



# ವಿಜ್ಞಾನ ಸೂರ್ತಿ

2019-20ನೇ ಸಾಲಿನ ವಿಜ್ಞಾನ ವಿಷಯದ ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಪರಿಷಾರ್ತ ಕಾರ್ಯಕ್ರಮಗಳೆಂದು ಕರೆಯುವುದು

## ಸಲಹೆ ಮತ್ತು ಮಾರ್ಗದರ್ಶನ

ಶ್ರೀ ರಾಜೇಂದ್ರ ಉಪನಿರ್ದೇಶಕರು (ಆಡಳಿತ)

ಶ್ರೀ ಗಿರಿಜಮ್ಮ ಹೆಚ್.ಎನ್., ಶಿಕ್ಷಣಾಧಿಕಾರಿಗಳು-1

ಶ್ರೀ ಅನಿಲ್.ಎ.ಎನ್., ಶಿಕ್ಷಣಾಧಿಕಾರಿಗಳು-2

ಶ್ರೀಮತಿ ಅರ್ಚನಾ ನಾಯಕ್, ವಿಜ್ಞಾನ ವಿಷಯ ಪರಿವೀಕ್ಷಕರು

## ಸಂಪನ್ಮೂಲ ವ್ಯಕ್ತಿಗಳು

ರಾಮಚಂದ್ರ ಭಟ್.ಬಿ.ಬಿ. ಎಂ.ಎಸ್ಸಿ. ವಿ.ಇಡಿ. ಸಪ್ತಾಹದ ವ್ಯಾಪ್ತಿರಾಯನಹಳ್ಳಿ,ಮಂಡವ-2

ನಾಗರಾಜ ಎಂ.ಎಸ್ಸಿ. ವಿ.ಇಡಿ. ಸಪ್ತಾಹದ ಮೊದಲಹಳ್ಳಿ,ಮಂಡವ-4

ಲಕ್ಷ್ಮಿ ಪ್ರಸಾದ್ ನಾಯಕ್ ಎಂ.ಎಸ್ಸಿ. ಎಂ.ಫಿಲ್, ವಿ.ಇಡಿ,ಕಿ.ಜಿ.ಡಿ.ಎ. ಸಪ್ತಾಹದ(BMISA) ಸೆಂಗೇರಿ,ಮಂಡವ-1

ವಿನಯ್.ಡಿ ಎಂ.ಎಸ್ಸಿ. ವಿ.ಇಡಿ ಸಪ್ತಾಹದ,ಯಶಿಯಾಹಳ್ಳಿ,ಮಂಡವ-3

ಲೋಹಿತ್ ಕೆ.ಬಿ ಎಂ.ಎಸ್ಸಿ. ವಿ.ಇಡಿ ಸಪ್ತಾಹದ,ಸೆಂಗೇರಿ,ಮಂಡವ-4

ಉಪನಿರ್ದೇಶಕರ ಕಚೇರಿ ಸಾರ್ವಜನಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ

ಕಲಾಸಿಪಾಳ್ಯಂ, ಬೆಂಗಳೂರು ದಕ್ಷಿಣ ಜಿಲ್ಲೆ

## IMPORTANCE GIVEN TO THE OBJECTIVES

Sl.No	Objectives	%	Marks
1	Knowledge	20	16
2	Understanding	40	32
3	Application	20	16
4	Skill	20	16
	<b>Total</b>	<b>100</b>	<b>80</b>

### EXAM QUESTION PATTERN 888941



### SSLC ANNUAL EXAM - 2020

SL. NO.	QUESTION TYPE	NO. OF QUESTIONS AND MARKS
1	MULTIPLE CHOICE QUESTIONS	8X1=8
2	VERY SHORT ANSWER QUESTIONS	8X1=8
3	TWO MARK QUESTIONS	8X1=8
4	THREE MARK QUESTIONS	9X3=27
5	FOUR MARK QUESTIONS	4X4=16
6	LONG ANSWER QUESTION	5X1=5
		38 QUESTIONS AND 80 MARKS

### Marks Distribution for themes and Units covered

Sl.No	THEMES	UNITS	TOTAL MARKS
1	<b>Materials in Daily Life</b>	1. Chemical Reactions and Equations 2. Acids, Bases and Salts 3. Metals and Non-metals 4. Carbon and its Compounds 5. Periodic Classification of Elements	<b>25</b>
2	<b>World of Living</b>	6. Life Processes 7. Control and Coordination 8. How do Organisms Reproduce? 9. Heredity and Evolution	<b>22</b>
3	<b>Natural Phenomena</b>	10. Light – Reflection and Refraction 11. The Human Eye and the Colourful World	<b>12</b>
4	<b>How do things work?</b>	12. Electricity 13. Magnetic Effects of Electric Current	<b>13</b>
5	<b>Natural Resources</b>	14. Sources of Energy 15. Our Environment 16. Sustainable Management of Natural Resources	<b>08</b>
		<b>TOTAL</b>	<b>80</b>

## Chapter 1: Chemical Reactions and Equations

1. **Define Chemical Reaction .**

The process of formation of new substances with new properties from one or more substances is called **Chemical Reaction**.

2. **What is balanced chemical equation?**

When the number of atoms of different elements on reactant side and product side are equal, such chemical equation is called a balanced chemical equation.

3. **Translate the following into balanced chemical equations.**

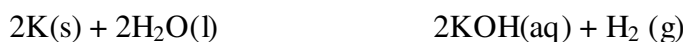
- i. Hydrogen gas reacts with nitrogen gas to form ammonia



- ii. Hydrogen sulphide gas burnt in air to give water and sulphur dioxide.



- iii. Potassium metal reacts with water gives potassium hydroxide hydrogen gas.



4. **What is Physical Change? Give Example.**

A physical change is a temporary change and is easily reversible. in which no new substance is formed and the composition of the substance is not altered although certain specific physical properties may be changed.

Eg: 1. Melting of Ice	2. Lighting of electric bulb	3. Magnetization of iron.
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5. **What is Chemical Change? Give Example.**

A chemical change is a permanent change in which a new chemical substance is formed with different properties than the substances which undergo chemical change.

**Ex. 1. Burning of fuel**

**2. Burning of wood**

6. **List the changes takes place during Chemical reaction.**

- change in state
- change in colour
- evolution of a gas
- Change in temperature.
- Change in the chemical composition
- **Define Chemical equation?**

Symbolic representation of reactants and products using suitable symbols and chemical formulae.

8. **What you mean by balancing of equation? Why chemical equation should be balanced?**

The practice of equalizing the number of atoms of elements on left hand side to the corresponding atoms on right hand side is called **balancing of equation**.

According to the law of conservation of mass, ‘mass can neither be created nor be destroyed during a chemical reaction’, Hence we must balance a chemical equation. .

1. **Write the 4 Types Of Chemical Reactions**

1. Combination
2. Decomposition
3. Displacement
4. Double decomposition



2. **What is a combination reaction? Give example.**

A reaction in which two or more reactants combine to form a single product is called chemical combination. (i) Burning of Coal  $C(s) + O_2(g) \rightarrow CO_2(g)$

3. **What is a decomposition reaction? Write the 3 types decomposition with examples.**

A reaction in which a single reactant breaks down to form two or more products is known as chemical decomposition reaction.

3 types of **decomposition** are-

i) **Thermal decomposition:** When a decomposition reaction is carried out by heating, it is called thermal decomposition.

**Example: 1.**  $CaCO_3(s) + \text{Heat} \rightarrow CaO(s) + CO_2(g)$

ii) **Electrolytic decomposition:** Take place by electric current.

**Example:**  $2H_2O + \text{electric current} \rightarrow 2H_2(g) + O_2(g)$

iii) **Photolytic reaction :** By using light energy

**Examples: 1** white silver chloride turns grey in sunlight. This is due to the decomposition of silver chloride into silver and chlorine by light.

$2AgCl(s) \xrightarrow{\text{Sunlight}} 2Ag(s) + Cl_2(g)$

The above reactions are used in black and white photography.

12) **Define exothermic reaction?**

i) A chemical reaction in which releases heat energy is called an exothermic reaction

Examples:

(i) Burning of natural gas  $CH_4(g) + O_2(g) \rightarrow CO_2(g) + 2H_2O(g) + \text{Heat}$

(ii) Respiration is also an exothermic reaction.  $C_6H_{12}O_6(aq) + 6O_2(g) \rightarrow 6CO_2(aq) + 6H_2O(l) + \text{energy}$

13) **Define Endothermic reaction?**

Endothermic reaction : A chemical reaction in which heat energy is absorbed.

Examples: i)  $CaCO_3 + \text{Heat} \rightarrow CaO + CO_2$

14) **Define Displacement reaction?**

When a more reactive element displaces less reactive element from its compound is called displacement reaction.

**Ex :** (i)  $Zn(s) + CuSO_4(aq) \rightarrow ZnSO_4(aq) + Cu(s)$

15) **What is double displacement reaction? Give 2 examples.**

The reaction in which two different ions or group of atoms in the reactant molecules are displaced by each other is called double displacement reaction.

**Example:** (i) When sodium carbonate solution added to magnesium sulphate solution in a test tube, a white precipitate of magnesium carbonate is formed.

$MgSO_4 + Na_2CO_3 \rightarrow MgCO_3 + Na_2SO_4$

(ii) When sodium sulphate mixed with barium chloride forms white precipitate of barium sulphate.

$Na_2SO_4(aq) + BaCl_2(aq) \rightarrow BaSO_4(s) + 2NaCl(aq)$

16) **What are precipitation reactions? Explain with suitable example.**

The chemical reactions which involves the formation of insoluble solid are called precipitation reaction.

$Na_2SO_4(aq) + BaCl_2(aq) \rightarrow BaSO_4(s) + 2NaCl(aq)$

**17) What is oxidation reaction? Give 2 examples.**

The process of addition of oxygen to a substance or removal of hydrogen from a substance is called oxidation reaction.

**example:** (i)  $4\text{Na} + \text{O}_2 \rightarrow 2\text{Na}_2\text{O}$       Na Oxidised to-  $\text{Na}_2\text{O}$  .

(ii)  $2\text{Cu} + \text{O}_2 \xrightarrow{-\text{Heat}} 2\text{CuO}$       Cu Oxidised to -  $\text{CuO}$  .

**18) Why do we apply paint on iron articles?**

By

applying paint on iron articles, they can be prevented from corrosion ( rusting). Paint does not allow oxygen and moisture to come in contact with the surface of iron.

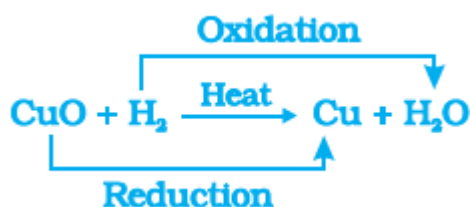
**19. What is reduction reaction?**

The processes of removal of oxygen from a substance or addition of hydrogen to a substance is called reduction reaction.

**20) What are redox reactions? Give 2 examples**

The reactions in which oxidation and reduction takes place simultaneously are called redox reactions.

**Example** (i)  $\text{CuO}$  reduced to -  $\text{Cu}$  .       $\text{H}_2$  Oxidised to -  $\text{H}_2\text{O}$



ii)  $\text{ZnO} + \text{C} \rightarrow \text{Zn} + \text{CO}$

C is oxidized to CO -----oxidation

ZnO is reduced to Zn -reduction

**21) How do you prevent the corrosion?**

The rusting of iron can be prevented by painting, oiling, greasing, galvanizing, chromium plating, anodizing or making alloys.

**22) What is Rancidity? How can it be controlled?**

The process of slow

oxidation of oil and fat present in the food materials resulting in the change of smell and taste in them is called rancidity.

1. By keeping food materials in air tight container.
2. Refrigeration of cooked food at low temperature.
3. By adding anti-oxidants.

1. Why are Oil food items flushed with nitrogen?

To prevent the rancidity by getting oxidized

2. **What will you observe when an iron nail is dipped in copper sulphate solution?**

Blue colour of copper sulphate fades to give green colour, because Iron displaces copper metal.



# Chapter-2: Acid Base and Salt

1. **List any 3 properties of acids.**

1. These are the substances which have sour taste.
2. They turn blue litmus to red.
3. They give  $\text{H}_3\text{O}^+$  ions in aqueous solution.

2. **List the any 3 properties of bases.**

- a. These are the substances which are bitter in taste and soapy in touch.
- b. They turn red litmus solution blue.
- c. They give  $\text{OH}^-$  ions in aqueous solution

c. **Give examples for acids**

Hydrochloric acid (HCl), Sulphuric acid ( $\text{H}_2\text{SO}_4$ ), nitric acid ( $\text{HNO}_3$ )

4. **Give examples for bases**

Sodium hydroxide (NaOH), calcium hydroxide [ $\text{Ca}(\text{OH})_2$ ], potassium hydroxide (KOH), and ammonium hydroxide ( $\text{NH}_4\text{OH}$ ).

5. **What are alkalis?**

Water soluble bases are called alkalis.

Eg: NaOH, KOH,  $\text{Ca}(\text{OH})_2$

6. **What is a salt?**

The substance produced by the neutralization reaction between acid and base is called salt.

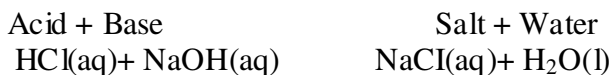
Eg: NaCl, KCl

7. **What are Indicators?**

These are the substances which change their colour or odour in different types of substances.

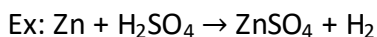
8. **What is neutralization reaction? Give example.**

The reaction between an acid and base to form salt and water is called neutralization reaction.



9. **How do? Write the equation.**

dil. acids react with metals to produce salt and release Hydrogen gas.

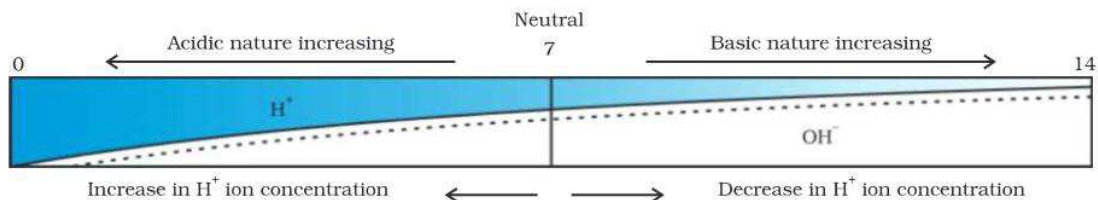


10. **Why does dry HCl gas not change the colour of dry litmus paper?**

Dry HCl gas does not contain any  $\text{H}^+$  or  $\text{H}_3\text{O}^+$  ions, so it does not show any acidic property. Hence, it does not change the colour of dry litmus paper. To show its acidic behavior, it needs wet litmus paper.

11. **What is the effect concentration of  $\text{H}^+$  ions on the solution? Represent with a diagram**

$\text{H}^+$  ions concentration increases the pH ranges between 1 to 6.9 and the solution become acidic.  $\text{H}^+$  ions concentration decreases from pH 7.0 to 14.0, the solution become basic as shown in the diagram



12. **What is the common name of  $\text{CaOCl}_2$ ? How it is prepared?**

Bleaching powder. Bleaching powder is produced by the action of chlorine on dry slaked lime [ $\text{Ca}(\text{OH})_2$ ]. It is represented as  $\text{CaOCl}_2$ .

13. **Name the sodium compound used to convert hard water to soft water. Write the formula**

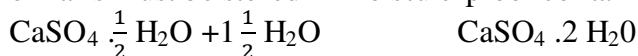
Washing soda-  $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$

14. **Why do not acids show acidic behavior in the absence of water?**

Ions are produced only in aqueous medium and presence of H<sup>+</sup> ions are responsible for the existence of acidic properties. Hence, acids show acidic behavior only in the presence of water and not in its absence.

15. **Plaster of Paris should be stored in moisture proof containers. Explain why?**

Plaster of Paris (POP) is chemically calcium sulphate hemihydrate ( $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$ ). When it comes in contact with water it sets into a hard solid mass, called gypsum. To prevent this Plaster of Paris must be stored in moisture-proof containers.



16. **Why milk and sours food substances are not stored in copper and brass container?**

Because, milk and sours food reacts with brass and copper release hydrogen gas and some toxic substances.

17. **Write any 2 uses of washing soda.**

Uses of washing soda are:

- i. It is used as a cleansing agent (detergents).
- ii. It is used to remove permanent hardness of water.

xviii. **Give two important uses of baking soda.**

Uses of baking soda are:

- i. It is used in bakery.
- ii. It is used for extinguishing fire (in soda-acid fire extinguishers).

xix. **What is Chlor-alkali process?**

When electricity is passed through an aqueous solution of sodium chloride (called brine), it decomposes to form sodium hydroxide. This process is called chlor-alkali process. (because of the products formed).

20. **Solutions of glucose and alcohol does not exhibit acidic property. Give scientific reason. Why?**

Solutions of glucose and alcohol does not exhibit acidic property because they does not dissociates into ions.

21. **While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid?**

Dilution of a concentrated acid is a highly exothermic reaction and a lot of heat is generated. Care must be taken while mixing concentrated acid with water. The acid must always be added slowly to water with constant stirring. Water is added to the concentrated acid, the heat generated may cause the mixture to splash out and cause burns. The glass container may also break due to excessive local heating.

22. **Write the uses of baking powder?**

- i. It is used as bleaching agent in textile industry and paper industry
- ii. Used as disinfectant for water to make it germ free.
- iii. Used as an oxidising agent in many chemical industry,

xxiii. **Write the chemical equation to show the reaction between plaster of Paris and water.**



24. **Write the uses of plaster of Paris.**

1. It used by the doctors for joining the fractured bones at right position i.e., for making plaster to support fractured bones.
2. It is used to making decorative pieces and for making design on ceilings.

25. **What is Baking Powder?**

Baking powder is a mixture of sodium hydrogen carbonate and tartaric acid. On heating it liberates  $\text{CO}_2$  which makes the cake soft and spongy.

26. **Define water of crystallization?**

Water of crystallization is the fixed number of water molecules present in one formula unit of a salt.

Eg:  $\text{Cu SO}_4 \cdot 5\text{H}_2\text{O}$ .

27. **What happens to  $\text{H}^+$  /  $\text{OH}^-$  on dilution?**

Mixing an acid or base with water results in decrease in the concentration of ions ( $\text{H}_3\text{O}^+$  /  $\text{OH}^-$ ) per unit volume. Such a process is called dilution.

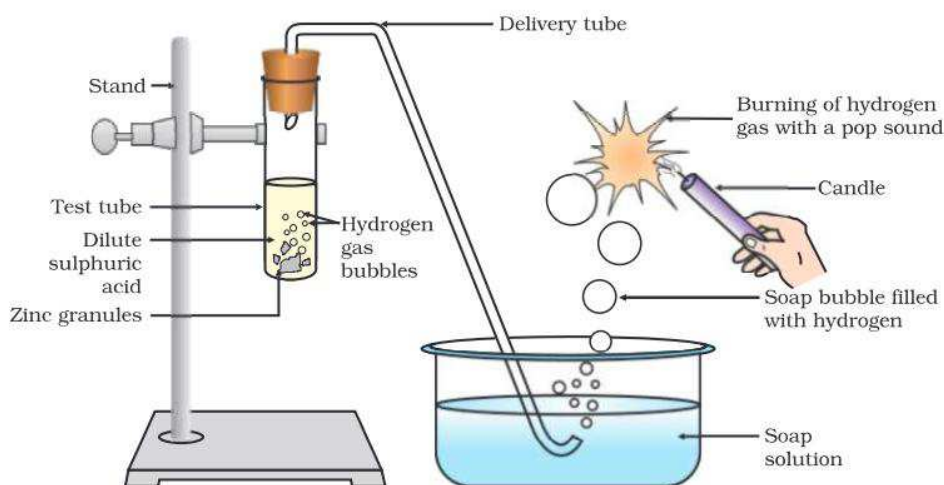
28. **Why Metallic Oxides are called Basic Oxides ?**

Metallic oxides react with acids to give salts and water, similar to the reaction of a base with an acid, Hence metallic oxides are said to be basic oxides.

