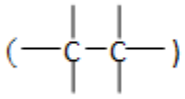
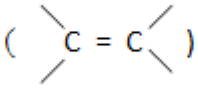
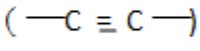
CHAPTER 4 – CARBON AND ITS COMPOUNDS

Some points to remember

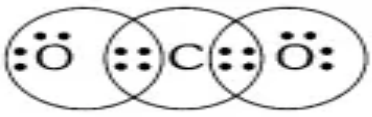
HYDROCARBONS(Compounds of carbon and hydrogen)

Alkane (Saturated)	**Alkene (Unsaturated)**	**Alkyne (Unsaturated)**
(2) __ane	__ene	__yne
		
C_nH_{2n+2}	C_nH_{2n}	C_nH_{2n-2}

(1)		(3)		
No. of Carbons	**Word Root**	**Functional Group**	**Formula of functional group**	**Name**
1	Meth	Halo	(-X) : X=F, Cl, Br, I	Fluoro__, Chloro__, Bromo__, Iodo__
2	Eth	Alcohol	-OH	__ol
3	Prop	Aldehyde	-CHO	__al
4	But	Ketone	-CO-	__one
5	Pent	Corboxylic acid	-COOH	__oic acid
6	Hex			

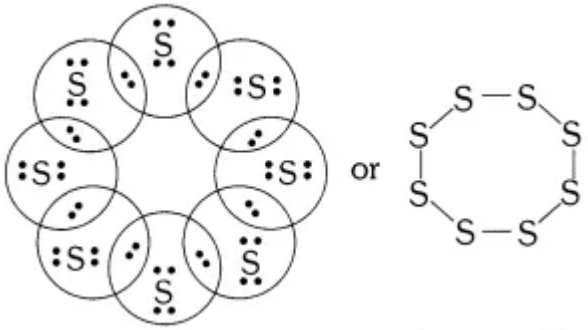
Question 1: What would be the electron dot structure of carbon dioxide which has the formula CO_2 ?

Answer-

 or O = C = O

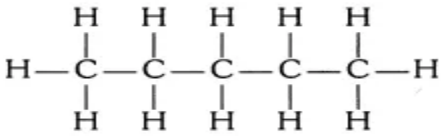
Question 2: What would be the electron dot structure of a molecule of sulphur which is made up of eight atoms of sulphur? (Hint − the eight atoms of sulphur are joined together in the form of a ring.)

Answer-

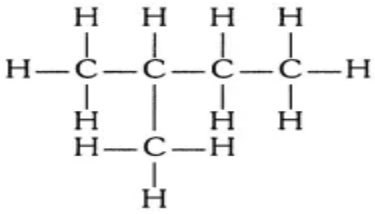


Question 3: How many structural isomers can you draw for pentane?

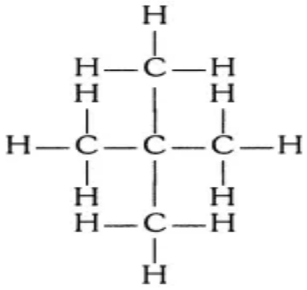
Answer- Three



n- Pentane



Iso- Pentane



Neo-Pentane

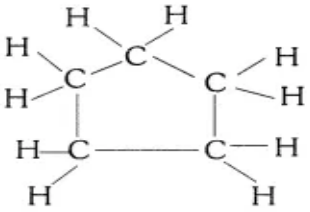
Question 4: What are the two properties of carbon which lead to the huge number of carbon compounds we see around us?

Answer- (i) **Catenation**: It is the ability to form bonds with other atoms of carbon.

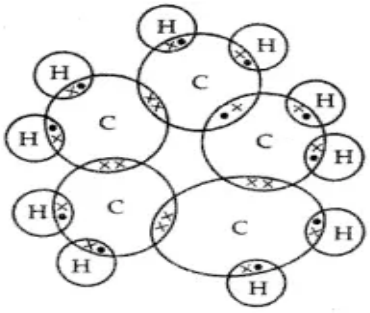
(ii) **Tetravalency**: With the valency of four, carbon is capable of bonding with four other atoms.

Question 5: What will be the formula and electron dot structure of cyclopentane?

Answer- Molecular Formula- C_5H_{10}



Structural formula



Electron dot structure

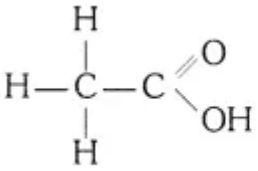
Question 6: Draw the structures for the following compounds.

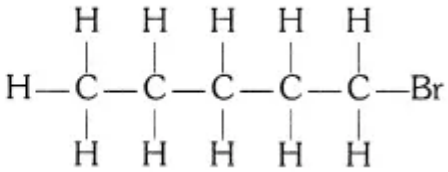
(i) Ethanoic acid **(ii) Bromopentane***

(iii) Butanone **(iv) Hexanal**

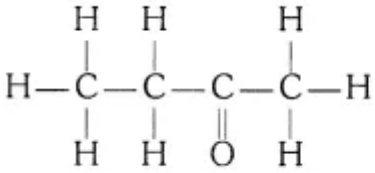
***Are structural isomers possible for bromopentane?**

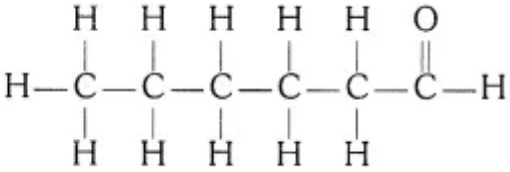
Answer- (i) Ethanoic Acid – CH_3COOH (ii) Bromopentane – $C_5H_{11}Br$



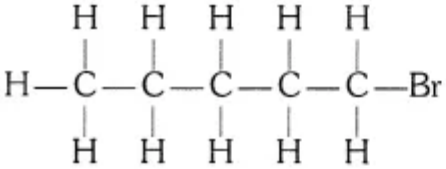


(iii) Butanone – $C2H5COCH_3$ (iv) Hexanal – $C_5H_{11}CHO$

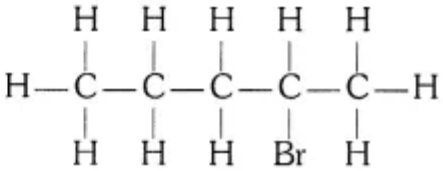




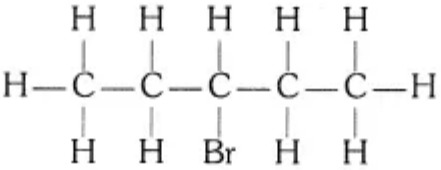
According to the position of bromine (Br) bromopentane can have 3 isomers.



