

CHAPTER-1-Chemical reactions and equations

- 1) What is a chemical reaction ?give example.

Process in which new substances are formed from one or more substances.

- 2) What are the observations which determine whether a chemical reaction has taken place?
- Change in state Change in colour
 - Release of gases Change in temperature
 - Formation of precipitate

Chemical equations

- 3) Magnesium oxide is formed when magnesium ribbon is burnt in oxygen. Write word-equation and balanced chemical equation for this reaction

Word-equation: Magnesium +Oxygen \rightarrow Magnesium Oxide

Balanced chemical equation : $2 \text{Mg} + \text{O}_2 \rightarrow 2 \text{MgO}$

- 4) What is chemical equation ?

Chemical equation is the symbolic representation of a chemical reaction.

- 5)
- $2 \text{Mg} + \text{O}_2 \rightarrow 2 \text{MgO}$
- Identify reactants and products in this reaction.

Reactants : $2 \text{Mg} + \text{O}_2$

Products : 2MgO

- 6) We need to balance chemical reactions. Why ?

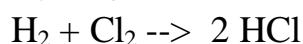
According to law of conservation of mass;mass can neither be created nor destroyed.Hence we need to balance chemical equations

- 7) We need to clean magnesium ribbon before use.Why?

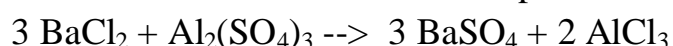
To remove the layer of magnesium oxide on magnesium

- 8) Write balanced chemical equations for the reactions given below

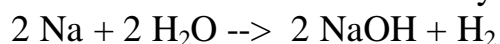
- a) Hydrogen + Chlorine
- \rightarrow
- Hydrochloric acid



- b) Barium chloride + Aluminium sulphate
- \rightarrow
- Barium sulphate + Aluminium chloride

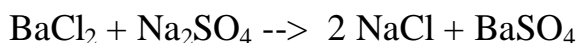


- c) Sodium + Water
- \rightarrow
- Sodium hydroxide + Hydrogen

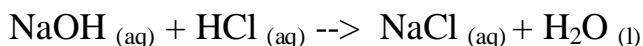


- 9) Write balanced chemical equations with symbols for the reaction given below

- a) The aqueous solutions of barium chloride and sodium sulphate reacts to give sodium chloride solution and precipitate of barium sulphate.



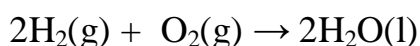
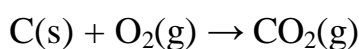
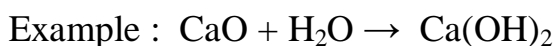
- b) The solution of sodium hydroxide(aq) reacts with solution of hydrochloric acid(aq) to give sodium chloride solution and water.



Types of chemical reactions

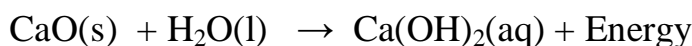
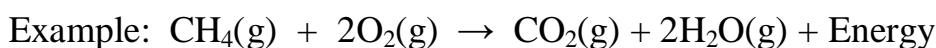
- 10) What is combination reaction? Give example.

Two or more reactants combine to form one product is known as combination reaction.



- 11) What is exothermic reaction? Give example.

Reaction in which heat is liberated with the product is known as exothermic reaction



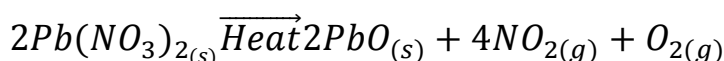
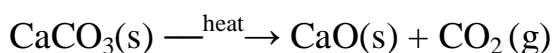
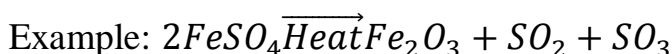
- 12) Respiration is an exothermic reaction. Justify.

Heat is liberated during respiration with the products. Hence respiration is exothermic reaction



- 13) What is decomposition reaction? Give example

Reaction in which one reactant dissociates to form two or more products is known as decomposition reaction.



- 14) Give one example each for decomposition reaction by heat, light and electricity.



Electrolytic Decomposition : $2H_2O \xrightarrow{\text{Electricity}} 2H_2 + O_2$

Decomposition by sun light : $2AgCl \xrightarrow{\text{sunlight}} 2Ag + Cl_2$

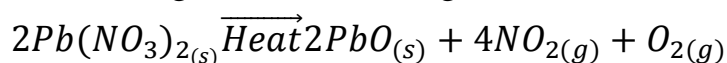
15) Colour changes when ferrous sulphate ($FeSO_4 \cdot 7H_2O$) crystals are heated. Why? When heated ferrous sulphate crystals lost water molecules of crystallisation. Hence they change their colour.

16) Give one use and chemical name of quick lime.

Chemical name of quick lime is calcium oxide

Use: In the manufacture of cement

17) Write balanced chemical equation for the reaction of lead nitrate when heated. Which is the brown gas released during this reaction?



Brown gas – Nitrogen dioxide (NO_2)

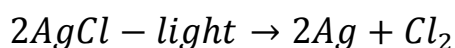
18) Name the gases released at cathode and anode during electrolysis of water.

Gas released at cathode – Hydrogen

Gas released at anode – Oxygen

19) Which is the process used in black and white photography? Write balanced chemical equation for this reaction.

Photolytic decomposition of silver chloride is used in black and white photography.



20) Compounds of silver are stored in black containers. Why?

Because compounds of silver get decomposed when exposed to light

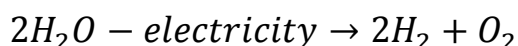
21) What are endothermic reactions? Give example

Reactions in which energy is absorbed are endothermic reactions

or

Reactions which require energy to decompose reactants are known as endothermic reactions.

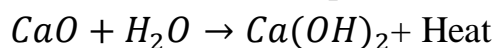
Example: $CaCO_3(s) \xrightarrow{\text{heat}} CaO(s) + CO_2(g)$



22) Compound X is being used for white washing of walls, which forms when reacted with water

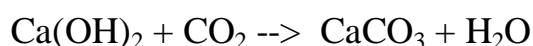
a) 'Name the compound X and write its molecular formula
Calcium oxide(quick lime), Molecular formula- CaO

b) Write the chemical equation when X reacts with water



23) The wall of your house turns glow white after some time when slaked lime is applied. Why?

Calcium hydroxide reacts slowly with carbon dioxide to form white precipitate of calcium carbonate

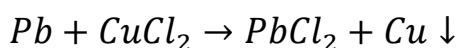
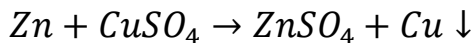


24) During electrolysis of water a gas formed in one test tube is 2 times more than the gas collected in another test tube. Why? Name that gas.

The ratio of hydrogen and oxygen atoms in water is 2:1. Hence hydrogen is two times more than oxygen in water by volume

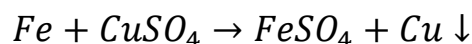
25) What is displacement reaction? Give example.

The more reactive element in reactants displaces less reactive element from its salt solution. This type of reaction is called displacement reaction



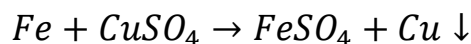
26) What are the changes that you observe when iron nails are dipped in copper sulphate solution?

- Iron displaces copper from copper sulphate solution.
- Blue coloured copper sulphate solution changes into green coloured ferrous sulphate solution.



27) Why the colour of copper sulphate solution changes when iron nails are dipped in it?

Iron displaces copper from copper sulphate solution and blue coloured copper sulphate changes into green coloured ferrous sulphate.

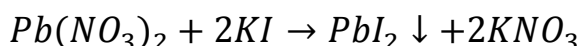
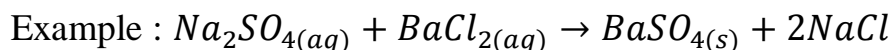


28) The process of purification of silver includes displacement of silver from silver nitrate solution by copper. Write balanced chemical equation of this reaction.



29) What is double displacement reaction? Give example

The reaction in which ions are exchanged between the reactants is known as double displacement reaction.



30) What is precipitation reaction?

The reaction in which precipitate is formed is known as precipitation reaction.

31) $Pb(NO_3)_2 + 2KI \rightarrow PbI_2 \downarrow + 2KNO_3$ In this reaction

a) What is the colour of precipitate formed

Yellow

b) Name the compound precipitated

Lead iodide (PbI_2)

c) Is it a double displacement reaction?

Yes, ions are exchanged between the reactants

32) What is oxidation? Give example

If a substance gains oxygen during a reaction, it is said to be oxidised.



33) What is reduction reaction? Give example

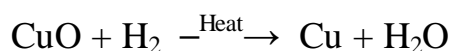
If a substance loses oxygen in the reaction, it is said to be reduced



34) What is redox reaction/oxidation-reduction reaction? Give example

One reactant gets oxidised while other gets reduced during a chemical reaction. Such reactions are called redox reactions (Oxidation-reduction reactions)

oxidation



Reduction

35) Identify oxidised and reduced substances in the following reactions.

a) $ZnO + C \rightarrow Zn + CO$

C oxidised to CO and ZnO reduced to Zn

b) $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$

HCl oxidised to H_2O and MnO_2 reduced to $MnCl_2$

c) $4Na + O_2 \rightarrow 2Na_2O$

Oxidised substance - Na (loses electron)

Reduced substance - O_2 (gains electron)

- d) $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$
Oxidised substance – H_2 (loses electron)
Reduced substance – CuO (gains electron)

Effects of oxidation on everyday life

36) What is corrosion? Give example

Some of the metals attacked by oxygen, carbon dioxide, moisture or acids from the surrounding. This process is known as corrosion

Example : * Rusting of iron

- Black coating on silver articles
- Green coating on copper articles

37) Justify the statement. 'The corrosion of iron is a serious problem'.

Due to corrosion the metal body of vehicles, bridges, iron railings, ships and all metallic objects especially made out of iron getting damaged. Every year a lot of money spent to replace corroded iron materials. Therefore the corrosion of iron is a serious problem.

38) What is rancidity? List the methods to prevent rancidity.

The oxidation of oils and fats causes bad odour and taste. This is known as rancidity.

- Adding antioxidants to food containing oils and fats.
- Keeping food in air tight containers
- Flush bags of chips with nitrogen gas
- Refrigeration

39) Which is the gas used to flush bags of chips to avoid rancidity?

Nitrogen

Exercise questions in text book

1) Which of the statements about the reaction below are incorrect $2 \text{PbO}(s) + \text{C}(s) \rightarrow 2 \text{Pb}(s) + \text{CO}(g)$

- (a) Lead is getting reduced. (b) Carbon dioxide is getting oxidised.
(c) Carbon is getting oxidised. (d) Lead oxide is getting reduced
(i) (a) and (b) (ii) (a) and (c)
(iii) (a) (b) and (c) (iv) all

Answer : (i) (a) and (b)

2) $\text{Fe}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$ The above reaction is an example of a

- (a) Combination reaction (b) Double displacement reaction
(c) Decomposition reaction (d) Displacement reaction

Answer : (d) Displacement reaction

3) What happens when dilute hydrochloric acid is added to iron fillings? Tick the correct

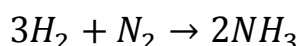
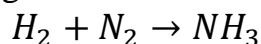
answer.

- Hydrogen gas and iron chloride are produced
- Chlorine gas and iron hydroxide are produced
- No reaction takes place
- Iron salt and water are produced

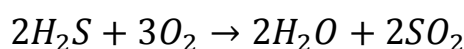
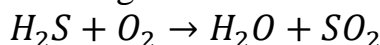
Answer : (a) Hydrogen gas and iron chloride are produced ($Fe + 2HCl \rightarrow FeCl_2 + H_2$)

4) Translate the following statements into chemical equations and then balance them.

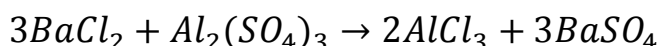
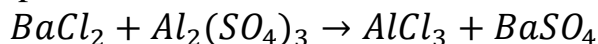
- Hydrogen gas combines with nitrogen to form ammonia



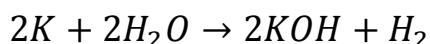
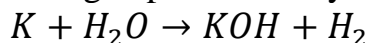
- Hydrogen sulphide gas burns in air to give water and sulphur dioxide



- Barium chloride reacts with aluminium sulphate to give aluminium chloride and precipitate of barium sulphate.

