Science

(Chapter 6)(Life Processes)
Class - 10

Exercises

Question 1:
The kidneys in human beings are a part of the system for
(a) nutrition.
(b) respiration.
(c) excretion.
(d) transportation.

Answer 1:
(c) In human beings, the kidneys are a part of the system for excretion.

Question 2:
The xylem in plants are responsible for
(a) transport of water.
(b) transport of food.
(c) transport of amino acids.
(d) transport of oxygen.

Answer 2:
(a) In a plant, the xylem is responsible for transport of water.

Question 3:
The autotrophic mode of nutrition requires
(a) carbon dioxide and water.
(b) chlorophyll.
(c) sunlight.
(d) all of the above.

Answer 3:
(d) The autotrophic mode of nutrition requires carbon dioxide, water, chlorophyll and sunlight.

Question 4:

The breakdown of pyruvate to give carbon dioxide, water and energy takes place in

(a) cytoplasm.

(b) mitochondria.

(c) chloroplast.

(d) nucleus.

Answer 4:

(b) The breakdown of pyruvate to give carbon dioxide, water and energy takes place in mitochondria.

Question 5:

How are fats digested in our bodies? Where does this process take place?

Answer 5:

Fats are present in the form of large globules in the small intestine. The small intestine gets the secretions in the form of bile juice and pancreatic juice respectively from the liver and the pancreas. The bile salts (from the liver) break down the large fat globules into smaller globules so that the pancreatic enzymes can easily act on them. This is referred to as *emulsification* of fats. It takes place in the small intestine.

Question 6:

What is the role of saliva in the digestion of food?

Answer 6:

Saliva is secreted by the salivary glands, located under the tongue. It makes the food soft for easy swallowing. It contains a digestive enzyme called salivary amylase, which breaks down starch into sugar.

Question 7:

What are the necessary conditions for autotrophic nutrition and what are its by-products?

Answer 7:

Autotrophic nutrition takes place through the process of photosynthesis. Carbon dioxide, water, chlorophyll pigment, and sunlight are the necessary conditions required for autotrophic nutrition. Carbohydrates (food) and O_2 are the by-products of photosynthesis.

$$6CO_2 + 6H_2O \xrightarrow{Chlorophyll\ and\ Sunlight} C_6H_{12}O_6 + 6O_2$$

Question 8:

What are the differences between aerobic and anaerobic respiration? Name some organisms that use the anaerobic mode of respiration.

Answer 8:

Difference between Aerobic respiration and Anaerobic respiration:

Aerobic respiration		***Anaerobic respiration***	
1.	It occurs in the presence of O_2.	1.	It occurs in the absence of O_2
2.	It involves the exchange of gases between the organism and the outside environment.	2.	Exchange of gases is absent.
3.	It occurs in cytoplasm and mitochondria.	3.	It occurs only in cytoplasm.
4.	It always releases CO_2 and H_2O.	4.	It produces alcohols and CO_2.
5.	It yields large amount of energy.	5.	Energy released is very low.

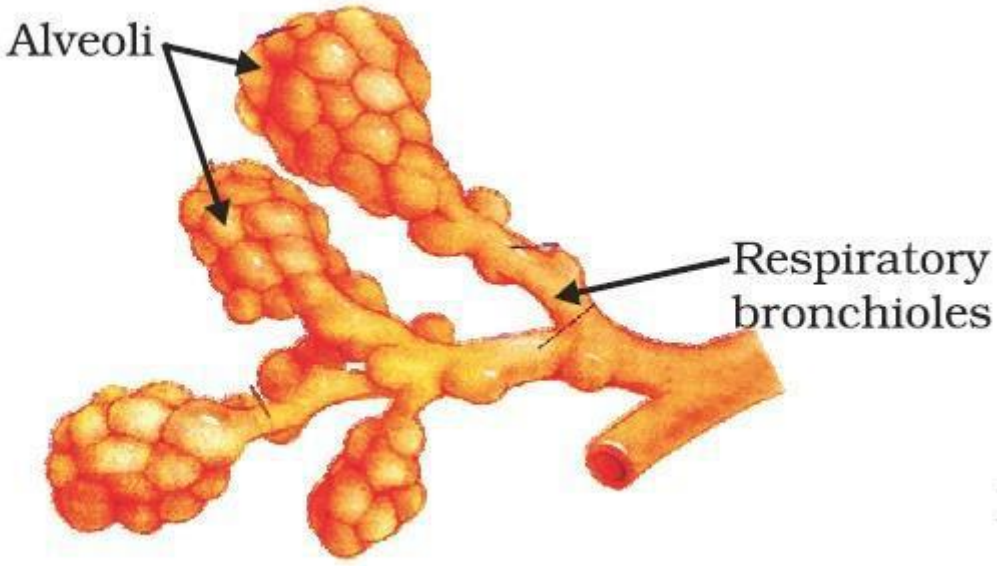
Anaerobic respiration occurs in the roots of some waterlogged plants, some parasitic worms, animal muscles and some micro-organisms such as yeasts.