29. **Why Non-Metallic Oxides are called Acidic Oxides?**

Non-Metallic oxides react with bases to give salts and water, similar to the reaction of an acid with a base, Hence metallic oxides are said to be basic oxides.

30. **Draw a neat diagram to show evolution of hydrogen gas when a metal reacts with a dilute acid.**



### Chapter-3: Metals and Non-Metals

1. **Name the metals melt at body temperature among gallium, magnesium, cesium and aluminum**

Gallium and cesium melt at body temperature.

2. **Name two metals which react with  $\text{dil.HNO}_3$  to evolve hydrogen gas.**

Manganese (Mn) and magnesium (Mg) .

3. **Arrange the following metals in the decreasing order of reactivity Na, K, Pb, Cu, Fe and Ag.**

The decreasing order of reactivity of the given metals is  $\text{K} > \text{Na} > \text{Fe} > \text{Pb} > \text{Cu} > \text{Ag}$ .

4. **Name the lustrous nonmetal.**

Iodine

5. **Name the metals which forms the amphoteric oxides.**

Zinc and Aluminium .

6. **How do metals and non-metals combine?**



Metals and non-metals combine by the transfer of electrons from metals to non-metals to form ionic bonds.

7. **Name a solvent in which electrovalent compounds are soluble and a solvent in which they are insoluble.**
8. Water is a (polar) solvent in which electrovalent compounds are soluble and Kerosene, benzene, petrol are organic or non-polar solvents in which they are insoluble.
9. **Name one metal which reacts neither with cold water, nor with hot water, but reacts with steam to produce hydrogen gas.**  
Iron is the metal which does not react with cold and hot water but reacts with steam to produce hydrogen gas.
10. **A piece of granulated zinc was dropped into copper sulphate solution. After sometime, the colour of the solution changed from blue to colourless. Why?**  
Blue copper sulphate is converted to colourless zinc sulphate, as zinc, being more reactive, displaces copper from  $\text{CuSO}_4$  solution and forms a colourless solution of zinc sulphate.
11. **Why does calcium float on water?**  
Calcium reacts with water to form hydrogen gas. Although, calcium is heavier than water, but due to the sticking of the  $\text{H}_2$  gas bubbles on calcium metal surface, it starts floating.
12. **A green layer is gradually formed on a copper plate when left exposed to air for a week. Mention the chemical composition of the substance.**  
This green substance is basic copper carbonate  $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$ .
13. **Name two metals that are obtained by electrolysis of their chlorides in molten form.**  
Sodium and calcium are obtained by electrolysis of their chlorides in molten form.
14. **Name an alloy which has mercury as one of its constituents.**  
Zinc amalgam is an alloy that has mercury as one of its constituents.
15. **Name a metal which - (i) Is a bad conductor of heat. (ii) Does not react with oxygen even at high temperature. (iii) is most ductile**  
(i) Mercury (ii) Gold (iii) Gold
16. **Give reason for the following: (i) temple bells are made up of metals. (ii) Electrical wires are made up of copper.**  
A) Metals are sonorous (produce sound on being hit), so bells are made up of metals.  
B) Copper is a very good conductor of electricity. So, it is used for making electrical wires.
17. **A non-metal X exists in two different forms M and N. M is hardest natural substance, whereas N is a good conductor of electricity. Identify X, M and N.**
- Non-metal X is carbon (C).
  - Carbon exists in two different forms called the allotropes of carbon. These allotropes are diamond and graphite.
  - M is diamond because diamond is the hardest natural substance and N is graphite which is a good conductor of electricity.
  - **Explain electrolytic reduction? How is sodium obtained from its molten chloride?**
  - In electrolytic reduction, the metals are extracted by the electrolysis of their salts.
  - Sodium obtained by the electrolysis of molten NaCl.
  - The Na is deposited at the cathode and chlorine is liberated at the anode.  
At anode – Oxidation:  $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$   
At cathode - Reduction:  $\text{Na}^+ + \text{e}^- \rightarrow \text{Na}$   
Overall Reaction:  $2\text{NaCl} \rightarrow 2\text{Na} + \text{Cl}_2$

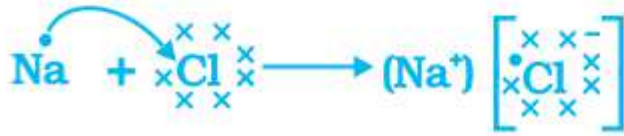
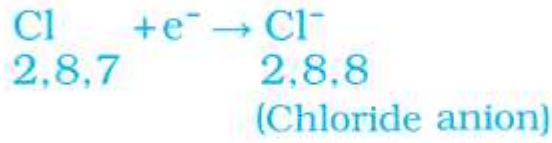
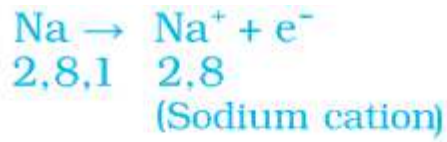
roasting	calcination
1. Roasting It is the process in which a sulphide ore is heated below its melting point in the presence of excess air to convert it into metal oxide	1. Calcination It is a process in which a carbonate ore is heated below its melting point in the absence of air to convert it into metal oxide.

20. **What is thermite reaction? Explain with an example.**  
 The reaction of metal oxide to form metal by using aluminum powder as a reducing agent is known as **thermite reaction**.  
 The amount of heat produced is so high in this reaction. Hence the metals are produced in the molten state. The reaction of iron (III) oxide (Fe<sub>2</sub>O<sub>3</sub>) with aluminum to produce iron in molten state.  
 It is used to join railway tracks or cracked machine parts. Hence called **thermite welding**.  

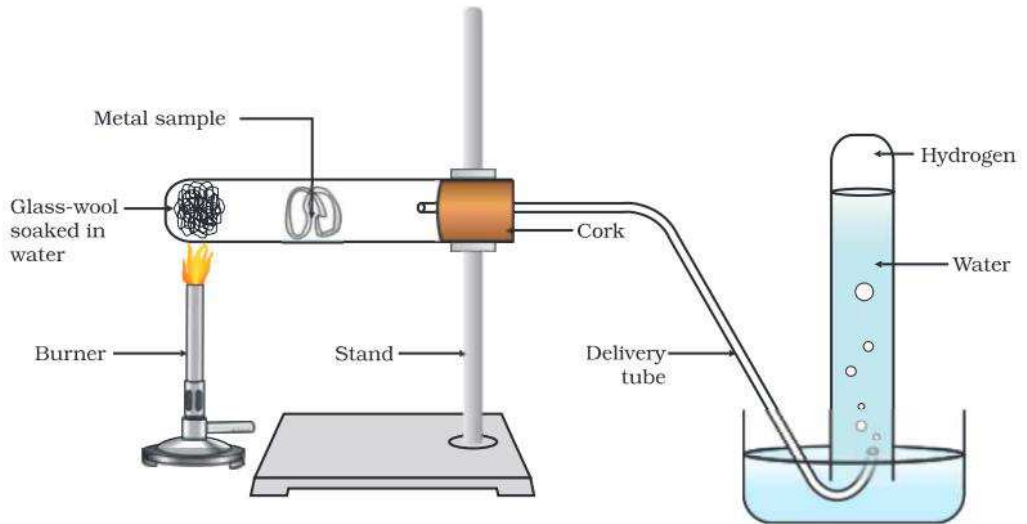
$$\text{Fe}_2\text{O}_3 (\text{s}) + 2\text{Al}(\text{s}) \rightarrow 2\text{Fe}(\text{l}) + \text{Al}_2\text{O}_3 (\text{s}) + \text{Heat}$$
21. **What is an alloy? Give example**  
 An alloy is a homogeneous mixture of two or more metals or a metal and a non-metal. It is prepared by mixing the metals in molten form and then cooling the mixture.  
 Ex : Solder- ( lead and tin )  
 Bronze - ( Cu and Sn )  
 Brass - (Cu and Zn)
22. **What is amalgam?**  
 If an alloy of metal with mercury is called amalgam,  
 e.g. sodium- amalgam, silver- amalgam etc.
23. **Write important properties of alloy.**
- The electrical conductivity and melting point of an alloy is less than that of pure metals.
  - Can change the metallic property by adding various components like metals and non-metals.
  - **What is reactivity series? Write the order of reactivity series of metals.**  
 The reactivity series is a list of metals arranged in the order of their decreasing activities.  

$$\text{K} > \text{Na} > \text{Ca} > \text{Mg} > \text{Al} > \text{Zn} > \text{Fe} > \text{Sn} > \text{Pb} > \text{H} > \text{Cu} > \text{Hg} > \text{Ag} > \text{Au}$$
25. **What are amphoteric oxides? Give two examples to show their amphoteric nature of Al<sub>2</sub>O<sub>3</sub> .**  
 The metallic oxides which show the properties of acids as well as bases are called amphoteric oxides.  
 It means that they react with both bases and acids to form salt and water.  
 e.g. ZnO and Al<sub>2</sub>O<sub>3</sub>  

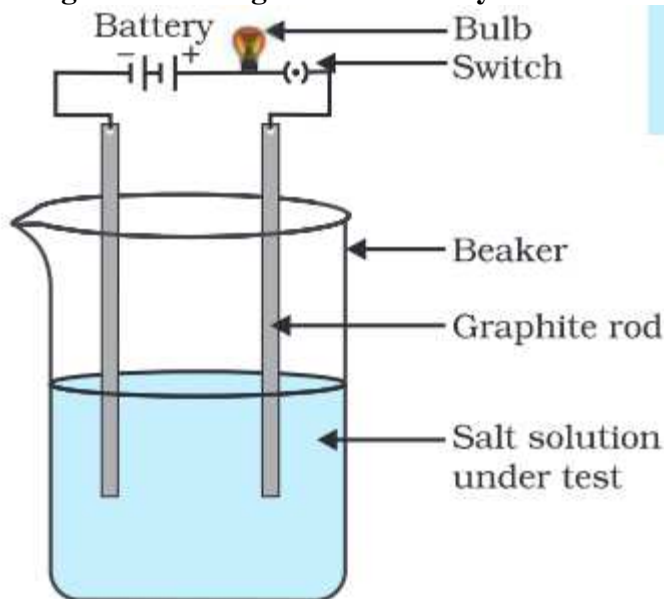
$$\begin{array}{l} \text{Al}_2\text{O}_3 + 6\text{HCl} \qquad \qquad \qquad 2\text{AlCl}_3 + 3\text{H}_2\text{O} \\ \text{Al}_2\text{O}_3 + 2\text{NaOH} \qquad \qquad \qquad 2\text{NaAlO}_2 + \text{H}_2\text{O} \end{array}$$
26. **Name two metals which will displace hydrogen from dilute acids, and two metals which will not.**  
 Zinc and magnesium displace H<sub>2</sub> (which are above in the reactivity series ) from dilute acids while copper and silver do not ( as they are below in the reactivity series)
27. **Name two metals which are found in nature in the native state.**  
 Gold and platinum are the two metals that are found in nature in native state.
28. **Why do ionic compounds have high melting points?**  
 Ionic compounds have strong electrostatic forces of attraction between the oppositely charged ions.  
 Hence they have high melting point and boiling points as more energy is required to break these strong electrostatic forces of attraction.
29. **Define - (i) Mineral (ii) Ore (iii) Gangue**
- The naturally occurring elements or compounds of metals present in the earth's crust are called minerals.
  - Ores are those minerals from which a particular metal can be extracted profitably.
  - The impurities present in the ore are called gangue.
- XXX. Schematically represent the formation of NaCl



31. Draw labeled diagram to show the action of steam on metals.



32. Draw labeled diagram of testing the conductivity of a salt solution.



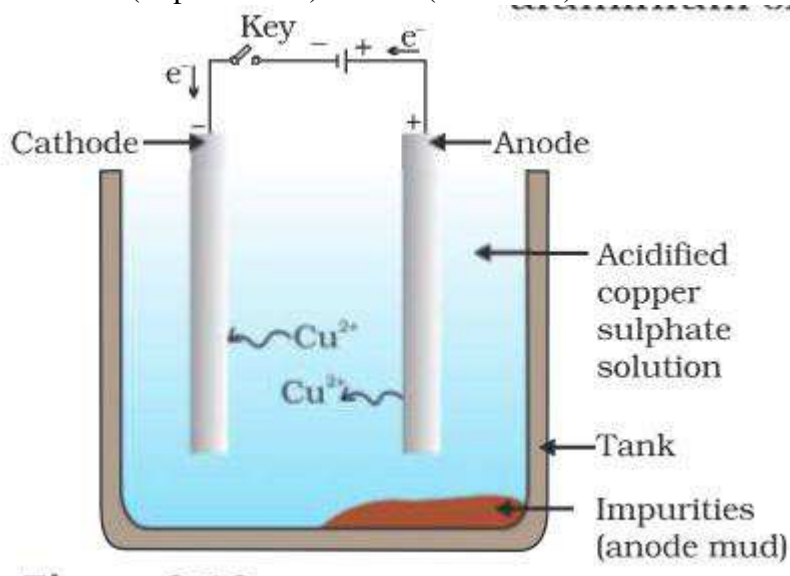
33. **Explain the process of electrolytic refining for copper with the help of a labeled diagram.**

In electrolytic process, the impure metal is made the anode and a thin strip of pure metal is made the cathode.

A solution of the metal salt is used as an electrolyte.

On passing the current through the electrolyte, the pure metal from the anode dissolves into the electrolyte.

An equivalent of pure metal from the electrolyte is deposited on the cathode.



## Chapter-4 : Carbon and its compounds

Carbon- C. Atomic number (Z)-6. Atomic Mass number (A)-12. Electronic configuration- $1\text{S}^2 2\text{S}^2 2\text{P}^2$

Hydrogen-H. Atomic number (Z)-1. Atomic Mass number (A)-1. Electronic configuration- $1\text{S}^1$

Oxygen-O. Atomic number (Z)-8. Atomic Mass number (A)-16. Electronic configuration- $1\text{S}^2 2\text{S}^2 2\text{P}^4$

1. **How are covalent bonds formed?**

The bonds formed by the sharing of an electrons are called covalent bonds.

2. **Write the properties of covalent compounds?**

- i. Covalent compounds have low melting and boiling points.
- ii. Covalent compounds are generally poor conductors of electricity
- iii. Covalent compounds are generally volatile in nature.

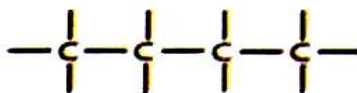
3. **What you mean by Tetravalency?**

**Tetravalency :** It has four electrons in the outermost shell. Hence, its valency is four.

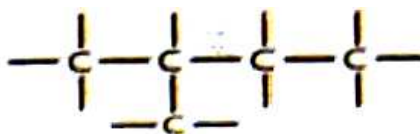
4. **Explain Catenation**

The property of self-linking of elements mainly C-atoms through covalent bonds to form long, straight or branched chains and rings of different sizes is called catenation.

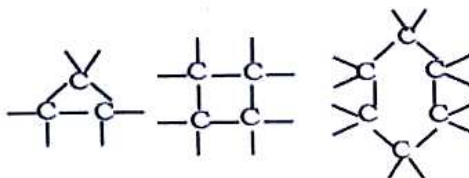
1. straight chain structure



2. Branched chain structure



3. Ring/Closed chain structure



5. **Mention four differences between saturated and unsaturated hydrocarbons.**

saturated hydrocarbons	unsaturated hydrocarbons
1. Only single bond is present in between carbon-carbon atoms.	1. Double or triple bond is also present in between carbon-carbon atoms.
1. Substitution reaction occurs.	1. Addition reaction occurs.
1. It burns with blue flame.	1. It burns with sooty flame.

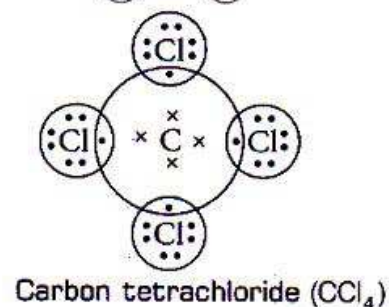
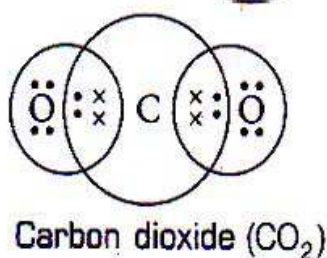
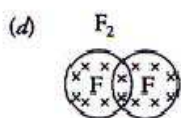
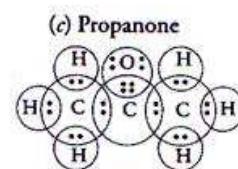
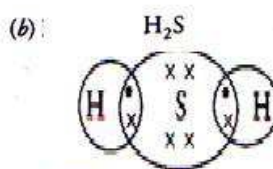
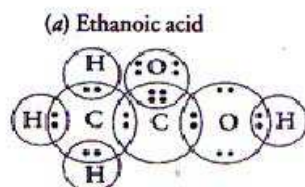
6. **Write the general formula of alkane, alkene, and alkyne.**

Alkane:  $C_nH_{2n+2}$  Alkene:  $C_nH_{2n}$  and Alkyne:  $C_nH_{2n-2}$

7. **What is esterification reaction?**

When ethanol reacts with acetic acid in the presence of sulphuric acid catalyst, a fruity smelling substance called ester is produced. This reaction is called esterification.