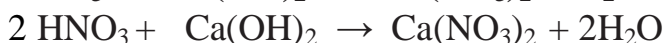


- Potassium metal reacts with water to give potassium hydroxide and hydrogen gas

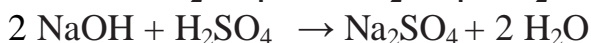


5) **Balance the following chemical equations:**

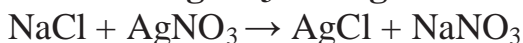
- $HNO_3 + Ca(OH)_2 \rightarrow Ca(NO_3)_2 + H_2O$



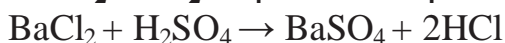
- $NaOH + H_2SO_4 \rightarrow Na_2SO_4 + H_2O$



- $NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$

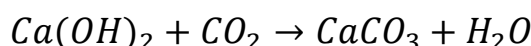


- $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + HCl$

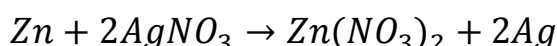


6) **Write the balanced chemical equations for following reactions.**

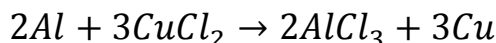
- Calcium hydroxide + Carbon dioxide \rightarrow calcium carbonate + Water



- Zinc + Silver nitrate \rightarrow Zinc nitrate + Silver



- Aluminium + Copper chloride \rightarrow Aluminium chloride + Copper



d) Barium chloride + Potassium sulphate \rightarrow Barium sulphate + Potassium chloride
 $BaCl_2 + K_2SO_4 \rightarrow BaSO_4 + 2KCl$

7) Write the balanced chemical equation for the following and identify the type of reaction in each case.

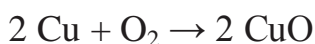
a) Potassium bromide(aq) + Barium chloride(aq) \rightarrow Potassium Iodide(aq) + Barium bromide(s)
 $2 KBr(aq) + BaI_2(aq) \rightarrow 2 KI(aq) + BaBr_2(s)$ – Double displacement reaction

b) Zinc carbonate(s) \rightarrow Zinc Oxide(s) + Carbon dioxide(g)
 $ZnCO_3(s) \rightarrow ZnO(s) + CO_2(g)$ – Decomposition reaction

c) Hydrogen(g) + Chlorine(g) \rightarrow Hydrogen chloride(g)
 $H_2(g) + Cl_2(g) \rightarrow 2 HCl(g)$ – Combination reaction

d) Magnesium(g) + Hydrochloric acid(aq) \rightarrow Magnesium chloride (aq) + Hydrogen(g)
 $Mg(s) + 2 HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$ – Displacement reaction

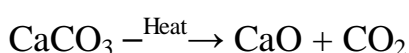
8) A shiny brown coloured element X on heating in air becomes black in colour. Name the element X and black coloured compound formed
Element 'X' is copper and black coloured compound is Cupric oxide.



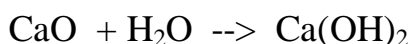
9) Why do we apply paint on iron articles?
To prevent rusting, we apply paint on iron articles

10) Why are decomposition reactions called the opposite of combination reactions? Write equations for these reactions.

In decomposition reaction single reactant decomposed to give 2 or products



In combination reaction 2 or more reactants combined to form a single product



Points to remember :

- A complete chemical equation represents reactants, products and their physical state
- Chemical equations are balanced so that the atoms of elements involved should be equal in both sides of the equation
- **In combination reaction 2 or more reactants combined to form a single product**
- **Decomposition reactions are opposite to combination reaction. In combination reaction a single reactant decomposed to form 2 or more products**
- The reactions in which heat is liberated with the products are known as exothermic reactions
- The reactions in which heat is absorbed are known as endothermic reactions

- In displacement reaction, the more reactive element displaces less reactive element from its salt solution.
- **In double displacement reaction, groups/ions are exchanged between the reactants.**
- **Precipitation reaction produces insoluble precipitate**
- When a substance gains oxygen/loses hydrogen in a reaction, it is said to be oxidised.
- When a substance loses oxygen/gains hydrogen in a reaction, it is said to be reduced

CHAPTER 2 : ACIDS, BASES AND SALTS

I. Answer the following Questions :

1. Which element present in the acids can be displaced ?
Ans: Hydrogen
2. Name two metals which react with conc. NaOH solution to liberate hydrogen gas.
Ans: Zinc and Aluminium
3. Write the general word equation for reaction between acids and bases.
Ans: Acid + Base \rightarrow Salt + Water
4. What is the pH of a neutral solution ?
Ans: 7
5. What is dilution of an acid or base ?
Ans: The process of mixing an acid or base with water results in, decrease in the concentration of ions (H_3O^+ / OH^-) per unit volume.
6. Name the acid produced in our stomach.
Ans: Hydrochloric acid.
7. Name of the gas released when zinc granules react with dilute HCl.
Ans: Hydrogen
8. Acids do not show acidic behavior in the absence of water. Why ?
Ans: The separation of H^+ ion from acid molecules cannot occur in the absence of water.
9. What types of drugs are used to treat indigestion?
Ans: Antacids [Ex: Milk of magnesia]
10. Give two different forms of calcium carbonate.
Ans: Limestone, chalk and marble.
11. Why do metal oxides are called basic oxides ?
Ans: Metallic oxides are basic in nature because they react with dilute acids to form salt and water.

12. The pH of fresh milk is 6.0. How does the pH change as it becomes curd ?
Ans: The pH value of milk is 6 since it is acidic in nature. When the milk is converted into curd due to the action of bacteria, lactic acid is formed which is more acidic in nature. Therefore the pH value of the milk is reduced as it turns to curd
13. What is neutralization reaction ?
Ans: The reaction between an acid and a base to give salt and water is known as a neutralization reaction.
14. Why should curd and sour substances not be kept in brass and copper vessels?
Ans : Both the Curd and sour substances contain acids. Acids react with metals to produce salt and hydrogen gas. So, if such substances are kept in a copper container, the acid will react and the container will be corroded. Thereby it may spoil the food.
15. Name the acid present in ant sting.
Ans : Methanoic acid
16. Why does an aqueous solution of an acid conduct electricity?
Ans : Acids undergo dissociation in aqueous solution to form $H^+_{(aq)}$ / H_3O^+ ions and other ionic species and the movement of these ions helps for the flow of electrical current through the solution.
17. The pH of a sample of vegetable soup was found to be 6. How is this soup likely to taste?
Ans : The vegetable soup is slightly acidic. Therefore it is sour to taste.
18. What would be the colour of litmus in a solution of sodium hydrogen carbonate?
Ans : Sodium hydrogen carbonate is basic in nature. Therefore the colour of litmus will be BLUE.
19. Which one of these has a higher concentration of H^+ ions? 1M HCl or 1M CH_3COOH
Ans : 1M HCl (strong acid)
20. How does the pH of the solution change when a solution of a base is diluted?
Ans : When a solution of base is diluted, its pH value will be decreased (towards 7), because the concentration of OH^- ions per unit volume will be decreased.
21. What effect does an increase in concentration of $H^+_{(aq)}$ in a solution have on the pH of the solution?
Ans : An increase in concentration of $H^+_{(aq)}$ in a solution, the solution becomes more acidic which results in a decrease in the pH value of the solution.
22. How will you test for a gas which is liberated when hydrochloric acid reacts with an active Metal?
Ans : H_2 gas will be liberated when HCl reacts with an active metal. Pass the gas evolved through the soap solution. Gas filled bubbles will be formed. Take a burning candle near a gas filled bubble. On doing so, hydrogen gas burns with a squeaky pop sound. Hydrogen gas is recognized by the 'pop' when it burns.

23. On adding dilute hydrochloric acid to copper oxide powder, the solution formed is blue-green. Predict the new compound formed which imparts blue-green colour to the solution.
Ans : The blue-green colour of the solution is due to the formation of **Copper (II) chloride** in the reaction.
24. How does the flow of acid rain into a river make the survival of aquatic life in the river difficult?
Ans : When acid rain flows into the rivers, it lowers the pH of the river water below 7. But the living body works normally within a pH range of 7.0 to 7.8. Therefore, the survival of aquatic life in such rivers becomes difficult.
25. How does the pH of a solution of an acid influence when it is diluted ?
Ans : When a solution of an acid is diluted, its pH value will be increased (towards 7), because the concentration of $H^+_{(aq)}$ ions per unit volume will be decreased.
26. How does the pH of a solution of a base influence when it is diluted ?
Ans : When a solution of base is diluted, its pH value will be decreased (towards 7), because the concentration of OH^- ions per unit volume will be decreased.
27. Write the name and the chemical formula of the organic acid present in vinegar.
Ans : Acetic Acid CH_3COOH
28. Which will be more acidic and why ? A solution with pH value of 6.0 or a solution with pH value of 5.0
Ans : A solution with pH value 5.0 is more acidic than a solution with pH value 6.0. Because higher the hydronium ion concentration, lower is the pH value.
29. An element 'X' on reacting with oxygen forms an oxide XO. The oxide dissolves in water and turns red litmus blue. Predict the nature of the element whether metal or nonmetal?
Ans : The element 'X' is a metal. Because metallic oxides are basic oxides and bases turn red litmus blue.
30. The pH of rainwater collected from two cities A and B was found to be 6 and 5 respectively. The water of which city is more acidic ?
Ans : The rainwater collected from city B is more acidic (pH is less)
31. What is the difference between strong acid and concentrated acid ?
Ans : The acid which dissociates into ions completely is called strong acid, whereas the concentrated acid is the one which has less water content.
32. Why do solutions of compounds like alcohol and glucose do not show acidic character ?
Ans : Although aqueous solutions of alcohol and glucose contain hydrogen, these cannot dissociate in water to form hydrogen ions. Hence they do not show acidic.
33. What is the role of acid in our stomach ?

Ans: It helps in the digestion of food.

34. Which bases are called alkalis? Give an example of an alkali.

Ans: The bases which dissolve in water are called alkalis. Ex: KOH, NaOH

35. Why does tooth decay start when the pH of the mouth is lower than 5.5?

Ans: Tooth enamel is made up of Calcium Hydroxyapatite. It corrodes when the pH of the mouth is below 5.5. The bacteria present in the mouth produce acids by degradation of sugar and food particles remaining in the mouth after eating.

36. How does the flow of acid rain into a river make the survival of aquatic life in the river difficult?

Ans: When acid rain flows into the rivers, it lowers the pH of the river water. Therefore, the survival of aquatic life in such rivers becomes difficult.

37. Name the gas usually liberated when a dilute acid reacts with a metal. What happens when a burning candle is brought near this gas?

Ans : Hydrogen gas.

Hydrogen gas burns with a pop sound.

38. Name the acid present in ant sting and give its chemical formula. Also give the common method to get relief from the discomfort caused by the ant sting.

Ans : Methanoic Acid HCOOH

Use of a mild base like baking soda on the stung area gives relief.

39. Do basic solutions also have $H^+_{(aq)}$ ions ? If yes, then why are these basic ?

Yes. They are basic because the concentration of OH^- is higher than the H^+ ions.

40. Arrange the following solutions in order of decreasing $H^+_{(aq)}$ ions concentration.

(i) ammonium hydroxide (ii) gastric juice (iii) vinegar (iv) sodium hydroxide

Gastric juice > vinegar > ammonium hydroxide > sodium hydroxide

41. Two solutions P and Q are tested with universal indicator. The solution P turns red, whereas solution Q turns orange. Which solution : (i) is more acidic; (ii) has more pH

i) Solution P is more acidic

ii) Solution Q has more pH value

42. A knife, which is used to cut a fruit, was immediately dipped into water containing drops of blue litmus solution. If the colour of the solution is changed to red, what inference can be drawn about the nature of the fruit and why?

Ans : The fruit is acidic in nature. Acids turn blue litmus into red.