1-Bromopentane



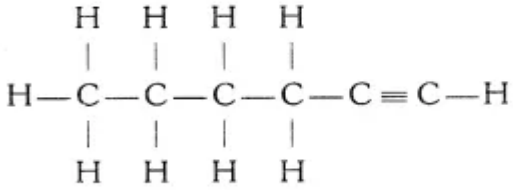
2-Bromopentane



3-Bromopentane

Question 7: How would you name the following compounds?

(i) $CH_3 — CH_2 — Br$ (ii) $H — C(=O) — H$



Answer- (i). Bromoethane, *(ii)* Methanal, *(iii)* Hexyne

Question 8: Why is the conversion of ethanol to ethanoic acid an oxidation reaction?

Answer-Since the conversion of ethanol to ethanoic acid involves the addition of oxygen to ethanol, it is an oxidation reaction.

$$CH_3 - CH_2OH \xrightarrow[\text{Or acidified } K_2Cr_2O_7 + \text{Heat}]{\text{Alkaline } KMnO_4 + \text{Heat}} CH_3COOH$$

Question 9: A mixture of oxygen and ethyne is burnt for welding. Can you tell why a mixture of ethyne and air is not used?

Answer- When ethyne is burnt in air, it gives a sooty flame. This is due to incomplete combustion caused by limited supply of air. However, if ethyne is burnt with oxygen, it gives a clean flame with temperature 3000°C because of complete combustion.

Question 10: How would you distinguish experimentally between an alcohol and a carboxylic acid?

Answer-

Alcohol	Carboxylic acid
1. It does not change the colour of litmus.	1. It turns blue litmus red.
2. It does not react with baking soda (Sodium bicarbonate)	2. This react with baking soda (Sodium bicarbonate) to form CO_2 gas.
3. By heating in alkaline potassium permanganate solution, alcohol disappear the pink colour of solution.	3. By heating in alkaline potassium permanganate solution, carboxylic acid do not affect the pink colour of solution.

Question 11: What are oxidising agents?

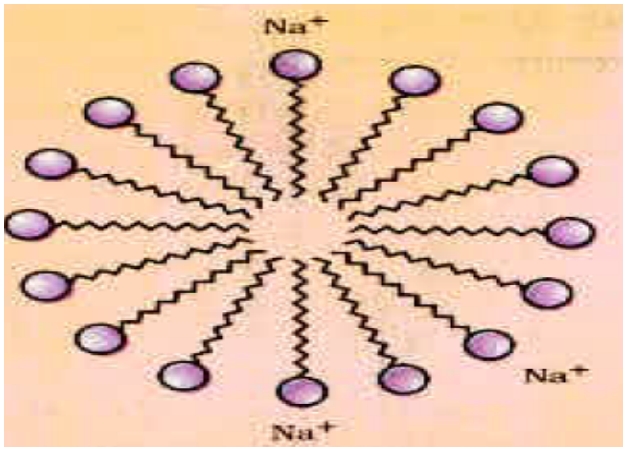
Answer- Some substances such as alkaline potassium permanganate and acidified potassium dichromate are capable of adding oxygen to others. These are known as oxidising agents.

Question 12: Would you be able to check if water is hard by using a detergent?

Answer- No, because detergents make lather with both type of water hard and soft.

Question 13: People use a variety of methods to wash clothes. Usually after adding the soap, they 'beat' the clothes on a stone, or beat it with a paddle, scrub with a brush or the mixture is agitated in a washing machine. Why is agitation necessary to get clean clothes?

Answer- A soap molecule has two ends namely hydrophobic (oil soluble) and hydrophilic (water soluble). With the help of these, it attaches to the grease or dirt particle and forms a cluster called micelle. These micelles remain suspended as a colloid. To remove these micelles (entrapping the dirt), it is necessary to agitate clothes.



EXERCISE

Question 1: Ethane, with the molecular formula C2H6 has

(a) 6 covalent bonds. (b) 7 covalent bonds. ✓

(c) 8 covalent bonds. (d) 9 covalent bonds.

Question 2: Butanone is a four-carbon compound with the functional group

(a) carboxylic acid. (b) aldehyde.

(c) ketone. ✓ (d) alcohol.

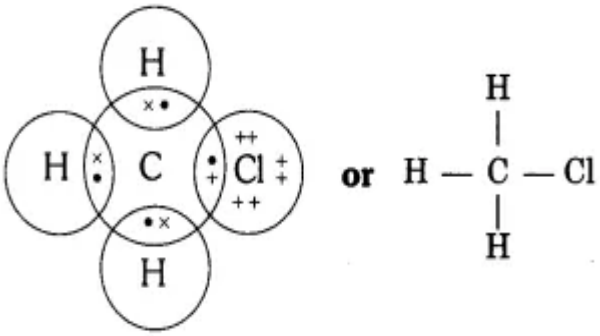
Question 3: While cooking, if the bottom of the vessel is getting blackened on the outside, it means that

(a) the food is not cooked completely. (b) the fuel is not burning completely. ✓

(c) the fuel is wet. (d) the fuel is burning completely.

Question 4: Explain the nature of the covalent bond using the bond formation in CH_3Cl.

