Nutrition

1
CHAPTER

Nutrition

The process of intake of nutrients & its utilization is called nutrition.

◈ **Nutrient :**

The different component of food that have distinct functions like

(i) providing energy

(ii) providing materials for body building

(iii) maintenance & regulation of metabolism are called nutrient.

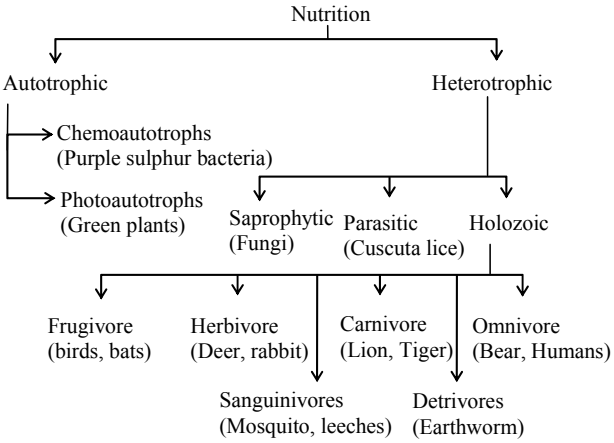
For example –

(i) Proteins	- Egg, pulses
(ii) Minerals, Vitamin	- Green leafy vegetable
(iii) Carbohydrates	- Wheat
(iv) Fats	- Butter, Oils

Boost Your Knowledge

- Fats provide the most energy followed by carbohydrates and proteins respectively.
- Proteins are the building blocks of body.

Types of Nutrition



◈ **Autotrophic Nutrition :** (Gk. *autos*-self, *trophe*-nourishment)

It is a mode of nutrition in which organisms are able to build up their own organic food from inorganic raw materials with the help of energy. The organism performing autotrophic nutrition are called autotrophs.

(A) Chemoautotrophs : These organisms use chemical energy for the synthesis of food.

E.g. Purple sulphur bacteria

(B) Photoautotrophs : These organism use light energy for the synthesis of food.

E.g. Green plants

◈ **Heterotrophic Nutrition :**

It is a mode of nutrition in which the organisms obtain readymade organic food from outside sources. The organisms that depend upon outside sources for obtaining organic nutrients are called heterotrophs. Heterotrophic nutrition is of three types - saprophytic, parasitic and holozoic.

- **Type of Heterotrophic Nutrition**

1. **Saprophytic or Saprotrophic Nutrition :**

   It is a mode of heterotrophic nutrition in which food is obtained from organic remains like dead organisms, excreta, fallen leaves, broken twigs, food articles, etc. Organisms performing saprophytic nutrition are called saprophytes. Eg. Fungi

2. **Parasitic Nutrition :** It is a mode of hetrotrophic nutrition in which a living organism flourishes by obtaining food from another living organism. The living organisms which obtains food and shelter from another organism is called parasite. The organism which provides food and shelter to a parasite is known as host. An external plant parasite is *Cuscuta* (Amarbel). It is a non-green plant that sends haustoria or sucking roots into host plant for obtaining food and water.

3 **Holozoic Nutrition :** It is a mode of heterotrophic nutrition which involves intake of solid pieces of food. Since solid food is taken in holozoic nutrition, it is also called ingestive nutrition. The food may consist of another animal, plant or its parts.

Nutrition in Plants

◈ **Photosynthesis :**

Photosynthesis is the primary mode of food production in green plant. " The process by which green plants synthesize food from simple substances i.e. carbon dioxide and water in the presence of light and chlorophyll is called **Photosynthesis**"

The process of photosynthesis can be represented in the form of chemical reaction, as given below :

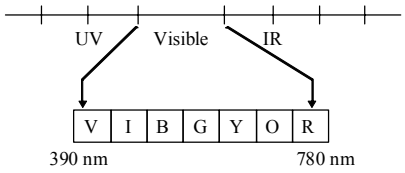
$$\underset{\text{Carbon dioxide}}{6CO_2} + \underset{\text{Water}}{12H_2O} \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} \underset{\text{Glucose}}{C_6H_{12}O_6} + \underset{\text{Water}}{6H_2O} + \underset{\text{Oxygen}}{6O_2}$$

◈ **Essential of photosynthesis :**

(A) Sunlight : For plants sun is the basic source of radiant energy.

- Plants utilize the light in the visible region of solar spectra (electromagnetic spectrum) which comes under the range of 390 nm – 780 nm wavelength

- Visible region consists of white light which is a mixture of 7 lights of different wavelength.
- Maximum photosynthesis occurs in **red region**
- There is minimum photosynthesis in green region because green parts of plants reflect almost whole of the green light.



(B) Chlorophyll : These are the green pigments present in chloroplast. They are found in green leaves in the maximum amount as well as in other green aerial parts of plant. There are six different types of chlorophyll : chl a, b, c, d, e and bacteriochlorophyll. Amongst them chlorophyll a and chlorophyll b are the most commonly occurring chlorophyll.