43. A person is suffering from indigestion due to the intake of hot spicy food. What remedy will you prescribe to the patient? Give the name of a chemical that can give relief to him.

Ans : The person is advised to use bases called antacids.

Ex: Baking soda solution, Magnesium hydroxide (Milk of magnesia)

44. When a drop of orange juice is added to pure water, how does the pH value vary for water? If a drop of lemon juice is also added, will there be any more change in the pH value?

The pH of pure water decreases when orange juice is added. When to this lemon juice is also added, the pH value further decreases. (both fruits are acidic in nature)

45. Fresh milk has a pH of 6. How do you think the pH will change as it turns into curd? Explain.

The pH of milk decreases below 6 due to the formation of lactic acid in curd.

46. HCl and HNO₃ show acidic characters in aqueous solution while alcohol and glucose solution do not. Give reasons.

Solutions like HCl, HNO₃ etc. get ionized in aqueous solutions and due to the presence of H⁺ ions they show acidic characters. While solutions of compounds like alcohol and glucose do not form any such ions so they do not show acidic characters.

47. (i) An aqueous solution has a pH value of 7.0. Is this solution acidic, basic or neutral?
(ii) Which has a higher pH value, 1 M HCl or 1 M NaOH solution?

i) Neutral in nature

ii) 1M NaOH solution has higher pH value. (base)

48. Given below are the pH values of four different liquids: 7.0, 14.0, 4.0, 2.0. Which of these could be that of

(i) lemon juice

(ii) distilled water

(iii) 1 m sodium hydroxide solution

(iv) tomato juice

Ans : (i) lemon juice

- Liquid with the pH value 2.0

(ii) distilled water

- Liquid with the pH value 7.0

(iii) 1 m sodium hydroxide solution

- Liquid with the pH value 14.0

(iv) tomato juice

- Liquid with the pH value 4.0

49. What is meant by the term 'pH of a solution'? The pH of gastric juices extracted from the stomach of two persons A and B were found to be 1 and 3 respectively. The stomach juice of which person is more acidic?

Ans : pH of a solution is a scale for measuring hydrogen ion concentration in the solution. The stomach juice of person A is more acidic. Because lower the pH value, higher is the hydronium ion concentration.

50. You have been provided with three test tubes. One of them contains distilled water and the other two contain an acidic solution and a basic solution respectively. If you are given only red litmus paper, how will you identify the contents of each test tube?

Ans: Dip the red litmus paper individually in all three test tubes. It will turn blue in a basic solution. Dip this blue litmus into the other two. In acid it turns red. The colour of the litmus does not change in the other. It will be water.

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

If water is added to a 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.

52. You have two solutions, A and B. the pH of solution A is 6 and pH of Solution B is 8. Which solution has more hydrogen ion concentration? Which of this is acidic and which is basic?

Ans : Solution A has more hydrogen ion concentration (pH is less).

Solution A is acidic (pH is < 7) and solution B is basic (pH is > 7).

53. Under what soil condition do you think a farmer would treat the soil of his fields with quick lime (Calcium oxide) or slaked lime (calcium hydroxide) or chalk (Calcium carbonate) ?

Ans: If the soil is acidic and improper for cultivation, then to increase the basicity of soil, the farmer would treat the soil with quicklime or slaked lime or chalk.

54. Name the acid present in the following

a) Tomato b) Vinegar c) Tamarind d) lemon

a) Tomato : Oxalic acid

b) Vinegar : Acetic acid

c) Tamarind : Tartaric acid

d) lemon : Citric acid

55. Mention the pH of the following substances

a) Gastric juice b) Pure water c) Milk of Magnesia d) NaOH solution

a) Gastric juice : pH 1.2

b) Pure water : pH 7

c) Milk of Magnesia : pH 10

d) sodium hydroxide solution : pH 14

56. Tooth decay starts when the pH of the mouth is lower than 5.5. Give your reasons
Tooth enamel is made up of Calcium Hydroxyapatite. It corrodes when the pH of the mouth is below 5.5. The bacteria present in the mouth produce acids by degradation of sugar and food particles remaining in the mouth after eating.

57. Equal lengths of Mg ribbons are taken in test tubes A and B. Hydrochloric acid (HCl) is added to test tube A, while acetic acid (CH₃COOH) is added to test tube B. In which test tube will the fizzing occur more vigorously and why?

Ans: The fizzing will occur strongly in test tube A, in which HCl is added. This is because HCl is a stronger acid than CH₃COOH and therefore produces hydrogen gas at a faster speed due to which fizzing occurs.

58. A sodium salt is placed in a dry test tube. To this salt is added 5 ml of hydrochloric acid. Then a lot of effervescence takes place with the liberations of a colourless gas. The gas on passing through a colourless solution, turns it milky. Answer the following questions.

(i) Which gas is produced during the chemical reaction?

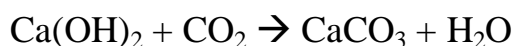
(ii) What is the colourless solution and why does it turn milky?

(i) Carbon dioxide

(ii) Lime water / Calcium hydroxide [Ca(OH)₂]. It turns milky due to the formation of a white precipitate CaCO₃.

59. Describe your observations and explain by writing chemical equations, when carbon dioxide gas is passed through limewater : (a) for a minute (b) for more than 5 minutes.

a) On passing the carbon dioxide gas through lime water, it turns milky.



b) On passing CO₂ for more than 5 minutes again the solution turns colourless due to formation of calcium hydrogen carbonate.



60. You are given two solutions A & B. The pH of solution A is 6 and pH of solution B is 8.

(a) Which solution is acidic and which is basic?

(b) Which solution has more H⁺ ion concentration?

(c) Why is HCl a stronger acid than acetic acid?

Ans : (a) Solution A is acidic (pH < 7) and solution B is basic (pH > 7).

(b) Solution A has more H⁺ ion concentration. Lower the pH value, higher is the H⁺ ion concentration.

(c) Because HCl produces more H⁺ ions

61. (a) Why does an aqueous solution of an acid conduct electricity?

(b) How does the concentration of hydronium ions (H₃O⁺) change when a solution of an acid is diluted?

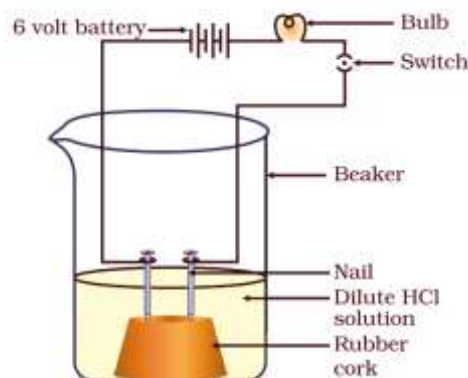
(c) Which has a higher pH value, a concentrated or dilute solution of hydrochloric acid?

Ans : (a) Acids dissociate in aqueous solutions to form ions. These ions are responsible for the conduction of electricity.

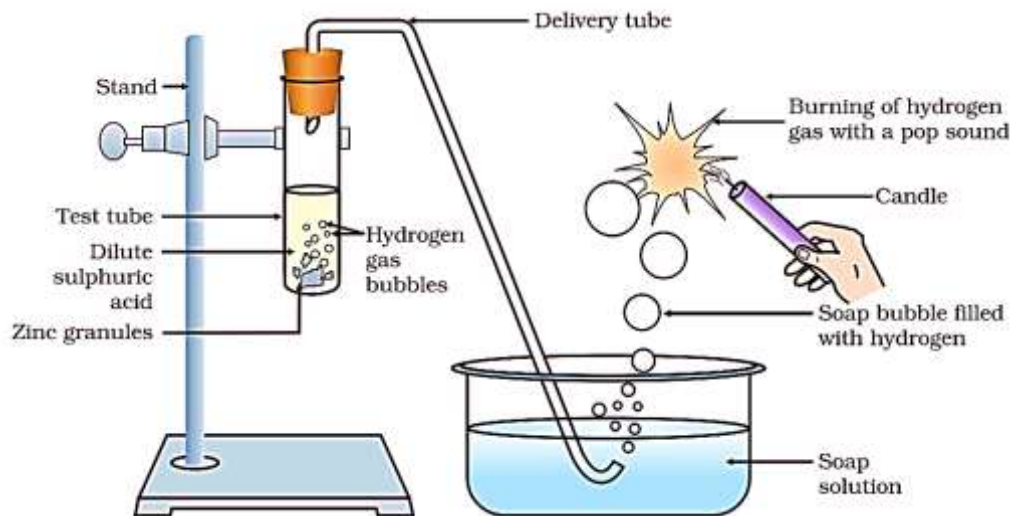
(b) Mixing an acid with water results in decrease in the concentration of H_3O^+ ions per unit volume.

(c) A dilute solution of HCl has a higher pH value. Lower the $\text{H}^+_{(\text{aq})}$ ion concentration, higher is the pH value.

62. Draw a neat diagram showing Acid solution in water conducts electricity



63. In the following schematic diagram for the preparation of hydrogen gas as shown, what would happen if the following changes are made?



(a) In place of zinc granules, the same amount of zinc dust is taken in the test tube.

(b) Instead of dilute sulphuric acid, dilute hydrochloric acid is taken.

(c) In place of zinc, copper turnings are taken.

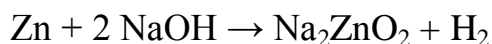
(d) Sodium hydroxide is taken in place of dilute sulphuric acid and the tube is heated.

Ans : (a) Hydrogen gas will evolve with greater speed.

(b) Almost the same amount of gas is evolved.

(c) Reaction does not take place. -OR- Hydrogen gas is not evolved.

(d) If NaOH is taken, Sodium zincate will be formed and hydrogen gas will be evolved.



64. A few drops of phenolphthalein and blue litmus were added to the three solutions listed below separately. Specify the colour change in each case.

(i) Sodium carbonate (ii) Hydrochloric acid (iii) Sodium chloride

Sl No	Name of the Solution	Colour change	
		Phenolphthalein	Blue Litmus
1	Sodium carbonate	Turns pink	no change
2	Hydrochloric acid	no change	Turns red
3	Sodium chloride	no change	no change

65. Fill the missing data in the following table :

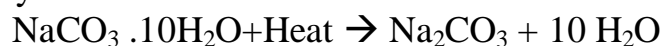
Sl.No.	Name of the Salt	Molecular Formula	Salt Obtained from		pH	Nature of the salt
			Acid	Base		
1	Sodium chloride	NaCl	HCl			Neutral
2		KNO ₃		KOH		
3	Aluminium chloride		HCl	Al(OH) ₃	<7	Acidic
4	Zinc sulphate		H ₂ SO ₄		<7	
5	Copper sulphate			Cu(OH) ₂		Acidic
6	Sodium acetate	CH ₃ COONa		NaOH	>7	
7		Na ₂ CO ₃	H ₂ CO ₃			Basic
8		NaHCO ₃		NaOH	>7	Basic

