. The tongue helps to mix the food with saliva and swallow the food.



ii) The food pipe (oesophagus) :-

The food pipe passes along the neck and chest. The swallowed food is pushed down by the movement of the walls of the food pipe into the stomach.

iii) The stomach :-

The stomach secretes digestive juices, hydrochloric acid and mucous. The digestive juices breaks down proteins. Hydrochloric acid makes the medium acidic and kills bacteria which enter along with the food. Mucous protects the walls of the stomach from the acid.

iv) The small intestine :-

The small intestine is a long coiled tube. It receives secretions from liver and pancreas. It also secretes digestive juices.

The liver is the largest gland in the body. It secretes bile juice which is stored in the gall bladder. It breaks down fats.

The pancreas secretes pancreatic juice which breaks down carbohydrates and proteins.

The intestinal juice completes the digestion of starch into glucose, fats into fatty acid and glycerol and proteins into amino acids.

Absorption of digested food in the small intestine :-

The digested food is absorbed by the walls of the small intestine. This process is called absorption. The small intestine has several finger like projections called villi having blood vessels. The villi helps to increase the surface area for absorption. The absorbed materials are carried by the blood to the different parts of the body and used by the body. This is called assimilation. The undigested food then passes into the large intestine.

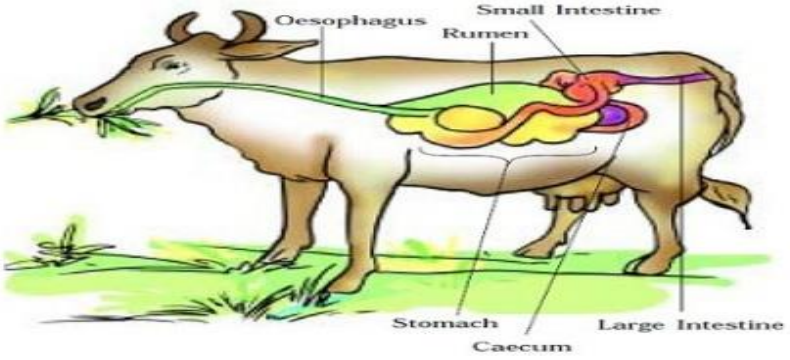
v) The large intestine :-

In the large intestine water and some salts are. The remaining waste then passes to the rectum and remains there as faeces. It is removed through the anus from time to time.This process is called egestion.

—

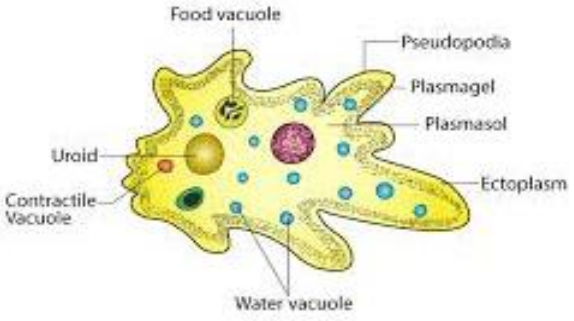
4) Digestion in grass eating animals (Ruminants) :-

Grass eating animals like cows and buffaloes quickly swallow the grass and store it in a separate part of the stomach called rumen. Here the food is partly digested and is called cud. Then the cud is brought back to the mouth in small lumps and chewed. This process is called rumination. The chewed food then passes into a sac like structure between the small intestine and large intestine. The cellulose in the grass is digested with the help of some bacteria.



Chapter – 2
Nutrition in Animals

- **Key words:-**
- **Classification based on Eating Habits:**
  (i) **Herbivorous: A**nimals that eat plants or plant products. Example: cow, sheep, goat, deer, elephant, kangaroo, giraffe, etc.
  (ii) **Carnivorous:** Animals that eat only flesh of other animals. They never eat plants. Example: tiger, lizard, lion, etc.
  (iii) **Omnivorous:** Animals consume plants as well as other animals as their food. Example: bear, dog, human being, etc.
  (iv) **Parasites:** Organisms that obtain their food from other animals either by living inside (endoparasites) or outside (ectoparasites) their body. Example: tapeworm and roundworm (inside body), tick and lice (outside body).
- (v) **Scavengers:** Animals which feed on the remains of dead animals preyed by predators. Example: vulture, crows, jackal, etc.
- **Amoeba** ingests its food with the help of its false feet or pseudopodia. The food is digested in the food vacuole. It pushes out finger-like pseudopodia which engulf the prey.