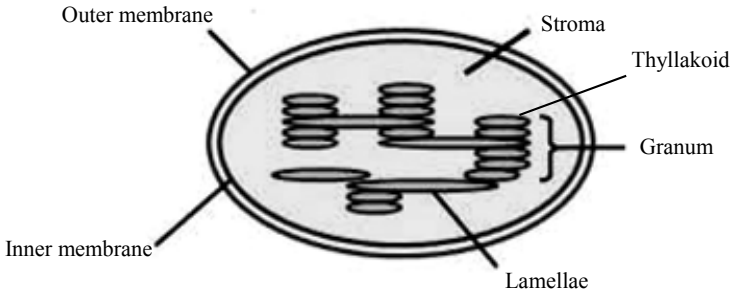


Figure : Chloroplast

(C) Water : Plant's roots absorb water from the soil by the process of osmosis (endosmosis). This water is transported to leaves by a special type of tissue called as xylem.

(D) 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.

Boost Your Knowledge

Opening and Closing Stomata :

The opening and closing of stomata depend upon the turgid or flaccid state of the guard cells. When guard cells are in turgid state the stomatal aperture opens and when guard cells are in flaccid state the stomatal aperture closes.

The inner wall of guard cells (towards pore) is thick and outer wall (towards other epidermal cells) is thin. When the turgor pressure of the guard cells is increased the outer thinner wall of the guard cell is pushed out (towards the periphery) due to which a tension is created on the inner thicker wall thus pulling the inner thicker wall towards the periphery thus leading to the opening of stomatal aperture.

On the contrary when the guard cells are in a flaccid state the outer thinner wall of guard cells returns to original position (moves towards pore) due to which tension on the inner wall is released which also returns to its original position and stomatal aperture gets closed again.

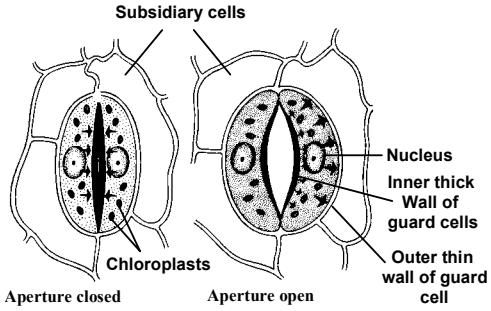


Figure : Stomata

- Plants utilize the light in the visible region of solar spectrum (electromagnetic spectrum) which comes under the range of 390 nm – 780 nm wavelength.
- Photosynthetically Active Radiation or PAR refers to radiation with wavelengths between 400 and 700 nm.
- 50% of incident solar radiation is PAR. Plant absorbs only 2-10% of PAR.
- Maximum photosynthesis takes place in white light followed by red and blue light.
- Minimum photosynthesis takes place in green light.
- RuBisCO is the most abundant enzyme.

***Can you think why ?* /**

- Why plants use only visible light ?
- Why photosynthesis is maximum in white light ?

◈ **Mechanism of Photosynthesis :**

Photosynthesis is divided in 2 main steps

(A) Light reaction (B) Dark reaction

(A) Light reaction :

- It is also called Hill Reaction. As it was discovered by Robert Hill.
- Site - grana of thylakoids
- It is named as light reaction as it occurs only in presence of light.

Major Step :

(i) Photoexcitation of chlorophyll molecule : During this process chlorophyll molecule receives sunlight in the form of small energy bundles called as **photons** and becomes excited to higher energy level.

(ii) Photolysis : It is also called as photooxidation of water, this takes place in presence of Mn^{+2} and Cl^{-} ions.

$4H_2O \rightarrow 4H^+ + O_2 + 4e^- + 2H_2O$

O_2 is liberated as by product and H^+ ions are used for reduction of NADP

$2NADP + 4H^+ \rightarrow 2NADPH_2$

(iii) Photophosphorylation : During this process ATP are produced. It takes place in **quantasomes / photosystem**. Inorganic phosphate is required to convert ADP to ATP.

(B) Dark Reaction :

- This reaction is not dependent on light. It is also known as Calvin – Benson Cycle or C3 cycle as first stable product is phosphoglyceric acid (PGA) a 3 carbon compound.
- **Site :** Stroma of chloroplast

Major Step :

(i) Carboxylation : In this CO_2 is captured by CO_2 acceptors like RUBP (C_3 Plants) PEP (C_4 Plants) with the help of **carboxylase enzyme** i.e. **RuBisCO & PEPCo** respectively. The first stable compound of C_3 cycle is a three carbon containing moleclule **phosphoglyceric acid** so it is called as C_3 cycle while in C_4 cycle it is four carbon containing **oxalo acetic acid**.

(ii) Synthesis of glucose : In this phase captured CO_2 is assimilated into glucose in the presence of phosphatase and isomerase enzyme.

(iii) Regeneration of RUBP.

◈ **C_4 Cycle or Hatch & Slack cycle :**

- 4-C compound i.e. **oxaloacetic acid** (OAA).
- This cycle is found in many other tropical & subtropical monocots eg : Maize, Sorghum , Wheat, Oat, Pearl, millet etc.
- In dicots also many such plants are known eg : Amaranthus, Chenopodium, Atriplex, Euphorbia etc. In some families of dicots Compositae, Portulaceae, Nyctaginaceae.