Sl.No.	Name of the Salt	Molecular Formula	Salt Obtained from		pH	Nature of the salt
			Acid	Base		
1	Sodium chloride	NaCl	HCl	NaOH	7	Neutral
2	Potassium nitrate	KNO ₃	HNO ₃	KOH	7	Neutral
3	Aluminium chloride	AlCl ₃	HCl	Al(OH) ₃	<7	Acidic
4	Zinc sulphate	ZnSO ₄	H ₂ SO ₄	Zn(OH) ₂	<7	Acidic
5	Copper sulphate	CuSO ₄	H ₂ SO ₄	Cu(OH) ₂	<7	Acidic
6	Sodium acetate	CH ₃ COONa	CH ₃ COOH	NaOH	>7	Basic
7	Sodium carbonate	Na ₂ CO ₃	H ₂ CO ₃	NaOH	>7	Basic
8	Sodium	NaHCO ₃	H ₂ CO ₃	NaOH	>7	Basic

	hydrogen carbonate					
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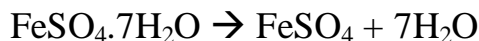
66. What is the common name of the compound CaOCl_2 ?
Bleaching powder
67. Name the substance which on treatment with chlorine yields bleaching powder.
Dry slaked lime / Calcium hydroxide / $\text{Ca}(\text{OH})_2$
68. Name the sodium compound which is used for softening hard water.
Washing soda [$\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$] is used for softening hard water.
69. What will happen if a solution of sodium hydrogen carbonate is heated? Give the equation of the reaction involved.
When a solution of sodium hydrogen carbonate is heated, sodium carbonate and water are formed with the evolution of carbon dioxide gas.
$$2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2$$
70. Write an equation to show the reaction between Plaster of Paris and water.
$$\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O} + 1 \frac{1}{2} \text{H}_2\text{O} \rightarrow \text{CaSO}_4 \cdot 2\text{H}_2\text{O}$$
71. Write fully balanced equation when carbon dioxide is passed through ammonical brine solution.
$$\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2 + \text{NH}_3 \rightarrow \text{NH}_4\text{Cl} + \text{NaHCO}_3$$
72. Name a carbonate of a metal which has cleansing properties.
Sodium carbonate
73. A compound which is prepared from gypsum has the property of hardening when mixed with proper quantity of water. Identify the compound and write its chemical formula.
The compound is Plaster of Paris (Calcium sulphate hemihydrate).
Its molecular formula – $(\text{CaSO}_4)_2 \cdot \text{H}_2\text{O}$
74. Name a salt which does not contain water of crystallisation.
sodium nitrate, potassium chloride, potassium nitrate, barium sulphate
75. Name the salt which was an important symbol of India's struggle for freedom ?
Common salt (sodium chloride)
76. What are alkalis? Give examples.
Metal oxides dissolve in water to form alkalis. Ex : NaOH , KOH
77. What is water of crystallisation ?
Water of crystallisation is the fixed number of water molecules present in one formula unit of a salt.
78. How would you distinguish between baking powder and washing soda by heating ?
Baking powder (NaHCO_3) on heating **produces carbon dioxide** which extinguishes a burning matchstick. It also gives sodium carbonate and water vapour.
$$2\text{NaHCO}_3 + \text{Heat} \rightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2$$

When washing soda ($\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$) is heated it does **not produce carbon dioxide** but it loses water of Crystallisation molecules.



79. What is the colour of $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ crystals? How does this colour change upon heating? Give balanced chemical equation for the changes.

Hydrated ferrous sulphate crystals are green in colour. Upon heating it, colour changes from green to white.



80. In one of the industrial processes used for manufacture of sodium hydroxide, a gas X is formed as by product. The gas X reacts with dry slaked lime to give a compound Y which is used as a bleaching agent in chemical industry. Identify X and Y.

X – Chlorine gas

Y – Bleaching powder

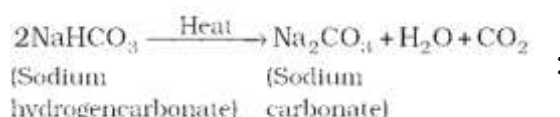
81. A white powder A is a mild non corrosive base and is used in the preparation of cakes. When the powder is heated it gives another powder B. The powder B is re-crystallised to get a substance C which has detergent properties. Identify A, B and C and also write balanced chemical equations for the conversions of A to B.

A – Baking soda

B – Sodium carbonate

C – Washing soda

Conversion of A to B



82. What are the three products of ‘Chlor-alkali process’? Write one commercially or industrially important material each that can be prepared from each of these products?

a) **Sodium hydroxide** – used in the preparation of Soaps & Detergents

b) **Chlorine** - used in the preparation of PVC

c) **Hydrogen** – used in the preparation of Ammonia

83. Give two important uses of washing soda and baking soda.

Two important uses of washing soda are:

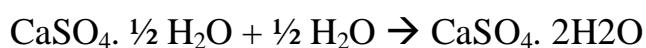
- used in glass, soap and paper industries.
- used in softening of hard water.

Two important uses of baking soda are:

- For making Baking powder.
- It is used in soda acid fire extinguisher.

84. Plaster the Paris should be stored in a moisture proof container. Explain why?

By absorbing moisture, POP can change into hard mass (gypsum), so it should be stored in moisture proof container.



(POP) (Water) (Gypsum)

85. A milkman adds a very small amount of baking soda to fresh milk.
- Why does he shift the pH of the fresh milk to slightly alkaline?
 - Why does this milk take a longer time to set as curd?
- (a) On addition of small amount of baking soda, the milk will be slightly alkaline to stop the curdling.
- (b) This milk takes more time to set as curd because the lactic acid produced reacts with the baking soda.
86. Write the name and chemical formula of the calcium compound used for disinfecting drinking water. How is this compound manufactured?
- Bleaching powder (Calcium oxychloride). Its chemical formula is CaOCl_2 .
- Bleaching powder is produced by the action of chlorine on dry slaked lime $[\text{Ca}(\text{OH})_2]$.
- $$\text{Ca}(\text{OH})_2 + \text{Cl}_2 \rightarrow \text{CaOCl}_2 + \text{H}_2\text{O}$$
87. Classify the following salts into acidic, basic and neutral — Potassium sulphate, Ammonium chloride, Sodium carbonate, Sodium chloride.
- Neutral Salts:** Potassium sulphate, Sodium chloride
Basic Salts: Sodium carbonate
Acidic Salts: Ammonium chloride
88. In a bakery, baking powder was not added while preparing cake. The cake obtained was hard and small in size. What is the reason for this?
- The reason for the hardness is absence of banking powder. Baking powder when added releases Carbon dioxide gas, which gets trapped in the wet dough and bubbles out slowly making the cake to rise and hence, soft and spongy.
89. What is 'Baking Powder'?
- Baking powder is a mixture of baking soda and a mild edible acid such as tartaric acid.
90. Crystals of copper sulphate are heated in a test tube for some time.
- What is the colour of copper sulphate crystals (i) before heating and (ii) after heating
 - What is the source of liquid droplets seen on the inner upper side of the test tube during the heating process?
 - i) Blue ii) White
 - Water of crystallisation present in Copper sulphate molecule.
91. Why is an aqueous solution of sodium carbonate is alkaline in nature ?
- Sodium carbonate when dissolved in water is hydrolysed to form carbonic acid (a weak acid) and sodium hydroxide (a strong base). Hence, an aqueous solution of sodium carbonate is alkaline in nature.
92. Why is an aqueous solution of sodium chloride neutral, whereas that of ammonium chloride acidic in nature ?

- In aqueous solution, salts breakdown into their constituent acid and base called salt hydrolysis.
- Aqueous solution of ammonium chloride

$$\text{NH}_4\text{Cl} + \text{H}_2\text{O} \rightarrow \text{HCl} + \text{NH}_4\text{OH}$$
 HCl is strong acid and NH_4OH is weak base. Therefore solution is acidic.
- Aqueous solution of sodium chloride

$$\text{NaCl} + \text{H}_2\text{O} \rightarrow \text{HCl} + \text{NaOH}$$
 HCl is strong acid and NaOH is strong base. Therefore they neutralizes each other and solution becomes neutral.

Chapter- 3 Metals and Nonmetals

1. Soft metals that can be cut with a knife
Lithium , Sodium , Potassium
2. Metals with the highest ductility
Gold and silver
3. Metal with highest malleability
Gold
4. 2 properties that give metals a different shape,
Malleability and Ductility
5. Metals are used to make cooking utensils. Because they are,
Good conductors of heat and
Have the highest melting point.
6. These metals are good conductors of heat ,
Silver and Copper
7. These metals are weak conductors of heat
Lead and Mercury
8. Metal wires are used in power transmission lines. Because,
Metals are good electrical conductors.
9. PVC on electrical wires Or there will be a rubber blanket. Because,
PVC and rubber are electrical insulators.
They protect us from electric shocks.
10. Metals with Low Melting Points
Gallium & Cesium
11. Liquid metal at room temperature
Mercury
12. Liquid non-metal at room temperature
Bromine
13. Non metals having lustre..
Iodine & The diamond
14. The hardest natural material / natural material with the highest melting point and boiling point

The diamond

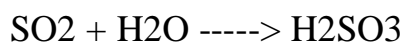
15. Electric Conductor non metal is.....

Graphite

16. How Acidic oxides are formed ?

The following chemical reaction shows the formation of acidic oxides.

Non Metallic oxide + water ----> acids

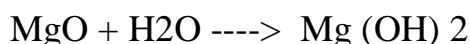


When the non Metallic oxides are soluble in water.

17. How the Basic oxides are formed ?

The following reaction shows the formation of basic oxides.

Metal oxide + water ----> base



When the metallic oxides are soluble in water.

18. metal oxides that react with both Acid and base to form salt and water.

Amphoteric oxides.

Example: Aluminum oxide, Zinc oxide.

19. Sodium and potassium are stored in kerosene. Because they are,

When exposed to the air, act quickly and ignite the fire

20. Non-reactive metals with oxygen are.....

Gold & Silver

21. Non-reactive metals with water are.....

Lead, Copper, Silver, Gold

22. Mention the properties of Ionic compounds

- Ionic compounds are hard,
- Ionic compounds have high melting points and boiling points,
- Ionic compounds dissolve in water but not in organic solvents
- Ionic compounds do not let electricity flow in the solid state,
- Ionic compounds allow the current to flow through them in a liquid state.

23. Give reason for the following properties of ionic compounds.

- Ionic compounds are hard.

By the strong attraction force between the positive and negative ions.

- Ionic compounds have high melting points and boiling points,

More energy is needed to break the strong ionic bond between the molecules.

- Ionic compounds dissolve in water but do not dissolve in organic solvents.

Ionic compounds are broken down into positive and negative ions in water as water molecules enclose ions.

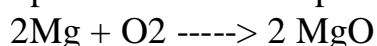
- Ionic compounds do not let electricity flow in the solid state,

This is because the rigid structure of solids cannot move the ions.

- Ionic compounds allow the current to flow through them in a liquid state.

This is because the electric attraction forces between the opposite ions break down in temperature so that the ions can move freely and carry electricity.

24. Explain with an example of magnesium that metal oxides are basically acidic.

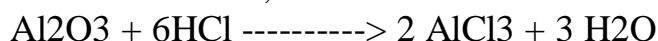


Magnesium oxide is formed when magnesium is ignited in the air.

Dilute this product into water which results in the formation of magnesium hydroxide. If you put wet red litmus in this mixture it turns into blue litmus which shows that 8mm ionic oxides are basic in nature.

Render aluminum oxide as an amphoteric oxide.

Aluminum oxide,



Aluminum oxide reacts with both acid and base acids to form salts and water.

Aluminum oxide,

As a base with acid and

Act as acid with base acid

25. What are alkalis? How do they form? Explain with an example.

Alkalies are the products that cause metal oxides to dissolve in water.

Metal oxides dissolve in water and form alkalies.

Metal

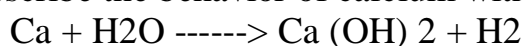
26. Write an equation of chemical reactions where sodium and potassium metals react with water.

Is this action endothermic? Or is it exothermic? Explain.

This is exothermic.

Hydrogen released in this action burns immediately with the help of heat liberated.

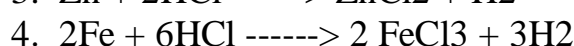
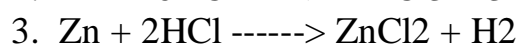
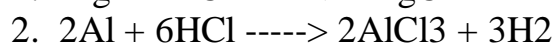
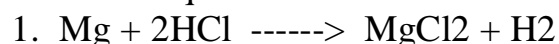
27. Describe the behavior of calcium with water.



In this process, the calcium floats on the water because the hydrogen gas bubbles produced here are attached to the calcium.

28. Write the balanced chemical equation for which With hydrochloric acid, Magnesium, Aluminum, Zinc

Write the chemical equation for the behavior of iron.



29. Why does hydrogen gas not release when metals react with nitric acid?

Nitric acid is a powerful oxidising agent.

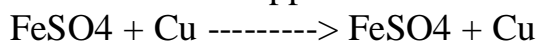
It absorbs the hydrogen produced and produces water, and is itself becomes any of the nitrogen gases.