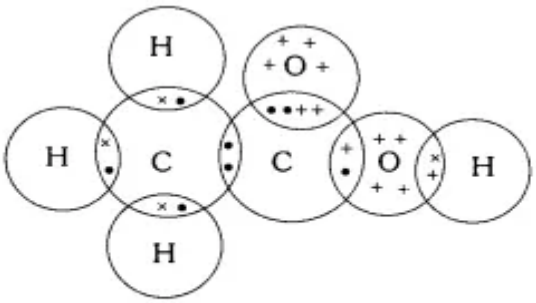
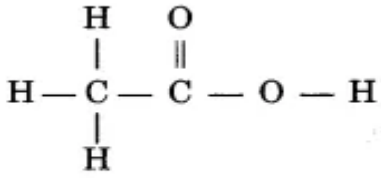
Answer- In covalent bonding, both the atoms share the valence electrons, to complete their last shell. In CH_3Cl hydrogen, carbon and chlorine share their valence electrons to completely fill their outermost shells.

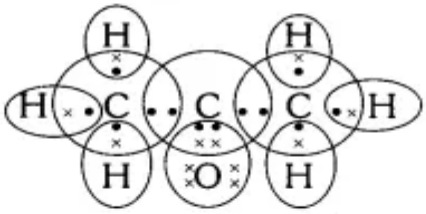
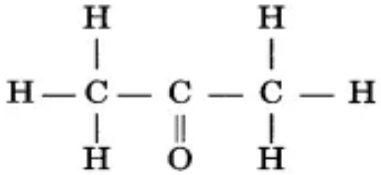


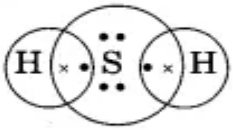
Question 5: Draw the electron dot structures for

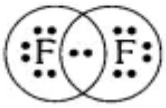
(a) ethanoic acid, (b)H_2S, (c) propanone, (d)F_2

Answer-

(a) **Ethanoic acid:**  or 

(b) **Propanone** :  or 

(c) **Hydrogen sulphide (H_2S) :**  or H–S–H

(d) **Fluorine (F_2)** :  or F–F

Question 6: What is a homologous series? Explain with an example.

Answer - A homologous series is a series of carbon compounds that have different numbers of carbon atoms but contain the same functional group. All members of homologous series have similar chemical properties. All members have difference of CH_2. For example homologous series of alcohol group is

CH_3OH , C_2H_5OH , C_3H_7OH , C_4H_9OH

Question 7: How can ethanol and ethanoic acid be differentiated on the basis of their physical and chemical properties?

Answer –

Ethanol	Ethanoic acid
1. It's melting point is 156 K.	1. It's melting point is 290 K.
2. It's boiling point is 351 K.	2. It's boiling point is 391 K.
3. It does not change the colour of litmus.	3. It turns blue litmus red.
4. It does not react with baking soda (Sodium bicarbonate)	4. This react with baking soda (Sodium bicarbonate) to form CO_2 gas.
5. By heating in alkaline potassium permanganate solution, alcohol disappear the pink colour of solution.	5. By heating in alkaline potassium permanganate solution, carboxylic acid do not affect the pink colour of solution.

Question 8: In the electrolytic refining of a metal M, what would you take as the anode, the cathode and the electrolyte?

Answer - In the electrolytic refining of a metal M:

Anode → Impure metal M

Cathode → Thin strip of pure metal M

Electrolyte → Solution of salt of the metal M

Question 9: Why are carbon and its compounds used as fuels for most applications?

Answer- Because: (1) Carbon compounds have optimum ignition temperature.

(2) Carbon compounds have high calorific value.

(3) Ignition of carbon compounds can be controlled easily.

.**Question 10 : Explain the formation of scum when hard water is treated with soap.**

Answer- Soap does not work properly when the water is hard. Hard water contains salts of calcium and magnesium. When soap is added to hard water, calcium and magnesium ions present in water displace sodium or potassium ions from the soap molecules forming an insoluble substance called scum.

Question 11 : What change will you observe if you test soap with litmus paper (red and blue)?

Answer- Since soap is basic in nature, it will turn red litmus blue. However, the colour of blue litmus will remain blue.

Question 12 : What is hydrogenation? What is its industrial application?

Answer- Hydrogenation is the process of addition of hydrogen in unsaturated hydrocarbons in the presence of palladium and nickel catalysts to give saturated hydrocarbons.

Industrial application- vegetable oils (unsaturated) are converted into vegetable ghee (saturated) by hydrogenation.

Question 13 : Which of the following hydrocarbons undergo addition reactions: C_2H_6 , C_3H_8 , C_3H_6 , C_2H_2 and CH_4

Answer- Addition reaction take place only in unsaturated hydrocarbons and these are : C_3H_6 and C_2H_2

Question 14 : Give a test that can be used to differentiate chemically between butter and cooking oil.

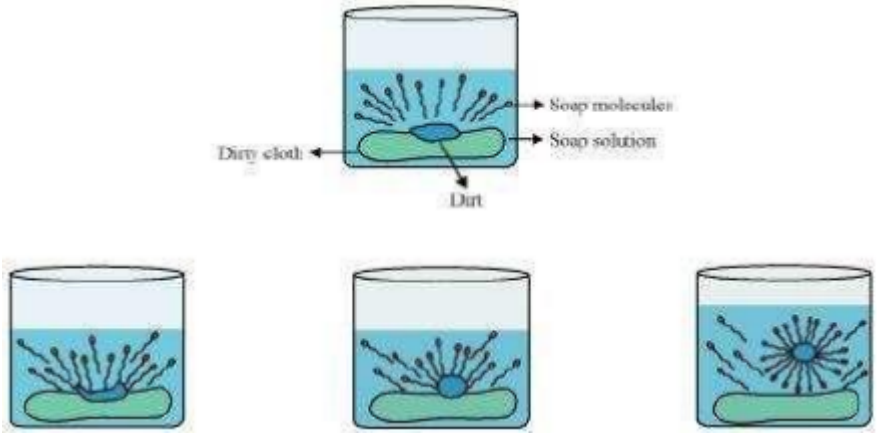
Answer- Butter has saturated but cooking oil has unsaturated fats. Therefore:

(1) Butter burn with blue flame, but oil burn with sooty yellow flame.

(2) Cooking oil make bromine water colorless but butter cannot.