Question 9:

How are the alveoli designed to maximise the exchange of gases?

Answer 9:

The alveoli are the small balloon-like structures present in the lungs. The walls of the alveoli consist of extensive network of blood vessels. Each lung contains 300−350 million alveoli, making it a total of approximately 700 million in both the lungs. The alveolar surface when spread out covers about 80 m^2 area. This large surface area makes the gaseous exchange more efficient.



Question 10:

What would be the consequences of a deficiency of haemoglobin in our bodies?

Answer 10:

Haemoglobin is the respiratory pigment that transports oxygen to the body cells for cellular respiration. Therefore, deficiency of haemoglobin in blood can affect the oxygen supplying capacity of blood. This can lead to deficiency of oxygen in the body cells. It can also lead to a disease called anaemia.

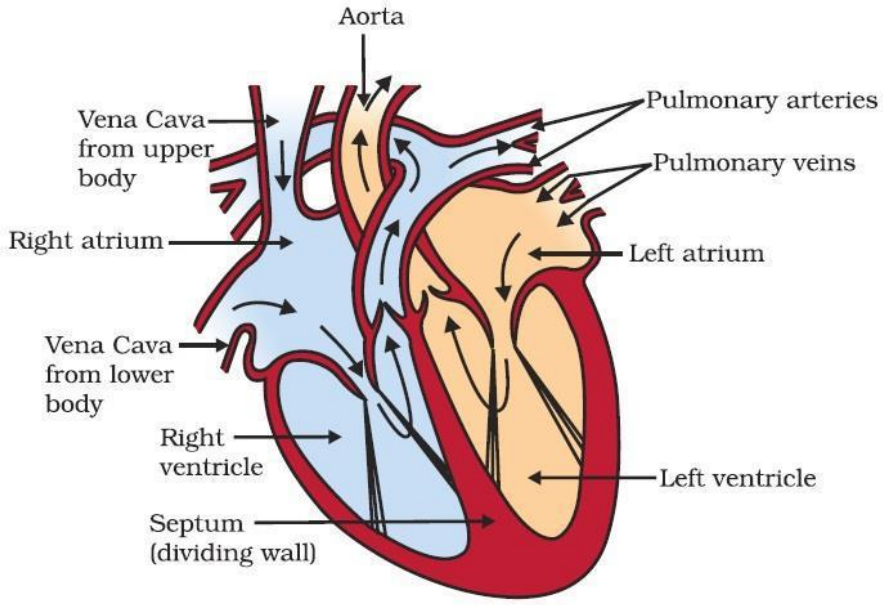
Question 11:

Describe double circulation in human beings. Why is it necessary?

Answer 11:

Because both oxygen and carbon dioxide have to be transported by the blood, the heart has different chambers to prevent the oxygen-rich blood from mixing with the blood containing carbon dioxide. The human heart is divided into four chambers − the right atrium, the right ventricle, the left atrium and the left ventricle.

Oxygen-rich blood from the lungs comes to the thin-walled upper chamber of the heart on the left, the left atrium. The left atrium relaxes when it is collecting this blood. It then contracts, while the next chamber, the left ventricle, expands, so that the blood is transferred to it. When the muscular left ventricle contracts in its turn, the blood is pumped out to the body.



De-oxygenated blood comes from the body to the upper chamber on the right, the right atrium, as it expands. As the right atrium contracts, the corresponding lower chamber, the right ventricle, dilates. This transfers blood to the right ventricle, which in turn pumps it to the lungs for oxygenation.

During this process blood goes twice through the heart. That's why it is known as double circulation.

Double Circulation is necessary:

The separation of oxygenated and de-oxygenated blood allows a more efficient supply of oxygen to the body cells. This efficient system of oxygen supply is very useful in warm-blooded animals such as human beings. As we know, warm-blooded animals have to maintain a constant body temperature by cooling themselves when they are in a hotter environment and by warming their bodies when they are in a cooler environment. Hence, they require more O_2 for more respiration so that they can produce more energy to maintain their body temperature.

Thus, the circulatory system of humans is more efficient because of the double circulatory heart.

Question 12:

What are the differences between the transport of materials in xylem and phloem?