30. A metal that does not react with concentrated hydrochloric acid

Copper.

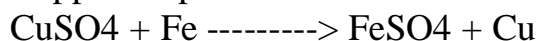
31. Explain with equations the changes you observe when placing a copper wire in an iron sulfate solution and an iron core in a copper sulfate solution.

Iron Sulfate + Copper \longrightarrow Iron Sulfate + Copper



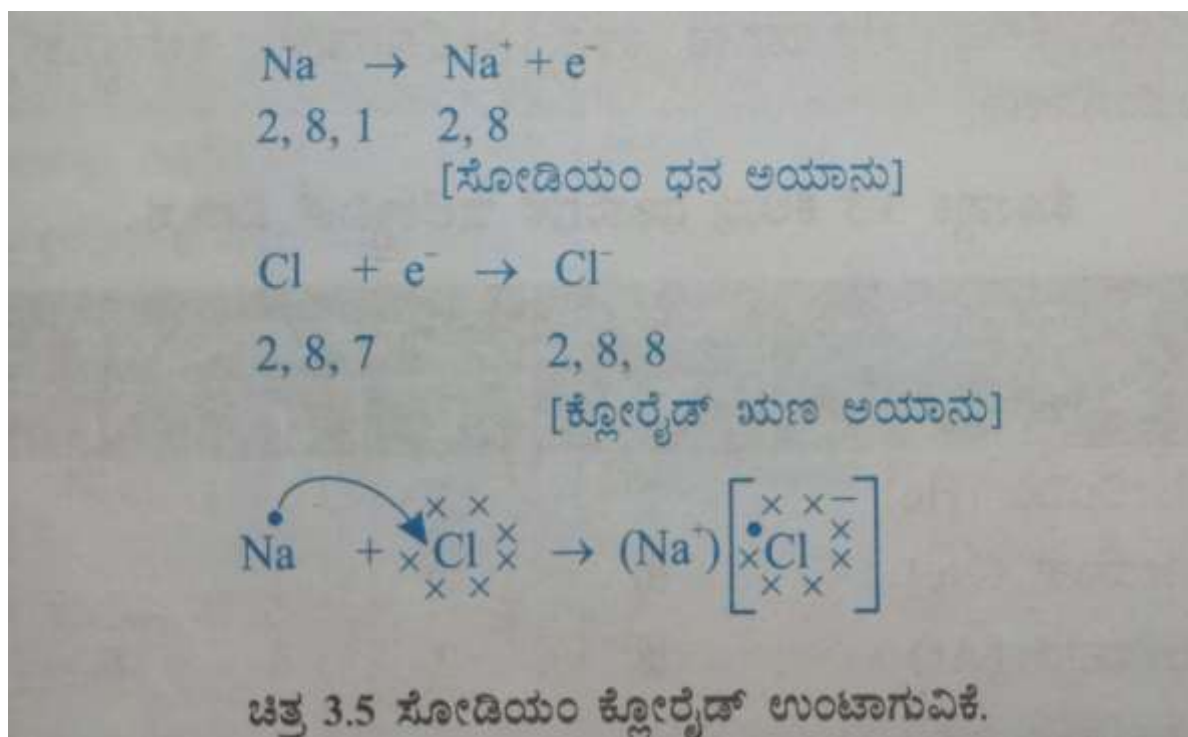
This chemical reacts because iron is more active than copper.

Copper Sulphate + Iron \longrightarrow Iron Sulfate + Copper



In this process, iron replaces copper, to form iron sulfate and copper.

32. Describe the formation of sodium chloride.



The sodium atom loses one electron in its outer most shell and is formed by a fixed octave, and the sodium ion is formed.

Chlorine obtained one electron in the outermost layer of the atom

CHAPTER 4 : Carbon and its Compounds

1. Define reactivity elements?

Ans: The tendency of, atom of an element to attain octet configuration either by losing or gaining electrons is called reactivity of elements.

2. What is covalent bond?

Ans: The bond formed between two atoms by sharing of electrons is called covalent bond.

3. Give an example for the molecule which has triple bond.

Ans: Ethyne (C₂ H₂)

4. What is catenation?

Ans: The property of carbon atoms to form covalent bonds with other carbon atoms to give rise to a large molecule is called catenation.

5. What are structural isomers?

Ans: The carbon compounds having same molecular formula but different structural arrangements are called structural isomers.

6. How many structural isomers can be drawn for pentane?

Ans: Three

n-pentane, iso-pentane and neo-pentane

7. Which is the functional group present in alcohols?

Ans: -OH

8. How many electrons must be shared between two atoms to form a double bond?

Ans: Two pairs or four electrons.

9. Name the oxidizing agents which can be used to convert alcohols into carboxylic acid?

Ans: Alkaline potassium permanganate (KMnO_4) or acidic potassium dichromate ($\text{K}_2\text{Cr}_2\text{O}_7$)

10. Name the catalyst used in the hydrogenation of oils?

Ans: Nickel or palladium

11. Define homologous series? Explain with an example.

Ans: The group of carbon compounds with same general formula, similar chemical properties and each successive member differ by CH_2 are said to belong to a homologous series.

Ex: Methane and Ethane belongs to alkane group, their molecular formulas are CH_4 and C_2H_6 respectively. They both differ by CH_2 .

They have same general formula, $\text{C}_n\text{H}_{2n+2}$.

They both have similar chemical properties.

12. Differentiate between saturated and unsaturated carbon compounds.

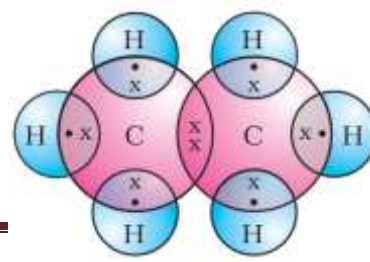
Ans:

saturated carbon compounds.	unsaturated carbon compounds.
The carbon compounds having single bond between carbon atoms.	The carbon compounds having double or triple bonds between carbon atoms.
They are generally less reactive.	They are generally more reactive.
Eg: alkanes	Eg: alkenes and alkynes

13. Write the structural formula and electron dot structure of ethane.

Ans: Molecular formula of ethane C_2H_6 .

Structural formula -



Electron dot structure -

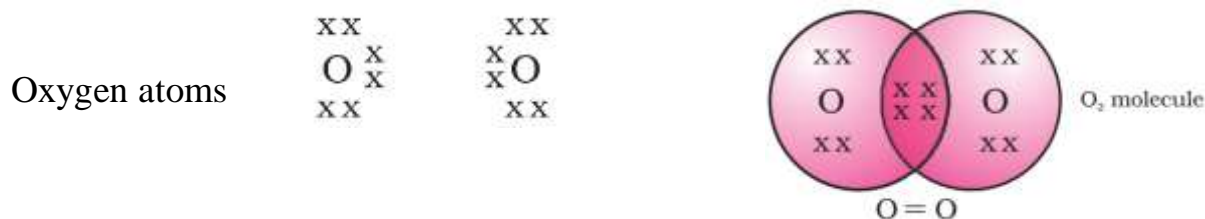
14. Explain the formation of oxygen molecule with electron dot structure.

Ans: The atomic number of oxygen is 8.

Its electron distribution is 2, 6

Oxygen atom needs two electrons to obtain Octet configuration.

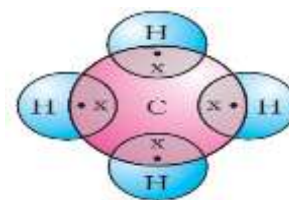
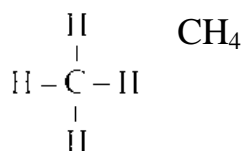
Oxygen atom shares two electrons with another oxygen atom to form double bond and attains octet configuration, thus becomes stable molecule.



15. Write the electron dot structure for methane.

Ans: Molecular formula of methane is

Structural formula of methane is



Electron dot structure

16. Give example for molecules having double and triple bonds.

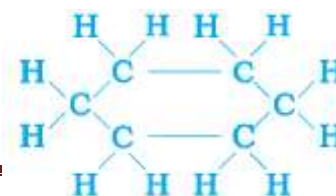
Ans: Molecule having double bond between carbon atoms is Ethene. (C_2H_4)

Molecule having triple bond between carbon atoms is Ethyne. (C_2H_2)

17. Write the molecular and structural formula of benzene.

Ans: Molecular formula of benzene is C_6H_6 .

Structural formula of benzene is



18. Write the molecular and structural formula of cyclohexane.

Ans: Molecular formula of Cyclohexane is C_6H_{12} .

Structural formula of Cyclohexane -

19. Why carbon cannot form ionic compounds?

Ans: Carbon cannot form ionic compounds because

i) It could gain four electrons forming C^{4-} **anion**. But it would be difficult for the nucleus with six protons to hold on to ten electrons.

ii) It could lose four electrons forming C^{4+} **cation**. But it would require a large amount of energy to remove four electrons.

20. List out the properties of covalent compounds (carbon compounds).

Ans: i) Covalent compounds are poor conductors of electricity.

ii) They have low boiling and melting points.

iii) They are generally insoluble in water.

iv) They have covalent bonds between atoms.

21. Explain the two versatile nature of carbon.

Ans: **i) Catenation:**

- Carbon has the unique ability to form bonds with other carbon atoms, giving rise to large molecules. This property is called catenation.

- The carbon compounds may have straight chains, branched chains or closed chains.

ii) Tetravalency :

- Carbon has four valence electrons.

- Its valency is four.

- It is capable of bonding with four other atoms of carbon or atoms of some other monovalent element.

22. Name the functional group present in ketone? Mention the name and molecular formula of first member of ketone group.

Ans: Functional group present in ketone $\begin{array}{c} -C- \\ || \\ O \end{array}$ is

The first member of ketone family is Propanone.

The molecular formula of propanone is C_3H_6O

23. Write the properties of homologous series.

Ans: i) The members of the series will have same general formula.

- ii) The members of the series will have same functional group.
- iii) The members of the series will have similar chemical properties.
- iv) The successive members differ by $-CH_2$
- v) They have gradually varying physical properties.

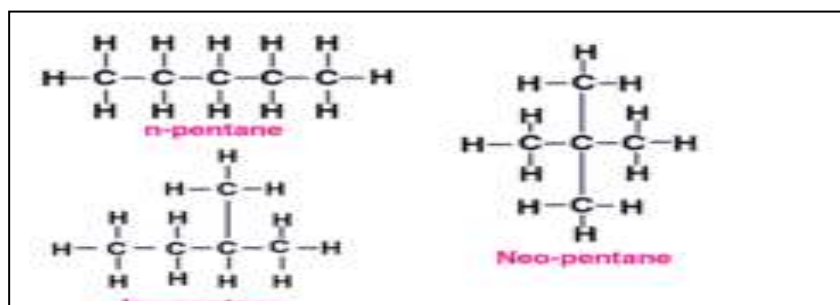
24. Define homologous series? Write the properties of homologous series.

Ans: The group of carbon compounds with same general formula, similar chemical properties and each successive member differ by CH_2 are said to belong to a homologous series.

- i) The members of the series will have same general formula.
- ii) The members of the series will have same functional group.
- iii) The members of the series will have similar chemical properties.
- iv) The successive members differ by $-CH_2$
- v) They have gradually varying physical properties.

25. Write the three structural isomers of pentane?

Ans:



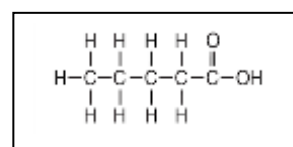
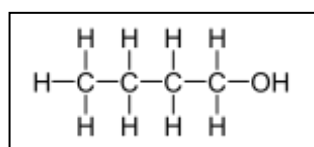
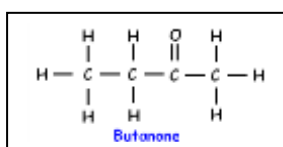
26. Write the structures of the following.

a) Butanone

b) Butanol

c) Butanoic acid

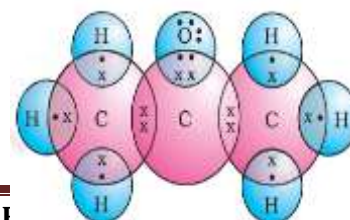
Ans:



27. Which is the functional group present in aldehydes?

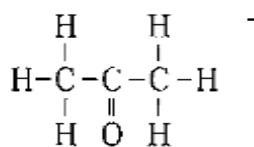
Write the molecular and structural formula of first member of ketone group and write its electron dot structure.