◈ **Crassulacean Acid Metabolism (CAM) :**

- Certain plants, especially succulents which grow under extremely xeric (dry) condition, fix atmospheric CO_2 in dark.
- Since the process was first observed in the plants belonging to family crassulaceae (eg. Bryophyllum, kalanchoe etc.) It was termed crassulacean acid metabolism (CAM).
- The most characteristic feature of these plants is that their stomata remain open at night (in dark) but closed during the day (in light).
- Thus, CAM is a kind of adaptation in succulents to carry out photosynthesis without much loss of water.

Nutrition in Animals

◈ **Nutrition in Amoeba :**

Protozoa carry out holozoic nutrition through intracellular digestion.

(i) Ingestion : Some protozoa can ingest food particle from any point on the surface (e.g., *Amoeba*) while others have fixed points for the same (*e.g.*, *Paramoecium*). Protozoans like *Amoeba* capture food with the help of temporary finger-like processes called **pseudopodia**. Protozoans like (*Paramoecium* have small hair-like processes called cilia.) Beating of cilia creates current in water that pushes food particle through cytostome or cell mouth. The process of ingestion of solid food particle by a cell or unicellular organism is called **phagocytosis**.

(ii) Digestion : In amoeba, food is digested in the food vacuole by digestive enzymes. These enzymes break down the food into small and soluble molecules by chemical reactions.

(iii) Absorption : The digested food is directly absorbed into the cytoplasm by diffusion. After absorption the food vacuole disappears.

(iv) Assimilation : The absorbed food is used to obtain energy which leads to growth and reproduction of Amoeba.

(v) Egestion : Amoeba does not have any fixed place for removing the digested food.

For removal of accumulated wastes or undigested food, the cell membrane ruptures at a place and waste is thrown out.

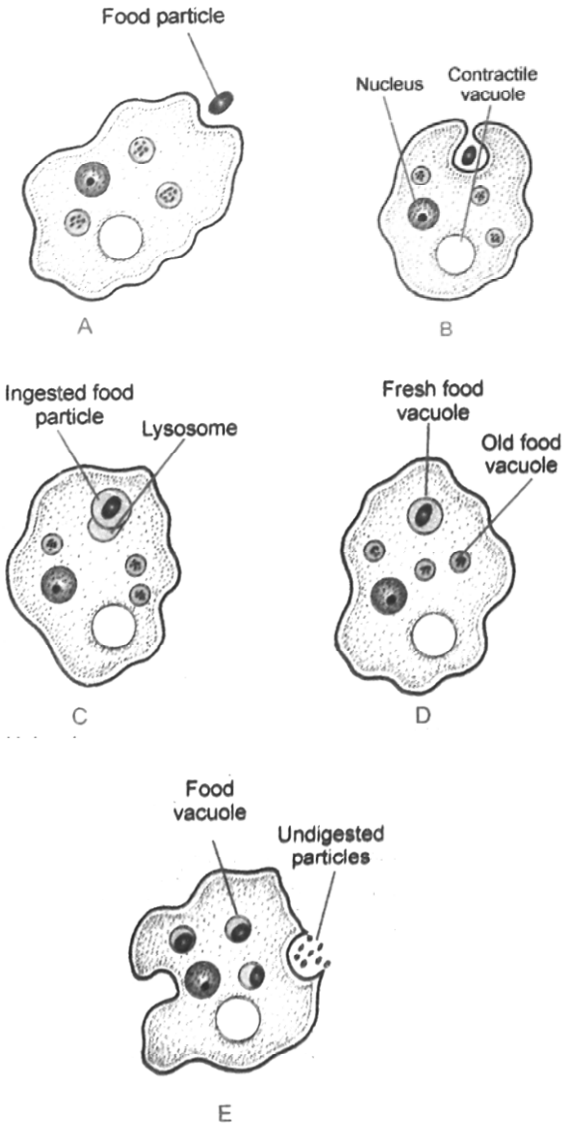
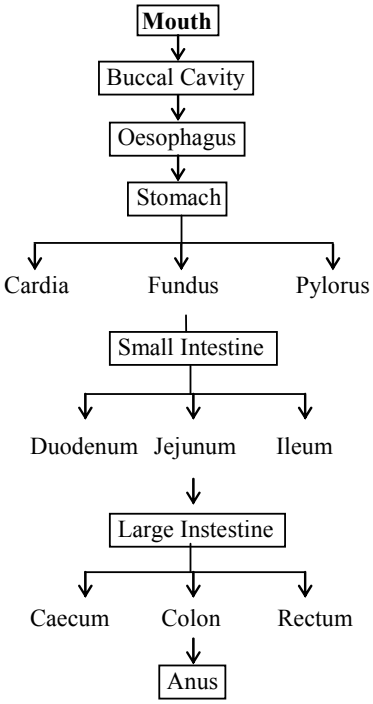


Figure : Holozoic nutrition in Amoeba

- As soon as *Amoeba* comes in contact with a food particle or prey, it throws pseudopodia all around the same. The tips of encircling pseudopodia fuse and the prey comes to lie in a vesicle or **phagosome**.