Answer 12:

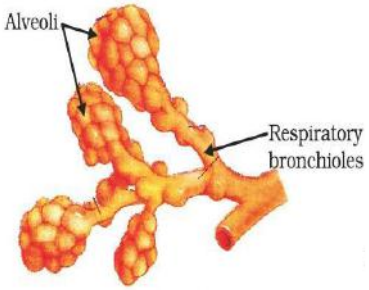
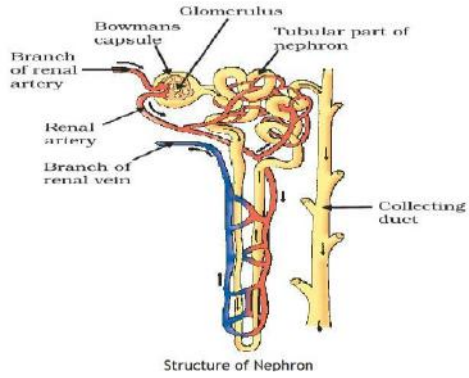
Difference between Xylem and Phloem:

	Xylem		***Phloem***
1.	Xylem tissue helps in the transport of water and minerals.	1.	Phloem tissue helps in the transport of food.
2.	Water is transported upwards from roots to all other plant parts.	2.	Food is transported in both upward and downward directions.
3.	Transport in xylem occurs with the help of simple physical forces such as transpiration pull.	3.	Transport of food in phloem requires energy in the form of ATP.

Question 13:

Compare the functioning of alveoli in the lungs and nephrons in the kidneys with respect to their structure and functioning.

Answer 13:

	Alveoli		***Nephron***
1.	Alveoli are tiny balloon-like structures present inside the lungs.	1.	Nephrons are tubular structures present inside the kidneys.
2.	The walls of the alveoli are one cell thick and it contains an extensive network of blood capillaries.  	2.	Nephrons are made of glomerulus, bowman's capsule, and a long renal tube. It also contains a cluster of thin walled capillaries.  Structure of Nephron
3.	The exchange of O_2 and CO_2 takes place between the blood of the capillaries that surround the alveoli and the gases present in the alveoli. Alveoli are the site of gaseous exchange.	3.	The blood enters the kidneys through the renal artery which branches into many capillaries in the glomerulus. The water and solute are transferred to the nephron at Bowman's capsule. Then the filtrate moves through the proximal tubule, distal tubule and collecting duct. The collecting duct collects the urine from many nephrons and passes it to the ureter. During the flow of filtrate, some substances such as glucose, amino acids, and water are selectively reabsorbed. Nephrons are the basic filtration unit.

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Question 1:

Why is diffusion insufficient to meet the oxygen requirements of multicellular organisms like humans?

Answer 1:

In multi-cellular organisms, all the cells may not be in direct contact with the surrounding environment. Thus, simple diffusion will not meet the requirements of all the cells.

Question 2:

What criteria do we use to decide whether something is alive?

Answer 2:

Any visible movement such as walking, breathing, or growing is generally used to decide whether something is alive or not. However, a living organism can also have movements, which are not visible to the naked eye. Therefore, the presence of molecular movement inside the organisms used to decide whether something is alive or not.

Question 3:

What are outside raw materials used for by an organism?

Answer 3:

An organism uses outside raw materials mostly in the form of food (Since life on earth depends on carbon based molecules, most of these food sources are also carbon-based) and oxygen. The raw materials required by an organism can be quite varied depending on the complexity of the organism and its environment.

Question 4:

What processes would you consider essential for maintaining life?

Answer 4:

Life processes such as nutrition, respiration, transportation, excretion, etc. are essential for maintaining life.

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Question 1:

What are the differences between autotrophic nutrition and heterotrophic nutrition?

Answer 1:

	Autotrophic nutrition		*Heterotrophic nutrition*
1.	Food is synthesised from simple inorganic raw materials such as CO_2 and water.	1.	Food is obtained directly or indirectly from autotrophs. This food is broken down with the help of enzymes.
2.	Presence of green pigment (chlorophyll) is necessary.	2.	No pigment is required in this type of nutrition.
3.	Food is generally prepared during day time.	3.	Food can be prepared at all times.
4.	All green plants and some bacteria have this type of nutrition.	4.	All animals and fungi have this type of nutrition.

Question 2:

Where do plants get each of the raw materials required for photosynthesis?

Answer 2:

The following raw materials are required for photosynthesis:

- The raw material CO_2 enters from the atmosphere through stomata.
- Water is absorbed from the soil by the plant roots.
- Sunlight, an important component to manufacture food, is absorbed by the chlorophyll and other green parts of the plants.

Question 3:

What is the role of the acid in our stomach?

Answer 3:

Role of the acid (HCl) in our stomach:

- Kills germs present in the food.
- Makes the food acidic, so that pepsin can digest protein.