Ans: i) Functional group present in aldehydes is $-CHO$



ii) The molecular formula of first member of ketone family is C_2H_6CO .

iii) structural formula of Propanone is



iv) Electron dot structure of

propanone is -

CHAPTER 5 : PERIODIC CLASSIFICATION OF ELEMENTS

One Mark Questions

- Electronic configuration of X and Y elements are 2,8,8,1 and 2,8,7 respectively. Which type of bond formed in between them?
Ans: Ionic Bond
- The metallic property _____ as it moves from left to right in the periodic table.
Ans: Decreases
- The atomic number of the X element is 7. To which period the element X belongs in the Modern periodic table?
Ans: 2nd row/ 2nd period.
- Which element is having large atomic size in Na, Mg, K & Ca?
Ans: K
- State the Henry Moseley's Modern periodic law?
Ans: The Modern periodic law states that "The chemical and physical properties of elements are a periodic function of their atomic numbers"
- The atomic numbers of nitrogen and phosphorus are 7 & 15 respectively. Which of these is most electronegative and why?
Ans: Nitrogen. Tendency of gaining electrons decreases down the group.
- How does the metallic property of a metal depend on the size of the atom?
Ans: As the atomic size increases, metallic property (losing electrons) increases and vice versa.
- Why hydrogen placed in 1st group?
Ans: It is having $1s^1$ electronic configuration and shows the property of alkali metals.
- Lithium, Sodium and Potassium elements are Dobereiner triads. If atomic masses of Lithium and potassium atoms are 7&39, find out the atomic mass of Sodium?
Ans: Atomic mass of Na = $\frac{Li+K}{2}$, $=\frac{7+39}{2}$, Na=23. Atomic mass of Sodium is 23.
- What are electro positive atoms?
Ans: The atoms which gain net positive charge by losing of electrons are called electro positive atoms.
- In the Mendeleev's Periodic Table Hydrogen could not be placed in a permanent position, Why?

Ans: According to Mendeleev's theory, isotopes of hydrogen cannot be placed in a periodic table because they have different atomic masses.

2-Marks questions.

12. What are electro negative atoms? How does electro-negativity changes in a modern periodic table?

Ans: The electro negative atoms are atoms which gain net negative charge by gaining of electrons.

Across the period it increases and down the group it decreases.

13. The position of the elements A, B, C, D in the modern periodic table is given in the table below. Look at the table and answer the questions below.

	Group-1	Group-2
Period-3	A	B
Period-4	C	D

i. Which element is having maximum atomic size and why?

Ans: Element C. Across the period atomic size decreases and down the group increases.

ii. Which element is having minimum metallic property? Why?

Ans: Element B. Metallic property decreases across the period and increases down the group.

14. What are electro positive atoms? How this property varies across a period ?

Ans: By losing of electrons the atom will get the net positive charge. This property decreases along the period in modern periodic table.

15. Atomic numbers of A, B, C, D & E elements are given below. Answer the following questions based on this table.

Elements	A	B	C	D	E
Atomic number	7	10	12	4	19

i. Which two elements are similar in chemical property?

Ans: C & D (4&12)

ii. Which are noble gases?

Ans: B (10)

iii. Which element belongs to 3rd period of modern periodic table?

Ans: C (12)

iv. Which elements are nonmetals?

Ans: A & B (7&10)

16. The elements X, Y & Z are in the 2,3 & 4 periods respectively. Which element is having large atomic size in X & Y elements? Which element is having more electro positivity in X, Y & Z elements?

Ans: Y element is having more atomic size in X & Y elements.

Z element is having more electro positivity in X, Y & Z elements.

17. Arrange Mg, Cl, P & Ar elements in decreasing order based on their atomic size. Justify your answer.

Ans: Mg=12 :: $1s^2, 2s^2, 2p^6, 3s^2$:: 3rd period, 2nd group
 Cl = 17 :: $1s^2, 2s^2, 2p^6, 3s^2, 3p^5$:: 3rd period, 17th group
 P = 15 :: $1s^2, 2s^2, 2p^6, 3s^2, 3p^3$:: 3rd period, 15th group
 Ar = 18 :: $1s^2, 2s^2, 2p^6, 3s^2, 3p^6$:: 3rd period, 18th group.

Mg < P < Cl < Ar

Across the period increases the number of electrons, the greater the affinity between the nucleus and electrons leads to reduction of atomic size.

18. Atomic number of X & Y elements are 12 & 16 respectively. To which period these X & Y elements belong? Which type of bond is formed in between them and why?

Ans: X=12 :: $1s^2, 2s^2, 2p^6, 3s^2$:: 3rd Period

- Valency of X element is +2. It becomes X^{2+} by losing two electrons.
- Valency of Y element is -2, it becomes Y^{2-} by gaining the electrons.
- By electrostatic force of attraction in between the ions, the ionic bond is formed.

19. Electronic configuration of an element is 2, 8, 6. Explain the position of this element in modern periodic table and compare the atomic size of sodium with hydrogen and justify the answer with reason.

Ans: 16 = $1s^2, 2s^2, 2p^6, 3s^2, 3p^4$:: It belongs to 3rd period (3 shells), 16th group (6 valence electrons).

Hydrogen present in 1st period, Sodium present in 3rd period. Atomic size increases down the group due to addition of shells. Therefore, atomic size of Sodium is larger than Hydrogen.

20. How does the electronic configuration depend on the position of the element in a periodic table? Explain with an example.

Ans: Mg=12 :: $1s^2, 2s^2, 2p^6, 3s^2$

- In electronic configuration highest shell number indicates period.
- In electronic configuration ended sub shell number shows that the group which element belongs.

$\frac{s^1}{1}, \frac{s^2}{2}, \frac{d^1}{3}, \frac{d^2}{4}, \frac{d^3}{5}, \frac{d^5}{6}, \frac{d^5}{7}, \frac{d^6}{8}, \frac{d^7}{9}, \frac{d^8}{10}, \frac{d^{10}}{11}, \frac{d^{10}}{12}, \frac{p^1}{13}, \frac{p^2}{14}, \frac{p^3}{15}, \frac{p^4}{16}, \frac{p^5}{17}, \frac{p^6}{18}$

21. Write the electronic configuration of Mg & Al, mention their periods in periodic table. Justify your answer.

Ans: Mg=12 :: $1s^2, 2s^2, 2p^6, 3s^2$

Both the elements highest shell number is 3, therefore both the elements belong to the 3rd period in modern periodic table.

22. X, Y, Z elements position has been given in the table. Which type of ion formed with X element? In Y & Z elements which element is having relatively greater in atomic size?

Group-1	Group-2
-	Z

X	-
Y	-

Ans: X element is form cation by losing electrons.

Y element is having relatively large atomic size in Y&Z elements.

23. Write the no. of valence electrons in P, Q & R elements? Write the chemical formula of the compound when P & Q elements react. Which element is having larger atomic size?

Elements	Atomic Numbers
P	3
Q	17
R	13
S	11

Ans: P=3 :: $1s^2, 2s^1$

:: Valence Electrons =1

- Molecular Formula = PQ
- S is having large atomic radius. (atomic size decreases across the period)

3 Mark Questions

24. Atomic numbers of A & B elements are 11 & 12 respectively. Which shows highest metallic property? Why? Write the molecular formulas of compound when A & B elements reacts with the element C which is having the atomic number 8.

- Element A is having higher metallic property because when we move along the period, metallic property decreases.
- A_2C & BC

25. Atomic numbers of A, B, C, D & E elements are 6, 8, 3, 7 & 9 respectively. Which element shows less metallic property and why? What is your conclusion on the relationship between metallicity and electro positivity?

- C element is having highest electro positivity, because it is having the tendency to lose more electrons.
- Metallic property of E element is more because it is having tendency to gain electrons.
- Electro positivity and metallic property are directly proportional.

26. Atomic number of calcium is 20. Answer the following questions with reasons.

- i. Is calcium a metal or non-metal?
Calcium is having a tendency to lose electrons and shows metallic property. It is a metal.
- ii. Compare with potassium which is having the atomic number 20.
Potassium is having one valence electron. Therefore it's metallic property is more when compared to Calcium which is having 2 valence electrons.
- iii. Write the formula of, oxide of calcium.
CaO

Additional notes :

Dobereiner's Triads : When elements were arranged in the order of increasing atomic masses, groups of three elements having similar chemical properties are obtained. These are known as Triads.

Ex : i) Li, Na, K ii) Ca, Sr, Ba iii) Cl, Br, I

Law of Triads : The atomic mass of the middle element of the triad was roughly the average of the atomic masses of the other two elements.

Limitations : Only three triads were recognized from the elements known at that time.

Newland's Law of Octaves: When elements are arranged in the increasing order of their atomic masses, every eighth element has similar properties to the first.

Merits of Newlands Classification :

- This system worked quite well for the lighter elements. For example, lithium, sodium and potassium were brought together.
- It relates the properties of the elements to their atomic masses.
- For the first time, it was shown that there is a distinct periodicity in the properties of elements.

Limitations:

- It was applicable up to calcium (for lighter elements only).
- Properties of newly discovered elements did not fit into the law of octaves.
- To fit elements into his table, he put even two elements together in one slot and that too in the column of unlike elements having very different properties.
- He also put some **unlike elements under the same note**. Cobalt and nickel are placed in the same column as fluorine, chlorine and bromine which have very different properties than these elements.
- Iron, which resembles cobalt and nickel in properties, has been **placed far away** from these elements.

Mendeleev's Periodic Law:

The properties of elements are the periodic function of their atomic masses.

Merits of Mendeleev's Periodic Table :

- i) Some gaps were left for the undiscovered elements like Gallium (Ga), Scandium (Sc) and Germanium (Ge).
- ii) Predict properties of elements on the basis of their positions in the periodic table.
- iii) Accommodate noble gases when they were discovered without disturbing the original arrangement.

- iv) This arrangement helped to **calculate the correct atomic masses** of elements. For Ex: Atomic mass of Beryllium was corrected from 13.5 to 9. Similarly, with the help of this table, atomic masses of Indium, Gold, Platinum, Uranium etc. were corrected.

Limitations of Mendeleev's Classification:

- i) Position of isotopes could not be explained.
- ii) Position of Hydrogen in the periodic table is uncertain.
- iii) Increase in atomic mass was not regular while moving from one element to another.
Hence, the number of elements yet to be discovered was not predictable

Modern Periodic Law

Properties of elements are a periodic function of their atomic **number**.

Modern Periodic Table remove various anomalies of Mendeleev's Periodic Table.

- a) In Mendeleev's periodic table, position of hydrogen is uncertain. In Modern periodic table, Hydrogen is placed in 1st group since it is having $1s^1$ electronic configuration.
- b) In Mendeleev's periodic table, the position of isotopes could not be explained. In Modern periodic table, the isotopes were assigned same position as they have same atomic number.
- c) In Mendeleev's periodic table, elements with larger atomic weights were placed before elements with smaller atomic weight without any justified reason. In modern periodic table, all were arranged systematically with increasing atomic number.