7. **Draw the electron dot structures for (a) Ethanoic acid (b)  $H_2S$  (c) Propanone (d)  $F_2$  e)  $CCl_4$  f)  $CO_2$**



8. **Write the molecular formula and structural formula of methane, ethane, propane and butane.**

Name of alkane	Molecular formula	Structural formula
Methane	$CH_4$	



		$\begin{array}{c} \text{H} \\   \\ \text{H}-\text{C}-\text{H} \\   \\ \text{H} \end{array}$
Ethane	$\text{C}_2\text{H}_6$	$\begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{H}-\text{C}-\text{C}-\text{H} \\   \quad   \\ \text{H} \quad \text{H} \end{array}$
Propane	$\text{C}_3\text{H}_8$	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\   \quad   \quad   \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\   \quad   \quad   \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$
Butane	$\text{C}_4\text{H}_{10}$	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \\   \quad   \quad   \quad   \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\   \quad   \quad   \quad   \\ \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \end{array}$

9. Write the molecular formula and structural formula of ethene, propene and butene.

Name of alkane	Molecular formula	Structural formula
Ethene	$\text{C}_2\text{H}_4$	$\begin{array}{c} \text{H} \quad \quad \text{H} \\ \diagdown \quad \diagup \\ \text{C}=\text{C} \\ \diagup \quad \diagdown \\ \text{H} \quad \quad \text{H} \end{array}$
Propene	$\text{C}_3\text{H}_6$	$\begin{array}{c} \text{H} \\   \\ \text{H}-\text{C}-\text{C}=\text{C}-\text{H} \\   \quad   \quad   \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$
Butene	$\text{C}_4\text{H}_8$	$\begin{array}{c} \text{H} \quad \text{H} \quad \quad \text{H} \\   \quad   \quad \quad   \\ \text{H}-\text{C}-\text{C}-\text{C}=\text{C}-\text{H} \\   \quad   \quad   \quad   \\ \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \end{array}$

10. Write the molecular formula and structural formula of ethyne and propyne.

Name of alkane	Molecular formula	Structural formula
Ethyne	$\text{C}_2\text{H}_2$	$\text{H}-\text{C}\equiv\text{C}-\text{H}$
Propyne	$\text{C}_3\text{H}_4$	$\begin{array}{c} \text{H} \\   \\ \text{H}-\text{C}-\text{C}\equiv\text{C}-\text{H} \\   \\ \text{H} \end{array}$
Butyne	$\text{C}_4\text{H}_6$	$\begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{H}-\text{C}-\text{C}-\text{C}\equiv\text{C}-\text{H} \\   \quad   \\ \text{H} \quad \text{H} \end{array}$

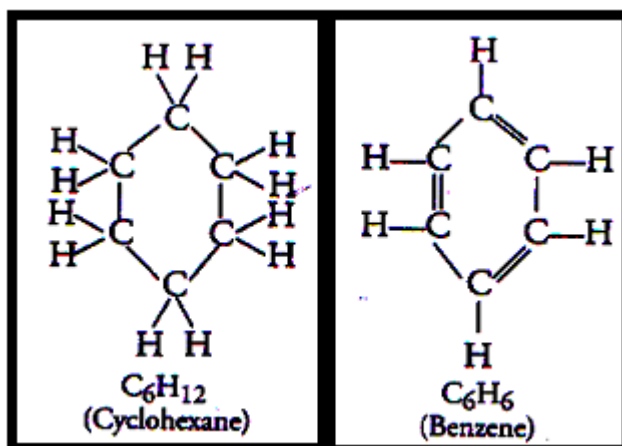
11. **What is a homologous series? Explain with an example.**

A series of similarly constituted compounds in which the members present have the same functional group and similar chemical properties and any two successive members in a particular series differ by  $-CH_2$  unit, is called a homologous series.

e.g. alkane series  $C_nH_{2n+2}$

$CH_4$  Methane ,  $C_2H_6$  Ethane ,  $C_3H_8$  Propane ,

12. **Write the structures of benzene and cyclohexane.**



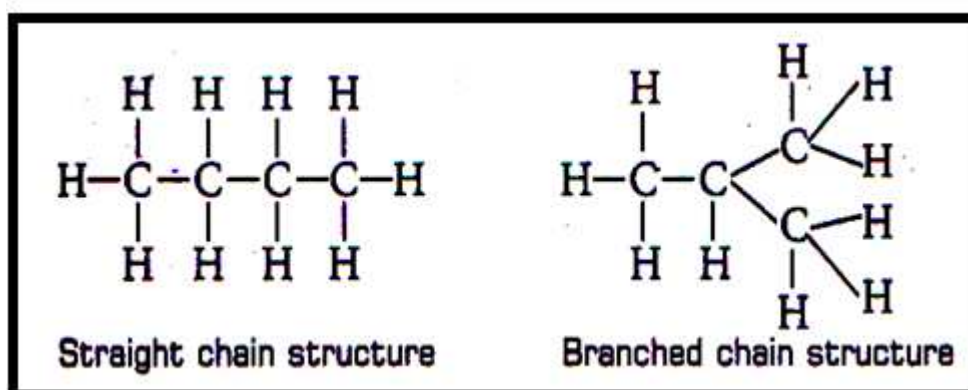
13. **Write the uses of acetic acid.**

Uses of Acetic Acid

- i. It is used as a preservative in pickles.
- ii. It is used in the synthesis of esters.

xiv. **What are isomers? Give examples.**

Carbon compounds having same molecular formula but different structural formula are called isomers.



15. **What is functional group? Name the different functional groups.**

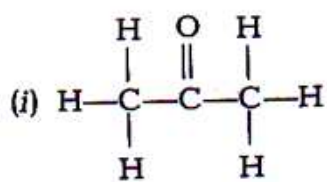
Functional groups may be defined as an 'atom' or a 'group of atoms' which makes a carbon compound (or organic compound) reactive and decide its properties regardless of the length and nature of carbon chain.

Hetero atom	Class of compounds	Formula of functional group
Cl/Br	Halo- (Chloro/bromo) alkane	—Cl, —Br (substitutes for hydrogen atom)
Oxygen	1. Alcohol	—OH
	2. Aldehyde	$\begin{array}{c} \text{H} \\   \\ -\text{C} \\    \\ \text{O} \end{array}$
	3. Ketone	$\begin{array}{c} -\text{C}- \\    \\ \text{O} \end{array}$
	4. Carboxylic acid	$\begin{array}{c} \text{O} \\    \\ -\text{C}-\text{OH} \end{array}$

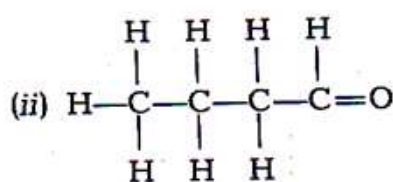
16. List the uses of ethanol.

- It is used in alcoholic drinks.
- It is useful in tincture of iodine, cough syrups and many other tonics.
- Alcohol is used as an additive to petrol, since it is cleaner fuel and gives only  $\text{CO}_2$  and  $\text{H}_2\text{O}$  on complete combustion.

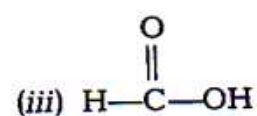
17. Name the following compounds.



Propanone

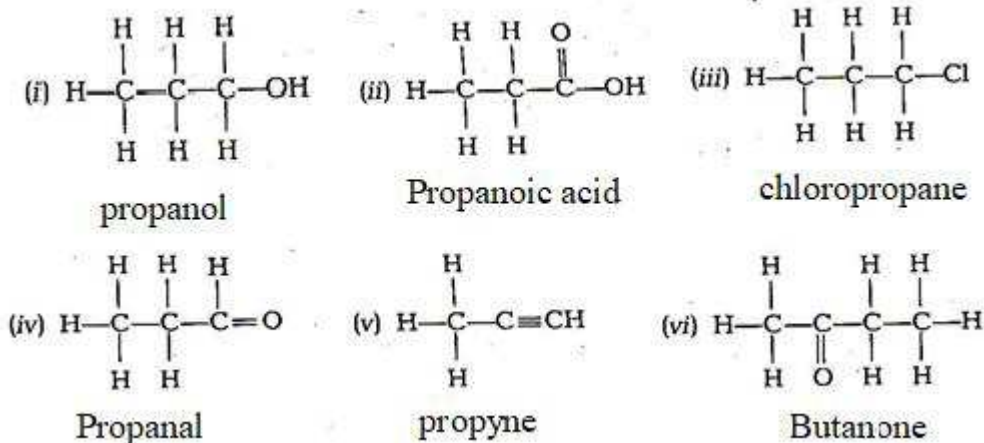


Butanal



Methanoic acid

18. Name the following compounds.



19. **Why carbon usually doesn't forms ionic bond with other carbon atoms or other elements?**

Carbon needs to gain or lose 4 electrons to attain noble gas electronic configuration,

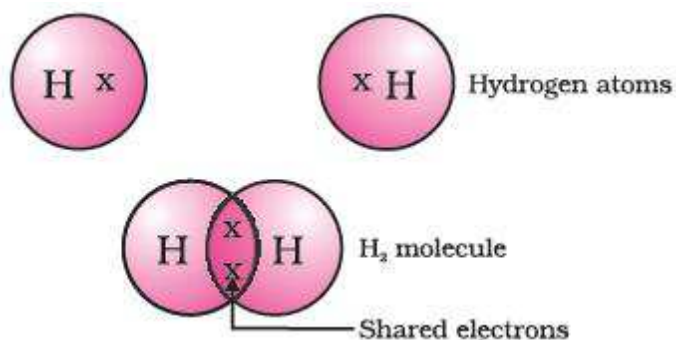
If it gains 4 electrons forming  $\text{C}^{4-}$  anion. It would be difficult for the nucleus with six protons to hold on 10 electrons, means attraction force of 6 electrons is not sufficient to hold 8 electrons in valance shell.

If it lose 4 electrons forming  $\text{C}^{4+}$  cation. It would require a lot amount of energy to remove 4 electrons from its valance shell that is not easily available in chemical reaction. Hence carbon doesn't forms Ionic bonds with any atoms

**4. Explain the formation of single covalent bond between two Hydrogen atoms. And write the electron dot structure.**

Hydrogen-H. Atomic number-1 Electronic configuration is- $1s^1$

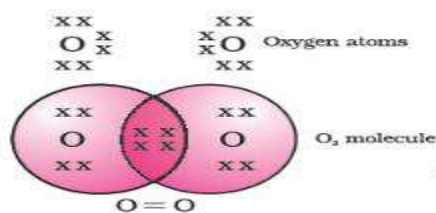
hydrogen atom has 1 electron in K shell. Hence two Hydrogen atoms share their electrons to form a hydrogen molecule  $\text{H}_2$  Hence both the hydrogen atoms attains nearest helium configuration by forming a  $\text{H}_2$  molecule.



**5. With electron dot structure explain the formation covalent double bond between two oxygen atoms?**

Oxygen-O. Atomic number-08. Electronic configuration -  $1s^2 2s^2 2p^4$  (2,6)

Oxygen atom has 6 electrons in L shell. It will need 2 electrons to attain octet state. Hence two carbon atoms share 2 electrons each and attain stability by forming  $\text{O}_2$  molecule by covalent double bond.



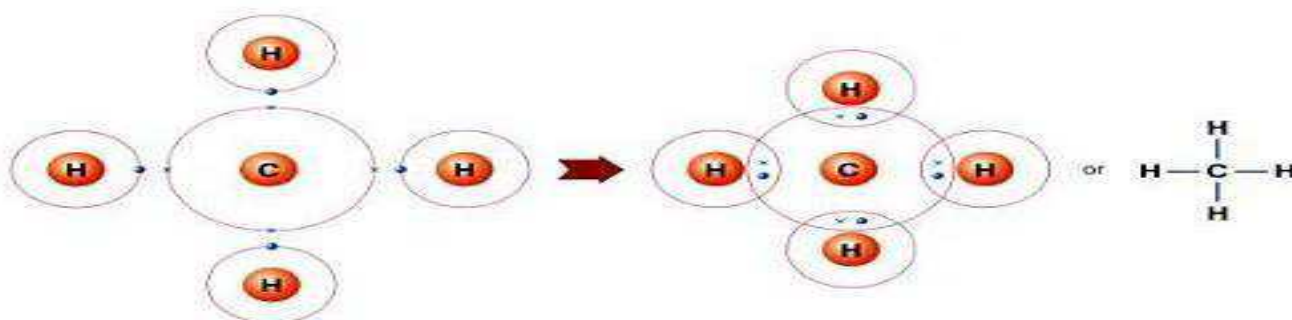
6. With electron dot structure explain the formation covalent Tripple bond between two Nitrogen atoms? (Try your self)

7. With electron dot structure explain the formation Methane molecule between Carbon and Hydrogen atoms?

Carbon-C                      Atomic number-6    Electronic configuration -  $1s^2 2s^2 2p^2$

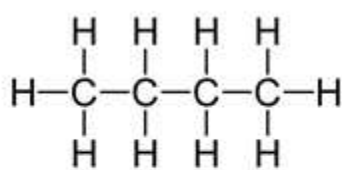
Hydrogen-H                    Atomic number-1    Electronic configuration -  $1s^1$

Carbon has 4 unpaired electrons (tetravalent) in valance shell. In order to achieve Nobel gas configuration, carbon shares these electrons with 4 atoms of Hydrogen and form  $CH_4$  Molecule.

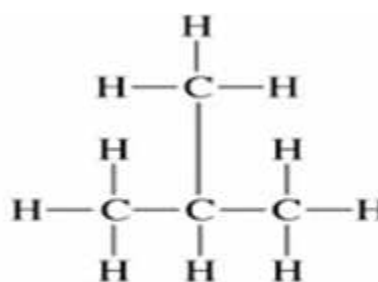


8. Define Isomerism. Write the structures of butane structural isomers.

Organic compounds with same molecular formula but different structural formula are called isomers. The phenomenon is called isomerism. Butane-  $C_4H_{10}$



Normal Butane



iso-Butane

10. Write the functional groups of Alcohol, Aldehydes, Ketones, and Carboxylic acid ?

Alcohol,	R -OH
Aldehydes,	R -CHO
Ketones,	R - CO- R



Carboxylic acid	R -COOH
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**11. Write the difference between Alkanes, Alkanes, Alkanyes ?**

Alkanes	Alkenes	Alkynes
These have carbon-carbon single bonds	These have carbon-carbon double bonds along with single bonds	: These have at least one carbon-carbon triple bond along with single bonds
Their general formula is $C_n H_{2n+2}$	Their general formula is $C_n H_{2n}$	Their general formula is $C_n H_{2n-2}$
They are saturated hydrocarbon	They are unsaturated hydrocarbon	They are unsaturated hydrocarbon

**12. Define Oxidation. Write the chemical equation of Oxidation of Alcohol.**

The process of addition of oxygen and removal of hydrogen is called Oxidation.



Alcohols can be oxidised

to carboxylic acid by heating them either in presence of oxidising agents. The substances which provide oxygen to other substances are called oxidising agents. Here Alkaline  $KMnO_4$  (potassium permanganate) or Acidified  $K_2Cr_2O_7$  (potassium dichromate) are oxidising agents.

**14. Mention four differences between Saturated and Unsaturated hydrocarbons?**

saturated hydrocarbons	unsaturated hydrocarbons
I. Only single bond is present in between carbon-carbon atoms.	I. Double or triple bond is also present in between carbon-carbon atoms.
II. Substitution reaction occurs.	II. Addition reaction occurs.
III. It burns with blue flame.	III. It burns with sooty flame.
IV. Less reactive	IV. More reactive.

**16. Write the molecular formula and structural formula of methane, ethane, propane and butane?**

Name of alkane	Molecular formula	Structural formula

Methane	$\text{CH}_4$	$\begin{array}{c} \text{H} \\   \\ \text{H}-\text{C}-\text{H} \\   \\ \text{H} \end{array}$
Ethane	$\text{C}_2\text{H}_6$	$\begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{H}-\text{C}-\text{C}-\text{H} \\   \quad   \\ \text{H} \quad \text{H} \end{array}$
Propane	$\text{C}_3\text{H}_8$	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\   \quad   \quad   \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\   \quad   \quad   \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$
Butane	$\text{C}_4\text{H}_{10}$	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \\   \quad   \quad   \quad   \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\   \quad   \quad   \quad   \\ \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \end{array}$

17. Write the molecular formula and structural formula of ethene, propene and butane?

Name of alkane	Molecular formula	Structural formula
Ethene	$\text{C}_2\text{H}_4$	$\begin{array}{c} \text{H} \quad \quad \text{H} \\ \diagdown \quad \diagup \\ \text{C}=\text{C} \\ \diagup \quad \diagdown \\ \text{H} \quad \quad \text{H} \end{array}$
Propene	$\text{C}_3\text{H}_6$	$\begin{array}{c} \text{H} \\   \\ \text{H}-\text{C}-\text{C}=\text{C}-\text{H} \\   \quad   \quad   \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$
Butene	$\text{C}_4\text{H}_8$	$\begin{array}{c} \text{H} \quad \text{H} \quad \quad \text{H} \\   \quad   \quad \quad   \\ \text{H}-\text{C}-\text{C}-\text{C}=\text{C}-\text{H} \\   \quad   \quad   \quad   \\ \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \end{array}$

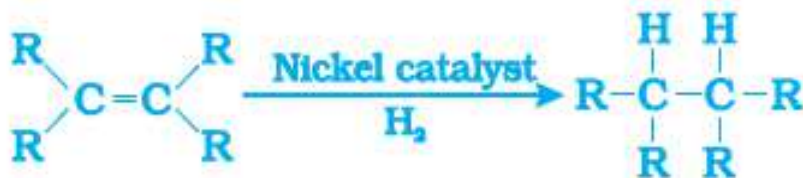
18. Write the molecular formula and structural formula of ethyne and propyne?

Name of alkane	Molecular formula	Structural formula
Ethyne	$\text{C}_2\text{H}_2$	$\text{H}-\text{C}\equiv\text{C}-\text{H}$
Propyne	$\text{C}_3\text{H}_4$	$\begin{array}{c} \text{H} \\   \\ \text{H}-\text{C}-\text{C}\equiv\text{C}-\text{H} \\   \\ \text{H} \end{array}$

Butane	$C_4H_8$	$  \begin{array}{c}  H & H \\    &   \\  H-C & -C-C \equiv C-H \\    &   \\  H & H  \end{array}  $
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**27. What is Addition reaction?**

Reactions in which a simple molecule added to Unsaturated compound to form a single product are called Addition reactions.



**28. What is Substitution reaction? Give example?**

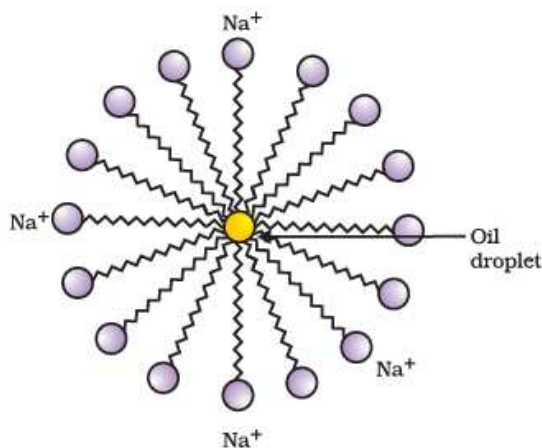
Reaction in which involve the direct replacement (displacement or substitution) of an atom or a group of atoms in an organic molecule by another atom or group of atoms without any change in the rest of the molecule are called Substitution reactions.



**29. How micelles are formed. Explain cleaning action of soap?**

Soaps are the molecules in which the two ends have differing properties, one is hydrophilic, that is it dissolves in water while other end is Hydrophobic, that is it dissolves in oil/dirt. This unique Orientation is called micelle.

Since oil/dirt will be collected in the centre of the micelle is easily rinsed away and clean the cloth.



**30. In hard water, Detergents are better cleansing agents. Give reason.**

Because the hardness of water is due to the presence of calcium and magnesium salts. In hard water Detergents do not form insoluble precipitates with calcium and magnesium ions. Thus detergents are better cleaning agents than soaps in hard water.

## Chapter -5: Periodic Classification of Elements

- 1. State Dobereiner's law of triads.**

Dobereiner's law states that "when the three elements in a triad were arranged in the order of increasing atomic masses, the atomic mass of the middle element was roughly equals to the average of the atomic masses of the other two elements.
- 2. Chlorine, bromine and iodine are Dobereiner's triads. The atomic masses of chlorine and iodine are 35.5 and 127 respectively. Find the atomic mass of bromine.**

In Dobereiner's triad, the atomic mass of the middle element was roughly the average of the atomic masses of the other two elements.  
Thus, the atomic mass of bromine

$$= \frac{\text{Average atomic mass of Cl} + \text{Atomic mass of I}}{2} = \frac{35.5 + 127}{2} = 81.25$$
- 3. A and B are the two elements having similar properties which obey Newlands' Law of Octaves. How many elements are there in between A and B?**

According to Newlands' law of octaves, every eighth element has properties similar to that of the first. The elements A and B have similar properties which obey Newlands' law of octaves. Thus, there are 6 elements in between A and B.
- 4. Define the term periodicity in properties of elements**

The repetition of the properties of elements after regular intervals, when the elements are arranged in the order of their increasing atomic numbers, is called periodicity. Ex: Atomic size
- 5. How is atomic number related to modern periodic table. Why?**

The properties of elements depend upon valence electrons in the atom which in turn depends on the atomic number. Therefore, atomic number is a more appropriate parameter than atomic mass for the development of modern periodic table .
- 6. Out of the two elements X and Y which has bigger atomic size?**
  - X has atomic number = 18 and Y has atomic number = 20**

Radius of Y is bigger than that of X. This is because in X, the number of shells is three (2, 8, 8) while in Y, it is four (2,8,8,2).
- vii. Write the correct increasing order of the atomic radii of O, F and N.**

F < O < N because atomic radii decreases as the atomic number increases due to increase in effective nuclear charge.
- 8. Write the atomic numbers of two elements X and Y having electronic configuration 2,8,2 and 2,8,6 respectively.**

Atomic number of X = 2, 8, 2 = 12  
Atomic number of Y = 2, 8, 6 = 16
- 9. Where would you locate the element with electronic configuration 2, 8 in the modern periodic table?**

Since, the element contains 8 valence electrons, thus, it belongs to group 18 .
- 10. Elements A, B, C and D have atomic numbers 1, 8, 11 and 19 respectively. Choose the odd element and give reason for your answer.**

Odd element is B having atomic number 8. Because B has 6 electrons in its valence shell but A, C and D have one electron in their valence shells.
- 11. Out of two elements, Ca and Mg which one will lose electron easily? Give reason for your answer.**

Ca because the tendency to lose electron increases as we move down a group.
- 12. Which group of elements will form an acidic oxide?**

Non-metallic oxides are acidic in nature. Elements of group 15, 16, 17 form acidic oxides as these are non-metals.
- 13. State the reason for the following: (i) The elements of the same group have similar chemical properties. (ii) The elements of the same period have different properties.**

- i. Due to same number of valence electrons. (ii) Due to different number of valence electrons.
- xiv. **An element X is in third period of group 15 of the periodic table. Is it metal or non-metal? Give reason.**  
 It's electronic configuration is 2, 8,5. Hence is a non-metal as it contains 5 valence electrons.
15. **An element X forms a Bromide with formula  $XBr_3$ . The element X would most likely be in the same group of the periodic table as is Na, Mg, Al or Ca.**  
 The formula of bromide is  $XBr_3$ , that means the valency of the element X is 3. The element having valency 3 will be present in group 13 (10 + 3).  
 Among the given choices, aluminium (Al) belongs to group 13.
16. **Mention the type of compounds formed between group 1 and group 17 elements.**  
 Ionic compounds.