Digestive System of Human

Digestive system is a group of organs & associated digestive glands that take part in ingestion, digestive absorption of food & egestion of undigested matter. Digestive organs form a continuous canal called alimentary canal. Alimentary Canal in man is 9 metres long & consists of the following parts.



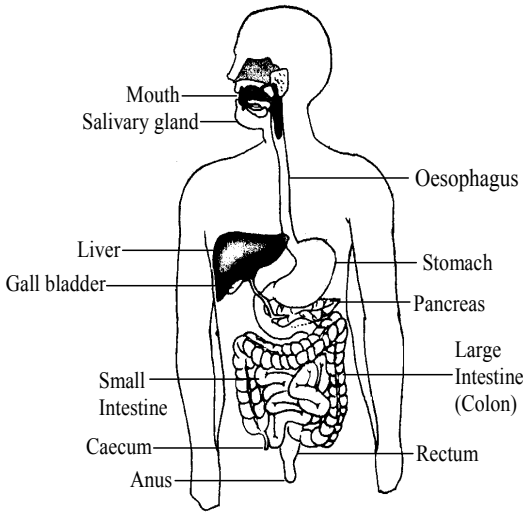


Figure : Digestive system

◈ **Associated glands :**

(A) Salivary glands : -

(i) Parotid gland, (ii) Sub mandibular glands, (iii) Sub lingual glands

(B) Gastric glands

(i) Cardiac gland, (ii) Pyloric gland, (iii) Fundic gland

(C) Liver

(D) Pancreas

Boost Your Knowledge

- Liver is a bilobed structure and is the largest gland present in the human body.
- Liver is the only organ that possess capacity to regenerate in human.

◈ **Mouth :**

Transverse slit like aperture which is bounded by lips.

◈ **Oral Cavity :**

It has teeth, tongue & palate.

(A) Teeth :

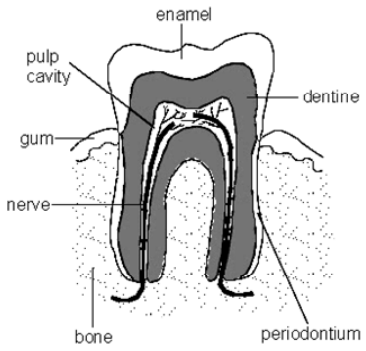


Figure : Tooth

- The food taken inside oral cavity is masticated i.e. mechanically broken into smaller particles before being swallowed by the help of teeth.
- Man possesses teeth on both the jaws, there are 32 teeth of four different types, namely incisors, canines, premolars & molars.
- There are four different types of teeth in humans (Heterodont).

Incisors	:	For cutting
Canines	:	For tearing
Premolars	:	For grinding
Molars	:	For grinding

Dental Formula :

(i) Milk teeth / Primary

(ii) Permanent teeth

$$\frac{\text{No. of teeth in half part of upper jaw}}{\text{No. of teeth in half part of lower jaw}} \times 2 = x$$

- In Child $\rightarrow I\frac{2}{2}, C\frac{1}{1}, Pm\frac{0}{0}, M\frac{2}{2} = \frac{5}{5} \times 2 =$ **Total 20 teeth**
- In Man $\rightarrow I\frac{2}{2}, C\frac{1}{1}, Pm\frac{2}{2}, M\frac{3}{3} = \frac{8}{8} \times 2 =$ **Total 32 teeth**

Boost Your Knowledge

- Jaws present in buccal cavity of humans are provided with four different types of teeth this is called **Heterodont**.
- Thecodont means "Socket tooth", means that thecodont teeth are set in sockets of jaw bones.
- **Dental plaque** is a biofilm or mass of bacteria that grows on surfaces within the mouth.
- **Diastema :** It is a space or gap between two teeth.
- **Enamel :** It is the hardest substance of human body. It covers the crown portion of the tooth.
- **Dentin :** It is the hard dense bony tissue forming bulk of teeth & it is second hardest tissue in body after enamel.
- **Periodontium :** It refers to the specialized tissues that surround & support the teeth, maintaining them in their respective bones.

(B) Tongue

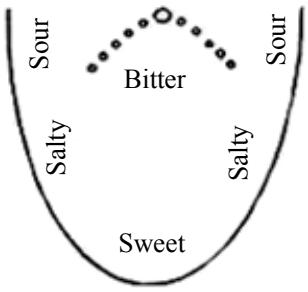


Figure : Tongue

- The fleshy muscular organ in the mouth of a mammal, used for tasting, licking, swallowing and (in humans) articulating speech.
- It forms the floor of the mouth and bears taste buds.

(C) Palate : It is the structure which separates nasal and oral cavity. It has two parts.

(i) Hard palate

(ii) Soft palate

◈ **Pharynx :**

- It is short conical region that lies after the oral cavity.
- It is a common passage to air and food.

