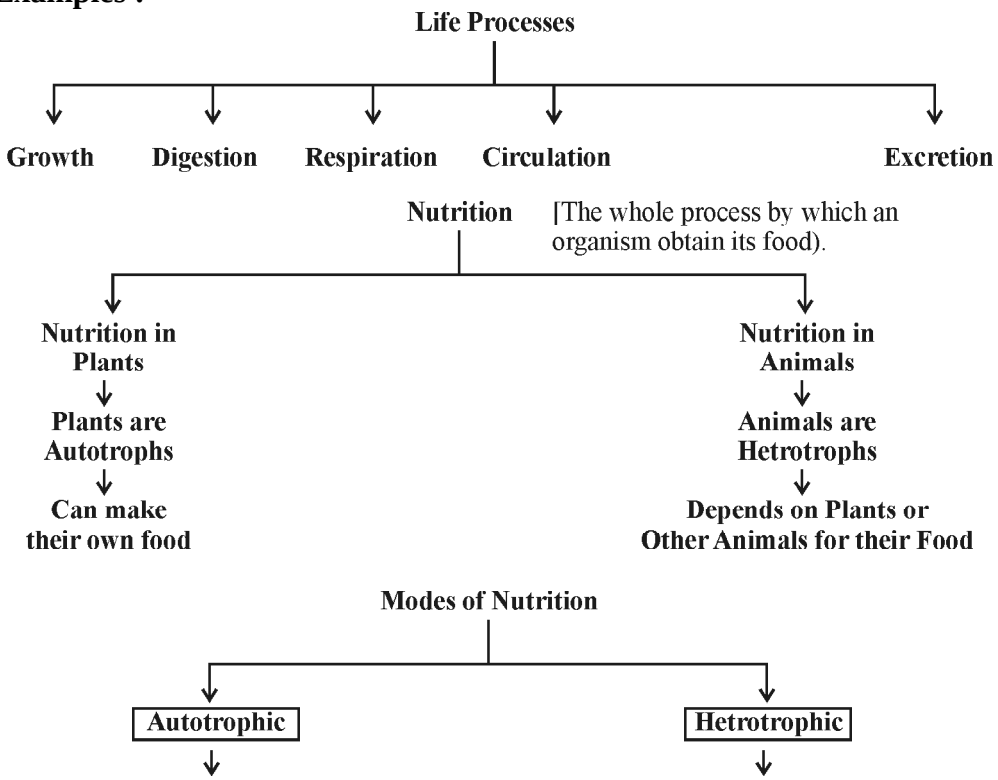
CHAPTER – 6

LIFE PROCESSES

All living things perform certain life processes like growth, excretion, respiration, circulation etc.

All the processes like respiration, digestion, which together keep the living organisms alive and perform the job of body maintenance are called life processes.

Examples :



Kinds of nutrition in which in organic materials like CO_2, water etc are utilized to prepare organic food by the process of photosyntheses

Eg. Green Plants

Kinds of nutrition in which in organisms do not possess the ability to synthesize their own food. They depend on autotrophs for their food supply directly or indirectly.

eg. Animals, Fungi

Autotrophic Nutrition :

The organisms which carry out autotrophic nutrition are called autotrophs (green plants)

Autotrophs —Use→ **Simple in organic material** —**Convert Into**→ **Complex high energy molecules Carbohydrates**

Autotrophic nutrition is fulfilled by the process by which autotrophs take in CO_2 and H_2O and convert these into carlohydrates in the presence of chlorophyll, sunlight is called PHOTOSYNTHESIS

Equation :

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

Raw Materials for Photosynthesis :

Sunlight

Chlorophyl → Sunlight absorbed by chlorophyll

CO_2 → enters through Stomata, and Oxygen (O_2) is released as by product through stomata on leaf.

Water → water + dissolved minerals like Nitrogen phosphorous etc are taken up by the roots from the soil.

Site of Photosynthesis :

Chloroplast in the leaf. Chloroplast contain chlorophyll. (green pigment)

Main Events of Photosynthesis :

Absorption of light energy by chlorophyll

Conversion of light energy into chemical energy + splitting (breaking) of water into hydrogen and oxygen.