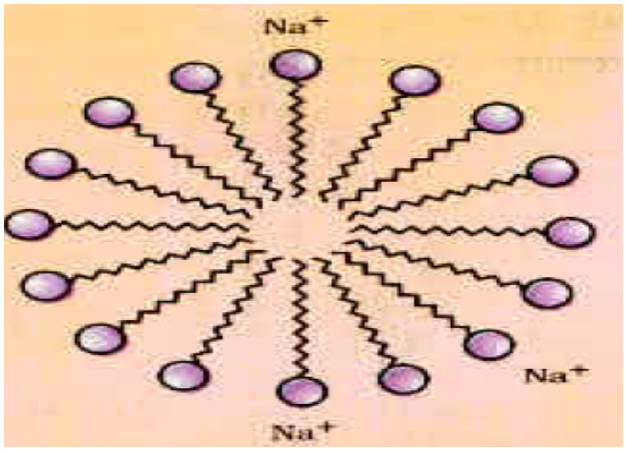
Question 15 : Explain the mechanism of the cleaning action of soaps.

Answer- A soap molecule has two ends namely hydrophobic (oil soluble) and hydrophilic (water soluble). With the help of these, it attaches to the grease or dirt particle and forms a cluster called micelle. These micelles remain suspended as a colloid. To remove these micelles (entrapping the dirt), it is necessary to agitate clothes.



Question 16 : Why does micelle formation take place when soap is added to water? Will a micelle be formed in other solvents such as ethanol also?

Answer- A soap molecule has two ends namely hydrophobic (oil soluble) and hydrophilic (water soluble). With the help of these, it attaches to the grease or dirt particle and forms a cluster called micelle. Ethanol is not polar solvent like water, so micelle will not be formed in ethanol.



CHAPTER 6 -LIFE PROCESSES

Question 1: Why is diffusion insufficient to meet the oxygen requirements of multicellular organisms like humans?

Answer- 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- Living objects (organisms) have many properties like respiration, growth, reproduction, excretion etc.

Question 3: What are outside raw materials used for by an organism?

Answer- Hetrotrophs use food, water and oxygen gas from outside as raw material, But Autotrophs use carbon dioxide gas, water, minerals and oxygen from outside as raw material.

Question 4: What processes would you consider essential for maintaining life?

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

Question 5 : What are the differences between autotrophic nutrition and heterotrophic nutrition?

Answer-

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

Answer- Plants take CO_2 from the atmosphere, water is absorbed from the soil and sunlight from Sun.

Question 7: What is the role of the acid in our stomach?

Answer-In our stomach, acid (HCl) kills germs present in the food and makes the food acidic, so that pepsin enzyme can digest protein.

Question 8: What is the function of digestive enzymes?

Answer- Digestive enzymes such as amylase, lipase, pepsin, trypsin, etc. help in the breaking down of complex food particles into simple ones.

Question 9: How is the small intestine designed to absorb digested food?

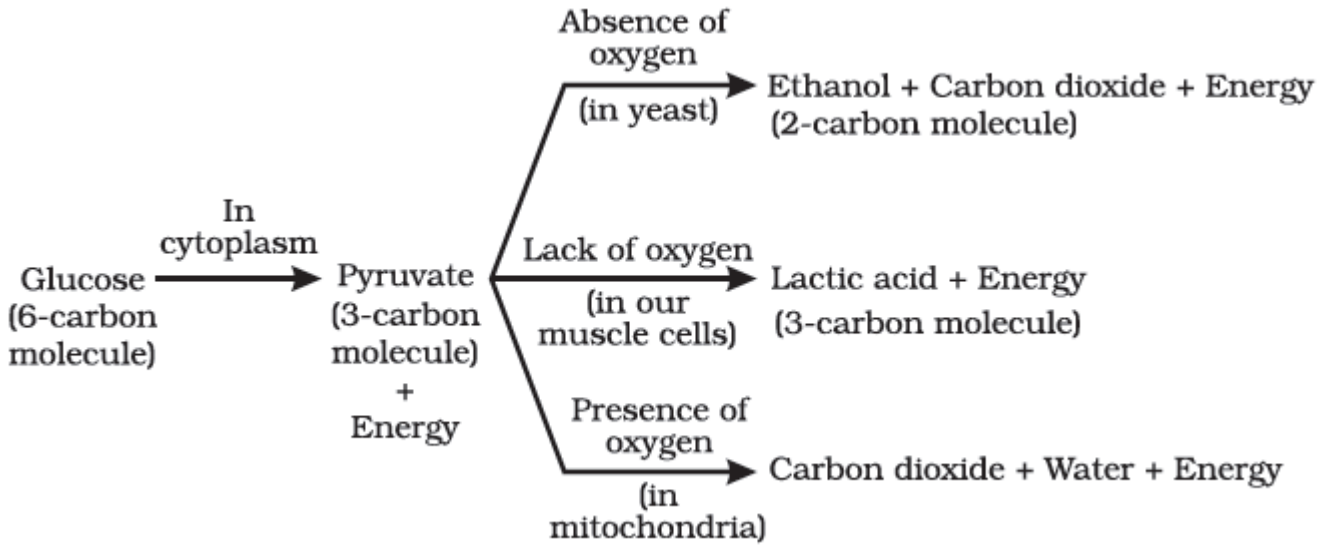
Answer- The small intestine has millions of tiny finger-like projections called villi. These villi increase the surface area for food absorption. Within these villi, many blood vessels are present that absorb the digested food and carry it to the blood stream. From the blood stream, the absorbed food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

Question 10- What advantage over an aquatic organism does a terrestrial organism have with regard to obtaining oxygen for respiration?

Answer- Since the amount of dissolved oxygen in water is very low as 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.

Question 11: What are the different ways in which glucose is oxidised to provide energy in various organisms?

Answer- 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 12: How is oxygen and carbon dioxide transported in human beings?

Answer- (1) Haemoglobin transports oxygen from lungs to different cells through arteries.

(2) Being more soluble in blood, carbon dioxide dissolves in blood and go from different body parts to lungs. Carbon dioxide is also transported by haemoglobin.

Question 13: How are the lungs designed in human beings to maximise the area for exchange of gases?

Answer- The exchange of gases takes place between the blood capillaries that surround the alveoli. Each lung contains 300-350 million alveoli. These numerous alveoli increase the surface area for gaseous exchange making the process of respiration more efficient.