◈ **Oesophagus :**

- It is a long narrow muscular tube which leads to the stomach. No digestive gland are present.
- It is also called as gullet or food pipe.

Boost Your Knowledge

- Cooked starch $\xrightarrow[\text{Ptyalin}]{\text{Amylase}}$ Maltose
- **Peristalsis** is a series of contraction and relaxation of muscles of alimentary canal that pushes the food downward.
- Reverse peristalsis or retroperistalsis is the reverse of peristalsis, usually occur before vomiting.

◈ **Stomach :**

- It lies below the diaphragm on the left side of abdominal cavity.
- It is J-shaped.

Boost Your Knowledge

- Food is churned in the stomach for about three hours.
- HCl provides acidic medium to the food, and kill microorganisms present in the food.
- Mucus secreted by the stomach wall protects its wall from its own secretion of HCl.
- Peptic ulcers are sores or ulcers in the lining of the stomach, lower oesophagus, or small intestine, usually as a result of inflammation caused by the bacteria.
- Salivary amylase become inactive in stomach due to acidic pH.
- Pepsinogen $\xrightarrow{\text{HCl}}$ Pepsin

  Protein $\xrightarrow{\text{Pepsin}}$ Proteases
- Gastric lipases partially digest fats
- Prorenin $\xrightarrow{\text{HCl}}$ Rennin
- Casein $\xrightarrow{\text{Rennin}}$ Paracasein

◈ **Small Intestine :**

- It is convoluted tube and differentiated into 3 regions, viz. **Duodenum** which is the first part of small intestine & is curved C-shaped; **Jejunum**, comparatively longer & more coiled and **Ileum**, which is the last part of small intestine whose inner surface is folded to form villi, which absorbs the products of digestion

Boost Your Knowledge

- The duodenum part of small intestine receives secretions from Liver and Pancreas through a common duct called the "Hepato-Pancreatic Duct".

- Liver secretes "Bile" which provides alkaline medium and emulsifies the fat molecules.
- Duodenal wall secretes enterokinase which activates the trypsin

  Trypsinogen $\xrightarrow{\text{Enterokinase}}$ Trypsin

  Chymotrypsinogen $\xrightarrow{\text{Trypsin}}$ Chymotrypsin

  Polypeptides $\xrightarrow{\text{Chymotrypsin}}$ Peptide fragments
- Carbohydrates are converted to dissacharides by pancreatic amylase and and maltase converts them to glucose.
- Pancreatic lipase converts emulsified fats to fatty acids and glycerols.
- Fats $\xrightarrow[\text{Emulsify}]{\text{Bile}}$ Fat globules $\xrightarrow{\text{Lipase}}$ Glycerol + Fatty acid

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***Can you think why ?* /**

- Why are villi present on the wall of ileum ?
- What will happen if no bile is secreted.

◈ **Large Intestine :**

- It is much shorter & wider than small intestine & is differentiated into three regions;
- **Caecum** which is small rounded blind sac from which vermiform appendix arises.
- **Colon** is the inverted U-shaped tube.
- The **rectum** opens to exterior through anus.
- No digestion takes place in large intestine, only absorption of water takes place.
- In herbivores like horse, rabbit digestion of cellulose takes place in caecum.

◈ **Absorption :**

- Some simple sugars are absorbed in the mouth.
- In the small intestine (ileum) absorption of all digested materials takes place through villi.
- Excess water is absorbed by the large intestine.

◈ **Assimilation :**

It is the process of utilisation of absorbed food for various body functions. The absorbed nutrients are utilised to resynthesise complex molecules like carbohydrates, protein & fats inside the cells.

Man cannot digest cellulose.

◈ **Egestion :**

It is the process of elimination of undigested food formed in the cells, or in the lumen of large intestine (colon & rectum) through the anus.

Voluntary contraction of abdominal muscles help in egestion of faeces.

Boost Your Knowledge

- **Dysphagia :** Difficulty or discomfort in swallowing.
- **Coprophagy :** It is the consumption of faeces. It has been observed in rabbits.