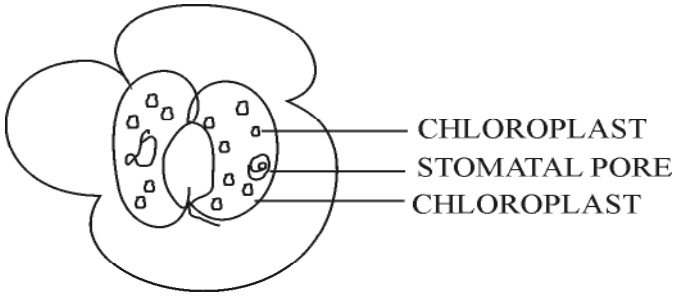
Reduction of CO_2 to carbohydrates.

STOMATA : Tiny pores present on the surface of the leaves

FUNCTIONS :

(i) Exchange of gases O_2/CO_2

(ii) Loses large amount of water [water vapour] during transpiration.



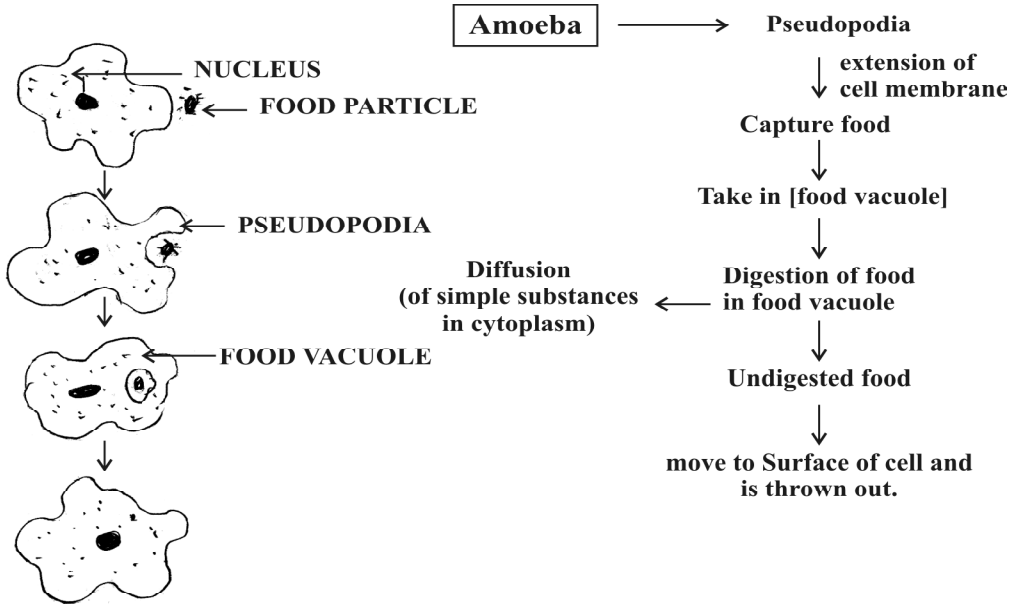
Hetrotrophic nutrition

HOLOZOIC	SAPROPHTIC	PARASITIC
Animals take in solid food and breakdown inside the body	Organisms feed on dead, decaying matter	Parasites live inside or outside other organism (host) and derive nutrition from it.
eg. Amoeba, animals	eg. fungi	eg. cuscuta (plant parasite ticks etc.

How do organisms obtain their food

Unicellular / single celled organism : food is taken up through entire surface.

Example : (i) Amoeba. (ii) Paramaecium



NUTRITION IN AMOEBA

(ii) Paramecium → Cilia (present all over the body) → take in food ↓ At a specific spot

Steps in Hologic nutrition

- **Ingestion** अंर्तग्रहण
- **Digestion** पाचन
- **Absorption** अवशोषण
- **Assimilation** स्वांगीकरण
- **Egestion** वहिक्षेषण

NUTRITION IN HUMAN BEINGS

The human digestive system comprises of alimentary canal and associated disgestive glands.

Mouth → Intake of whole food
↓
Teeth → Chewing/grinding of food.
↓
Tongue → Rolling of food
↓ +
Tasting of food
+
Swallowing / pushing down of the food

Salivary Glands → Secrete Saliva + Mucus.