17. **The position of three elements X, Y and Z in the periodic table is given below.**

Group 15      Group 17

—                      —  
 —                      —

X                      Z

**Answer the following with scientific reason**

- i. **Out of Y and Z which element will be more metallic?**  
 ii. **Will atomic size of Z be smaller or larger than that of X?**  
 iii. **Out of Y and Z which element will be more electronegative?**
- i. Z is more metallic than Y, as the size of element Z is more than that of Y and metallic character increases down the group.  
 ii. Atomic size of Z is smaller than that of X as atomic size decreases on moving from left to right across the period due to increase in effective nuclear charge.  
 iii. Y is more electronegative than Z as electronegativity decreases down the group due to increase in atomic size.
- xviii. **Atomic number of three elements X, Y and Z are given below:**  
**Element Atomic number X=4, Y= 13, Z= 18**  
**Identify the period and, group of the given elements.**

Element	Electronic configuration	Period	Group
X=4	2,2	2	2
Y=13	2,8,3	3	13
Z=18	2,8,8	3	18

19. **A part of the periodic table has been shown below.**

Group	1	2	13	14	15	16	17	18
Period								
2		C						
3	A						K	M
4	B			D			L	

**Answer the following questions on the basis of position of elements in the above table.**

- i. **Which element is a noble gas? Give reason.**  
 ii. **Which element is most electronegative? Give reason.**  
 iii. **Write the electronic configuration of (a) B and (b) E.**
- i. M is a noble gas, because it is present in group 18 and has zero valency.  
 ii. K is the most electronegative element due to its smallest atomic size  
 iii. Electronic configuration of B = 2,8,8,1 (ii) Electronic configuration of K = 2,8,7
- 20. How do the following changes occur on moving from top to bottom in a group?**
- i. **Number of valence electrons**

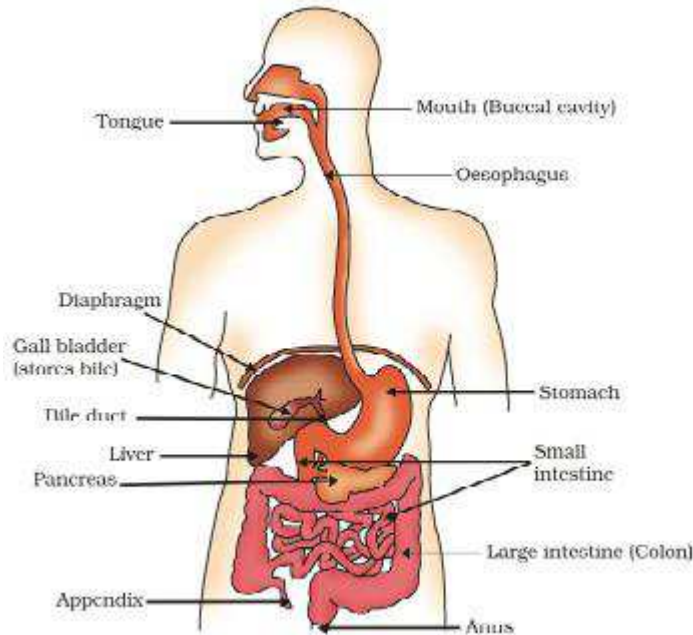


- ii. **Number of shells**
- iii. **Size of atom**
- iv. **Metallic character**
  - i. In a group number of valence electrons remains same.
  - ii. Number of shells increases.
  - iii. Size of atoms increases as we go down in a group. .
  - iv. Metallic character increases on going down the group.
- v.

## Chapter 6: LIFE PROCESSES

- i. **Nutrition**
- ii. **Write Equation of Photosynthesis?**  
**Ans:**  $6\text{CO}_2 + 12\text{H}_2\text{O} + \text{energy} \xrightarrow{\text{Sunlight}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + 6\text{H}_2\text{O}$
- iii. **Write the 3 Stages of Photosynthesis?**  
**Ans:** (i) Absorption of light energy by chlorophyll.  
(ii) Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen.  
(iii) Reduction of carbon dioxide to carbohydrates.
- 3. **Explain the Digestion in Stomach.**  
Muscular walls of the stomach help in mixing the food thoroughly with more digestive juices.  
The digestion in stomach is taken care of by the gastric glands present in the wall of the stomach. These release hydrochloric acid, a protein digesting enzyme called pepsin, and mucus.
- 4. **List the role of hydrochloric acid in stomach.**
  - i) HCl makes the medium acidic which facilitates the action of the enzyme pepsin.
  - ii) It also helps to kill microbes entering the stomach along with food.
- 5. **Explain the function of pancreatic juice.**  
**Action of Pancreatic juice:** The pancreas secretes pancreatic juice which contains enzymes like
  - **Amylase** converts Complex carbohydrates into glucose
  - **Lipase** for breaking down emulsified fats and
  - **Trypsin** for digesting proteins.
  - **How is the small intestine designed to absorb digested food ?**  
**Ans:** Small intestine has several finger like projections called villi.
    - These are specially designed for absorption.
    - They have a dense network of blood capillaries and lymph, which helps to carry the absorbed food lymph which helps to carry the absorbed food materials in blood to different parts of the body.
  - **Why does herbivores have longer, small intestine than carnivores?**  
**Ans:** Herbivores have longer small intestine for digestion of cellulose while carnivores have a shorter small intestine due to early digestion of meat.
- 8. **How is small intestine designed to absorb digested food?**  
The inner lining of small intestine has millions of tiny, finger like projections called villi which gives a very large surface area. The large inner surface area of small intestine helps in the rapid absorption of the digested food.

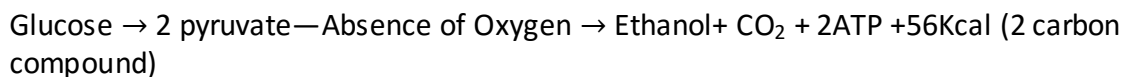
9. Draw a neat labelled diagram of human alimentary canal



B. **RESPIRATION**

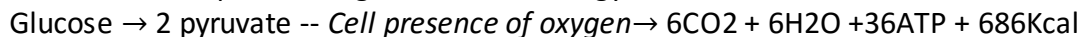
10. **What are the different ways in which glucose is oxidized to provide energy in various organisms ?**

a. In yeast cell glucose is breakdown in the absence of oxygen to form ethyl alcohol and carbon dioxide.



b. In skeletal muscles of humans, in the deficiency of oxygen. Glucose is converted into lactic acid  
 $\text{Glucose} \rightarrow 2 \text{ pyruvate} \text{---Cell lack of oxygen} \rightarrow \text{Lactic acid} + \text{Energy (3 carbon compound)}$

c. In the cells of higher organisms, in mitochondria, presence of oxygen glucose is converting into CO<sub>2</sub> and H<sub>2</sub>O. In this process large amount of energy is liberated.



11. **When a sportsman runs, he often gets muscle cramps. Why?**

**Ans:** In order to release more energy to perform sudden activity, pyruvate is converted into lactic acid in the lack of oxygen. Formation of lactic acid in muscles cause cramps or fatigue.

12. **The rate of breathing in aquatic organisms is much faster than that seen in terrestrial organisms. Give reason.**

**Ans:** The amount of oxygen dissolved in water is fairly low as compared to the amount of oxygen in air. Hence the rate of breathing in aquatic organism is much faster.

13. **Which pigment helps in transport of oxygen in our body?**

**Ans:** In human beings, the respiratory pigment is haemoglobin which has a very high affinity for oxygen. This pigment is present in the red blood corpuscles.

14. **Arrange the following in correct order through which the air flows up to alveoli.**

Trachea, larynx, alveoli, nostrils, pharynx

**Ans:** Nostrils → Pharynx → Larynx → trachea → alveoli

15. **How are the lungs designed in human beings to maximize the area for exchange of gases?**

**Ans:** Each lung contains 300-350 million alveoli. These highly coiled numerous alveoli increase the surface area for gaseous exchange making the process of respiration more efficient.

16. Give reasons for :

(i) Oxygenated and deoxygenated bloods are separate in the heart of mammals.

(ii) Ventricles are thick walled.

(iii) Herbivores have longer small intestine as compared to carnivores.

**Ans.** (i) This allows a highly efficient supply of oxygen, and meet their high energy needs (as they are warm-blooded animals) which helps to maintain body temperature.

iii. Because they have to pump blood throughout the body or into various organs.

17. Difference between Aerobic Respiration and Anaerobic Respiration :

Aerobic Respiration	Anaerobic Respiration
(i) Aerobic respiration takes place in the presence of oxygen.	i) Anaerobic respiration takes place in the absence of oxygen.
(ii) Complete breakdown of food occurs in this process.	Partial or incomplete breakdown of food occurs in the process.
iii) The end products are carbon dioxide (CO <sub>2</sub> ) and water (H <sub>2</sub> O).	The end products may be ethyl alcohol, CO <sub>2</sub> or lactic acid.

C. **TRANSPORTATION**

18. Write the important components and their functions of blood.

**Ans.** The components of blood are

i) **Plasma:** It helps in the transport of nutrients, salt waste materials, hormones and antibodies.

ii) **Red blood corpuscles:** helps in the transportation of oxygen and carbon dioxide.

iii) **White blood corpuscles:** helps in protection by destroying disease causing microorganisms

iv) **Blood platelets:** helps in the synthesis of thromboplastin for the clotting of blood.

19. Why Ventricles are having thick wall?

**Ans:** To pump blood into various organs, Ventricles have thicker muscular walls than the atria.

20. Arteries wall is thicker than vein. Why?

**Ans:** To withstand high pressure blood comes from ventricles, the arteries have thick, elastic walls.

21. What do you mean by double circulation of blood?

**Ans:** Blood goes through the heart twice during each cycle in the body is known as double circulation.

22. What is the use of 4 chambered heart in Mammals and birds?

**Ans:** 4 chambered heart prevents mixing of oxygenated and deoxygenated blood. Such separation allows a highly efficient supply of oxygen to the body. This is useful in animals that have high energy needs, such as birds and mammals, which constantly use energy to maintain their body temperature.

23. **Write the importance platelets during injury?**

**Ans:** During injury leakage would lead to a loss of pressure which would reduce the efficiency of the pumping system. To avoid this, the blood has platelet cells which circulate around the body and plug these leaks by helping to clot the blood at these points of injury.

24. **Write the functions of Lymph?**

- **Ans:** Lymph carries digested and absorbed fat from intestine and drains excess fluid from extra cellular space back into the blood.
- It helps in production of antibodies.

• **List out any three differences between arteries and veins.**

Artery	Vein
Carry oxygen-rich blood away from the heart except pulmonary artery	Carry deoxygenated blood towards the heart except pulmonary vein
Mostly deeply situated in the body	Superficial and deep in location
Have thick, elastic walls	Thin walled

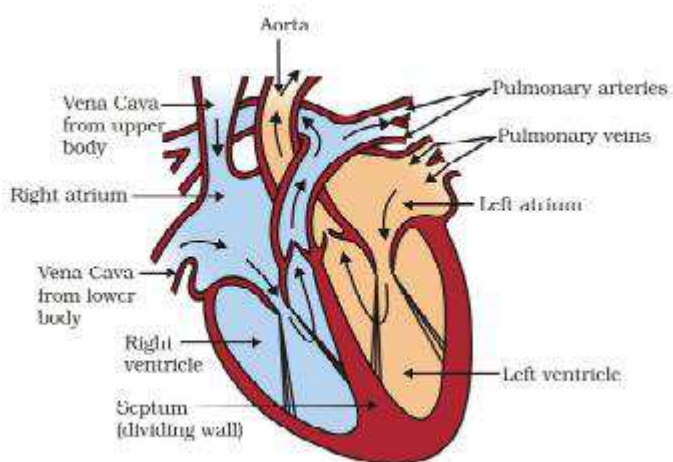
26. **Define Translocation?**

Transport of soluble products of photosynthesis is called translocation and it occurs in the part of the vascular tissue known as phloem.

27. **Differentiate between Xylem and phloem?**

Xylem	Phloem
Conducts water	Conducts food
Unidirectional transport only Upward	Multidirectional transport Both upward and downward
Transpiration doesn't require energy	Translocation in phloem is achieved by utilising energy
Contains 3 types of dead cells	Contains only one dead cell.

28. **Draw a neat diagram of human heart**



29. **What is osmoregulation?**

**Ans.** Osmoregulation is the maintenance of optimum concentration of water and salts in the body fluids.

30. **What causes the liquid part of blood to filter out from the glomerulus into the renal tubule?**

**Ans:** High pressure causes the liquid part of blood to filter out from the glomerulus into the renal tubule.

31. **What are the methods used by plants to get rid of excretory products? (any 2)**

**Ans:** \* Get rid of excess water by transpiration  
\* Waste products may be stored in leaves that fall off.  
\* Other waste products are stored as resins and gums  
\* Excrete some waste substances into the soil around them.

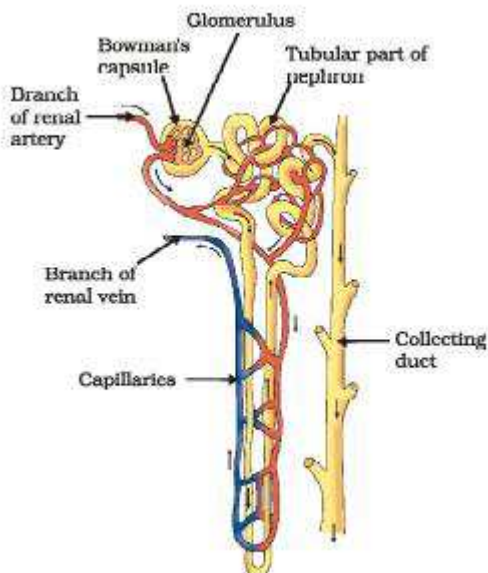
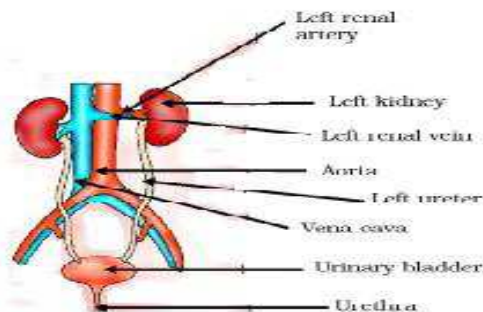
32. Draw a neat labelled diagram showing excretory system of man .

33. **Write one difference between Blood and Lymph.**

**Ans:** Blood – red in colour and contains more protein

Lymph – colourless and contains less protein

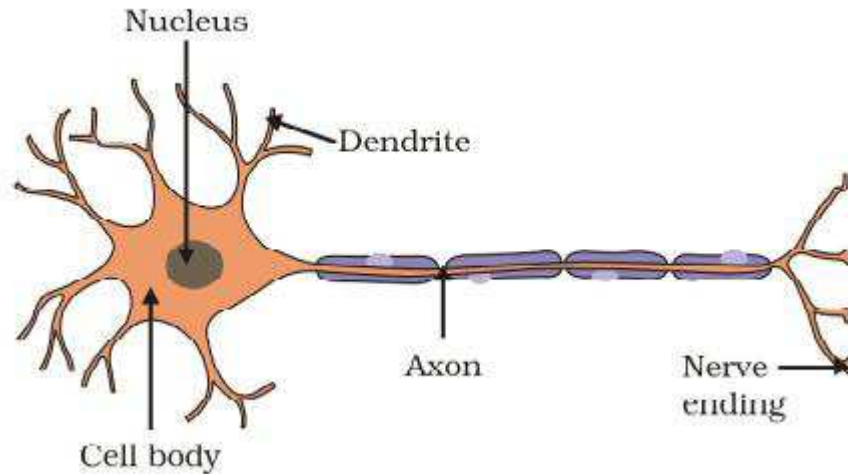
34. Draw a neat labelled diagram of basic unit of kidney.



## Chapter-7 Control and Coordination

1. Draw the structure of a neuron and explain its function.

Answer:



**Axon** : It conducts messages away from the cell body.

**Dendrite** : It receives information from axon of another cell and conducts the messages towards the cell body.

**Cell body** : It contains nucleus, mitochondria, and other organelles. It is mainly concerned with the maintenance and growth.

### **Plant hormones :**

3. What are phyto hormones ? Give examples .

Are chemical compounds which help to coordinate growth, development and responses to the environment.

**Plant hormones** : Main plant hormones are :

a) **Auxin** : [Synthesized at shoot tip]

Function : – Helps in growth and elongation of cells.

b) **Gibberellin** : Helps in the growth of the stem

c) **Cytokinins** : Promotes cell division

d) **Abscisic acid** : Inhibits growth, cause wilting of leaves.(Stress hormone)

e) **Ethylene**: Ripening of fruits.

4. **Explain closing and opening of leaves of sensitivity plant?**

Plant cells change shape by changing the amount of water in them, resulting in swelling or shrinking

5. **What is the response of stem towards light & gravity?**

**Ans.** Stem show positive response towards light and negative response toward gravity.

6. **How living organisms responds to stimuli?**

**Responses are of three main types:**

**Voluntary** : Controlled by fore brain **eg.** Talking, Writing

**Involuntary** : Controlled by mid and hind brain **eg.** Heart beat, vomiting, regulation of heartbeat

**Reflex action** : controlled by spinal cord **eg.** Withdrawal of hand on touching a hot object.

7. **Define Reflex Action**

A quick, sudden, immediate response of the body to the certain stimuli that involves **Spinal cord**. **eg.** (not brain) withdrawal of hand, knee jerk etc.

Draw a neat diagram of reflex action

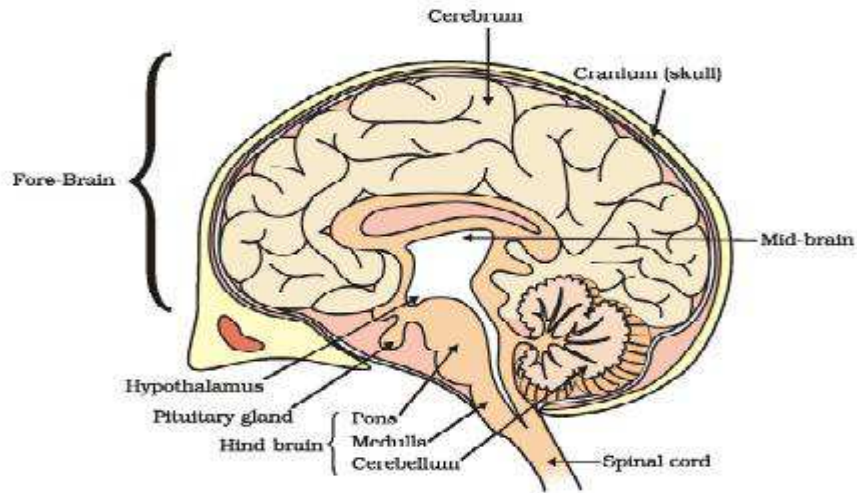
**Define Reflex arc :**

The pathway through which impulses pass is called reflex arc.