TABLE : SUMMARY OF DIGESTION ENZYMES OF VARIOUS GLANDS WITH THEIR SECRETIONS AND END PRODUCTS OF DIGESTION IN MAN

TABLE : DIGESTIVE GLANDS, THEIR SECRETIONS & ACTION					
Name of Gland	**Secretion**	**Enzyme**	**Site of action**	**Substrates**	**Products**
Salivary glands	Saliva	Salivary Amylase	Buccal cavity	Starch	Maltose., Isomaltose
Gastric glands	Gastric Juice	(a) Pepsin (Pepsinogen inactive)	Stomach	Protein	Peptones
		(b) Rennin (Prorennin inactive)	Stomach	Casein	Paracasein
Pancreas	Pancreatic Juice	(a) Pancreatic Amylase	Small intestine	Starch Glycogen	Maltose, Isomaltose
		(b) Trypsin (Trypsinogen inactive)	Small intestine	Proteins	Peptides
		(c) Chymotrypsin (Chymotrypsinogen inactive)	Small intestine	Casein (milk)	Paracasein
Intestinal gland (Crypts of Lieberkuhn)	Intestinal Juice	(a) Enterokinase (Hormone)	Small intestine	Trypsinogen (inactive)	Trypsin (active)
		(b) Aminopeptidase	Small intestine	Peptides	Smaller peptides Amino acids
		(c) Dipeptidases	Small intestine	Dipeptides	Amino acids
		(d) Isomaltase	Small intestine	Isomaltose	2 Glucose
		(e) Maltase	Small intenstine	Maltose	2 Glucose
		(f) Sucrase	Small intestine	Sucrose	Glucose, Fructose
		(g) Lactase	Small intestine	Lactose	Glucose, Galactose
		(h) Lipase	Small intestine	Triglycerides	Monoglycerides, Fatty acids
Liver	Bile (Bile + pigments)	No enzymes	Duodenum	Fats	Fat droplets

EXERCISE # 1

A Objective Type Questions

Q.1 CO_2 and O_2 balance in atmosphere is due to
(A) Photorespiration
(B) Photosynthesis
(C) Respiration
(D) Transpiration

Q.2 During photosynthesis the oxygen in glucose comes from
(A) Water
(B) Carbon dioxide
(C) Both from water and carbon dioxide
(D) Oxygen in air

Q.3 First stable compound in C_3 cycle is
(A) Phosphoglyceraldehyde
(B) Phosphoglyceric acid
(C) Fructose-1-6 diphosphate
(D) Glucose-6-phosphate

Q.4 Dark reaction of photosynthesis occurs in the
(A) Stroma of the chloroplast outside the lamellae
(B) Space between the two membranes of the chloroplast
(C) Membranes of the stroma lamellae
(D) Thylakoid membrane of the grana

Q.5 A specific function of light energy in the process of photosynthesis is to
(A) Activate chlorophyll
(B) Oxidation of CO_2
(C) Synthesis of glucose
(D) Reduce CO_2

Q.6 Digestion within a digestive tract is
(A) Incomplete
(B) Extracellular
(C) The same as absorption
(D) An irreversible process

Q.7 Dark reaction in photosynthesis is called so because
(A) It does not require light energy
(B) Cannot occur during daytime
(C) Occurs more rapidly at night
(D) It can also occur in darkness

Q.8 Phloem always flows from a
(A) Solar source to sugar sink
(B) Sugar sink to sugar source
(C) Leaf to the xylem to the phloem
(D) Leaf to a root

Q.9 With regards to natural eating habits, a human is
(A) An herbivore (B) A carnivore
(C) An omnivore (D) A Granivore

Q.10 Muscular contractions of alimentary canal are
(A) Circulation (B) Deglutition
(C) Peristalsis (D) Churning

Q.11 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

Q.12 A digestive enzyme, salivary amylase, in the saliva begin digestion of
(A) Protein (B) Nucleic acids
(C) Fats (D) Carbohydrates

Q.13 If you chew on a piece of bread long enough, it will begin to taste sweet because
(A) Maltase is breaking down maltose
(B) Lipases are forming fatty acids
(C) Amylase is breaking down starches to disaccharides
(D) Disaccharides are forming glucose

Q.14 In the presence of lactase, lactose breaks down into molecules of
(A) Glucose and galactose
(B) Glucose and fructose
(C) Galactose only
(D) Glucose only

Q.15 Saliva has the enzyme
(A) Pepsin (B) Ptyalin
(C) Trypsin (D) Rennin

Q.16 Pepsin digests
(A) Proteins in stomach
(B) Carbohydrates in duodenum
(C) Proteins in duodenum
(D) Fats in ileum

Q.17 Curding of milk in the stomach is due to the action of
(A) Lipase (B) Rennin
(C) Ptyalin (D) Tannin

Q.18 Chief function of HCl is
(A) To maintain a low pH to prevent growth of micro-organisms
(B) To facilitate absorption
(C) To maintain low pH to activate pepsinogen to form pepsin
(D) To dissolve enzyme secreted in stomach

Q.19 If the stomach did not produce any hydrochloric acid, which enzyme will not function ?
(A) Ptyalin (B) Trypsin
(C) Pepsin (D) Collagenase

Q.20 Chief function of bile is
(A) To digest fat by enzymatic action
(B) To emulsify fat for digestion
(C) To eliminate waste product
(D) To regulate process of digestion

Q.21 Where is bile produced ?
(A) In gall bladder
(B) In blood
(C) In liver
(D) In spleen

Q.22 Ileum is
(A) First part of the small intestine
(B) Middle part of the small intestine
(C) Last part of the small intestine
(D) Not a part of the small intestine

Q.23 Largest gland in human body is
(A) Liver (B) Pancreas
(C) Pituitary (D) Thyroid

Q.24 The specific function of liver is
(A) Excretion
(B) Digestion
(C) Histolysis
(D) Glycogenesis and glycogenolysis

Q.25 The original function of the vertebrate stomach was
(A) Storage
(B) Digestion
(C) Enzyme secretion
(D) Absorption

B Fill in the Blanks

Q.26 (i) …….is inverted U shaped tube in large intestine.
(ii) Liver secretes …… which provides alkaline medium.
(iii) Oesophagus is also called as ……. .
(iv) Amoeba ingests its food with the help of …….. .
(v) Dark reaction occurs in …… of a chloroplast.