Question 14: What are the components of the transport system in human beings? What are the functions of these components?

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

(1) 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.

(2) Blood is a fluid connective tissue, it helps in the transport of oxygen, nutrients, CO_2 and nitrogenous wastes.

(3) 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 15: Why is it necessary to separate oxygenated and deoxygenated blood in mammals and birds?

Answer- To keep body temperature normal and to fulfill high energy needs, it necessary to separate oxygenated and deoxygenated blood in mammals and birds.

Question 16: What are the components of the transport system in highly organised plants?

Answer- Xylem and phloem.

(1) Xylem conducts water and minerals obtained from the soil (via roots) to the rest of the plant.

(2) Phloem transports amino acids and food materials from the leaves to different parts of the plant body.

Question 17: How are water and minerals transported in plants?

Answer- 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 18: How is food transported in plants?

Answer- Phloem transports food materials from the leaves to different parts of the plant body 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.

Question 19: Describe the structure and functioning of nephrons.

Answer- 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.

Functioning of a nephron:

(1) The water and solute are transferred to the nephron at Bowman's capsule through with glomerulus

(2) In the proximal tubule, some substances such as amino acids, glucose, and salts are selectively reabsorbed and unwanted molecules are added in the urine.

(3) The filtrate then moves down into the loop of Henle, where more water is absorbed.

(4) From here, the filtrate moves upwards into the distal tubule and finally to the collecting duct. Collecting duct collects urine from many nephrons.

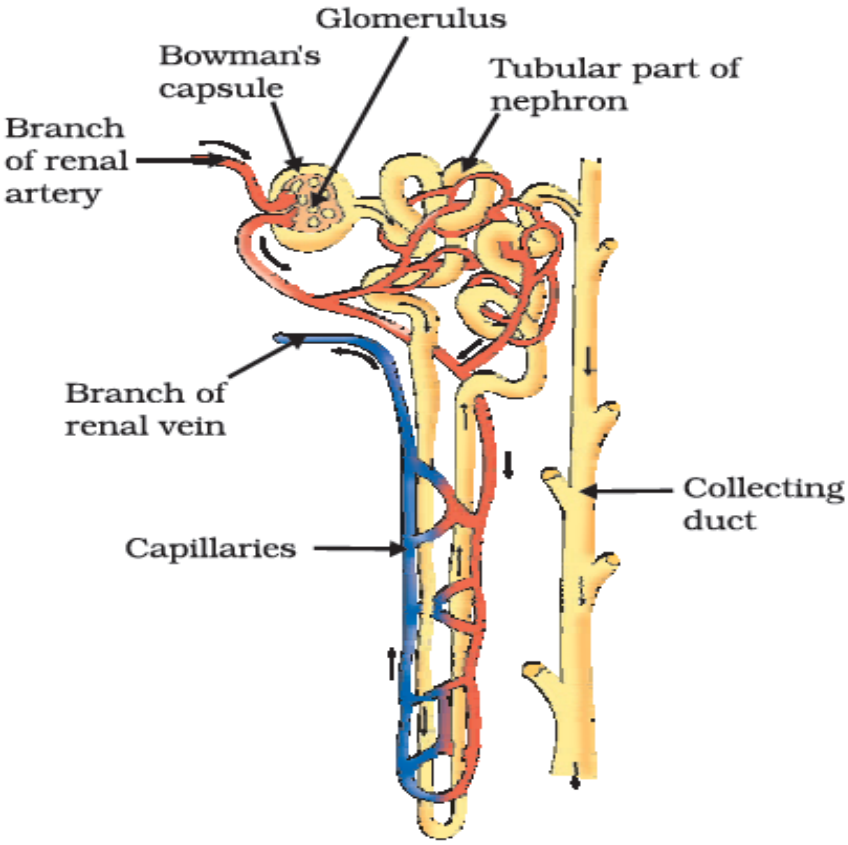


Figure 6.14
Structure of a nephron

Question 20: What are the methods used by plants to get rid of excretory products?

Answer- (1) Plants can get rid of excess water by transpiration.

(2) They can even lose some parts such as leaves.

(3) Other waste products are stored as resins and gums, especially in old xylem.

(4) Plants excrete waste gasses through stomata

Question 21: How is the amount of urine produced regulated?

Answer- 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.

EXERCISE QUESTION-ANSWERS

Question 1: The kidneys in human beings are a part of the system for

(a) nutrition. (b) respiration. (c) excretion. ✓ (d) transportation.

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.

Question 3: The autotrophic mode of nutrition requires

(a) carbon dioxide and water. (b) chlorophyll. (c) sunlight. (d) all of the above. ✓

Question 4: The breakdown of pyruvate to give carbon dioxide, water and energy takes place in

(a) cytoplasm. (b) mitochondria. ✓ (c) chloroplast. (d) nucleus.

Question 5: How are fats digested in our bodies? Where does this process take place?

Answer- 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- Saliva 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- 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.

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

Question 8: What are the differences between aerobic and anaerobic respiration? Name some organisms that use the anaerobic mode of respiration.

Answer-

	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 maximize the exchange of gases?

Answer- 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. This makes large surface area for maximize the gaseous exchange.

Question 10: What would be the consequences of a deficiency of haemoglobin in our bodies?

Answer- Deficiency of haemoglobin in blood can decrease the oxygen supply. 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- Blood in the form of oxygen-rich blood and de-oxygenated blood moves through heart two times, this is known as double circulation. Oxygen rich blood from the lungs comes to the thin-walled upper chamber of the heart, the left atrium. 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, 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.

Double circulation is necessary so that oxygen rich and de-oxygenated blood do not mix.