8. **How is Diabetes occurs?**  
**Cause :** It is due to deficiency of **Insulin hormone** secreted by Pancreas that is responsible to lower/control the blood sugar levels.  
**Treatment:** Patients have to internally administer injections of insulin
9. **On touching a hot plate, you suddenly withdraw your hand. Which category of neurons became active first and which one next?**  
**Ans.** On touching a hot plate, first the sensory neurons are activated, which take the information to the brain or the spinal cord. Next, the motor neurons become active and bring the impulses from the brain to the muscles. In receiving these impulses, the muscles contract, and the hand is immediately removed from the hot plate.
10. **What are the functions of cerebrum?**  
**FUNCTIONS :**
1. Thinking
  2. Control the voluntary actions.
  3. Receives sensory impulses from various body parts and integrates it
11. **Write the functions of a) HYPOTHALAMUS b) CEREBELLUM c) MEDULLA d) PONS**  
**HYPOTHALAMUS :**  
 \*Chemical co-ordination  
 Hypothalamus regulates body temperature under balance, appetite and sleep. It also controls autonomic nervous system and pituitary gland.
12. **CEREBELLUM** i) Controls posture and balance  
 ii) Control precision of voluntary actions,  
**MEDULLA** Controls involuntary actions  
 eg. blood pressure, salivation, vomiting  
**PONS** Involuntary action, regulation of respiration.
13. **Why is IODISED SALT IS NECESSARY?**  
 Iodine mineral is essential part of thyroxine hormone so it is important that we must consume iodised salt as in turn it is essential for thyroid gland to secrete **Thyroxine Hormone (Personality Hormone)** which controls carbohydrate, proteins and fat metabolism for best balance of growth deficiency of iodine might cause disease called **goitre**.
14. **What is Feedback mechanism? Give examples.**  
 The mechanism that regulates secretion of hormones in right time in precise quantities.  
**For example,** if the sugar levels in blood rise, they are detected by the cells of the pancreas which respond by producing more insulin. As the blood sugar level falls, insulin secretion is reduced.
15. **A person suffered a head injury, due to which he faces breathing problem. No problem was detected with his respiratory system. What could be the cause of this problem?**  
**Ans.** As the problem is caused due to head injury, it could be related to "Pons" a part of Hind brain responsible for regulation of respiration.
16. **Draw the structure of a neuron and explain its function.**





## Chapter-8 How Do Organisms Reproduce?

### 1. Define reproduction. Why is it important?

It is a process by which organisms are able to produce new organisms of their own kind.

It is important to maintain continuity of species or life.

### 2. What is the importance of DNA copying in reproduction?

DNA contains information for the inheritance of features from parents to next generation. DNA presents in nucleus of cells are the information source for making protein.

If information is different, different protein will be made that lead to altered body design.

The process of copying the DNA may have some variations. These variations are the basis for evolution.

### 3. Why is variation beneficial to the species but not necessarily for the individual?

- Variations act as pre-adaptations to environmental changes which have no immediate benefit to the individuals. However, variations may remain in the population.
- Sometimes drastic changes in the environment, the population may survive if, in each generation, at least some of its members can adopt effectively with the new conditions. Different genetic variations may work better than those that previously prevailed.
- If there are no variations present in the members of that population, the niche altered drastically. In that case, the population could be wiped out.
- Therefore, it is not necessary that all variations are beneficial to individuals.
- Variation is beneficial to the species as it enables a species for its survival in changed environment situations.

A favourable variation makes an organism to live better in a changed environment and an unfavourable variation will not. So it is not necessarily true that a variation is beneficial to the individual always.

### d. How does reproduction help in providing stability to populations of species?

a) The consistency of DNA copying during reproduction is important for the maintenance of body design features that allow the organism to use the particular area. This consistency of DNA copying provides stability to the populations of species.

a. Reproduction is responsible for continuation of a species.

- b. Stability of species attained by comparing the birth and death ratio of individuals. Birth is possible only due to reproduction. Reproduction is, therefore, linked to the stability to populations of species.
- e. **What are the advantages of sexual reproduction over asexual reproduction?**
- Sexual reproduction leads to variation due to recombination of genetic material DNA. These variations are essential for survival of species. On the contrary, asexual reproduction does not bring about variations.
  - Sexual reproduction promotes diversity of characters in offspring by providing genetic variations.
  - Genetic variation leads to the continuous evolution of various species to form better and better organisms.
- f. **What is the advantage of reproduction through spores in the case of Rhizopus?**

**Ans.** The spores are covered by thick walls that protect them until they come into contact with another moist surface and can begin to grow.

7. **What are the advantages of vegetative propagation?**
- Plants raised by vegetative propagation can bear flower and fruits earlier than those produced from seeds.
  - Such methods also make possible the propagation of plants such as banana, orange, rose and jasmine that have lost the capacity to produce seeds.
  - All plants produced by this method are genetically similar enough to the parent plant to have its all characteristics.

8. **Can you think of reasons why more complex organism cannot give rise to new individuals through regeneration?**

**Ans.** The reason is that complex organisms are not merely random collection of cells.

Specialized cells are organized in them as tissues are organized in organs. These organs have to be placed at definite positions in the body. So, regeneration is not possible in multicellular organism.

9. **What do you know about the post fertilisation stages in plants? Or List the changes in plants after fertilization?**

**Ans.a) Post-fertilisation changes**

- After fertilisation the sepals, petals, stamens, style and stigma wither away and usually fall off..
- Inside the ovule, the zygote undergoes cell division to form the **embryo** and ovule develops into **seed**.
- Embryo is the future plant. During seed germination under appropriate conditions, the embryo develops into a seedling and finally the complete plant.
- The ovary wall develops into the fruit wall and the whole ovary after fertilisation is called the **fruit**.

a. **List the types of asexual reproduction briefly.**

b. **(a) Why do testes located in scrotum outside the abdominal cavity?**

**(b) What will happen to ovary and ovule after fertilization in angiosperm plants.**

**Ans.** (a) Testes located in scrotum outside the abdominal cavity since the production of spermatozoa is feasible at a temperature of **2°C lower than the body temperature**.

(b) After fertilization, the ovary enlarges considerably and becomes the **fruit** and the ovule develops a tough coat and is gradually converted into **seed**.

c. **What is the role of the seminal vesicles and the prostate gland?**

**Ans.** Secretions of seminal vesicles and prostate gland provide fluid medium to **sperm to move** and also **provide nutrition to them**.

4. **How is the process of pollination different from fertilisation?**

**Ans.** Pollination is the transfer of pollen grains from anther to the stigma of a flower while Fertilisation is the fusion of male gamete with the female gamete.

5. **Why does menstruation occur? Or what happens if egg is fertilized?**

**Ans.** Every month uterus prepares itself for implantation of fertilized egg. Its lining becomes thick and spongy. But if fertilisation does not occur then this lining is not required any more. Hence, the thickened lining of the uterus breaks down along with blood vessels. The degenerated part of uterus along with the blood moves out of the vagina in the form of bleeding, called **menstruation**. It occurs in response to low level of estrogen and progesterone hormone.

### **Types of asexual reproduction and Definition with Examples.**

1. **Fission**

**Fission** is a process of division of a single celled organism into two or many cells (called binary and multiple fission respectively)

**Types and Examples:**

**Binary fission** Takes place during favorable conditions.

**Eg: Amoeba, Paramecium, Leishmania** (which cause **kala-azar**)

**Multiple Fission** Takes place during unfavorable conditions.

**Eg : Plasmodium** (Which causes **Malaria**)

2. **Budding**

**Budding** is a method of reproduction in which a protuberance develops on the mature organism's body, attains full maturity and then detaches. **Examples: Hydra, Yeast**

3. **Fragmentation**

Fragmentation is a process in which body of an individual simply breaks up into smaller pieces upon maturation. These pieces or fragments grow into new individuals. **Examples: Spirogyra**

4. **Regeneration**

**Regeneration** is the ability of an organism to replace or repair any lost part. Sometimes, an entire organism can be made from its fragmented body.

When an unfertilised egg can be made to develop into an entire organism, it is known as '**Parthenogenesis**' in animals and '**Parthenocarp**' in plants.

**Examples: Planaria, Hydra**

5. **Vegetative Propagation**

**Vegetative propagation** is a method of reproduction in which a vegetative plant part (i.e., a non-reproductive part or a non-flowering part) produces a new plant.

**Examples: Bryophyllum, Rose, Jasmine, Sugarcane, Potato.**

6. **Spore Formation**

Spores are special cells formed within special structures called '**sporangia**'

that disseminate and can form the entire plant. This is exclusive to the plant kingdom.

**Examples: Fungi-Rhizopus. Aspergillus, mushroom, ferns and mosses.**

o **How does the embryo get nourishment inside the mother's body?**

**Ans.** The embryo gets nutrition from the mother's blood with the help of a special tissue called **placenta**. This is a disc which is embedded in the wall of uterus. It contains finger-like projections villi on the embryo's side of the tissue. On mother's sides are blood spaces, which surround the villi. This provides a large surface area for glucose and oxygen to pass the mother to the embryo and waste products from embryo to mother.

7. **What are the different methods of contraception?**

**Ans.** Various methods used for regulation of child birth can broadly categories as:

- a. **Barrier methods:** In this method, physical devices such as condom, diaphragm, cervical cap and copper-T are used.
- b. **Chemical method:** use of spermicidal jelly by woman, oral pills and vaginal pills.
- c. **Surgical method:** In surgical method, a small portion of vas deferens in male and the oviduct of female, is surgically removed or ligated. It is called **vasectomy in male** and **Tubectomy in females**.

h. **What are the functions performed by the testis in human beings?**

**Ans.** Testes perform two main functions in human body.

The formation of germ cells or sperms takes place in the testes.

The hormone testosterone is also secreted from testes. Testosterone induces secondary sexual characters at puberty.

9. **Name the sex hormones secreted by male and female sex organs in human beings. State one Functions of each**

**Ans.** Testosterone is produced by the testicle (male sex organs) and oestrogen and progesterone are produced by ovary (female sex organ).

**Function of testosterone:** It brings about changes in appearance seen in boys at the time of puberty.

**Function of oestrogens:** helps in the development of secondary sex characters like breast development.

10. **What is the full form of STD? Give examples.**

**STDs** are sexually transmitted diseases. They are transmitted from the infected individuals to healthy ones during sexual contacts. Gonorrhoea and syphilis are common STDs. **AIDS (Acquired Immune Deficiency Syndrome)** is also transmitted by sexual contact.

11. **Differentiate between :**

- (a) **Asexual and sexual reproduction.**
- (b) **Binary fission and Multiple Fission**
- (c) **Fragmentation and Regeneration**
- (d) **Plumule and Radicle**
- (e) **Pollination and Fertilization**

Asexual Reproduction	Sexual Reproduction
New individual is produced from a single parent.	New individual is produced from two parents.
It does not involve the union of gametes.	It involves the union of gametes The young ones are not genetically identical to the parents.
	Organism produced has more

<ul style="list-style-type: none"> <li>The young ones are genetically identical to the parents.</li> <li>Variations are absent</li> </ul>	<ul style="list-style-type: none"> <li>adaptability</li> <li>Variations are present</li> </ul>
<b>Binary Fission</b>	<b>Multiple Fission</b>
<ul style="list-style-type: none"> <li>Formation of two daughter cells from the mother cell.</li> <li>Undertaken under optimal conditions.</li> <li>No formation of cyst</li> </ul>	<ul style="list-style-type: none"> <li>Formation of multiple daughter cells from the mother cell.</li> <li>Undertaken under adverse conditions.</li> <li>Cyst formation is common.</li> </ul>
<b>Fragmentation</b>	<b>Regeneration</b>
<ul style="list-style-type: none"> <li>Body of an individual simply breaks up into smaller pieces upon maturation. These pieces or fragments grow into new individuals.</li> </ul>	<ul style="list-style-type: none"> <li><b>a) Regeneration</b> is the ability of an organism to replace or repair any lost part</li> </ul>
<b>Plumule</b>	<b>Radicle</b>
<ul style="list-style-type: none"> <li>Plumule is future shoot.</li> <li>It grows towards the sun</li> </ul>	<ul style="list-style-type: none"> <li>Radicle is future root.</li> <li>It grows inside the soil or water</li> </ul>
<b>Pollination</b>	<b>Fertilization</b>
<ul style="list-style-type: none"> <li>It is the transfer of pollen grains from anther to the stigma of a flower.</li> <li>It carries the male gamete to the female sex organs.</li> <li>It precedes fertilization.</li> </ul>	<ul style="list-style-type: none"> <li>It is the fusion of male and female gametes.</li> <li>Fertilization occurs only after pollination</li> <li>When the pollen grain has germinated and sent the male gametes to the ovule.</li> </ul>
<b>Fission</b>	<b>Fragmentation</b>
<ul style="list-style-type: none"> <li>Occurs in Unicellular Organisms</li> <li>Division of a single celled organism into two cells</li> <li>Daughter cells are equal in size</li> </ul>	<ul style="list-style-type: none"> <li>Occurs in Multicellular Organisms</li> <li>Each piece grows into new individuals</li> <li>Daughter cells are not equal in size</li> </ul>

## Chapter-9 Heredity and Evolution

### What is variation? Why are hereditary variations important?

The differences in the characters among the offspring compared to their parents are called variations. Variations are necessary for organic evolution.

### What is monohybrid and dihybrid cross? Give one example of each.

**Ans. Monohybrid cross-** It is the simplest cross in which inheritance of one character is studied. A cross is made between the pair of plants having one contrasting character such as tall or dwarf.

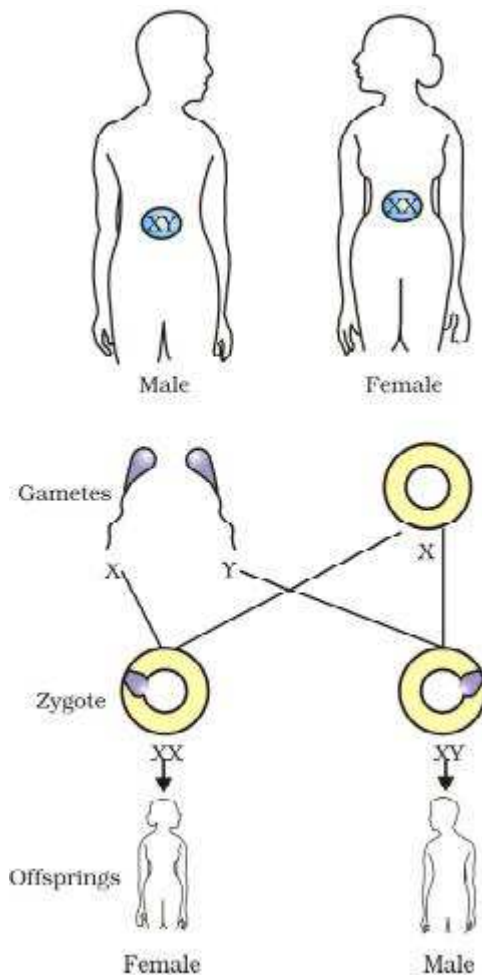
3. **Dihybrid cross-** A cross made between two plants having two pairs of contrasting character is Called dihybrid cross.

**For ex:** Round and green seed crossed with yellow and wrinkled seed.

4. **State three laws of Mendel.**

**Ans.** Mendel's law-

- i. **Law of dominance**- when two dissimilar factors of a character are present in an organism only one expresses itself (dominant factor) while other remain unexpressed (recessive factor)
  - ii. **Principle of segregation** – two factors of a character are separated at the time of gamete formation and each gamete gets only one factor for that character.
  - iii. **Principle of independent assortment**- this principle states that inheritance of two or more pair of contrasting traits is such a way that one pair of contrasting traits is independent of the other pair of contrasting traits.
- v. **How do Mendel's experiments show that traits are inherited independently?**  
**Ans.** Mendel crossed a variety of pea with round, yellow seeds with another variety having wrinkled green seeds, the F1 progeny showed only round yellow seeds. After self-fertilization of F1 plants, the F2 progeny obtained, showed four different types of plants having seeds in a ratio 9 (round, yellow) : 3 (round, green) : 3 (wrinkled, yellow) : 1 (wrinkled, green). This is called a **dihybrid ratio (9 : 3 : 3 : 1)**
6. **How is the sex of the child determined in human beings?**  
**Ans.** It is assumed that half the children of a couple will be girls and half will be boys. All children of the couple will inherit similar chromosomes (22 + X) from the mother but the sex of the children will depend on the chromosomes they inherit from the father. If a child inherits (22 + X) chromosomes from the father that will be a girl but when a child will inherit (22 + Y) chromosomes from the father that will be a boy. Therefore, the sex of a child is determined by the inheritance of X or Y chromosome from the father.
7. **Define the term 'speciation'.**  
**Ans.** Speciation is the formation of new species from pre-existing species.
8. **In evolutionary terms, which among-bacteria, spider, fish and chimpanzee have a "body design? Why or why not?**  
**Ans.** Chimpanzee have the better body design as compared to others given. They are better adapted for locomotion, communication and thinking.
9. **Mention two important features of fossils which help in evolution.**  
**Ans. (a)** Fossils provide direct evidence of evolution.  
 Fossil records also provide missing links between two groups of organisms, For example- Birds and Archaeopteryx.



10. **What are the different ways in which individuals with a particular trait may increase in a population?**

**Ans.** The different ways in which individuals with a particular trait may increase in a population are following.

- **Food availability:** Individuals with a particular trait may have extra abundance of food in their environment. They will naturally increase in number.
- **Genetic drift:** Individuals with a particular trait may increase in a population due to genetic drift. In it, there is a seasonal or accidental decline in population. The survivors have certain combination of traits which increase in number with increase in population.
- **Natural selection:** The particular trait which has survival value is picked up by natural selection. It increases in population through differential reproduction.

- **What are fossils? What do they tell us about the process of evolution?**

**Ans.** Fossils are the remains or traces and impressions of any organism that lived in the geological past. Fossils provide a direct evidence of evolution and are called written documents of evolution. They directly indicate the presence of different types of organisms in different ages. The path of evolution is known by arranging the fossils in a proper sequence age wise. The early fossils are the simple organisms. Later on different complex forms arose, flourished and died down. They are replaced by newer forms.

12. **Fossil study Methods:**

**Relative method:**



One is relative. If we dig into the earth and start finding fossils, it is reasonable to suppose that the fossils we find closer to the surface are more recent than the fossils we find in deeper layers.

**Carbon dating method:** The second way of dating fossils is by detecting the ratios of different isotopes of the same element in the fossil material.

13. **Only variations that confer an advantage to an individual organism will survive in a population. Do you agree with this statement? Why or why not?**

**Ans.** Variations that confer an advantage to an individual organism may or may not survive in the population depending upon the social behaviour of the organism. A variation in a social animal like ant may not survive in a population while a variation in an animal like a leopard may survive.

14. **Give a suitable explanation for geographical isolation of individual of a species lead to formation of a new species?**

**Ans.** Reproduction barrier such as river (geographical isolation) between the sub populations leading to -

(a) Genetic drift or random changes in the gene frequency by chance alone e.g. selection of red or blue beetles instead of green in presence of crows.

(b) Natural selection or selection of the fittest by nature itself e.g. Selection of green beetles

Instead of red ones in the presence of crows.