C True or False

Q.27 (i) Most of the digestion occurs is jejunum,

(ii) Enamel is the hardest substance of human body.
(iii) Pepsionogen requires alkaline medium to convert into pepsin.

(iv) Coprophagy is the consumption of faecal matter.
(v) Bile emulsifies fat molecules.

D Match the Column

Q.28

(i) Bats	A. Saprophytic
(ii) Leeches	B. Detrivores
(iii) Fungi	C. Parasitic
(iv) Earthworm	D. Sanguinivore
(v) Lice	E. Frugivore

EXERCISE # 2

A Very Short Answer Type Questions

Q.1 Define heterotrophic nutrition.

Q.2 What are heterotrophs ?

Q.3 Which types of organisms are called consumers ?

Q.4 What is saprophytic nutrition ?

Q.5 Define saprophyte.

Q.6 Define a herbivore.

Q.7 What is carnivore ?

Q.8 Which type of animal is called omnivore ?

Q.9 Define digestion.

Q.10 What is ingestion ?

Q.11 Define egestion.

Q.12 What is the mode of nutrition in *Amoeba* ?

Q.13 What type of digestion occurs in *Paramoecium* ?

B Short Answer Type Questions

Q.14 Differentiate between autotrophic and heterotrophic nutrition.

Q.15 Distinguish saprophytes from parasites.

Q.16 Differentiate between photosynthetic and holozoic nutrition.

Q.17 How do saprophytic organisms obtain their nourishment ?

Q.18 What is the importance of saprophytes ?

Q.19 What is the action of hydrochloric acid of gastric juice ?

Q.20 Name a digestive juice that has no enzymes. What is the role of this juice ?

Q.21 Name the various parts of large intestine. What is the role of large intestine ?

C Long Answer Type Questions

Q.22 Explain the mechanism of nutrition of *Amoeba* with the help of suitable diagram.

Q.23 Describe the various types of heterotrophic nutrition.

Q.24 Briefly describe the digestive system of humans.

Q.25 What happens to food in the small intestine ?

Q.26 Why chlorophyll is needed for photosynthesis.

EXERCISE # 3

Q.1 Bile Juice is secreted from –
(Raj/NTSE Stage-1/Nutrition/13)
(A) Salivary glands (B) Intestinal glands
(C) Stomach (D) Liver

Q.2 When acidity in Stomach increases, the medicine generally used is –
(Raj/NTSE Stage-1/Nutrition/13)
(A) Sodium bicarbonate
(B) Sodium Carbonate
(C) Ammonium Carbonate
(D) Ammonium bicarbonate

Q.3 Substances necessary for autotrophic Nutrition are – **(Raj/NTSE Stage-1/Nutrition/13)**
(A) CO_2 and H_2O (B) Chlorophyll
(C) Sun light (D) All of the above

Q.4 Consider following chemical reaction
$6CO_2+12H_2O \longrightarrow C_6H_{12}O_6+6O_2+6H_2O$
(Haryana/NTSE Stage-1/Nutrition/2013)
(a) CO_2 is oxidized to glucose
(b) CO_2 is reduced to glucose
(c) H_2O is oxidized to O_2
(d) H_2O is reduced to O_2
Which answer is correct?
(A) a & d (B) b & c
(C) b & d (D) a & c

Q.5 Hydrochloric acid facilitates the action of which enzyme?
(Chandigarh/NTSE Stage-1/Nutrition/2013)
(A) salivary amylase (B) pepsin
(C) trypsin (D) Lipase

Q.6 Concentrated nitric acid is used in a test to detect adulteration of:
(Karnataka /NTSE Stage-1/Nutrition/2013)
(A) Cooking oil (B) Milk
(C) Salt (D) Tea powder

Q.7 In an experiment where two potted plants kept in a dark room are used to demonstrate that carbondioxide is essential for photosynthesis potassium hydroxide is used because it :
(Karnataka /NTSE Stage-1/Nutrition/2013)
(A) Releases oxygen
(B) Absorbs carbondioxide
(C) Releases carbon dioxide
(D) Absorbs oxygen

Q.8 Organisms capable of synthesizing their own food are called:
(Mizoram/NTSE Stage-1/Nutrition/2013)
(A) heterotrophs
(B) autotrophs
(C) decomposers
(D) parasites

Q.9 Which one of the following enzymes is present in saliva?
(Mizoram/NTSE Stage-1/Nutrition/2013)
(A) Pepsin (B) Chymotrypsin
(C) Trypsin (D) Ptyalin

Q.10 Which one of the following compound contains two carbon atoms?
(Orrisa/NTSE Stage-1/Nutrition/2013)
(A) Ethanol
(B) Pyruvic acid
(C) Lactic acid
(D) Glucose