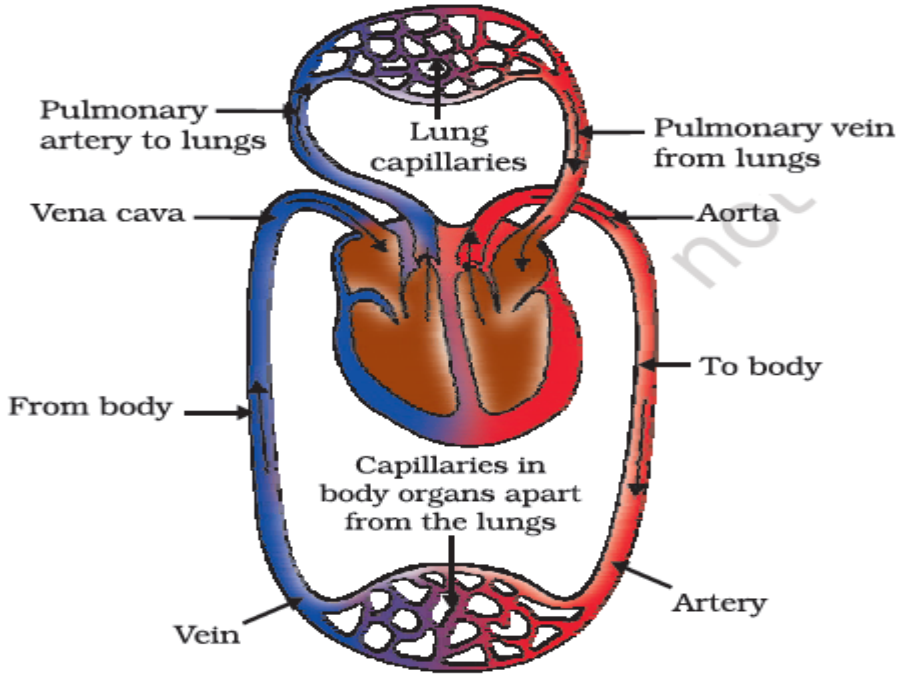


Figure 6.11
Schematic representation of transport and exchange of oxygen and carbon dioxide

Question 12: What are the differences between the transport of materials in xylem and phloem?

Answer-

	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-

Alveoli in the lungs	**Nephrons in the kidneys**
1. This is a functioning unit of lungs.	1. This is a functioning unit of kidneys.
2. There are approximately 30 crores alveoli in each lung.	2. There are approximately 10 lakh nephron in each kidney.
3. Alveoli provide a large area for exchange of gasses.	3. It do not have large area.
4. It exchanges oxygen and carbon dioxide gasses.	4. It controls the amount of water and minerals.

CHAPTER 8 –HOW DO ORGANISMS REPRODUCE?

Question 1: What is the importance of DNA copying in reproduction?

Answer- DNA (Deoxyribonucleic acid) determines the body design of an individual. DNA transfers inherited properties from parents to offsprings. DNA copying is also responsible for variations, which are necessary for development.

Question 2: Why is variation beneficial to the species but not necessarily for the individual?

Answer- Because sometimes for a species, the environmental conditions change so drastically that their survival becomes difficult. So due to variations some individuals will adapt according to the conditions, and will survive. Thus, these variants help in the survival of the species. However, all variations are not necessarily beneficial for the individual organisms.

Question 3: How does binary fission differ from multiple fission?

Answer- In **binary fission**, a single cell divides into two equal halves. Amoeba and Paramecium divide by binary fission.

In **multiple fission**, a single cell divides into many daughter cells simultaneously. Plasmodium divide by multiple fission.

Question 4: How will an organism be benefited if it reproduces through spores?

Answer- Spores are distributed easily by air to far-off places to avoid competition at one place. Spores are covered by thick walls to prevent dehydration under unfavourable conditions.

Question 5: Can you think of reasons why more complex organisms cannot give rise to new individuals through regeneration?

Answer- complex organisms have organ-system level of organization. All the organ systems of their body work together as an interconnected unit. So new complete organism cannot be regenerated from any body part.

Question 6: Why is vegetative propagation practised for growing some types of plants?

Answer- Some plants which cannot produce seeds or produce dormant seeds are produced by vegetative propagation

Question 7: Why is DNA copying an essential part of the process of reproduction?

Answer- DNA (Deoxyribonucleic acid) determines the body design of an individual. DNA transfers inherited properties from parents to offsprings. DNA copying is also responsible for variations, which are necessary for development.

Question 8: How is the process of pollination different from fertilization?

Answer-

Pollination	Fertilization

1. Pollination is the process of transfer of pollens from anther to stigma.	1. Fertilization is the fusion of the male and female gametes.
2. It is of two types: Self- pollination and cross-Pollination	2. It is of two types: Internal and external fertilization.

Question 9: What is the role of the seminal vesicles and the prostate gland?

Answer- The secretions from seminal vesicles and prostate glands lubricate the sperms and provide a fluid medium for easy transport of sperms. Their secretion also provides nutrients to sperms.

Question 10: What are the changes seen in girls at the time of puberty?

Answer- (1) Increase in breast size and darkening of skin of the nipples present at the tips of the breasts.

(2) Appearance of hair in the genital area.

(3) Appearance of hair in other areas of skin like underarms, face, hands, and legs.

(4) Maturity in the reproductive organs.

(4) Beginning of menstrual cycle.

(5) More secretion of oil from the skin, which results in the appearance of pimples.

Question 11: How does the embryo get nourishment inside the mother's body?

Answer- Embryo get nutrients from blood of mother. Inside the uterus, the outer tissue surrounding the embryo develops finger-like projections called villi. These villi are surrounded by uterine tissue and maternal blood. Also, there is a special tissue called placenta, which is embedded in the uterine wall. The embryo receives the oxygen and nutrients from the mother's blood via the placenta. The waste materials produced by the embryo are also removed through the placenta.

Question 12: If a woman is using a copper-T, will it help in protecting her from sexually transmitted diseases?

Answer- No, because it is only contraceptive. It does not prevent the entry of semen.

QUESTION-ANSWERS

EXERCISE

Question1: Asexual reproduction takes place through budding in

(a) amoeba. (b) yeast. ✓ (c) plasmodium. (d) leishmania.

Question 2: Which of the following is not a part of the female reproductive system in human beings?

(a) Ovary (b) Uterus (c) Vas deferens ✓ (d) Fallopian tube

Question 3: The anther contains

(a) sepals. (b) ovules. (c) carpel. (d) pollen grains. ✓

Question 4: What are the advantages of sexual reproduction over asexual reproduction?