Question 4:

What is the function of digestive enzymes?

Answer 4:

Digestive enzymes such as amylase, lipase, pepsin, trypsin, etc. help in the breaking down of complex food particles into simple ones. These simple particles can be easily absorbed by the blood and thus transported to all the cells of the body.

Question 5:

How is the small intestine designed to absorb digested food?

Answer 5:

The small intestine has millions of tiny finger-like projections called villi. These villi increase the surface area for food absorption. Within these villi, many blood vessels are present that absorb the digested food and carry it to the blood stream. From the blood stream, the absorbed food is delivered to each and every cell of the body.

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Question 1:

What advantage over an aquatic organism does a terrestrial organism have with regard to obtaining oxygen for respiration?

Answer 1:

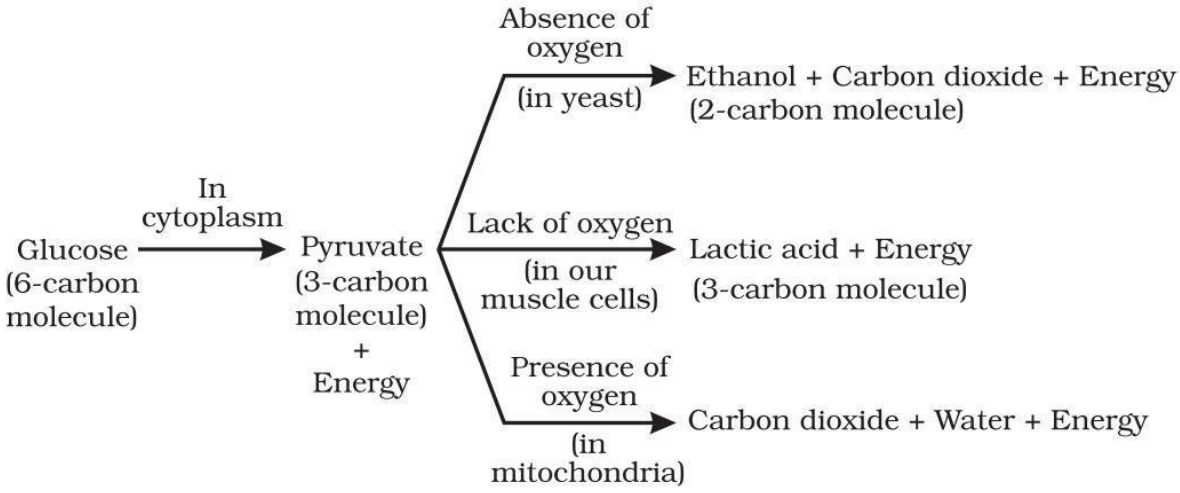
Since the amount of dissolved oxygen is fairly low compared to the amount of oxygen in the air, the rate of breathing in aquatic organisms is much faster than that seen in terrestrial organisms. Therefore, unlike aquatic animals, terrestrial animals do not have to show various adaptations for better gaseous exchange.

Question 2:

What are the different ways in which glucose is oxidised to provide energy in various organisms?

Answer 2:

Glucose is first broken down in the cell cytoplasm into a three carbon molecule called pyruvate. Pyruvate is further broken down in the following ways to provide energy:



Question 3:

How is oxygen and carbon dioxide transported in human beings?

Answer 3:

Haemoglobin transports oxygen molecule to all the body cells for cellular respiration. The haemoglobin pigment present in the blood gets attached to O_2 molecules that are obtained from breathing. It thus forms oxyhaemoglobin and the blood becomes oxygenated. This oxygenated blood is then distributed to all the body cells by the heart. After giving away O_2 to the body cells, blood takes CO_2 which is the end product of cellular respiration. Now the blood becomes de-oxygenated.

Since haemoglobin pigment has less affinity for CO_2, CO_2 is mainly transported in the dissolved form. This de-oxygenated blood gives CO_2 to lung alveoli and takes O_2 in return.

Question 4:

How are the lungs designed in human beings to maximise the area for exchange of gases?

Answer 4:

The exchange of gases takes place between the blood capillaries that surround the alveoli and the gases present in the alveoli. Thus, alveoli are the site for exchange of gases. The lungs get filled up with air during the process of inhalation as ribs are lifted up and diaphragm is flattened. The air that is rushed inside the lungs fills the numerous alveoli present in the lungs. Each lung contains 300-350 million alveoli. These numerous alveoli increase the surface area for gaseous exchange making the process of respiration more efficient.

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Question 1:

What are the components of the transport system in human beings? What are the functions of these components?

Answer 1:

The main components of the transport system in human beings are the heart, blood, and blood vessels.