Q.11 Read the following two statements and choose the correct answer.
(Orrisa/NTSE Stage-1/Nutrition/2013)
i. Stomata regulates the body temperature in plants.
ii. Stomata helps in the absorption of minerals from the soil.
(A) i is true but ii is false
(B) i is false but ii is true
(C) Both i and ii are true
(D) Both i and ii are false

Q.12 Which part of the human alimentary canal, is the site for complete digestion of carbohydrates.
(Punjab/NTSE Stage-1/Nutrition/2013)
(A) Stomach
(B) Small Intestine
(C) Large Intestine
(D) Rectum

Q.13 In which one of the following alternatives the correct order of processes is given ?
(Maharashtra/NTSE Stage-1/Nutrition/2013)
(A) Assimilation → Absorption → Digestion → Ingestion → Egestion
(B) Absorption → Digestion → Ingestion → Assimilation → Egestion
(C) Digestion → Ingestion → Assimilation → Absorption → Egestion
(D) Ingestion → Digestion → Absorption → Assimilation → Egestion

Q.14 This part of alimentary canal absorbs maximum amount of water and minerals:
(Maharashtra/NTSE Stage-1/Nutrition/2013)
(A) Small intestine (B) Large intestine
(C) Stomach (D) Oesophagus

Q.15 Food becomes _____ due to bile juice.
(Maharashtra/NTSE Stage-1/Nutrition/2013)
(A) Acidic
(B) Alkaline
(C) Neutral
(D) First neutral and then acidic

Q.16 Which of the following enzymes is related with digestion of protein?
(Raj/NTSE Stage-1/Nutrition/2013)
(A) Lipase (B) Pepsin
(C) Sucrase (D) Amylase

Q.17 What does liver secrete?
(Gujarat/NTSE Stage-1/Nutrition/2013)
(A) Insulin (B) Bile
(C) Gastric juice (D) Mucus

Q.18 Which of the following plant is a parasite?
(Gujarat/NTSE Stage-1/Nutrition/2013)
(A) Cuscuta (B) Mushroom
(C) Giloe (D) Fern

Q.19 Which two plant species obtain nutrition as symbionts in Lichens?
(M.P./NTSE Stage-1/Nutrition/2013)
(A) Rhizobium and Drocera
(B) Fungi and Rose plant
(C) Algae and Virus
(D) Algae and Fungi

Q.20 In photosynthesis, the function of stomata is to let:
(Karnataka/NTSEStage-1/Nutrition/2013)
(A) CO_2 into the leaf from atmosphere
(B) O_2 in to the leaf from atmosphere
(C) Out CO_2 from the leaf to atmosphere
(D) Out O_2 from the leaf to atmosphere

Q.21 Assertion : Photosynthesis is minimum in green light
(Hariyanan/NTSE Stage-1/Nutrition/2013)
Reason : Chlorophylls are green in colour.
Direction :
(A) both assertion and reason are true and reason is correct explanation of assertion.
(B) Both assertion and reason are true but reason is not correct explnation of assertion
(C) Assertion is true but reason is False
(D) Assertion is false but reason is true.

Q.22 The substance essential for photosynthesis is
(Rajasthan/ntsestage I 2015)
(A) glucose (B) oxygen
(C) nitrogen (D) water

Q.23 Which of the following products of light dependent phase are used during light independent phase of photosynthesis?
(W.B./ntsestage I 2015)
(A) RuBP & ATP
(B) H_2O & O_2
(C) $NADPH_2$ & ATP
(D) ATP & O_2

Q.24 Chlorophyll contains.....
(M.P./ntsestage I 2015)
(A) Potassium
(B) Iron
(C) Manganese
(D) Magnesium

Q.25 Which of the following is an example of Insectivorous plant –
(M.P./ntsestage I 2015)
(A) Cuscuta (B) Rafflesia
(C) Drosera (D) Tulsi

Q.26 Photosynthesis is an important mode of autotrophic nutrition. The event which does not occur in photosynthesis is:

(Delhi/ntsestage I 2015)

(A) Conversion of light energy to chemical energy
(B) Reduction of carbon dioxide to carbohydrate
(C) Oxidation of carbon to carbondioxide
(D) Absorption of light energy by chlorophyll

Q.27 Which is the longest organ of the digestive system?

(Gujarat/NTSE Stage-1/Nutrition/2015-16)

(A) Oesophagus (B) Stomach
(C) Small Intestine (D) Large Intestine

Q.28 Deficiency of vitamin 'A' causes –

(M.P./NTSE Stage-1/Nutrition/2015-16)

(A) Beri-Beri (B) Anaemia
(C) Night blindness (D) Scurvy

Q.29 One of the following juices secreted in the body of man does not contain any enzyme –

(Bihar/NTSE Stage-1/Nutrition/2015)

(A) Gastric juice (B) Saliva
(C) Bile juice (D) Pancreatic juice

Q.30 Which of the following factors does a plant use for the process of photosynthesis?

(Gujarat/NTSE stage I 2015-16)

(A) Sunlight (B) Chlorophyll
(C) CO_2 and H_2O (D) All of them