Trends in the Modern Periodic Table :

a) Valency :

- i) On moving from left to right in each period, the valency of elements increases from 1 to 4 and then decreases to 0.
- ii) Valency remains the same down in a group.

b) Atomic Size :

- i) Atomic size or radius of an atom **decreases** as we move from left to right in a period.
This is due to an **increase in nuclear charge** which tends to **pull the electrons closer** to the nucleus and reduces the size of the atom.
- ii) Atomic size **increases as we move down the group**. Because new shells are being added and this increases the distance between nucleus and outermost electron.

c) Metallic Character : (the tendency of an atom to lose electron)

- i) On moving left to right in a period, the metallic character of an element decreases because the effective nuclear charge increases. It means tendency to lose electron decreases.
- ii) Metallic character increases as we go down a group as the effective nuclear charge is decreasing.
- iii) Metals are electropositive as they tend to lose electrons while forming bonds.
- iv) Metals occupy the left side of the periodic table.
- v) Oxides of metals are basic in nature.

d) **Non-Metallic Character :**

- i) Non-metallic character increases across a period because due to increase in effective nuclear charge that means tendency to gain electron increase.
- ii) Non-metallic character decreases as we move down a group due to decrease in effective nuclear charge experienced by the valence electron thus the tendency to gain electron decreases.
- iii) Non-metals are electronegative as they tend to form bonds by gaining electrons.
- iv) Non-metals occupies the right side of the periodic table.
- v) Oxides of non-metals are acidic in nature.

In the middle of periodic table, we have semi-metals or **metalloid** because they exhibit some properties of metals and non-metals. Ex : Boron, Silicon, Germanium, Arsenic, Antimony, Tellurium, Polonium.

CHAPTER 6 : Life Processes

1. Define transpiration.

Ans: The loss of water in the form of vapour from the aerial parts of the plant is known as transpiration.

2. Define lymph.

Ans: It is similar to the plasma of blood but colorless (no RBC) and contains less protein.

3. Write the function of lymph?

Ans: Carries digested and absorbed fat from intestine and drains excess fluid from extracellular space back into the blood.

4. Why arteries have thick elastic walls?

Ans: The blood emerges from the heart under high pressure. To withstand this pressure, arteries have thick elastic walls.

5. Write the function of valves present in veins.

Ans: Valves ensure that the blood flows only in one direction.

OR

Valves prevent the backflow of the blood.

6. Write the function of platelets.

Ans: Helps to clot the blood

7. Define excretion. How unicellular organisms remove waste?

Ans: The removal of harmful metabolic wastes from the body is called excretion. Unicellular organisms remove waste by simple diffusion

8. Name the nitrogenous waste present in urine.

- Urea
- uric acid

9. Name the factors on which re-absorption of water in nephron depends.

- How much excess water there in the body.
- How much of dissolved waste there is to be extracted

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

- Highly efficient supply of oxygen to the body.
- This is used in animals to maintain constant body temperature

11. Write any two main functions of kidney.

- Remove nitrogenous waste from the body.
- Maintain pH of our body.
- Maintain water level of our body.

12. Define translocation? Name the tissue helps in the process.

- The transport of soluble products of photosynthesis is called translocation.
- Phloem tissue helps in this process.

13. Define transpiration pull ? Name the tissue helps in this process.

- It is major driving force in the movement of water.
- Xylem tissue helps in this process.

14. Define double circulation? Why ventricles are thick walled compared to atria.

Blood moves twice in to heart during each cycle. This is known as double circulation. Since ventricles have to pump blood into various organs they have thicker muscles walls than the atria.

25. How plants obtain raw materials for their photosynthesis ?

- Carbondioxide enter inside leaves through stomata
- Water from roots
- Leaves absorb sunlight with help of chlorophyll pigment

26. a . What are blood capillaries?

b. Blood moves only once in heart of fishes. Why?

c. Diffusion is not enough in multi-cellular organisms to remove wastes from body. Why ?

- a) Capillaries are tiny blood vessels connecting arteries to veins.
- b) In fishes, blood is pumped through gills is oxygenated their and passes directly to the rest of the body they do not maintain constant body temperature.
- c) Since all the body cells are not in direct contact with the surrounding environment.

27. Explain the process of digestion in Amoeba?

- Amoeba uses diffusion method for its digestion
- It uses finger like projections called pseudopodia for intake of food
- It encircle food material and take inside as food reservoir
- Complex food materials are converted into simple diffusible materials
- Food diffused from food reservoir to cytoplasm by diffusion method

28 A. Write the function of blood vessels which are involved in circulatory system in man. Why is it necessary to separate oxygenated and deoxygenated blood in mammals and birds?

- **Arteries:** Arteries are the vessels which carry blood away from the heart to various organs of the body.
 - **Veins:** veins collect the blood from different organs of the body.
 - **Capillaries:** smaller blood vessels which bring the blood in contact with all the individual cells.
-
- Highly efficient supply of oxygen to the body.
 - Animals maintain constant body temperature.

29. Define respiration. explain different pathways involved in break-down of glucose .Why the rate of breathing in aquatic animal is higher than that of terrestrial animals.

The process of breakdown of glucose into carbon dioxide water and energy is called respiration,

Pathways involved in breakdown of glucose as follows

Absence of oxygen

Glucose is converted into 3-carbon molecule called pyruvate in cytoplasm .In absence of oxygen in yeast pyruvate converted into Ethenol ,carbon-dioxide and energy

Presence of oxygen

In presence of oxygen in mitochondria pyruvate converted into Carbon-dioxide , water and energy.

Lack of oxygen

Lack of oxygen in our muscle cell pyruvate is converted into lactic acid and energy.

- Since the amount of dissolved oxygen is fairly low compared to the amount of oxygen in the air, the rate of breathing in aquatic organisms much faster than that seen in terrestrial organisms.

30 a) .What are the functions of blood and lymph in humans?

b) .What are the different waste materials added to the urine from the blood?

c). How are waste materials excreted in plants?

a) Functions of Blood:

- Plasma of blood transports food carbon dioxide and nitrogenous waste.

Functions of Lymph

- Lymph carries digested and absorbed fat from intestine and
- drains excess freed from extracellular space back into the blood.

b) Nitrogenous wastes like urea and uric acid are removed from the blood in the kidneys.

c) Excretion in plants :

- Excess of water is get rid by transpiration.
- Many plants waste products or stored in cellular vacuoles.

- Waste products may be stored in leaves that fall off.
- Waste products are stored as resins and gums especially in older xylem.
- Plants also excrete some waste substances into the soil around them.

31.Explain the process of digestive enzymes with functions involved in digestion

Mouth

- Digestion process starts from mouth .Mouth contain saliva in which Amylase enzyme is present.it converts starch into glucose,

Stomach

- The digestion in stomach took place with the help of gastric glands present in wall of the stomach.
 - Gastric glands secretes HCl.Pepsin and Renin
 - HCl maintain acidic medium
 - Pepsin convert proteins into polypeptides

Liver

- Food coming from the stomach is acidic ,it has to be made alkaline by bile juice
- Bile salts break large fat globules into smaller globules

Pancreas

- Pancreas secretes pancreatic juice which contain enzyme called trypsin and lipase
- Trypsin helps in digestion of proteins
- Lipase helps in emulsifying fats

Small intestine

- Finally protein converted into aminoacids
- Carbohydrates converted into glucose and fats
- Fats are converted into fattyacids and glycerol
- Complete digestion occur in small intestine
- Villi helps in absorption of digestive food

CHAPTER 7 : CONTROL AND COORDINATION

1. Which are the two components of central nervous system in humans?

A. Brain and spinal cord.

2. What is reflex action?

A. Any sudden, involuntary response to a stimulus is known as reflex action.

3. If a potted plant is made to lie horizontally on the ground, which part of the plant will show a positive geotropism and negative geotropism?

Roots -positive geotropism

shoots- negative geotropism.

4. A young green plant receive sunlight unidirectionally. What will happen to the roots and shoots?

Root - negative phototropism

shoot -positive phototropism

5. Name the plant hormone which help to promote growth of the plant cell division

a. cell division- cytokinin

b. growth of stem - gibberellin

6. Among these which are the promoters?

a. phototropism

b. geotropism

c. chemotropism

A. a. phototropism- light

b. geotropism - gravity

c. chemotropism- chemicals.

7. Give an example of a plant hormone that promotes its growth and where is it synthesized?

A. Auxins promotes the growth in plants and it is synthesized at the tip of the plant body.

8. State the functions of gustatory receptors and olfactory receptors.

A. Gustatory receptors: helps in sensing the taste of the food.

Olfactory receptors: helps in sensing the smell.

9. Where are gustatory and olfactory receptors located?

A. Gustatory receptors are located in tongue and olfactory receptors are located in nose.

10. Mention the function of hind brain in humans.

A. Hind brain maintains the balance of the body, regulates the facial expression, mastication and in involuntary actions of the body.

11. Name the part of the human body where large number of neurons are found.

A. Brain.

12. Name the hormone that regulates blood sugar level. Name the gland associated in the secretion of this hormone?

A. Insulin is the hormone that regulates blood sugar level.

The gland associated in its secretion is pancreas.

13. Adrenalin hormone is called emergency hormone. Why?

A. Adrenalin is secreted only at the time of emergency situation like fear, anxiety, and extreme happiness.

14. Name the important hormone secreted by thyroid gland and mention its function.

A. The hormone secreted by thyroid gland is Thyroxin.

Thyroxin helps in the metabolism of carbohydrates, proteins, calcium and phosphorus.

15. Name the hormone which is associated with the metabolism of carbohydrates, proteins, calcium and phosphorus.

A. Thyroxin.

16. Why is pituitary gland is called the “Master gland”?

A. Pituitary gland control the activities of all the other glands in the body. So, it is called the “Master gland”.

17. Why hormones are called chemical messengers?

A. Hormones carry information to perform definite functions to the target organs. Hence, they are called chemical messengers.

18. Why are endocrine glands called ductless glands?

A. Endocrine glands directly secrete the hormone into the blood stream to reach the target organs instead of proper ducts. Hence, they are called as ductless glands.

19. Why is it advised to use iodized salt in our diet?

A. Iodine helps in balancing the secretion of thyroxin hormone which is very essential for the physical and mental development of the body.

20. Which part of our brain is responsible for maintaining posture and balance of our body?

A. Cerebellum is responsible for maintaining posture and balance of our body.

21.If we step on something sharp, immediately we remove /lift our foot away at once. What type of response is it?

A. Reflex Action.

22. When a boy is met with an accident, he loses his memory. Which part of the brain is affected?

A. Cerebrum.

23. how does coordination occur in humans

A . Nervous system and endocrine glands.

III. Two marks questions:

1.How do auxins promote the growth of tendril around a support?

A. Auxin is plant hormone which is synthesized at the tip of the shoot. It helps the cell to grow longer. When a stem comes in contact with a support, auxin stimulates faster growth of the cells on the opposite side. That is why tendril forms a coil around a support.

2. How the nervous system is contrast from endocrine system in forming control and coordination in animals?

Nervous system	endocrine system
Electrical impulses are the messengers in the nervous system.	chemical messengers.
composed of brain, spinal cord and nerves.	composed of glands.

3. Which is the control center of reflex action?

What is the route taken by the reflex action called? And write its pathway.

A. Spinal cord is the control center of the reflex action.

The route taken by the reflex action is called Reflex arc.

Receptors----- sensory neurons----- spinal cord----- motor neurons ----- effector.

4. Which is the largest part of the brain? Write its function.

A. Cerebrum is the largest part of the brain. It is the seat of memory power. All the impulses from the sense organs are interpreted in different centers of cerebrum.

5. The given experimental set up establishes the response of different plant parts towards gravity.

i) Give the scientific term used for such response /movement.

ii) How is shoot response different from the root ?

A. i) Geotropism.

ii) Shoot- negative geotropism

Root- positive geotropism.

6. Classify the following movements as tropic or nastic :

a. Opening of flower

b. roots moving downwards

c. shoots moving towards light.

d. twirling of a tendril.

A. Tropic movement: roots moving downwards, shoots moving towards light.

Nastic movement: Opening of flower, twirling of a tendril.

7. Mention the name of pituitary hormone and its function secreted in humans.

A. Growth hormone

Function - controls the growth and development of body.

8. List out the functions of testosterone and estrogen.

Testosterone helps to develop secondary sexual character in male and controls the secretion of male gametes.

Estrogen helps to develop secondary sexual character in female and controls the secretion of female gametes.

9. How do you support the statement that “Pancreas is the overall controller of blood sugar level”?

A. Because they secrete insulin and glucagon hormones which are essential for balancing both high and low sugar level in blood.

10. Justify that the pancreas and the gonads perform dual function.

A. Pancreas act as both exocrine and endocrine gland and

gonads secrete hormones and also release gametes.