- ***Heart*** pumps oxygenated blood throughout the body. It receives deoxygenated blood from the various body parts and sends this impure blood to the lungs for oxygenation.
- ***Blood*** is a fluid connective tissue, it helps in the transport of oxygen, nutrients, CO_2, and nitrogenous wastes.
- ***Blood vessels*** (arteries, veins, and capillaries) carry blood either away from the heart to various organs or from various organs back to the heart.

Question 2:

Why is it necessary to separate oxygenated and deoxygenated blood in mammals and birds?

Answer 2:

Warm-blooded animals such as birds and mammals maintain a constant body temperature by cooling themselves when they are in a hotter environment and by warming their bodies when they are in a cooler environment. Hence, these animals require more oxygen (O_2) for more cellular respiration so that they can produce more energy to maintain their body temperature.

Thus, it is necessary for them to separate oxygenated and de-oxygenated blood, so that their circulatory system is more efficient and can maintain their constant body temperature.

Question 3:

What are the components of the transport system in highly organised plants?

Answer 3:

In highly organised plants, there are two different types of conducting tissues − *xylem* and *phloem*.

- ***Xylem*** conducts water and minerals obtained from the soil (via roots) to the rest of the plant.
- ***Phloem*** transports amino acids and food materials from the leaves to different parts of the plant body.

Question 4:

How are water and minerals transported in plants?

Answer 4:

The components of xylem tissue (tracheids and vessels) of roots, stems and leaves are interconnected to form a continuous system of water – conducting channels that reaches all parts of the plant. Transpiration creates a suction pressure, as a result of which water is forced into the xylem cells of the roots. Then there is a steady movement of water from the root xylem to all the plant parts through the interconnected water – conducting channels.

Question 5:

How is food transported in plants?

Answer 5:

Phloem transports food materials from the leaves to different parts of the plant body. The transportation of food in phloem is achieved by utilizing energy from ATP. As a result of this, the osmotic pressure in the tissue increases causing water to move into it. This pressure moves the material in the phloem to the tissues which have less pressure. This is helpful in moving materials according to the needs of the plant. For example, the food material, such as sucrose, is transported into the phloem tissue using ATP energy.

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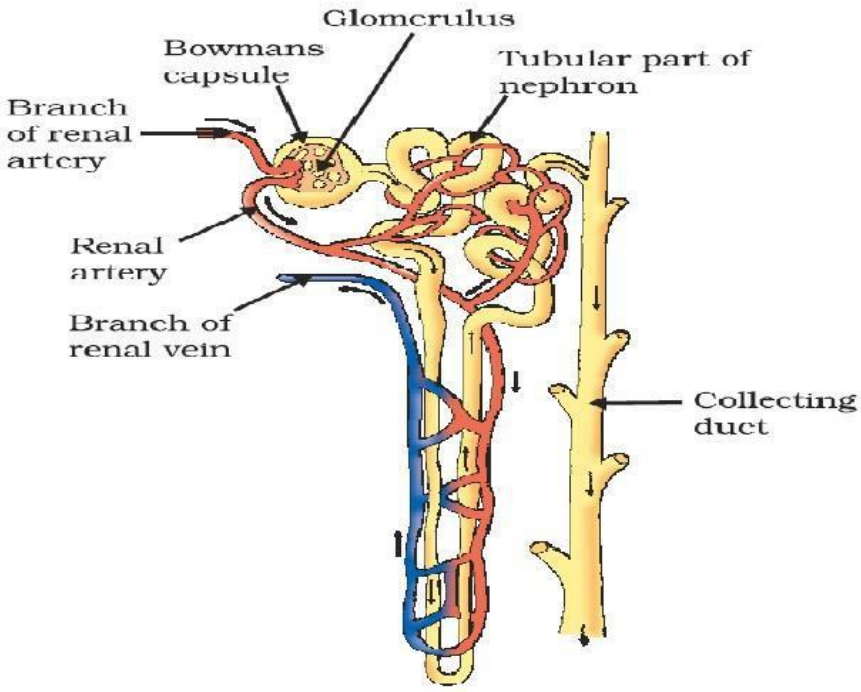
Question 1:

Describe the structure and functioning of nephrons.

Answer 1:

Nephrons are the basic filtering units of kidneys. Each kidney possesses large number of nephrons, approximately 1-1.5 million. The main components of the nephron are glomerulus, Bowman's capsule, and a long renal tubule.



Structure of Nephron

Functioning of a nephron:

- The blood enters the kidney through the renal artery, which branches into many capillaries associated with glomerulus.
- The water and solute are transferred to the nephron at Bowman's capsule.