↓ Starch $\xrightarrow[\text{amylase [Saliva]}]{\text{Salivary}}$ Sugar

Oesophagus → Taking food from mouth to stomach by
↓ Peristaltic movements
[contraction and expansion of muscles of the oesophagus]

Stomach → Gastric glands secrete Gastric juice

Gastric juice

- **PEPSIN** [enzyme that breaks down proteins]
- **HCl** [makes medium acidic]
- **MUCUS** [Protects inner lining of the stomach

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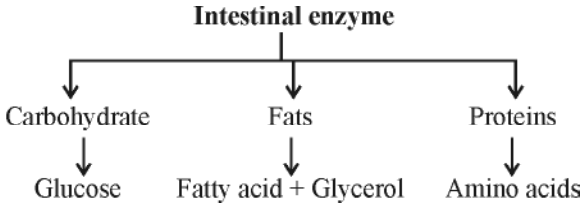
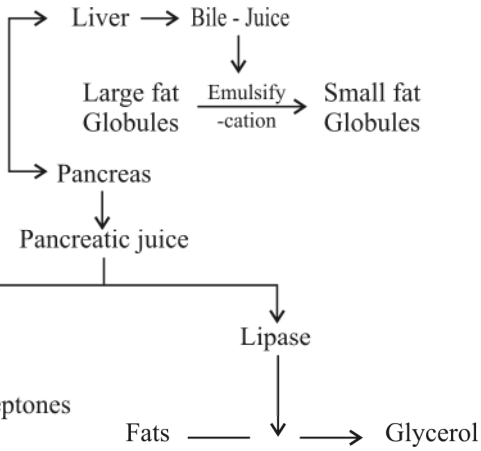
Small Intestinal →



Small Intestine → Villi ⟶ helps in absorption of food into the blood. [finger like projections]

small intestine → Receives secretion from



Emulsification : The process of breakdown of large fat globules into smaller fat globules by bile juice.

Large intestine → Absorb excess of water.

→ The rest of the material is removed from the body via the anus. (Egestion)

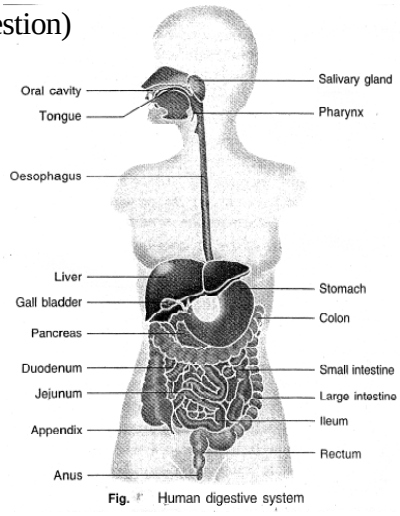


Fig. Human digestive system

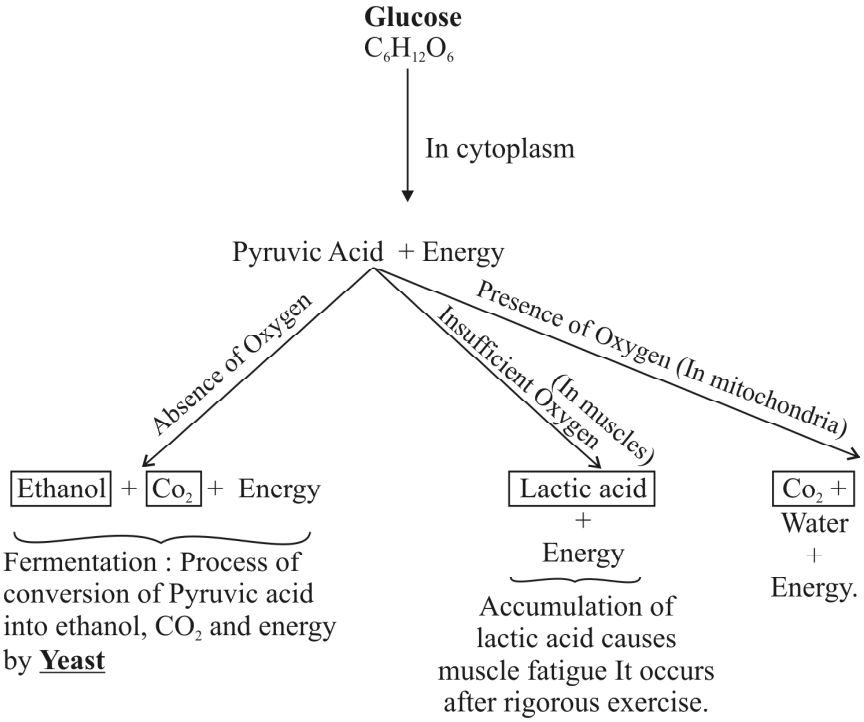
Respiration

Respiration involves

(i) Gaseous exchange : Intake of oxygen from the atmosphere and release of CO_2 $\rightarrow$ Breathing