15. **Write the differences between Acquired Traits Acquired Traits.**

<b>.Acquired Traits</b>	<b>Acquired Traits</b>
<input type="checkbox"/> These are somatic variations. <input type="checkbox"/> Acquired traits develop due to the effects of environmental factors, use and disuse of organs and special (conscious) efforts. <input type="checkbox"/> These traits develop throughout the lifetime of an individual and die with the death of that individual. <input type="checkbox"/> Example—Learning of dance, music, etc, and muscular body of a wrestler.	<input type="checkbox"/> These are genetic variations. <input type="checkbox"/> Inherited traits develop due to reshuffling of genetic material and mutations. <input type="checkbox"/> These traits are transferred (inherited) by the parents to their offspring. These do not die but are passed on to the next generation. <input type="checkbox"/> Example—Attached or free earlobe and curly hair.

16. **How has the method of artificial selection by humans helped in the evolution of different vegetables? Explain in brief giving an example.**

**Ans.** Humans have developed different varieties of vegetables from a single wild cabbage by

artificial selection some of these are as follows —

(i) Some farmers have wanted to select very short distances between the leaves and developed the **cabbage**.

(ii) Some farmers selected immature green flowers and developed the **broccoli**.

(iii) Some have selected the sterile flowers and developed the **cauliflowers**.

(iv) Some farmers selected the swollen part of the wild cabbage and developed the **kohlrabi**.

(v) Some of them have selected the larger leaves and developed **Kale**.

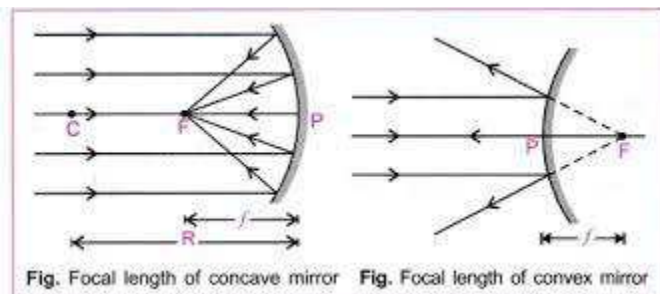
So all these vegetables are descended from a common ancestor.

17. **What is called phylogenetic system of classification?**  
**Ans.** Classification based on evolutionary relationships of organisms.
18. **Feather imprints were preserved along the dinosaur's bones but dinosaurs could not fly. What was the significance of feathers in reptiles and later on for other species?**  
**Ans.** It is believed that feathers in dinosaurs might have provided insulation in cold weather but later on became useful for flights in birds.
19. **How does Archaeopteryx provide evidence for organic evolution?**  
**Ans.** Archeopteryx has some features of reptiles, characters of dinosaurs as well as some features of birds like wings. This shows that birds are closely related to reptiles. Birds could evolve from reptiles.

## PHYSICS

### Chapter-10: LIGHT- Reflection and Refraction

#### 1. Terms related to Mirrors :-



**Pole (P) :** Pole is the mid point of a spherical mirror.

**Center of Curvature (C) :** The centre of the sphere of which the spherical mirror is a part.

**Radius of Curvature (CP):** is the linear distance between the pole and the centre of curvature

**Principal Axis :** is an imaginary line passing through the pole and the centre of curvature

**Principal Focus (F) :** is a point on the principal axis, where a beam of light parallel to the principal axis, after reflection meets.

**Focal Length (f) :** is the distance between the pole and the principal axis.

#### 2. State laws of reflection.

- The angle of incidence is equal to the angle of reflection.
- The incident ray , the normal to the mirror at the point of incidence and the reflected ray all lie in the same plane.

3. **Types of mirrors :** Plane mirror, concave mirror, convex mirror

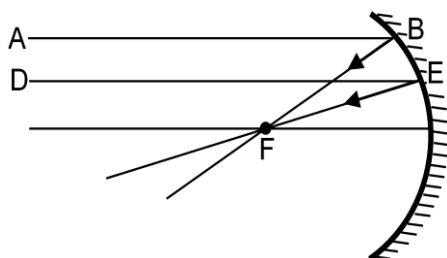
4. **List out the characteristics of image formed by a plane mirror.**

1. The Image formed is always virtual and erect
2. The size of the image is equal to that of the object.
3. The object distance and image distance are same.

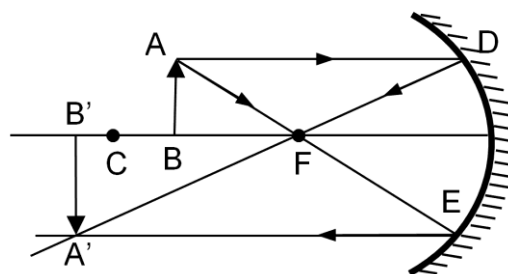
5. **Ray diagrams and the position, size and the nature of the image formed in a concave mirror, when object is placed at different positions**

Sl No.	Position of the Object	Position of the Image	Size of the image	Nature of the image	Figure number
1	At infinity	At the focus 'F'	Highly diminished	Real and inverted	i
2	Beyond 'C'	Between F and C	diminished	Real and inverted	ii
3	At 'C'	At 'C'	Same size	Real and inverted	iii
4	Between C and F	Beyond C	Enlarged	Real and inverted	iv
5	At focus F	At infinity	Highly enlarged	Real and inverted	v
6	Between F and P	Behind the mirror	Highly enlarged	Virtual and erect	vi

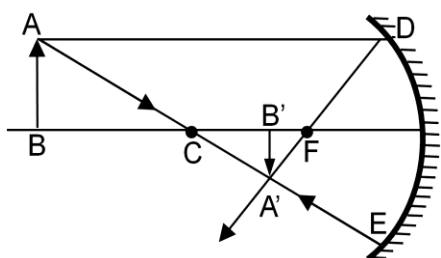
i.



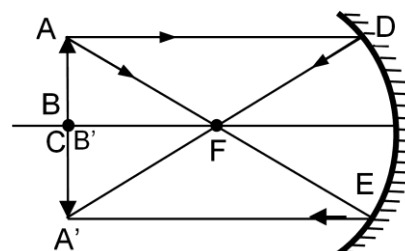
ii.



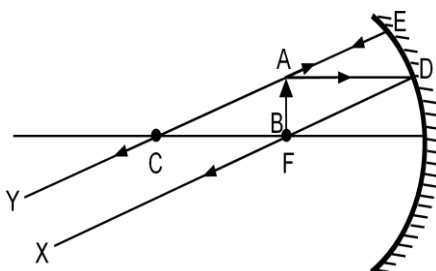
iii.



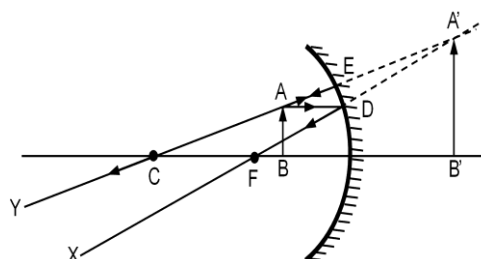
iv.



v.



vi.



**6. What is the position, size and nature of the image formed by the convex mirror.**

Position : Always behind the mirror.      Size : Smaller than the object

Nature : Always virtual and erect

**7. What are the uses of concave mirrors?**

Used in Torches, Search-light, Vehicle headlights, Shaving mirrors, Solar furnace, Dentist use Concave mirror to see large images of the teeth.

**8. What are the uses of convex mirrors?**

Used in rear view Mirror of vehicles.

**9. Why do dentists use concave mirrors?**

Dentists need erect and magnified image of the teeth. When the object (teeth) is very close to the concave mirror a virtual, erect and magnified image is produced.

**10. Why is convex mirror used in rear view mirror in motor vehicles?**

Because they give an erect, virtual, full size diminished image of distant objects with a wider field of view.

**11. List out the differences between Real image and Virtual image**

Real Image	Virtual Image
1.It can be taken on a screen.	1. It can't be taken on a screen.
2. It is formed in front of the mirror.	2. It is formed behind the mirror.
3. It is always inverted	3. It is always erect

**12. State laws of Refraction.**

1. The incident ray, refracted ray and the normal to the interface of two transparent media at the point of incidence all lie in the same plane.
2. The ratio of the sine of angle of incidence to the sine of the angle of refraction is a constant for the light of a given color and for the given pair of media. (Snell's Law)

**13. What is refractive index?**

The ratio of the velocity of light in vacuum to its velocity in a given medium.

$$\text{Refractive Index } n = \frac{\text{Speed of light in medium 1}}{\text{Speed of light in medium 2}} = \frac{v_1}{v_2}$$

**14. The refractive index of crown glass is 1.52. What is the meaning of this statement?**

It means the velocity of light in air is 1.52 times faster than the velocity of light in crown glass.

**15. On what factors do refractive Index of a material depend?**

1. Nature of an object
2. Density of medium
3. The relative speed of propagation of light

**16. On what factors do the lateral shift( displacement) of light depend during refraction of light?**

1. Angle of incidence
2. Refractive index of the medium
3. Nature of the medium
4. Wavelength of incident ray.

**17. Mention the reason for the refraction of light.**

The change in the speed of the light when travelling from one medium to another medium

**18. Nature, relative size and position of the image formed by a convex lens for various positions of the object.**

Sl No.	Position of the	Position of the	Size of the	Nature of the	Figure number
--------	-----------------	-----------------	-------------	---------------	---------------

	Object	Image	image	image	and page no. in text book
1	At infinity	At the focus 'F <sub>2</sub> '	Highly diminished	Real and inverted	10.16(a) page no. 90
2	Beyond '2F <sub>1</sub> '	Between F <sub>2</sub> and 2F <sub>2</sub>	diminished	Real and inverted	10.16(b) page no. 90
3	At '2F <sub>1</sub> '	At '2F <sub>2</sub> '	Same size	Real and inverted	10.16(c) page no. 90
4	Between F <sub>1</sub> and 2F <sub>1</sub>	Beyond 2F <sub>2</sub>	Enlarged	Real and inverted	10.16(d) page no. 90
5	At focus F <sub>1</sub>	At infinity	Highly enlarged	Real and inverted	10.16(e) page no. 91
6	Between F <sub>1</sub> and O	On the same side of the lens as the object	Highly enlarged	Virtual and erect	10.16(f) page no. 91

**19. What is the position, size and nature of the image formed by the concave lens?**

A concave lens always gives a virtual, erect and diminishing image.

**20. What are the uses of convex lens?**

Convex lens are used in magnifying glasses, microscopes, correction of hypermetropia.

**21. Define The power of a lens. Write its SI unit.**

The power of lens is defined as the reciprocal of its focal length

$$P = 1/f$$

SI unit : dioptre

**22. What is Magnification?**

The ratio between the height of the image to the height of the object.

**23. Define 1 dioptre. mention the Power of Concave and Convex lenses.**

A lens is said to have a power of 1 dioptre, if its focal length is 1 metre.  $1D=1m^{-1}$ .

The power of a convex lens is positive and concave lens is negative.

**Points to remember:**

1. **Mirror Formula,**  $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$

$$\text{Magnification, } m = \frac{h^I}{h} = -\frac{v}{u}$$

2. **Lens Fomula,**  $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

$$\text{Magnification, } m = \frac{h^I}{h} = \frac{v}{u}$$

3. The focal length of concave mirror is -ve and that of a convex mirror is +ve

- a. The focal length of concave lens is -ve and that of a convex lens is +ve
  - b. The power of concave lens is -ve and that of a convex lens is +ve
  - c. The object distance is always negative ( both in mirror and lens)
  - d. Magnification,  $m=1$ , Height of object is equal to height of image  
 $m>1$  Height of object is lesser than height of image  
 $m<1$  Height of object is greater than height of image
  - e. Magnification of real image is -ve
  - f. Magnification of virtual image is +ve.
4. If the Magnification of an object of 1m is 2, find the height of the Image?

$$h = 1m, h^1 = ?, m = 2$$

$$m = \frac{h^1}{h}$$

$$2 = \frac{h^1}{1}$$

$$h^1 = 2 \times 1 = 2m$$

5. If the radius of curvature of a mirror is 30cm then find the Focal length  $R = 30cm, f = ?$

$$f = \frac{R}{2}$$

$$f = \frac{30}{2} = 15cm$$

6. The image is formed at the distance of 15 cm by a concave lens of focal length 20 cm. Find the Object distance.

$$f = -20cm, v = -15cm$$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\frac{1}{-20} = \frac{1}{-15} - \frac{1}{u}$$

$$\frac{1}{u} = \frac{-1}{15} + \frac{1}{20}$$

$$\frac{1}{u} = \frac{-1}{60}$$

$$u = -60cm$$

7. The focal length of a convex lens is 10cm. Find the Power of Lens.

$$f = 10cm = 0.1m$$

$$P = \frac{1}{f}$$

$$P = \frac{1}{0.1} = +10D$$

1. A student uses a lens of focal length +50cm and another student uses a lens of -50cm . discuss the nature and find power of lens
2. The power of a lens is -2.0 D find the nature and focal length of the lens.

- An object of height 5 cm is placed at a distance of 40cm from a convex lens of focal length 50cm. Calculate the size, position and nature of image formed.
- The speed of light in water is  $2.25 \times 10^8$  m/s and in vacuum it is  $3 \times 10^8$  m/s Calculate the refractive index of water.
- An object of height 2 cm is placed at a distance of 16cm from a concave mirror. The mirror forms a real image of height 3cm. Calculate position of image formed and the focal length of the mirror.

### Natural phenomena

## Chapter 5: The Human Eye and the colourful world

### 1. List the various eye defects and their corrections.

Eye Defects	Definitions	Scientific Reasons	Corrective Measures
1. Myopia	Myopic eye can see nearby objects clearly but cannot see distant objects clearly.	1. Excessive curvature of the eye lens. 2. Elongation of the eyeball.	Concave lens of suitable power.
2. Hypermetropia	Hypermetropic can see distant objects clearly but cannot see nearby objects clearly.	.The focal length of the eye lens is too long. .The near point is farther away from the normal near point (25 cm). .The eyeball has become too small.	Convex lens of appropriate power can be used.
3. Presbyopia	The power of accommodation of the eye usually decreases with age. Gradual change in the near point.	Loss of flexibility of the eye lens. Gradual weakening of the ciliary muscles.	Concave and convex lens of appropriate power can be used.
4. Astigmatism	Change in the curvature of the eye lens	Defect in refraction of eye lens.	Usage of appropriate lens.
5. Cataract	The crystalline lens of people at old age become milky and cloudy.		Cataract surgery restores the vision

### 3. Define the term vision range.

The difference between the near and farthest point which a normal eye can see is called the vision range.

### 4. What is the near and farthest point of the eye?

The near point of the eye is about 25cm and farthest point is infinity.

### 5. Explain Tyndall effect briefly.



The phenomenon of scattering of light by the colloidal particles is called Tyndall effect.

Very fine particles of the medium scatter the light of shorter wave lengths while particles of larger size scatter light of longer wavelengths.

6. **What is spectrum? Give an example for natural spectrum.**

The band of the coloured components of the light beam is called its spectrum. Rainbow is a natural spectrum.
7. **What is dispersion of light? Name the colours formed due to the dispersion of white light.**

When a white light is incident on a prism it gets refracted and splits into 7 constituent colours. This phenomenon is called dispersion of light. The 7 colours so formed are violet, indigo, blue, green, yellow, orange and red (VIBGYOR)
8. **Why the dispersion of light occurs?**

Different colours have different wavelengths. During refraction, each colour bends with an angle with respect to the incident ray.
9. **Briefly explain Newton's experiment that proved 7 colours constitute white light.**

Two identical prisms are taken. One is placed erect and the second prism is placed in an inverted position. When white light incidents on an erect prism it will be refracted and dispersed into the spectrum of seven colours. When the spectrum incidents on the inverted prism, white light emerges out.
10. **Describe the process of formation of formation of a rainbow.**

A rainbow is caused by dispersion of sunlight by tiny water droplets, present in the atmosphere. It is formed in a direction opposite to that of sun. The water droplets acts like small prisms. They refract and disperse the incident sunlight, then reflect it internally and finally refract it again when it comes out of the raindrop. Due to the dispersion of light and internal reflection, rainbow is formed.
11. **Why do stars twinkle?**

The twinkling of a stars is due to atmospheric refraction of starlight. The starlight on entering the earth's atmosphere, undergoes refraction continuously before it reaches the earth. As the path of rays of light coming from the stars goes on varying slightly, the apparent position of the star fluctuates and causing twinkling effect.
12. **Why planets do not twinkle?**

The planets are much closer to the earth and are thus seen as extended sources but as point sized sources of light. So the planets do not twinkle.
13. **Why will there be advanced sunrise and delayed sunset?**

Due to atmospheric refraction, the sun is visible about 2 minutes before the actual sunrise and about 2 minutes after the actual sunset.
14. **Why is the colour of the clear sky blue?**

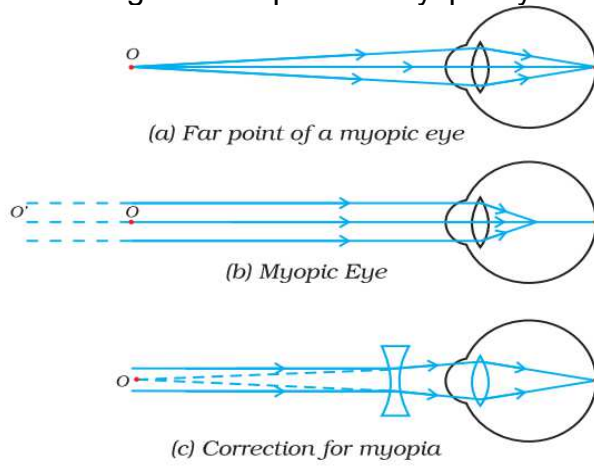
Size of the molecules of air and other fine particles in the atmosphere is smaller than the wavelength of visible light. Hence these are more effective in scattering light of shorter wavelength at the blue end.
15. **Why is the sea water blue in colour?**

Sea water absorbs the colours of longer wavelength in large quantity than the blue colour of shorter wavelength. So, from the white light entering the sea, only blue colour is reflected.
16. **Why is the colour of the sun red at sunrise and sunset?**

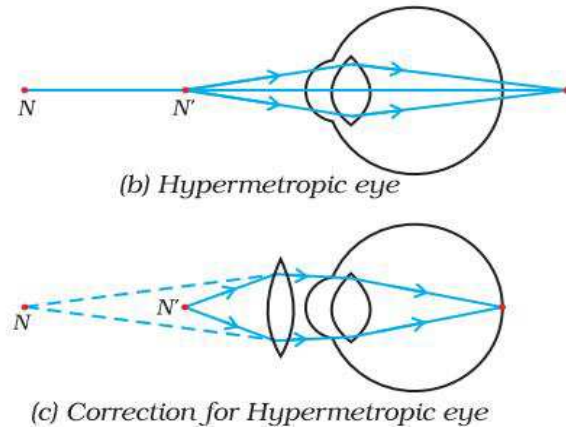
During sunrise and sunset, the light form the sun travels a longer distance in the atmosphere, red colour of longer wavelength scatters more.
17. **Why danger signals use red colour? OR Why are red lights used to stop the vehicles in traffic signals?**

Red colour can be seen from faraway distance. The red colour is least scattered by fog or smoke and has longer wavelength.

18. Draw a neat diagram to represent myopic eye with correction.



19. Draw a neat diagram to represent hypermetropic eye with correction.



## CHAPTER 12: ELECTRICITY

1. Define the following terms with suitable mathematical relations.

1. Electric Current    b) Potential Difference    c) Resistance    d) Electric power    e) Ampere    f) Volt

1. **Electric Current (I)** : The rate of flow of electric charges.

$$I = \frac{Q}{t}$$

2. **Potential Difference** : Amount of work done to move a unit positive charge from one point to another in the electric field.

$$V = \frac{W}{Q}$$

c. **Resistance R** : The opposition that a substance offers to the flow of current.

$$1. \quad R = \frac{V}{I}$$

d. **Electric power P** : Electric power is the rate, per unit time, at which electric energy is transferred by an electric circuit. It can be represented as  $P=VI$     ii)  $P = I^2R$     iii)  $P = \frac{V^2}{R}$

iv)  $P = \frac{W}{t}$

e. **1 Ampere** : Is defined as 1 coulomb of charge per second.

$$1A = 1 C/ 1s$$

- f. **1 Volt** : One volt is defined as energy consumption of one joule per electric charge of one coulomb.

$$1V=1 JC^{-1}$$

2. **Complete the following related to Physical Quantities and SI units :-**

Sl. No	Physical Quantities	-----	SI units
1	<b>Electric Current</b>	-----	A (Ampere )
2	<b>Potential Difference</b>	-----	V (Volt)
3	<b>Resistance</b>	-----	$\Omega$ (Ohm)
4	<b>Electric power</b>	-----	W (Watt)

3. **Name the various Electronic devices used in a circuit?**

Ammeter : Used to measure the flow of current.