- In the proximal tubule, some substances such as amino acids, glucose, and salts are selectively reabsorbed and unwanted molecules are added in the urine.
- The filtrate then moves down into the loop of Henle, where more water is absorbed.
- From here, the filtrate moves upwards into the distal tubule and finally to the collecting duct. Collecting duct collects urine from many nephrons.
- The urine formed in each kidney enters a long tube called ureter. From ureter, it gets transported to the urinary bladder and then into the urethra.

Question 2:

What are the methods used by plants to get rid of excretory products?

Answer 2:

Plants use completely different strategies for excretion than those of animals. They can get rid of excess water by transpiration. For other wastes, plants use the fact that many of their tissues consist of dead cells, and that they can even lose some parts such as leaves. Many plant waste products are stored in cellular vacuoles. Waste products may be stored in leaves that fall off. Other waste products are stored as resins and gums, especially in old xylem. Plants also excrete some waste substances into the soil around them.

Question 3:

How is the amount of urine produced regulated?

Answer 3:

The amount of urine produced depends on the amount of excess water and dissolved wastes present in the body. Some other factors such as habitat of an organism and hormone such as Antidiuretic hormone (ADH) also regulates the amount of urine produced.

Chapter 6 Life Processes

➢ **Life processes –** The processes that are necessary for an organism to stay alive. Eg. Nutrition,respiration, etc.

➢ **Criteria of life**- (i) Growth (ii) Movement

➢ **Nutrition-** The process in which an organism takes in food, utilizes it to get energy, for growth, repair and maintenance, etc. and excretes the waste materials from the body

Types of nutrition

1. Autotrophic nutrition (Auto =self: trophos = nourishment) E.g. Plants, Algae, blue green bacteria.

o Process – Photosynthesis (Photo=light; Synthesis= to combine)

o Raw materials- (i) Carbon dioxide (ii)Water

o Equation-

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

o Energy conversion- Light/Solar energy to Chemical energy

o Role off Chlorophyll- To trap the sun's energy for photosynthesis

o Factors for Autotrophic nutrition -

(i) Carbon dioxide

(ii) Water

(iii) Light

(iv) Temperature

o **Events/ Steps of photosynthesis-**

(i) Absorption of light energy by chlorophyll

(ii) Conversion of light energy to chemical energy & Splitting of water molecule into Hydrogen & oxygen

(iii) Reduction of Carbon dioxide to Carbohydrate

o Gaseous exchange-

(i) Gas used- Carbon dioxide

(ii) By product - Oxygen

o Source of raw materials-

(i) Carbon dioxide –Land plants- Air, Aquatic plants- Water

(ii) Water & Minerals - Soil

2. Heterotrophic nutrition (Hetero =others: trophos =ourishment) Eg. Animals, plants lacking chlorophyll like fungi.

(a) **Saprophytic nutrition**: Organisms feeds on dead decaying plants or animals material. E.g. Fungi, Bacteri

(b) **Parasitic nutrition**: Organisms obtain food from the body of another living (host)

o Endoparasite : Parasite lives inside the body of the host e.g. tapeworm, roundworm.

o Exoparasite : Parasite lives on the body of the host. E.g. lice, leech.

Note- The parasite benefits while the host is usually harmed e.g. Cuscutta-plant parasite (amar bel), plasmodium (malarial parasite).

(c) **Holozoic nutrition**: Organism (mostly animals) take in whole food and then digest it into smaller particles with enzyme. Eg.Amoeba, Paramoecium. Animals, human beings.

o Steps in Holozoic nutrition

(i) Ingestion: taking in of food.

(ii) Digestion: breaking down of complex food into simpler, absorbable form.

(iii Assimilation: Utilization of digested food from the body.

(iv)Egestion: Removing undigested food from the body

o Nutrition in human beings

♦ Alimentary canal-

Mouth Oesophagus Stomach Small intestine Large intestine

♦ Important gland/juices

(Refer to figure 6.6 page no.97 of N.C.E.R.T Text book)

Organ	Gland	Enzyme/Juice	Function
Mouth	Salivary glands	Salivary Amylase	Converts starch into sugar
Stomach	Gastric glands	Gastric juice- (i) Hydrochloric acid	(a) Kills harmful bacteria that enters with the food. (b) Makes the medium alkaline for the action of Pepsin
		(ii) Pepsin	Digests proteins
		(iii) Mucus	Protects the inner lining of the stomach from the corrosive action of Hydrochloric acid.
Small intestine	1) Liver	(i) Bile juice	(a) Makes the medium acidic for the action of Pancreatic enzymes. (b) Breaks down large fat molecules into smaller globules so that enzymes can act upon them.
	2) Pancreas	(ii) Pancreatic Juice ♦ Amylase	Converts Carbohydrates to glucose
		♦ Trypsin	Converts Proteins to Amino acids
		♦ Lipase	Converts Fats into Fatty acids & Glycerol