(ii) Breakdown of simple food in order to release energy inside the cell $\rightarrow$ Cellular Respiration

Breakdown of Glucose by various pathways



Respiration

Aerobic

* Takes place in the presence of oxygen
* Occurs in mitochondria
* End products are CO_2 and H_2O
* More amount of energy is released

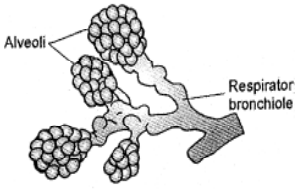
Anaerobic

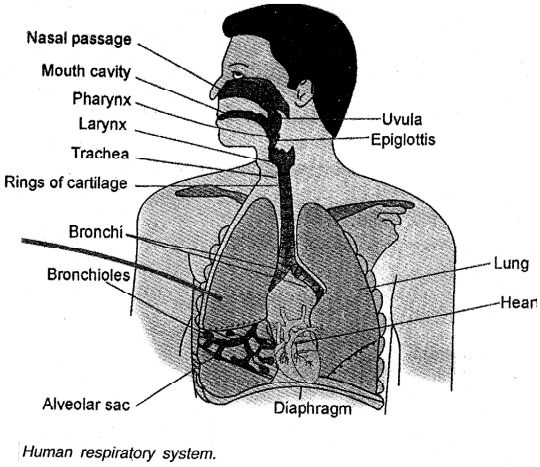
* Takes place in the absence of oxygen
* Occurs in cytoplasm
* End products are alcohol or lactic acid.
* Less amount of energy is released.

Human Respiratory System

Passage of air through the respiratory system.

Nostril
↓
Nasal Passage
↓
Nasal Cavity
↓
Pharynx
↓
Larynx
↓
Trachea
↓
Bronchi
↓
Lungs
↓
Bronchioles
↓
Alveolar → Blood capillaries





Human respiratory system.

Mechanism of Breathing

Inhalation

* During inhalation the thoracic cavity (chest cavity) expands
* Ribs lift up
* Diaphragm become flat in shape
* Volume of lungs increases and air enters the lungs

Exhalation

* Thoracic cavity contracts
* Ribs move downwards

Diaphragm becomes dome shaped

* Volume of lungs decreases and air exits from the lungs.

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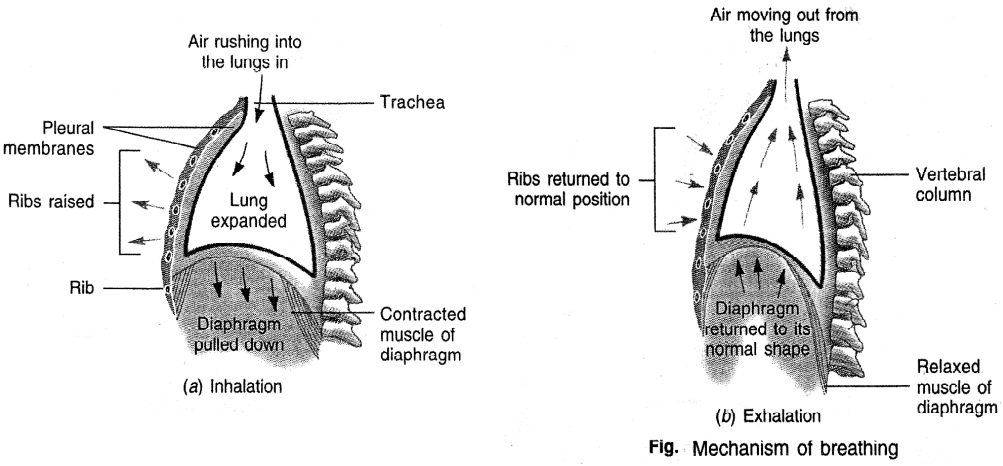


Fig. Mechanism of breathing

Exchange of Gases between alveolus, blood and tissues.