Answer- (1) In sexual reproduction, more variations are produced. Thus, it ensures survival of species in a population.

(2) The new formed individual has characteristics of both the parents.

Question 5: What are the functions performed by the testis in human beings?

Answer- Testes produce sperms and a hormone called testosterone, which brings about secondary sexual characters in boys.

Question 6: Why does menstruation occur?

Answer- Menstruation is a process in which blood and mucous flows out every month through the vagina. This process occurs every month because one egg is released from the ovary every month and at the same time, the uterus (womb) prepares itself to receive the fertilized egg. Thus, the inner lining of the uterus gets thickened and is supplied with blood to nourish the embryo. If the egg does not get fertilized, then the lining of the uterus breaks down slowly and gets released in the form of blood and mucous from the vagina.

Question 7: Draw a labelled diagram of the longitudinal section of a flower.

Answer-

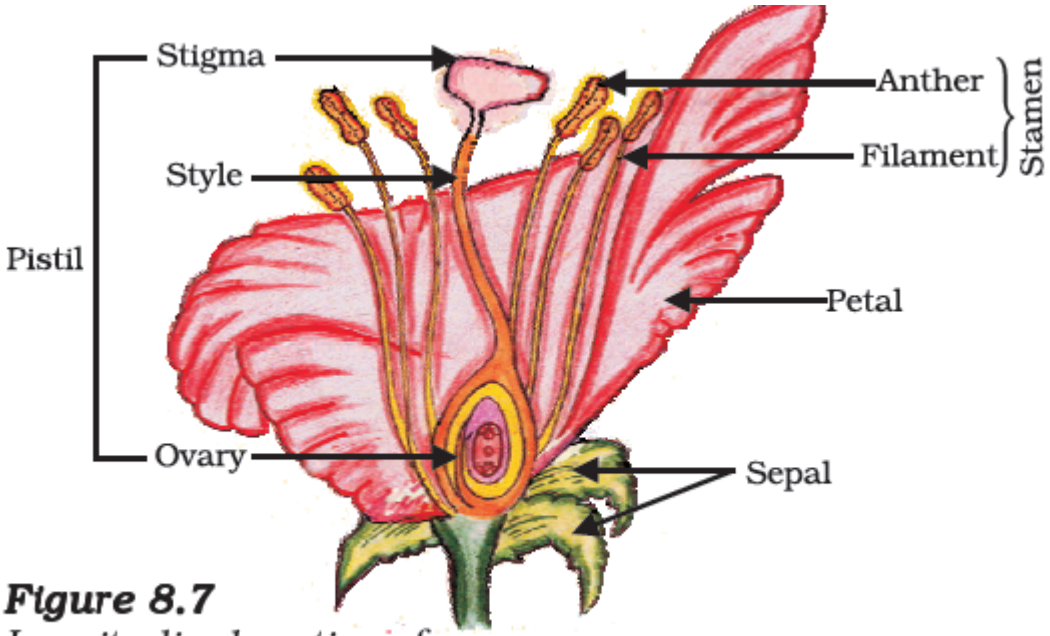


Figure 8.7
Longitudinal section of flower

Question 8- What are the different methods of contraception?

Answer- Contraceptive methods-

(1) **Physical methods** like condom, copper-T and loop etc can prevent fertilization.

(2) **Oral contraceptive** tablets or drugs can prevent the release of egg, thus can stop fertilization.

(3) **Surgical methods** like vasectomy in man and tubectomy in woman can stop fertilization.

Question 9: How are the modes for reproduction different in unicellular and multicellular organisms?

Answer- Unicellular organism reproduce only by asexually reproduction, but most of multicellular organism reproduce by sexual reproduction.

Question 10: How does reproduction help in providing stability to populations of species?

Answer- With reproduction an organism produce new individuals that resemble the parents. Also sexual reproduction causes variations, which are necessary for the survival of a species in drastic environmental changes.

Question 11: What could be the reasons for adopting contraceptive methods?

Answer- Contraceptive methods are mainly adopted because of the following reasons:

(i) To prevent unwanted pregnancies.

(ii) To control population rise or birth rate.

(iii) To keep appropriate gap between children for good health.

(iv) To prevent the transfer of sexually transmitted diseases.

CHAPTER 14 –SOURCES OF ENERGY

Question 1: What is a good source of energy?

Answer- A good source of energy should have the following qualities-

(1) It should be easily available.

(2) It should have high calorific value.

(3) It should be easy to store and transport.

(4) It should be economical.

(5) It should cause less environmental pollution.

Question 2: What is a good fuel?

Answer- A good fuel should have the following qualities-

(1) It should be easily available.

(2) It should have high calorific value.

(3) It should be easy to store and transport.

(4) It should be economical.

(5) It should cause less environmental pollution.

Question 3: If you could use any source of energy for heating your food, which one would you use and why?

Answer- We shall use LPG/CNG gas or electricity for heating our food because these are have all properties of good fuel.

Question 4: What are the disadvantages of fossil fuels?

Answer- There are following disadvantages of fossil fuels like coal and petroleum-

(1) Burning of coal or petroleum causes air pollution.

(2) Burning of fossil fuels produce gasses responsible for acidic rain and green house effect.

(3) Fossil fuels are non-renewable sources of energy.

Question 5: Why are we looking at alternate sources of energy?

Answer- Because traditional sources of energy like coal, petroleum are non renewable sources, have limited sources on earth. Also these cause pollution. So we are looking at alternate sources.

Question 6: How has the traditional use of wind and water energy been modified for our convenience?

Answer- (1) Wind energy is converted into electricity by wind mills.

(2) Energy of moving water is also converted into electricity by the use of dams and generators.

Question 7: What kind of mirror – concave, convex or plain – would be best suited for use in a solar cooker? Why?

Answer- **Concave mirrors** are used in soalr cooker. Because concave mirrors converge the light incident on them at a single point to produce a large amount of heat.

Question 8: What are the limitations of the energy that can be obtained from the oceans?

Answer- (1) Limitations **Tidal energy**-There are very few locations where dams to utilize tidal energy can be built and these cannot work all the time.

(2) Limitations of **wave energy**- There are limited locations with high strength waves.