Aerobic espiration	Anaerobic respiration
1. Takes place in presence of Oxygen. 2. End products- Carbon dioxide & Water 3. More energy is released. 4. Takes place in Cytoplasm & Mitochondria 5. Complete oxidation of glucose takes place. 6. It occurs in most organisms. 7. Equation- Glucose→ Pyruvate→ CO_2 + H_2O + Energy	1. Takes place in absence of Oxygen. 2. End products- Ethanol & Carbon dioxide 3. Less energy is released. 4. Takes place in only in Cytoplasm. 5. Incomplete oxidation of glucose takes place. 6. It occurs in certain bacteria, yeast & certain tissues of higher organisms. E.g. In humans during vigorous exercise, when the demand for Oxygen is more than the supply, muscle cells respire anaerobically for some time. 7. Equation- In Yeast- Glucose→ Pyruvate→ Ethanol + H_2O + Energy In muscle cells - Glucose→ Pyruvate→ Lactic acid + Energy

o Some common features of Respiratory organs-

(i) Large surface area- for greater rate of diffusion of respiratory gases.

(ii) Thin permeable walls – to ensure easy diffusion & exchange of gases.

(iii) Extensive blood supply- Respiratory organs are richly supplied with blood vessels for quick transport of gases.

o Gaseous exchange in plants-

♦ Process – Diffusion

♦ Direction of diffusion depends on-

(i) Environmental conditions

(ii) Requirement of the plant

(ii) Requirement of the plant.

♦ Day time- Carbon dioxide given out during respiration is used for photosynthesis.Therefore only Oxygen is released, which is a major activity during the day.

♦ Night time – Only respiration takes place. Therefore only Carbon dioxide is released, which is a major activity during the night.

o Gaseous exchange in animals-

♦ Terrestrial animals- take Oxygen from the atmosphere.

♦ Aquatic animals- take Oxygen dissolved in water. (Oxygen content is low in water, therefore they breathe faster.

o Human Respiratory system-

External nostrils → Nasal cavity → Trachea→ Bronchi → Bronchioles →Alveoli

♦ Rings of cartilage present in the throat ensure that the trachea (air passage) does not collapse when there is less air in it.

♦ Lungs –

(i) Present in the thoracic cavity.

(ii) They are spongy, elastic bags consisting of Bronchi, Bronchioles and Alveoli

Refer to figure 6.9 page no. 104 of N.C.E.R.T Text book)

o Respiration occurs in two phases-

o (i) External-Breathing, which is a mechanical process.

(ii) Internal - Cellular respiration

o Mechanism of breathing – It includes :

(i)Inhalation

(ii) Exhalation

o Exchange of gases-

♦ Unicellular organisms- By Diffusion

♦ Animals-

(i) As the body size is large, diffusion alone is not enough.

(ii) Respiratory pigments also required.

(iii) Respiratory pigment in human beings is Haemoglobin, which is present in red blood corpuscles.

(iv) It has very high affinity for Oxygen.

(iv) Carbon dioxide is more soluble in water than Oxygen, so it

Gets dissolves in blood and is thus transported.

v Transportation

o Transportation in human beings-

♦ **Blood-**

(i) It is a fluid connective tissue.

(ii) Components-

(1) Fluid medium- Plasma (2) Red blood corpuscles (3) White blood corpuscles

(4) Platelets suspended in plasma

(iii) Plasma transports food, Oxygen, Carbon dioxide, Nitrogenous wastes, etc.

♦ **Functions of blood-**

(i) Transport of respiratory gases.

(ii) Transport of nutrients.

(iii) Transport of waste products.

(iv) Defence against infection

♦ **Blood vessels-** (i) Arteries (ii) Veins (iii) Capillaries

Arteries	Veins
1. Thick walled. 2. Deep seated. 3. Carry blood away from the heart. 4. Carry Oxygenated blood. 5. Valves absent.	1. Thin walled. 2. Superficial. 3. Carry blood to the heart. 4. Carry Deoxygenated blood. 5. Valves present

♦ **Heart-**

(Refer to figure 6.10 page no. 106 of N.C.E.R.T Text book)

(i) It is a muscular organ, which works as a pump in the circulatory system.

(ii) It is the size of our fist.

(iii) It has two sides, which are separated by a partition so that the oxygenated and deoxygenated blood do not get mixed up.

(iv) It has four chambers-

Two upper chambers called Atria.
Two lower chambers called Ventricles.