1. Air (rich in O_2) (in alveolus) → Blood [through blood vessels] → O_2 Binds with Haemoglobin in RBC → O_2 is rclcascd in tissues

2. CO_2 (from tissue) → CO_2 released into blood → CO_2 Dissolved in blood → Blood vessels (in alveoli) → CO_2 Released in alveolar SaC → CO_2 Sent out through nostrils

Terrestial Organism – use atmospheric oxygen for respiration

Aquatic Organisms – used dissolved oxygen for respiration

Respiration in Plants :

Respiration in plants is simpler than the respiration in animals. Gaseous exchange occur through

1. Stomata in leaves
2. Lenticels in stems
3. General surface of the roots.

Life Process (II)

Transporation and Excretion

– Human beings like other multicellular organism need regular supply of food, oxygen etc., This function is performed by circulatory system or Transport system.

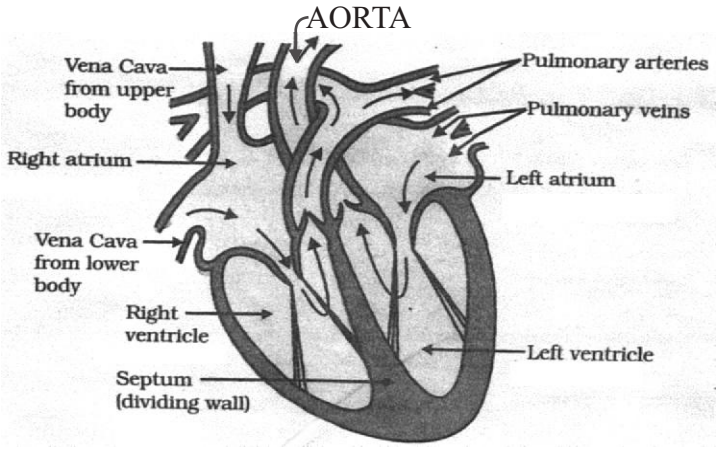
– The circulatory system in human beings consists of :

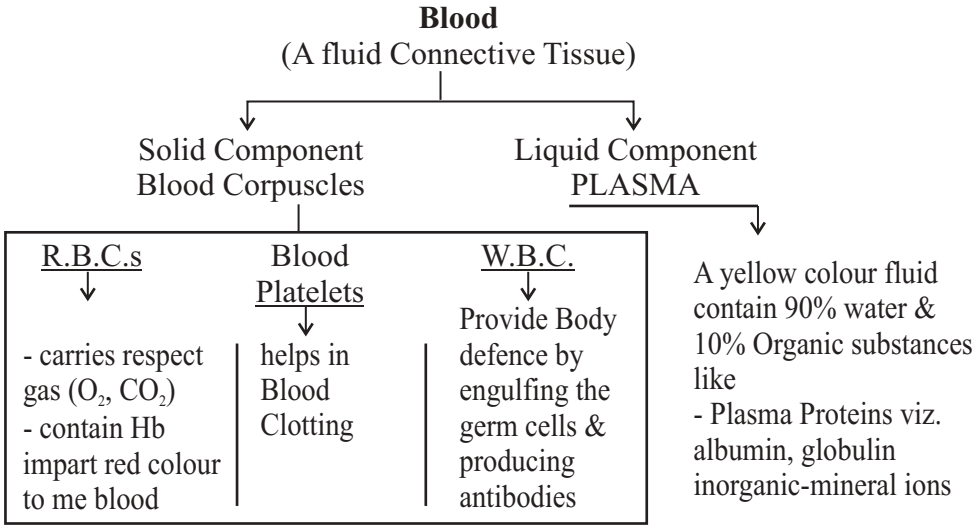
The circulatory system in human beings consists of :

A Pumping Organ **Heart** | Blood vessels **- Arteries & Veins** | A circulatory medium **Blood & Lymph**

Blood Circulation in Human Heart

Deoxygenate Blood (from body) → Vena Cava → Right Atrium (Relaxed) → Right Atrium (contracts) → Right Ventricle (relaxed) → Right ventricle contracts → Lungs → Oxygenated blood → Left Atrium (relaxed) → Left Atrium (contracts) → Left Ventricle (relaxed) → Left Ventricle (contracts) → Body Parts via AoRTA





- Lymph - a yellowish fluids escapes from the blood capillaries into the intercellular spaces contain less proteins than blood. Lymph flows from the tissues to the heart assisting in transportation and destroying germs.

Blood Vessels

Arteries	**Veins**
1. Carry Oxygenated blood from heart to body part except pulmonary Artery	1. Carry deoxygenated blood from body parts to heart except pulmonary vein.
2. Also called distributing Vessel	2. Also called collecting Vessel.
3. Thick and elastic	3. Thin and Less elastic.