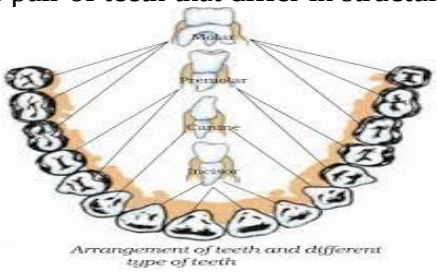


-

EXTRA QUESTIONS:-

1. Which of the following pair of teeth differ in structure but are similar in function?

Ans. Molars and premolars are the pair of teeth that differ in structure but are similar in function i.e. tearing and crushing the food.



Arrangement of teeth and different type of teeth

2. What is the function of acid present in the stomach ?

Ans. The acid present in the stomach kills most of the bacteria entering along with the food and makes the medium in the stomach acidic and helps the digestive juices to act.

3. The false feet of Amoeba are used for

Ans. (c) Amoeba has one, or more finger-like projections, called pseudopodia or false feet that helps in movement and capture of food.

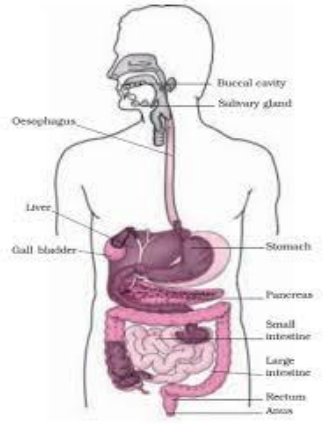
4. The enzymes present in the saliva convert

Ans. The saliva breaks down the starch into simple sugars.

SHORT ANSWER QUESTIONS

1. Name the parts of the alimentary canal where

(i) water gets absorbed from undigested food.



(ii) digested food gets absorbed.

(iii) taste of the food is perceived.

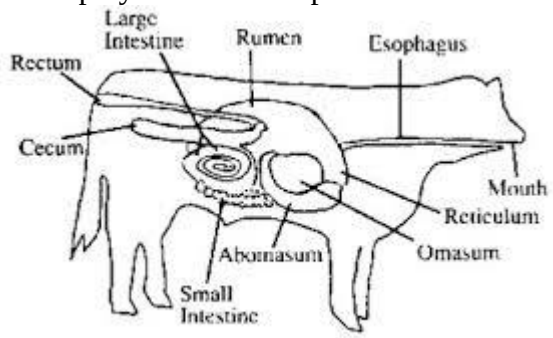
(iv) bile juice is produced.

Ans. (i) Large intestine (ii) Small intestine (iii) Tongue (iv) Liver

2. Ruminants such as cows and buffaloes swallow their food hurriedly and then sit restfully and chew their food. Can you reason why?

Ans. Ruminants quickly swallow the food and store it in an isolated part of the stomach called rumen where the food gets partially digested and is called cud which later on return to the mouth

in the form of small lumps and then chewed up by animal. This process is called rumination **and**



these animals are called rumination.

LONG QUESTION ANSWERS

1. Label the below given Figure 2.1 as directed below in (i) to (iv) and give the name of each type of teeth.

Fig. 2.1

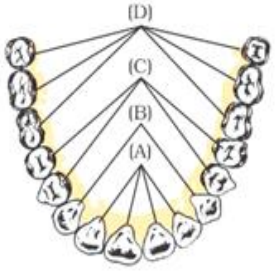
(i) The cutting and biting teeth as 'A'

(ii) The piercing and tearing teeth as 'B'

(iii) The grinding and chewing teeth as 'C'

(iv) The grinding teeth present only in adult as 'D'

Ans. A. Incisors B. Canines C. Premolars D. Molars



EXERCISE :-

Question 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 _____ juices which act on food.
(d) The inner wall of the small intestine has many finger-like outgrowths called _____.
(e) Amoeba digests its food in the _____.

Answer: Fill in the blanks:
(a) The main steps of digestion in humans
are **ingestion**, **digestion**, **absorption**, **assimilation** and **egestion**.
(b) The largest gland in the human body is **liver**.
(c) The stomach releases hydrochloric acid and **digestive** juices which act on food.
(d) The inner wall of the small intestine has many finger-like outgrowths called **villi**.
(e) Amoeba digests its food in the **food vacuole**.

Question 2. Mark 'T' if the statement is true and "F" if it is false.