- **Working of heart**- Left side-

(i) Left atrium relaxes & the Oxygenated blood enters it from the lungs through the pulmonary vein.
(ii) Left atrium contracts & the blood enters the left ventricle through the valve.
(iii) Left Ventricle contracts and the blood is pumped into the largest artery _Aorta' and is carried to all parts of the body.

- **Working of heart**-Right side-

(i) Right atrium relaxes & the deoxygenated blood from the body enters it through superior and inferior Vena cava.
(ii) Right atrium contracts & the blood enters the right Ventricle through the valve.
(iii) Right Ventricle contracts and the blood is pumped into the Pulmonary artery and is carried to lungs.

- Valves- Unidirectional to prevent the backward flow of blood.
- Pulmonary vein is the only vein that carries Oxygenated blood.
- Aorta is the only artery that carries Deoxygenated blood.
- Double circulation in man- because the blood passes through the heart twice in one complete cycle of the circulation.
- **Capillaries-**

(i) Form the connection between arteries & veins.
(ii) Walls are one cell thick only for easy exchange of blood.

- Platelets- Plug the leaks of arteries and veins by clotting the blood.
- Lymph- Extracellular fluid similar to plasma but colourless with lesser protein.
- Function of lymph-

(i) Transportation of digested & absorbed fats from the small intestine.
(ii) Drains excess fluid from the intercellular spaces back in the blood.

- Higher animals- E.g., birds, mammals.

(i)Oxygenated blood & Deoxygenated blood are completely separate for efficient Oxygen supply.
(ii)This is to fulfil higher energy needs and to maintain body temperature (warm blooded animals).

- Amphibians & reptiles- have 3 chambered heat where little mixing of Oxygenated blood & Deoxygenated blood takes place. Therefore their body temperature varies with the temperature of the environment. (cold blooded animals)

o Transportation in plants-

- Plants need less energy needs- because they do not move and therefore have a slow transport system
- **Transport of water-**

(i) Takes place by xylem tissue present in roots, stem, leaves and is therefore interconnected.
(ii) Root cells take up ions from the soil, which creates a concentration difference between root and soil. Column of water therefore rises upwards.

- In very tall plants- transpiration creates a suction pressure, which pulls the water upwards.
- Importance of transpiration-

(i) Helps in upward movement of water in plants.
(ii) It regulates the temperature in plants.

- **Transport of food-**

(i) Takes place by phloem tissue.
(ii) Movement of prepared food in plants is called translocation.

➢ Excretion- The biological process of removal of harmful metabolic wastes in living organisms.
➢ Excretion in human beings-

(Refer to figure 6.13 page no. 110 of N.C.E.R.T Text book)

- **Organs of excretory system-**

(i) Kidneys (iii) Urinary bladder
(ii) Ureters (iv) Urethra

♦ **Kidneys-**

(i) Two in number
(ii) Bean shaped
(iii) Present in abdomen on either side of the backbone
(iv) Basic unit is nephron.

a) Glomerulus- Group of capillaries (cluster) present in Bowman's capsule to receive blood from renal artery and filters it.

b) Bowman's capsule- Cup shaped structure, which contains glomerulus.

c) Convoluted tubule- is long and reabsorbs vital nutrients like glucose, amino acids, salts, urea and water.

Note-Vital functions of kidneys-
(a) Filtration & removal of Nitrogenous wastes
(b) Reabsorption of vital nutrients

♦ Ureters- Transport the urine formed in the kidneys to the urinary bladder.
♦ Urinary bladder- Muscular bag like structure to store urine.
♦ Urethra- Helps in removal of urine when the Urinary bladder is full.
♦ Artificial kidney- Principle: Dialysis

➢ **Excretion in plants-**

♦ Gaseous wastes- CO_2 in respiration & O_2 in photosynthesis are removed by the process of diffusion.
♦ Excess water- is removed by transpiration.
♦ Other wastes-
(i) Stored in cellular vacuoles or in leaves, which fall off or as gums, resins, etc. in old xylem.
(ii) Excreted in soil.

➢ **Important diagrams-**

1. Open & close stomata
2. Steps of nutrition in Amoeba
3. Alimentary canal of human beings/ Digestive system of human beings
4. Respiratory system of human beings
5. Structure of heart.
6. Excretory system of human beings
7. Structure of nephron

➢ **Important activities-**

1. To prove that chlorophyll is necessary for photosynthesis.
2. To prove that Carbon dioxide is necessary for photosynthesis.
3. To prove that light is necessary for photosynthesis.
4. To prove that product of fermentation is Carbon dioxide.
5. To prove that leaves lose water by transpiration.
6. To study the action of salivary amylase on starch.
7. To demonstrate that Carbon dioxide is present in exhaled air.
8. To demonstrate the process of transpiration in plants.