Transportation in Plants

- There are two main conducting Pathways in a Plant

Xylem	**Phloem**
1. Carries water & minerals from the roots to other part of the plant	1. Carries product of photosynthesis from leaves to the other part of the plant.
2. No energy is used.	2. Energy is used from ATP

– Transpiration is the process of loss of water as vapour from aerial parts of the plant.

Function :

1. Absorption and upward movement of water and minerals by creating PULL.
2. helps in temperature regulation in Plant.

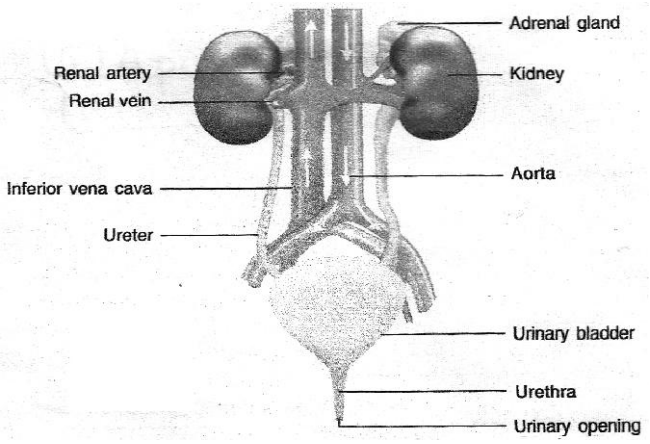
– Transport of food from leaves (food factory) to different part of the plant is called Translocation.

EXCRETION

– The process of the removal of the harmful metabolic wastes from the body.

– Excretory system of human beings includes :

1) A pair of kidneys
ii) A Urinary Bladder
iii) A pair of Ureter
iv) A Urethera



– Urine produced in the kidneys passes through the ureters into the urinary bladder where it is stored until it is released through the urethera.

– The purpose of making urine is to filter out waste product from the blood ie, urea which is produced in the liver.

– Each kidney has large numbers of filtration units called nephrons.

– The Urine formation involves three steps

1. **Glomerular Filtration :** Nitrogenous wastes, glucose water, amino acid filter from the blood into Bowman Capsule of the nephron.
2. **Tubular reabsorption :** Now, useful substances from the filtrate are reabsorbed back by capillaries surrounding the nephron.
3. **Secretion** Extra, water, salts are secreted into the tubule which open up into the collecting duct & then into the ureter.

– Haemodialysis : The process of purifying blood by an artificial kidney. it is meant for Kidney failure patient.

Excretion in Plants

– Oxygen, CO_2 & H_2O ⟶ ⟶] Through stomata (Transpiration)

– Other wastes may be stored in leaves, bark etc. which fall off from the plant.

– Plants excrete some waste into the soil around them.

– Gums, Resin In old Xylem

– Some metabolic wastes in the form of crystals of Calcium oxalates in the leaves of colocasia and stem of Zamikand.

Life Processes

EXERCISE

(Question Bank)

Very Short Answers (1 Mark)

1. State one difference between autotrophic and heterotrophic mode of nutrition.
2. What will happen to a plant if the xylem is removed.
3. What is the role of saliva in the digestion of food?
4. Name the tissue that transports water and minerals in plants.
5. What is the role of acid in our stomach?
6. What is emulsification
7. Name the organelle in which photosynthesis occur.
8. Name the largest artery in the human body.
9. Define transpiration
10. What are structural and functional unit of kidneys called.

Short Answers (2 Marks or 3 Marks)

1. How is small intestine designed to absorb digested food?
2. What are stomata? Draw a labelled diagram of stomata.

3. Write the equation for the process of breakdown of glucose in a cell
   i) in the presence of oxygen
   ii) in the absence of oxygen.
4. Write the difference between inhalation and exhalation.
5. List the three events which occur during photo synthesis.
6. How does transpiration helps in upward transport of substances.
7. Describe the process of double circulation in human beings.
8. Write the functions of the components of blood.

Long Answers (5 Marks)

1. Explain the process of digestion of food in mouth stomach and small intestine in human body. Draw a well labelled diagram.
2. Draw a diagram showing Human Respiratory system. Label the following parts
   i) Larynx ii) Trachea
   iii) Bronchus iv) Lungs