(a) Digestion of starch starts in the stomach. (T/F)
(b) The tongue helps in mixing food with saliva. (T/F)
(c) The gall bladder temporarily stores bile. (T/F)
(d) The ruminants bring back swallowed grass into their mouth and chew it for some time. (T/F)

Answer: (a) F (b) T (c) T (d) T

Question 3. Tick ( ) mark the correct answers in each of the following:

(a) Fat is completely digested in the
(i) Stomach
(ii) mouth
(iii) Small intestine
(iv) large intestine.

(b) Water from the undigested food is absorbed mainly in the
(i) stomach
(ii) food pipe
(iii) small intestine
(iv) large intestine

Answer: (a) (iii) small intestine. (b) (iv) large intestine.

Question 4. Match the item of Column I with those given in Column II.

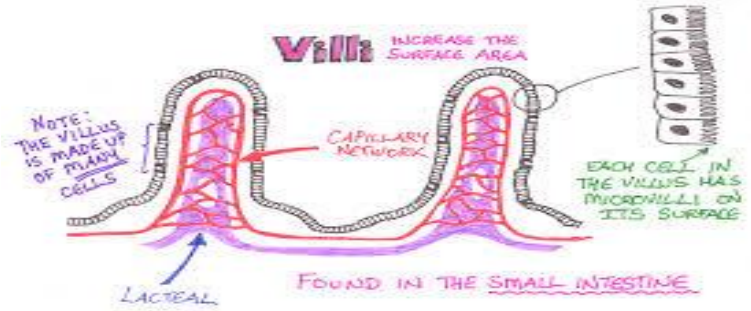
Column I	Column II
Food Components	**Product of digestion**
Carbohydrates	Fatty acids and glycerol
Proteins	Sugar
Fats	Amino Acids

Answer:

Column I	Column II
Food Components	**Product of digestion**
Carbohydrates	Sugar
Proteins	Amino acids
Fats	Fatty acids and glycerol

Question 5. What are villi? What is their location and function?

Answer: The inner wall of the small intestine have thousands of finger-like outgrowths. These are called villi. Villi are located in the small intestine. The villi increase the surface area for absorption of the digested food. Each villus has a network of thin and small blood vessels close to its surface. The surface of the villi absorbs the digested food materials.



Question 6. Where is the bile produced? Which component of the food does it digest?

Answer: Bile is produced in liver and stored in gall bladder. Bile juice digests fat.

Question 7. Name the type of carbohydrate that can be digested by ruminants but not by humans. Give the reason also.

Answer: Cellulose is a type of carbohydrate that can be digested by ruminants and not by humans. Ruminants have a large saclike structure called rumen between the oesophagus and the small intestine. The cellulose of the food is digested here by the action of certain bacteria which are not present in humans.

Question 8. Why do we get instant energy from glucose?

Answer: Glucose is the simplest form of carbohydrate which can be broken easily to give energy. So we get instant energy from glucose.

Question 9. 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 ----------.

Answer: (i) small intestine (ii) mouth (iii) stomach (iv) small intestine
(v) large intestine

Question 11. Write one similarity and one difference between the nutrition in amoeba and humanbeings.

Answer: Similarity: Both Amoeba and human have holozoic type of nutrition.

Difference: Human beings have complex structure for the ingestion, digestion and egestion of food while Amoeba has simple process in which it engulfs the with the help of pseudopodia and food get trapped in food vacuoles.

Question 12. Match the items of Column I with suitable items in Column II.

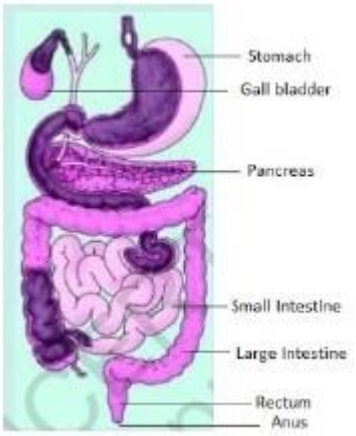
Column I	Column II
(a) Salivary gland	(i) Bile juice secretion
(b) Stomach	(ii) Storage of undigested food
(c) Liver	(iii) Saliva secretion
(d) Rectum	(iv) Acid release
(e) Small intestine	(v) Digestion is completed
(f) Large intestine	(vi) Absorption of water
	(vii) Release of faeces.

Answer:

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

Question 13. Label fig. 2.2 of the digestive system.

Answer:



Question 14. Can we survive only on raw, leafy vegetables/grass? Discuss.

Answer: No, because to live alive a healthy life we need a complete balance of all nutrients. Raw green vegetables may have cellulose which cannot be digested by us. So, only green leafy vegetables will not solve the purpose