Voltmeter : Used to measure potential difference (Voltage) between two points in a circuit.

Galvanometer : Used to detect electric current in a circuit.

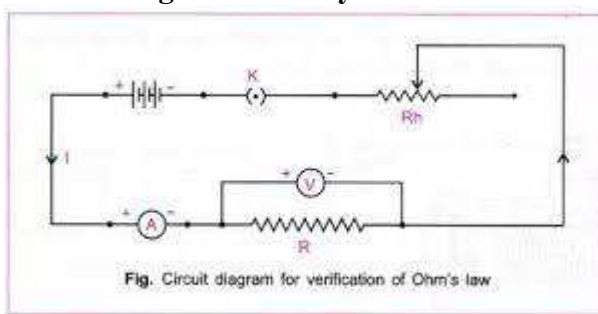
Ohm meter: Used to measure the electrical resistance of a component.

4. **State Ohm's Law and express mathematically.**

Ohm's law states that the current through a conductor between two points is directly proportional to the potential difference across the two points, provided its temperature remains the same.

$$\frac{V}{I} = \text{constant} \quad \frac{V}{I} = R$$

5. **Draw a circuit diagram to verify Ohm's law.**



6. **Name the 4 factors on which the resistance of a conductor depends?**

- a. Length of a conductor      c. Temperature  
b. Material of conductor      d. Area of Cross section of conductor

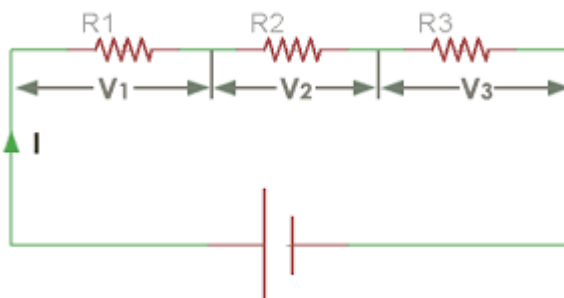
7. **How does the resistance of a wire vary with its area of cross section?**

Resistance is inversely proportional to area of cross section of the conductor.

8. **How is a voltmeter connected in the circuit to measure the potential difference between two points?**

A voltmeter is connected in parallel with a device to measure its voltage.

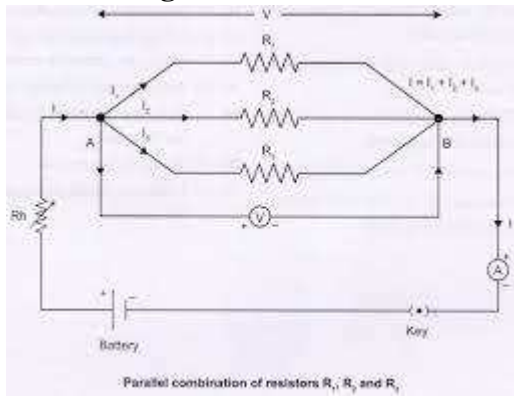
9. **Draw a circuit diagram to show three resistors connected in series with a cell.**



10. **Write the equation to represent the equivalent resistance when set of resistors are connected in series.**

$$R_s = R_1 + R_2 + R_3 \dots$$

11. Draw a circuit diagram to show three resistors connected in parallel with a cell and key.



12. Write the equation to represent the equivalent resistance when set of resistors are connected in parallel.

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \dots$$

13. Three resistors  $12\Omega$ ,  $8\Omega$ ,  $4\Omega$  are connected in series. Calculate the total resistance of the circuit.

Solution : As resistors are connected in series,  $R_s = R_1 + R_2 + R_3$

$$\therefore R_s = 12 + 8 + 4 = 24\Omega$$

14. Three resistors  $12\Omega$ ,  $6\Omega$ ,  $3\Omega$  are connected in parallel. Calculate the total resistance of the circuit.

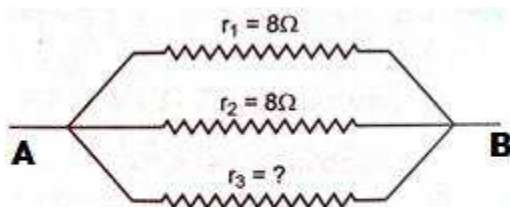
Solution : As resistors are connected in parallel,  $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$

$$\frac{1}{R_p} = \frac{1}{12} + \frac{1}{6} + \frac{1}{3}$$

$$\therefore \frac{1}{R_p} = \frac{1}{12} + \frac{1}{6} + \frac{1}{3} = \frac{1 + 2 + 4}{12} = \frac{7}{12}$$

$$\therefore R_p = \frac{12}{7} = 1.71\Omega$$

- 15.



If the total resistance between the points A and B is  $2\Omega$  then calculate  $r_3$ .

Solution : As resistors are connected in parallel,

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$$\therefore \frac{1}{2} = \frac{1}{8} + \frac{1}{8} + \frac{1}{r}$$

$$\frac{1}{r} = \frac{1}{2} - \frac{1}{8} - \frac{1}{8}$$

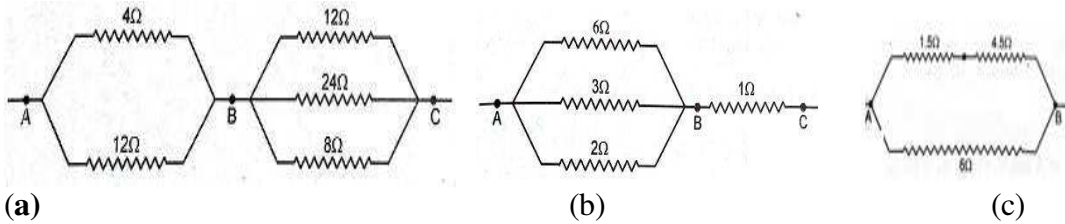
$$= \frac{4 - 1 - 1}{8} = \frac{2}{8} = \frac{1}{4}$$

$$\therefore r = 4\Omega$$

16. Tungsten is used in electric bulbs. Why?

The melting point of tungsten is  $3380^\circ\text{C}$  and has high resistance. So that the electric energy can easily change into heat energy and then light energy.

17. Calculate the total resistance in the following circuits.



18. What are the characteristics of a fuse wire?

a) It should has high resistivity    b) Low melting point

19. What connection is used in domestic appliances and why?

Parallel connection is used in domestic appliances. Because parallel connection

- In domestic wiring provides equal amount of energy to all appliances.
- This reduces the equivalent resistance and results in consumption of energy,
- All the appliances can be operate separately.

20. The specific resistance of copper is  $1.62 \times 10^{-8} \Omega m$ . What do you mean by the statement?

The resistance offered by copper wire of length 1 m, area of cross section  $1 m^2$  is  $1.62 \times 10^{-8} \Omega$

20. What is heating effect of electric current?

When current flows through a conductor, heat energy is generated in the conductor. This phenomenon is called heating effect of electric current.

21. What are the factors does the heating effect of electric current depends.

- The resistance of the conductor.
- The time  $t$  for which the current flows.
- The amount of current.

- v. State Joule's law of electrical heating.

Joule's law of electrical heating states that, the heat produced in a resistor is

- Directly proportional to the square of electric current flowing through it.
- Directly proportional to the resistance of the conductor
- Directly proportional to the time for which electric current flows through it.

- w. Write the Joule's equation of electrical heating.

$$H = I^2 R t$$

24. Write the equations to find the heat generated in a conductor when current flows through it.

$$H = I^2 R t \quad H = V I t$$

25. What determines the rate at which energy is delivered by a current?

The rate at which energy is delivered by a current is determined by

- Magnitude of current
- Resistance of the device

- z. An electric iron of  $30 \Omega$  takes a current of 5 A. Calculate the heat developed in 30 seconds.

Given :  $R = 30 \Omega$ ,  $I = 5A$ ,  $t=30s$

$$H = I^2 R t = 5^2 \times 30 \times 30 = 25 \times 900 = 22500J = 2.25 \times 10^4 J \text{ or } 22.5kJ$$

27. Calculate the monthly bill for a heater of resistance  $40\Omega$ , which is used on 220V mains, such that its daily use is for 5 hours. The cost of electric energy is Rs 5.00 per kWh. Solution:

Resistance of heater =  $40 \Omega$  , Potential Difference = 220V , time = 5 hrs

$$\text{Power} = \frac{v^2}{r} = \frac{220 \times 220}{40} = 1210W$$

$$\text{Energy consumed in 5 hrs} = p \times t = 1210 \times 5 = 6050 \text{ Wh}$$

$$\text{Energy consumed in a month} = 6050 \times 30 = 181500 \text{ Wh} = \frac{181500}{1000} \text{ kWh} = 181.5 \text{ kWh}$$

$$\text{Monthly bill} = 181.5 \times 5.00 = \text{Rs-}907.50$$

28. **Define specific resistance.**

It is the amount of resistance offered by a conductor of unit length and unit area of cross section

SI unit is  $\Omega m$ .

It is mathematically expressed as  $\rho = R \frac{a}{l}$

29. **How many  $9\Omega$  resistors (in parallel) are required to carry 4A on 12V battery ?**

Solution:

Current ( $I$ ) = 4A, Potential Difference ( $V$ ) = 12 V,

Total resistance of the circuit (when resistors are in parallel) ( $R_p$ ) =  $\frac{V}{I} = \frac{12}{4} = 3\Omega$

$$\frac{1}{R_p} = \frac{1}{r_1} + \frac{1}{r_2} + \dots \dots \dots n$$

$$\frac{1}{3} = \frac{1}{9} + \frac{1}{9} + \dots \dots \dots n$$

$$\frac{1}{3} = \frac{n}{9} \quad \therefore n = 3$$

30. **A piece of wire having a resistance R is cut into five equal parts**

i. How will be the resistance of each part of the wire compare with the original resistance?

ii. If the five parts of the wire are placed in parallel, how will the resistance of the combination compare with the resistance of the original wire? What will be the ratio of resistance in series with that of parallel?

Sol :

i. Let the resistance of original wire be R. We know that the resistance of wire is proportional to its length. Here the wire is cut into five equal parts, hence the resistance of each part will be  $\frac{R}{5}$

ii. If the five parts of the wire are placed in parallel, then the equivalent resistance is

$$\frac{1}{R'} = \frac{5}{R} + \frac{5}{R} + \frac{5}{R} + \frac{5}{R} + \frac{5}{R}$$

$$= \frac{25}{R}$$

$$R' = \frac{R}{25}$$

The ratio of resistance in series with that of parallel is

$$\frac{R}{R'} = R \times \frac{25}{R}$$

$$\frac{R}{R'} = 25$$

$$R : R' = 25 : 1$$

**Give scientific reasons :-**

**1. Why copper wire cannot be used as a fuse wire.**

Because it has low resistance and high melting point.

**2. Why parallel circuit arrangement best for domestic wiring?**

a. Parallel arrangement in domestic wiring provides equal amount of energy to all appliances.

i. This reduces the equivalent resistance and results in consumption of energy,

ii. All the appliances can be operate separately.

**3. Why is the series arrangement not used for domestic circuit?**

In series circuit

- All electrical switches will have common switch due to which they cannot be turn on or off Separately.

- Overall resistance of circuit will increase due to which the current from power supply will be less

i. **Why the voltmeter needs to be connected in parallel with resistor.**

Voltmeter is a device which measures the voltage across a resistor. If it is connected in series then it will change the value of potential difference which will minimise the current in the circuit as it has very large resistance and you will get faulty readings.

ii. **Why an ammeter is always connected in series in a circuit.**

Ammeter measures the current flowing in the circuit. It has low resistance. If it is connected

in parallel across any load then all current in circuit will choose lower resistive path

(i.e ammeter ) to cause its circuit to be damaged. Hence it is used in series.

3. **Why does the cord of an electric heater not glow while the heating element does?**

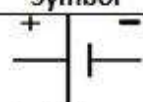
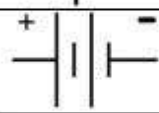
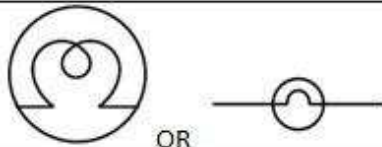
The cord of the electric heater is a good conductor so it does not get heated up and also does not glow. But the heating element of the heater is made up of alloy which has very high resistance, so when current flows through it gets heated up and glows.

4. **Why are coils of electric toasters and electric irons made of an alloy rather than a pure metal.**

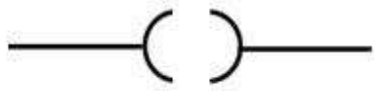


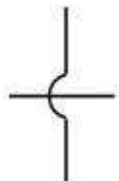

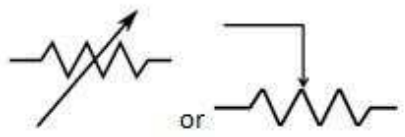


The resistivity of an alloy is higher than the pure metal and also at high temperatures the alloys

Do not melt easily.

*Remember the following symbols :*

S.No.	Electric Component	Symbol
1	Electric Cell	
2	Electric Battery	
3	Bulb	



4	Plug key or open Switch (off)	
5	Plug key or closed Switch (on)	
6	Wire Joint	
7	Wire crossing without joint	
8	Resistor	
9	Variable Resistor or Rheostat	
10	Ammeter	
11	Voltmeter	

## Chapter 13 : Magnetic Effect of Electric Current

1. What are the properties of magnetic field lines?
3. Magnetic field lines always starts from north pole and end on south pole
4. Two magnetic field lines never intersect each other
5. They always form closed loops.
2. State the conclusions that can be drawn from the observation that a current carrying wire deflects a magnetic needle placed near it.

The conclusion that can be drawn is that a magnetic field exists around a current carrying conductor.

3. **Why do not two magnetic lines of force intersect with each other?**

If two magnetic lines of force intersect each other it would mean that there are two directions of the magnetic field at the point of intersection, which is not possible.

4. **State Right hand thumb rule.**

Hold a current carrying conductor in right hand, such that let the thumb points the direction of current. Then the fingers wrapped around the conductor indicate the direction of magnetic field. This is Right hand thumb rule.

5. **Remember :-**

**The magnetic field lines near a long straight wire** – consists of concentric circles centred On the wire.

**The magnetic field inside the solenoid-carrying current** – is same at all points.

6. **What type of core used to make an electromagnet?**

Soft iron core is used to make an electromagnet.

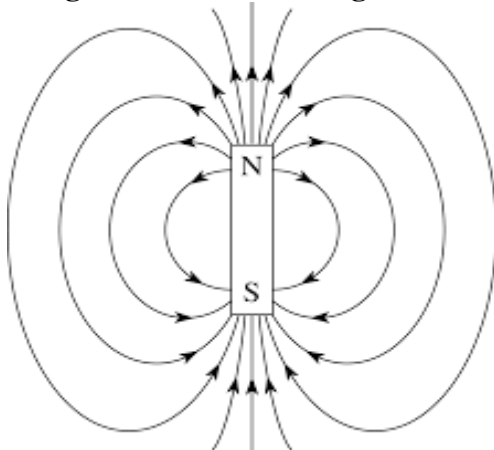
7. **Name the rule which gives the direction of force acting on the conductor.**

Fleming's left hand rule.

8. **State Fleming's right hand rule.**

Fleming's right hand rule states that, if the fore finger, middle finger and thumb of the right hand are stretched at right angles to each other, with the fore finger in the direction of the field and the thumb in the direction of the motion of the wire, then the current in the wire is in the direction of the middle finger.

9. **Draw a diagram to show the magnetic field lines around a bar magnet.**



10. **Name the device which converts electrical energy into mechanical energy.**

Motor

11. **What is the role of split ring in an electric motor?**

The role of split ring in an electric motor is to reverse the direction of current.

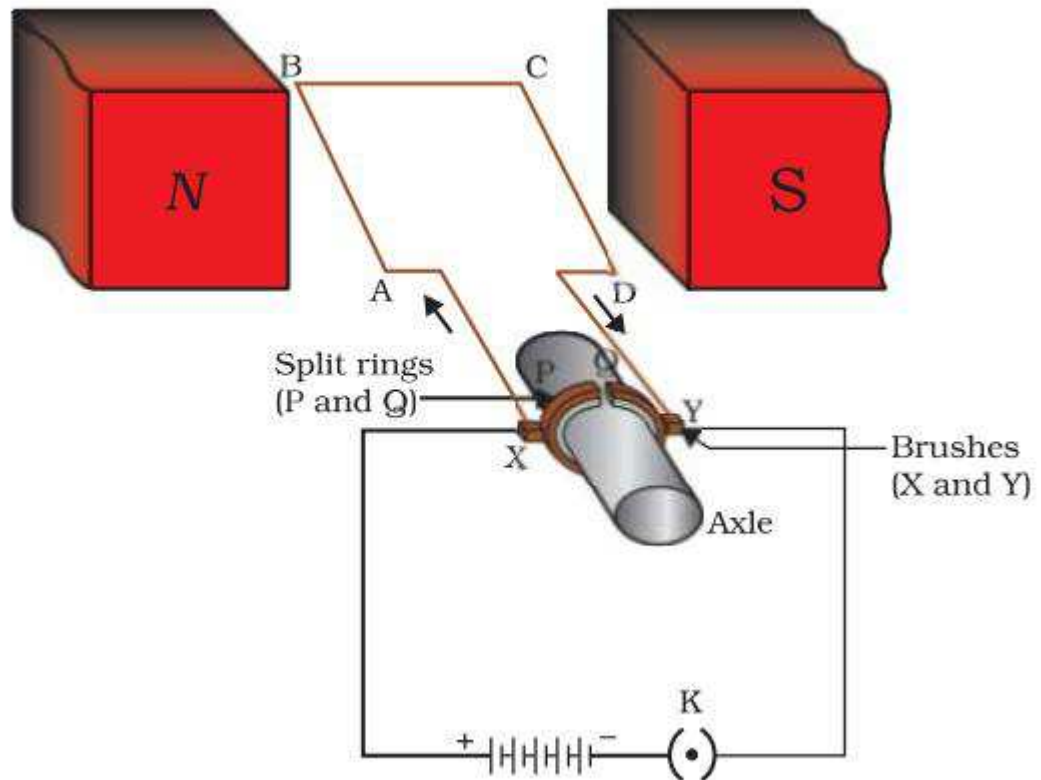
12. **What are the uses of brushes in a motor?**

They carry current to the Armature.