(3) Limitations of **Ocean thermal energy**- To get electricity from ocean thermal energy OTEC plants are made. This plant is very costly and can work only when there is temperature difference of minimum 20°C between sea level and some depth.

Question 9: What is geothermal energy?

Answer- Geothermal energy is the heat energy present inside earth in certain regions called hot spots. When underground water comes in contact with the hot spot, steam is generated. This steam is routed through a pipe to a turbine and used to generate electricity.

Question 10: What are the advantages of nuclear energy?

Answer- Electricity can be produced by nuclear fission reaction in nuclear reactor. Calorific value of nuclear sources are very high. Atomic bomb is also based on nuclear fission reaction. Sun and other stars produce a huge amount of energy by nuclear fusion reaction.

Question 11: Can any source of energy be pollution-free? Why or why not?

Answer- No, any source of energy cannot be pollution free. Solar cell like pollution free sources also produce pollution while production or destruction.

Question 12: Hydrogen has been used as a rocket fuel. Would you consider it a cleaner fuel than CNG? Why or why not?

Answer- Hydrogen is cleaner fuel than CNG because on burning hydrogen produce only water, but CNG produce green house gasses. Beside this hydrogen's calorific value is very high.

Question 13: Name two energy sources that you would consider to be renewable. Give reasons for your choices.

Answer- Solar, water and wind energy are renewable sources because these cannot be exhausted. Bio-mass and wood are also renewable sources of energy as these can be replenished again in some time.

Question 14: Give the names of two energy sources that you would consider to be exhaustible. Give reasons for your choices.

Answer- Coal and petroleum are two exhaustible sources of energy. These fuels were formed over millions of years ago and there are only limited reserves. If we continue to use them as at present, these reserves will be exhausted very soon.

EXERCISE QUESTION-ANSWERS

Question 1: A solar water heater cannot be used to get hot water on

(a) a sunny day (b) a cloudy day✓ (c) a hot day (d) a windy day.

Question 2: Which of the following is not an example of a bio-mass energy source?

(a) wood (b) gobar-gas (c) nuclear energy ✓ (d) coal

Question 3: Most of the sources of energy we use represent stored solar energy. Which of the following is not ultimately derived from the Sun's energy?

(a) geothermal energy (b) wind energy (c) nuclear energy ✓ (d) bio-mass.

Question 4: Compare and contrast fossil fuels and the Sun as direct sources of energy.

Answer-

Fossil fuels	Sun
1. These are non-renewable sources of energy.	1. This is a renewable source of energy.
2. These cause pollution.	2. It do not cause pollution.
3. These will exhaust in near future.	3. It will last as the solar system exist.
4. Energy can be produced any time.	4. Energy can only be utilized at day time in sunshine.

Question 5: Compare and contrast bio-mass and hydroelectricity as sources of energy.

Answer-

Bio-mass	Hydroelectricity
1. This is a renewable source of energy.	1. This is a renewable source of energy.
2. It causes pollution.	2. It do not cause pollution.
3. Energy can be produced anytime, anywhere.	3. There are limited places where hydroelectric power plants can be developed.

Question 6: What are the limitations of extracting energy from — (a) the wind? (b) waves? (c) tides?

Answer- (a) Limitations of **wind energy**-

(1) Initial cost of wind mill plant is very high.

(2) For proper working of will mills, speed of wind must be more than 15 km/h, but this is not possible for the whole year.

(3) There are limited places where wind mill plant can set up.

(4) A large area is required to set up a wind mill plant.

(b) Limitations of **wave energy**- There are limited locations with high strength waves.

(c) Limitations **tidal energy**-There are very few locations where dams to utilize tidal energy can be built and these cannot work all the time.

Question 7: On what basis would you classify energy sources as

(a) renewable and non-renewable?

(b) exhaustible and inexhaustible? Are the options given in (a) and (b) the same?

Answer- (a) The source of energy that replenishes in nature is known as **renewable** source of energy. Sun, wind, moving water, bio-mass, etc. are some of the examples of renewable sources of energy.

The source of energy that does not replenish in nature is known as **non-renewable** source of energy. Coal, petroleum, natural gas, etc. are some of the examples of non - renewable sources of energy.

(b) **Exhaustible** sources are those sources of energy, which will deplete and exhaust after a few hundred years. Coal, petroleum, etc. are the exhaustible sources of energy.

Inexhaustible resources of energy are those sources, which will not exhaust in future. These are unlimited. Bio-mass is one of the inexhaustible sources of energy.

Yes. The options given in (a) and (b) are the same.

Question 8- What are the qualities of an ideal source of energy?

Answer- An ideal source of energy should have the following qualities-

(1) It should be easily available.

(2) It should have high calorific value.

(3) It should be easy to store and transport.

(4) It should be economical.

(5) It should cause less environmental pollution.

Question 9: What are the advantages and disadvantages of using a solar cooker? Are there places where solar cookers would have limited utility?

Answer- **Advantages** of using solar cooker-

(1) This is pollution free.

(2) Free Sun energy is utilized.

(3) It do not destroy nutrients of food.

Disadvantages-

(1) It cannot work at night or during clouds.

(2) Reflector of solar cooker must be directed towards Sun from time to time.

(3) High temperature cannot be attained.

(4) It takes a lot of time to hot the food.

Question 10: What are the environmental consequences of the increasing demand for energy? What steps would you suggest to reduce energy consumption?

Answer- **Environmental consequences of the increasing demand for energy-**

(1) Gasses evolved during burning of fossil fuels increase green house effect.

(2) Gasses evolved during burning of fossil fuels are responsible for acidic rain.

(3) Gasses evolved during burning of fossil fuels cause air pollution.

(4) High energy demand result in deforestation, which cause less rain, soil erosion etc.

(5) Wastages of nuclear reactor are very dangerous.

Steps to reduce energy consumption-

(1) Lights and fans should be turned 'ON' only when needed.

(2) We should use energy efficient appliances.

(3) We should use bio-gas plant in rural area.

(4) We should use fuels which cause less pollution.

(5) We should use pressure cooker for cooking.

(6) We should use public transport instead of private vehicles.

(7) We should use cycle instead of bike.