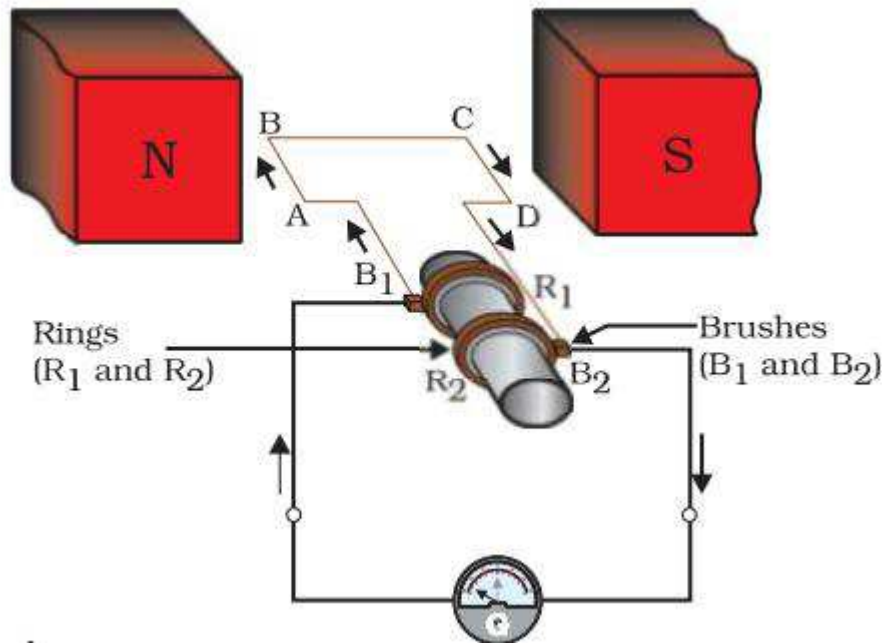
13. **What is electromagnetic induction?**

14. An electric current produced in a closed circuit by a changing magnetic field is called an induced current. This phenomenon is called electromagnetic induction.

15. **Draw a labelled diagram of an electric motor.**



14. **Write the working principle an electric motor.**  
The principle of electric motor is when a current carrying conductor is placed in magnetic field it experiences a force.
16. **Explain different ways to induce current in a coil.**  
The different ways to induce current in a coil are
  - a. Moving a magnet towards a coil
  - b. Moving a coil rapidly between the two poles of a horse-shoe magnet
- q. **When is the force experienced by a current carrying conductor placed in a magnetic field is largest?**  
The force experienced by a current carrying conductor placed in a magnetic field is largest, when the direction of current is perpendicular to the direction of magnetic field.
18. **Under what orientation, the induced current produced in moving conductor in a magnetic field can be maximum?**  
The current induced in a conductor is maximum when direction of motion of conductor is at right angle to the magnetic field.
19. **Name the rule which gives the direction of induced current in a conductor.**  
The rule that gives the direction of induced current is called Flerning's right hand rule.
20. **State Fleming's right hand rule.**  
Fleming's left hand rule states that, if the forefinger, thumb and middle finger of left hand are stretched mutually perpendicular and the forefinger points along the direction of external magnetic field, middle finger indicates the direction of current, then thumb points the direction of force acting on the conductor.
21. **Name the device which converts mechanical energy into electrical energy.**  
Generator
22. **Draw a neat labelled diagram of Generator.**



23. **Write the working principle of Generator.**  
It works on the principle of Faraday law of electromagnetic induction. The law states that whenever a conductor is placed in a varying magnetic field EMF is induced in the conductor.
24. **What type of ring has to be placed in a generator to produce AC current?**  
Slip rings
25. **What type of ring has to be placed in a generator to produce DC current?**  
Split rings
26. **Name some sources of direct current.**  
Some sources of direct current are electrochemical dry cells, solar cells, lead acid accumulator batteries, DC generators, etc.
27. **Which sources produce Alternating Current?**  
Some sources that produce alternating current are AC generators, thermal power stations, car alternators, etc.
28. **How is induced current in a secondary coil related to current in a primary coil?**  
When current in primary coil changes, then a current is induced in the secondary coil.
29. **An alternating current has frequency of 50 Hz. How many times does it change its direction in one second?**  
The given frequency is 50 Hz, so AC completes 50 cycles in 1 s.  
Therefore, it reverses its direction 100 times in one second.
30. **What is the type of current that we receive in domestic circuit ?**  
The current that we receive in domestic circuit is alternating current (AC)
31. **When does an electric short circuit occurs?**  
If the insulation of the wires used in the circuit is damaged , due to which the live wire and the neutral wire comes in direct contact as result current in the circuit rises and causes short circuit.
32. **What is the role of earth wire (neutral wire)? Why is it necessary to earth metallic appliances?**  
The metallic body of electric appliances is connected to the earth by means of earth wire so that any leakage of current is transferred to the ground. This prevents electric shock to the user.
33. **What precautions should be taken to avoid the overloading of domestic electric circuits?**  
The following precautions should be taken to avoid the overloading domestic electric circuits as given below:

- a. The circuits should be of proper current rating and appliances should be connected accordingly.
- b. Wires should be checked from time to time and those wires whose insulation is worn, should be immediately replaced.
- c. Connection of too many appliances in a single socket must be avoided.

34. **Complete the following**

- a. **When a rectangular coil of wires is rotated in magnetic field. The direction of induced current changes in each – Half revolution**
- 2. **At the time of short circuit, the current in the circuit – increases heavily**
- 3. **The device used for producing electric current is – Generator**

**Natural resources**

**Chapter-14 : Sources of energy**

1. **Mention the Conventional sources of energy.**

Firewood, Flowing water, Fossil fuels ( coal, petroleum, diesel, kerosene)

2. **Mention Non- Conventional sources of energy.**

Solar energy, wind energy, bio mass, geothermal energy, tidal energy, nuclear energy.

3. **Give example for renewable sources of energy**

Solar energy, wind energy, Firewood, flowing water

4. **List out the characteristics of good sources of energy**

- 2. Easily available
- 3. Easy to store and transport
- 4. Economical

1.High efficiency

5. **What is solar energy? List out solar devices and their functions.**

The energy received from Sun in the form of heat and light.

**Solar devices**

Solar cooker: Uses heat energy of sun to cook food.

Solar cell: Device used to convert light energy into electrical energy.

Solar water heater: Uses heat and light energy for getting hot water.

6. **Define Solar constant.**

The amount of energy reaching perpendicularly per square meter per second.

7. **How are fossil fuels formed? Mention the effects caused by using fossil fuels?**

Millions of years ago large number of animals and plants (Bio mass) got buried beneath the Earth. Under humid conditions, high pressure, temperature of the earth and bacterial decomposition in absence of air decomposed to form Fossil fuels. Ex: Coal and petroleum products. Effects-Pollution like Acid rain, greenhouse effect, Global warming.

8. **Write the function of glass top of solar cooker?**

top prevents heat losses due to conduction, convection and radiation.

The glass

9. **What is geothermal energy?**

pressure and temperature in the Earth's crust, the underground water comes in contact with hotspots and changes into steam. Steam so formed can be used to turn turbines and generate electricity.

Due to high

10. **What is wind energy? List out the merits and demerits**

The kinetic energy of the moving wind is used to rotate blades to produce electrical energy

Merits	Demerits
1. Doesn't cause pollution	1. Setting up of wind energy farms is expensive.
2. It is renewable source of energy.	2. Cannot be established in all places and requires more land.

**Name the major constituent of Bio-gas. List out the merits of Bio mass**

The major constituent of Bio-gas is Methane

Merits of bio mass: 1. Causes less pollution 2. Improves fertility of soil

12. **Differentiate between wave energy and tidal energy.**

Wave energy	Tidal energy
The kinetic energy of waves in sea is used to produce electricity.	The gravitational force of moon and earth causes tides. This rise and fall of tides can be used to produce electrical energy.

13. **Establishing Nuclear reactors causes pollution by radiation. How?** During nuclear fission process harmful radiations are emitted out and even during the disposal of the spent fuel, causes environmental contamination which can effect health of millions of people.

14. **Use of CNG is highly effective. How?**

Compared to other fuel CNG is a cleaner source of energy. So it can be used to reduce pollution also.

15. **How do thermal power plants work? Why it is not eco-friendly?**

By burning coal, the heat produced is used to convert water into steam. This steam is used to turn turbines and hence generate electricity.

Burning of coal causes pollution it releases oxides of carbon, nitrogen and sulphur into atmosphere.

16. **Most of the environmentalist opposes for construction of dams. Why?**

By construction of dams most of the agricultural lands are submerged and the submerged vegetation rots and produces large amount of methane gas.

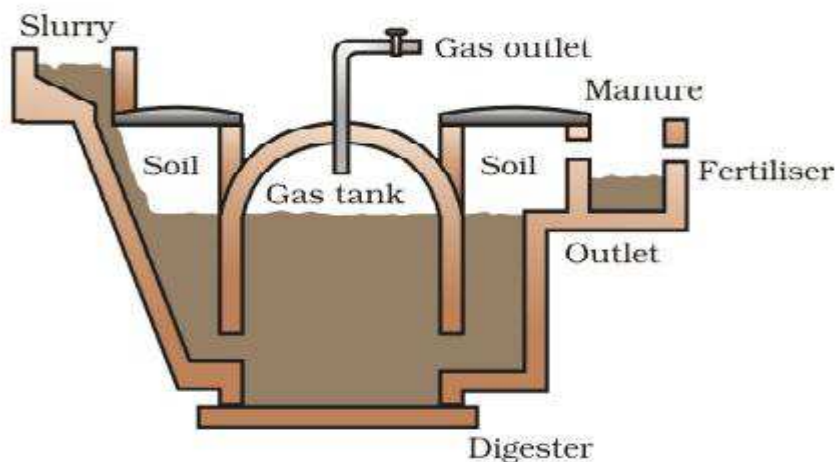
17. **The sources of energy must be conserved. Why?**

Most of the sources of are nonrenewable and are depleting at a very faster rate. In order to make it available to next generation it is to be conserved also to avoid pollution and save environment.

18. **Differentiate between nuclear fission and nuclear fusion reactions.**

Nuclear fission	Nuclear fusion
The process by which a heavy unstable nucleus is broken into medium weight nuclei by the bombardment of a slow neutron, So as to liberate more neutrons and tremendous amount of energy Ex: Fission of Uranium (U-235)	The process of combining two lighter nuclei to form an element Enormous amount of energy is liberated. Ex: Fusion of hydrogen

19. **Draw a neat diagram showing a unit used to produce a source of energy from organic wastes.**



## Chapter: 15 OUR ENVIRONMENT

1. **Name the 2 components of an ecosystem with examples ?**

1. Biotic components: Plants, animals and microorganisms.

2. Abiotic components: water, soil, wind, temperature etc.

2. **How the depletion of ozone layer does occurs?**

The chemicals like, chlorofluorocarbons (CFC's), carbon tetra chloride, halogens, methane, aerosols etc., are responsible for ozone layer depletion.

3. **What is food chain? Give an example.**

Transfer of energy from one organisms to another in the form of food is called food chain.

4. Grass → insects → snake → hawk

5. **Identify the substance that is non-biodegradable and undergoes bio magnification- from the following - DDT, cow dung, skin, glass.**

DDT

6. **What are producers and consumers?**

All photosynthetic green plants provide food for others and blue green algae produce food for others are called producers.

Animals always directly or indirectly depends on plants for their food. Hence animals are called consumers.

7. **In any ecosystem why the flow of energy is unidirectional?**

Because, the energy never returns back to the previous level.

8. **In the food chain including snake, grasshopper , grass and frog identify the trophic level of**

**Snake.**

Grass → grasshopper → frog → snake  
Trophic levels - I            II            III            IV

Snake is belongs to 4th trophic level.

9. **What is ozone? How does it affect the ecosystem?**

- Ozone is a triatomic molecule with the molecular formula is O<sub>3</sub>.
- It can affect any ecosystem in the following ways
  - (i) It forms thin sheet over Earth's atmosphere and it protects against ultraviolet rays.
  - (ii) If ozone layer is depleted, UV radiation enters the Earth's atmosphere and causes eye irritation, skin cancer in humans, reduces productivity in plants etc.

- **Name any two non-biodegradable waste substances.**

A. Plastic material, polythene bags, DDT.

K. **Which among the following belong to 1<sup>st</sup> trophic level?**

**Grasshopper, rose plant, Neem plant, and cockroach,**

Rose plant, Neem plant.

12. **Phytoplankton → zooplankton → fish → bird.**

**In the above food chain**

a. **Which organism get more energy.**

b. **In which organism deposition of insecticide is more**

a) **Phytoplankton**    b) **bird.**

m. **Give any two ways in which biodegradable substances would affect the environment.**

1. Decomposition of biodegradable substances may releases certain gases in the atmosphere and they pollute the environment. It causes entire place unhygienic

2. They may become the breeding places of flies and other pests, their causing diseases.

14. **Define bio magnification with suitable example.**

It is a phenomenon of progressive increase in the concentration of toxic substance at successive trophic level.

Ex: Pesticides like DDT sprayed on plants enters in to the body of living organisms through food chain.

Bio magnification of DDT will be as follows

Water → phytoplankton → fish → birds  
0.0001ppm 0.065 ppm 0.9 ppm 1.6 ppm

15. **In the food chain includes tiger, grass and sheeps.**

a. **Which transfers more energy ?**

b. **Which receives less energy ?**

a) Grass                      b) tiger

p. **What is represented by the following food chain?**

**Phytoplanktons → zooplanktons → small fish → large fish**  
**500 kJ                      50 kJ                      5kJ                      0.5kJ**

The above food chain represents the 10% law of energy law proposed by Lindeman.

17. **In the following food chain, the availability of energy to human being is 50 kJ. What is the amount of energy present in the producer's level.**

**Plants → sheep → human beings**  
**5000 kJ → 500kJ → 50kJ**

18. **List two methods of safe disposal of the no-biodegradable waste.**

i. Landfills .

ii. Recycling

iii. Composting,

iv. Biogas production

v. Incineration

xix. **What will happen if we kill all the organisms in or trophic level ?**

If we kill all the organisms in one trophic level, population of the lower trophic level will increase. It affects the energy flow and leads to imbalance in the nature.

20. **Give examples for terrestrial food chain and aquatic food chains.**

i. Terrestrial food chain : The food chain present o the land is called terrestrial food chain.

Ex : Grass → insects → snake --? hawk

ii. Aquatic food chain: The food chain present in different water bodies are called aquatic food chain.

Ex. : Phytoplankton → zooplankton → fish → shark

21. **What are the advantages of cloth bags over plastic bags during shopping?**

i. Cloth bags are biodegradable while Plastic bags are non-biodegradable.

ii. Cloth bags can be reused and hence do not cause any harm to the environment but plastic bags cause environmental pollution.

xxii. **What is food web? Give one example.**

Inter connecting food chains constitute food web.

23. **What are trophic levels? Give an examples.**

Each step of food chain through which food energy transferred is called trophic level.

Radish →  
rabbit → snake → hawk  
(Producers) (Primary consumers) (Secondary consumers) (Tertiary consumers)  
1<sup>st</sup> trophic level 2<sup>nd</sup> trophic level 3<sup>rd</sup> trophic level 4<sup>th</sup> trophic level  
T<sub>1</sub> T<sub>2</sub> T<sub>3</sub> T<sub>4</sub>

24. **What is biodegradable and non-biodegradable substance? Give example.**



The substances which are easily degraded by the enzymes of living organisms and get converted into simpler substances are called biodegradable substances.

Ex : Paper, cloth, agriculture waste etc.,

The substances, which are not easily degraded by enzymes of living organisms are called non –biodegradable substances.

Ex : plastics, DDT etc.,

25. **What are the consequences of ozone layer depletion?**

- i. UV radiation enters into the atmosphere causes skin cancer, cataract in humans.
- ii. It affect the growth and physiological function of both plants and animals
- iii. Causes variation in the number of phytoplankton, through which it affects the ecosystem.
- iv. Causes change in the composition of gases in the atmosphere.

26. **Why should biodegradable and non-biodegradable wastes be discarded in two separate dustbins?**

Biodegradable materials are broken down by microorganisms in nature into simple harmless substances.

Non –biodegradable materials need a different treatment like heat an temperature for disposal and hence, both should be discarded into two different dustbins. It saves the time and money and it is the responsibility of citizens.

27. **We often observe domestic waste decomposing in the residential colonies causes problems. Suggest ways to make people that the improper disposal of waste is harmful to the environment.**

- i) Awareness campaigns through Banners and signboards
- ii) Street plays can be used for the purpose.

28. **Usually more than four trophic levels are not exist in an ecosystem. Why ?**

The number of trophic levels in an ecosystem is restricted up to 4 – 5 because only 10 percent of the energy is transferred to each trophic level form the lower trophic level. Energy present in the last trophic level is not enough to the existence of next trophic level.

## Chapter-16: Sustainable Management of Natural Resources

1. **Give any 2 reasons to stop the usage of firewood as a source of fuel.**

- a) It causes deforestation
- b) It causes pollution.

2. **Name the two stakeholders who get advantages from the forests.**

- a. People live around the forest and tribal peoples
- b. Industrialists.

3. **Give any two reasons for the failure of sustainable management of ground water.**

- i. Use of ground water throughout the year without water recharging
- ii. Deforestation and urbanization

4. **What is sustainable management of natural resources?**

The controlled use of resources to assure their availability and continuous flow to the future generation without any disturbance to the environment is called sustainable management of natural resources.

5. **Suggest some consequences due to the loss of biodiversity?**

Dwindling of natural resources,  
Seasonal variations  
Imbalance in the nature.

6. **List two measures that you would suggest for the better management of water resources.**

Two measures for the better management of water resources are.  
i). Rain water harvesting

- ii). Construction of check dams.
7. **List any four stakeholders, who may help in conservation of forests.**
    - i. Locals living near the forest area
    - ii. Forest department
    - iii. Industrialists by practicing recycling.
    - iv. Wildlife protection NGOs
  8. **List any four disadvantages of destruction of forests.**
    - i) Loss of biodiversity
    - ii) Soil erosion.
    - iii) Dwindling of water tables.
    - iv) Climatic change
  9. **Mention any two reasons for which environmentalist protested against raising the height of “Sardar Sarovar Dam” on river Narmada.**
    - i) Large amount of fertile land will be submerged.
    - ii) Rehabilitation becomes very difficult.
  10. **What are the poisonous gasses released during the burning of fossil fuel?**  
Carbon monoxide, oxides of Sulphur and oxides Nitrogen.
  11. **What changes can you make in your habits to become more eco-friendly?**  
The following changes can be made to be environmental friendly
    1. Check the wastage of water, close the tap properly.
    2. Use solar water heater and cookers, install solar panel for electricity.
    3. Switch off the electrical appliances after the use to save electricity
    4. Use cloth bags instead of polythene bags.
  12. **Suggest some approaches towards the conservation of forests.**
    - i) Afforestation – growth of forest in new open area.
    - ii) Establishment of reserve forests.
    - iii) Execution of stringent laws.
    - iv) Involving locals to develop community and agro forests.
  13. **Reuse is better than recycling of materials. Give scientific reason.**  
Reduce is better than recycling because, Reuse of materials reduces accumulation of wastes and does not uses any energy But recycling needs energy and chemicals for processing.
  14. **How is hydroelectric power is indirect form of solar energy?**  
Solar energy vaporizes water from water bodies and rain water is stored in the dams. Hence hydroelectric power is also indirect form of solar energy.
  15. **Briefly explain 5R practices.**
    - a) **Refuse:** Refuse to buy products that can harm you and the environment.
    - b) **Reduce:** Minimize the use of energy by using bicycles. You can save fossil fuels. Unnecessary lights and fans. You can save water by repairing leaky taps. Do not waste food.
    - c) **Reuse:** Reuse the plastic bottles like jam bottles for storing things in the kitchen.
    - d) **Repurpose:** Plastic mugs, paint containers, buckets can be used as pots to grow small plants and as feeding vessels for birds.
    - e) **Recycle:** Collection of plastic, paper, glass and metal items can be recycled and this can reduce demand for raw materials.
  16. **Why do we need to manage our resources carefully?**
    - i. Resources are not continuously available
    - ii. Flow of resources must be smooth and continuous.
    - iii. Resources also need to be preserved for future generations
    - iv. Resources should be equally distributed amongst the rich and the poor.
  17. **What is the ill effect of increasing of greenhouse gasses in the environment?**

- Carbon dioxide, Methane, CFC's and Oxides of nitrogen increases temperature by trapping infrared radiations. This leads to melting of polar icecaps causing flood and submerging of land.

18. **List the methods to reduce the carbon dioxide concentration in the atmosphere.**

- a. Use public transport.
- b. Use compressed natural gas (CNG).
- c. Increase the forest cover.
- d. Use bicycles for shorter distance instead of using motor vehicles.

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