11. a. Which are the plant hormones present in the parts of the plant where rapid cell division takes place?

b. Give examples for the plant growth promoters and plant growth inhibitors?

A. a. Cytokinins - promotes cell division.

b. Plant growth promoters are Auxins, Gibberellins, Cytokinins,

Plant growth inhibitors are abscisic acid, ethylene.

IV. Three mark questions:

1.i) Which part acquires the information in neuron?

Dendrites

ii) Through which part does the information travel?

Dendrite → Cell body → Axon → Nerve ending.

2. Mention the functions of phytohormones.

A. Phyto hormones are of two types:

a. growth promoters: auxin, gibberellin, cytokinin

b. growth inhibitors: abscisic acid, ethylene.

Functions:

i) Auxins: cell elongation of stem and root.

ii) Gibberellins: helps in growth of stem.

iii) Cytokinin: promotes lateral growth, stimulates the formation of chloroplast in leaves.

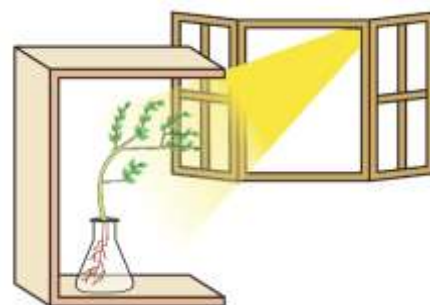
4. What is synapse? How are electric impulses created in nerve cell?

A. The tiny gap between successive neuron is called synapse. During the transmission of nerve impulse, the information acquired at the end of the dendrite's tip of a neuron, sets off a chemical reaction which creates an electrical impulse. This impulse travels from the dendrite to the cyton along the axon to its end. At the end of the axon the electrical impulses sets off the release of some chemicals which cross the synapse and start a similar electrical impulse in a dendrite of the next neuron. In this way nerve impulses travel in the body. Synapse helps in transmitting impulses from one neuron to another.

5. Explain how auxins are helpful for the plant shoot to bend towards light?

a) When light is coming from one direction of plant, auxins synthesized at the shoot diffuses towards shady side. This concentration of auxins stimulates the cells to grow longer on the side of the shoot which is away from light. Thus, plant appears to bend towards light.

b) Response of the plant to the direction of light. Shoot gives positive phototropism and root gives negative



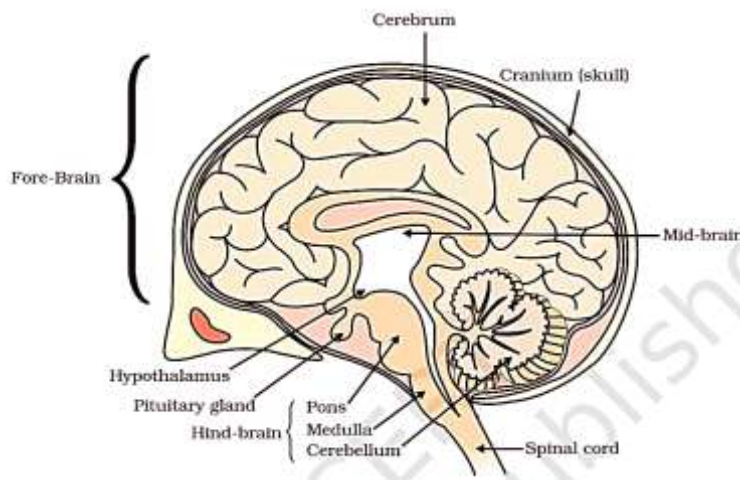
phototropism

6. How are involuntary actions and reflex actions different from each other?

Involuntary actions	Reflex actions
Cannot be consciously controlled	Reflex actions are sudden automatic response
Directly under the control of the brain	Controlled by spinal cords
Takes place slowly	Takes place very rapidly

V. Four marks questions:

1. Draw the diagram of longitudinal section of human brain and label the parts.



i) Name the part which controls involuntary actions in hind brain: Medulla

ii) Name the area receiving sensory impulses: fore brain cerebral hemisphere.

2. Mention the functions of plant hormones. Name four types of plant hormones.

A. i) Auxins: helps in growth of plant tissue.

ii) Gibberellins: promote cell division, delays ageing of cells.

iii) Absciscic acid: inhibits growth and cause withering of leaves.

iv) Ethylene: causes ripening of fruits.

VI. Five marks questions:

1.a. Distinguish between cerebellum and spinal cord.

CEREBRUM	SPINAL CORD
It is protected by a bony box called cranium.	It is protected by vertebral column.
Largest part of brain	Longest part of CNS.

Centre of perception, imagination, thoughts, judgement and decision making	Controls reflex action.
Surface is composed of grey matter over white matter.	White matter covers the grey matter.
Contains cell bodies of neuron outside and axons of the neuron inside.	It contains axons outside and cell bodies inside.

b. Give technical terms for the following events:

- i) The movement of plant in the direction of light- Phototropism
- ii) The movement of plant parts in response to water- Hydrotropism.
- iii) The movement of plant parts towards chemical substance – chemotropism.
- iv) The downward movement of roots in response to gravitational force- Positive geotropism.

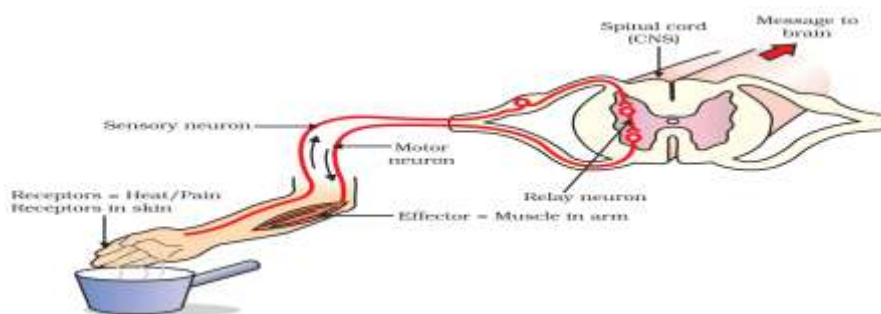
2. Define reflex action. What is reflex arc? Draw a neat labeled diagram of the components in a reflex arc. Why do impulse flow only in one direction in reflex arc?

A. Reflex action is a sudden involuntary reaction of the body in response to stimuli.

Reflex Arc- is the path followed by electrical impulse during reflex action.

The impulse travel from the receptor organ to the spinal cord/ brain. It is processed there and the information is brought back to the concerned muscle to carry out the action.

Thus, receptor organ, sensory/afferent neuron, inter neuron, motor/efferent neuron and effector organs are the components of reflex arc.



CHAPTER 8 : OUR ENVIRONMENT

I Multiple choice questions

- 1) Which bio mass will be more territorial ecosystem?
 - a) Herbivores
 - b) carnivores
 - c) Producers**
 - d) Top carnivores
- 2) The bio degradable substance among the following is
 - a) Paper**
 - b) Pesticide
 - c) Plastic bag
 - d) Lead vapors
- 3) An example for a simple food chain
 - a) goat- cow-elephant
 - b) grass-fish-goat
 - c) grass-wheat-mango
 - d) Grass-goat-tiger**
- 4) In an ecosystem usually bacteria and fungi are considered as
 - a) producers
 - b) primary consumers
 - c) Secondary consumers
 - d) decomposers**
- 5) An artificial eco sysem is
 - a) Aquarium**
 - b) Pond
 - c) Sea
 - d) Forest
- 6) The best way to manage non biodegradable waste
 - A) Burning
 - b) Accumulating
 - c) Burrying
 - d) Recycling**
- 7) The characteristic feature of artificial eco system among the following is
 - a) More stable
 - b) Has large number of docomposers
 - c) More biodiversity
 - d)Less bio diversity**
- 8) Which one uses more energy
 - a) Primary consumers
 - b) Decomposersers
 - c) Producers**
 - d)Secondary consumers
- 9) Food web is defined as

- a) Distribution of food
- b) Exhibition of food
- c) A complex relation between food chains**
- d) continuous flow of energy

10) which of the following are environment friendly practices?

- A) while shopping carrying cloth-bags to put purchased items.
- b) Switching off unnecessary lights and fans
- c) Walking to near by places without using vehicles
- d) All the above**

1. How many oxygens form ozone?

Ozone is formed by three oxygens.

2. Expand UNEP.

United Nation Environment Program.

3. In which year UNEP established?

1987

4. Expand CFC.

Chlorofluorocarbon.

5. What is the main reason for the depletion of ozone?

CFCs used in industries and household devices are the main cause for the depletion of ozone.

6. Which disease is caused by the depletion of ozone in human beings?

Skin Cancer.

7. List any two non-biodegradable objects.

Plastic and glasses.

8. Give example for biodegradable things.

Organic matter, green leafy vegetables etc.,

9. Why the Government has ordered the factories to manufacture the refrigerators free from CFC's?

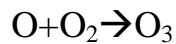
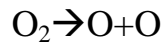
To avoid the damage caused to ozone by the CFC's, the government has issued an order to manufacture refrigerators free of CFC's

1. What are the steps taken to limit the ozone layer depletion?

- The Government has made it mandatory for the manufacturing countries to produce refrigerators free of CFC's.
- CO emission is tested by the authorities to avoid air pollution which in turn leads to ozone depletion.

2. How is the ozone formed?

UV radiation split apart some molecular oxygen (O_2) into free oxygen (O) atoms. These atoms then combine with the molecular oxygen to form ozone.



3. The government has banned the use of plastic. Why?

Plastics are non-biodegradable and they are not broken by the action of bacteria. Plastic remains in the environment for a long time thus polluting the environment and making it danger for animals and human beings.

4. What are saprophytes?

The organisms which derive food from dead and decaying organic matter are called saprophytes.

5. What are bio-degradable and non-biodegradable materials?

The materials which are broken by the bacteria are called bio-degradable and the things which are not broken by the bacteria are called non-biodegradable.

6. The presence of DDT is detected in mother's breast milk. Why?

Chemical fertilizers used to grow plants are non-biodegradable. DDT is a pesticide and it is non-biodegradable. It enters our body through the consumption of food. Hence DDT is detected in the breast milk of mother.

7. How can we help in the disposal of the waste products?

We can separate biodegradable and non-biodegradable materials while disposing garbage. Thus, helping in keeping our environment clean and pollution free.

8. list some eco friendly practices to save environment

- a) while shopping carrying cloth-bags to put purchased items.
- b) Switching off unnecessary lights and fans
- c) Walking to near by places without using vehicles
- d) plant more trees
- e) conserve soil water
- f) classify waste as bio degradable and non bio degradable before disposable.

CHAPTER -9 HOW DO ORGANISMS REPRODUCE

- The flower may be unisexual in
a) **Papaya** b) Hibiscus c) Mustard d) Toor dal
- Which of the following part is considered in female reproductive system in human beings?
a) **uterus** b) testis c) vasdeferens d) scrotum
- The ovule develops a tough coat and is gradually converted into
a) ovule b) ovary c) **seed** d) fruit
- The ovary grows rapidly and ripens to form a
a) Seed b) ovary c) ovule d) **fruit**
- A pollen tube, grows out of the pollen grain and travels through the style to reach the :
a) ovule b) **seed** c) ovary d) fruit
- The male reproductive system consists of
a) ovaries b) uterus c) **testis** d) cervix
- The female germ cells or egg are made in the
a) vagina b) cervix c) **ovaries** d) uterus
- The fertilized egg is called
a) embryo b) **zygote** c) egg d) placenta
- The embryo gets nutrition from the mother's blood with the help of a special tissue called
a) blood b) mucus c) **placenta** d) embryo
- Bacterial infections such as gonorrhoea and syphilis are :
a) **STD** b) virus c) corona d) fever
- The common passage for sperms and urine in the male reproductive system is
a) vas deferens b) **urethra** c) seminal vesicle d) ureter
- In sperms, mitochondria occurs in :
a) head b) tail c) **middle piece** d) acrosome
- A fruit is
a) An enlarged ovule b) **a mature ovary** c) an anther d) a thin style
- What makes the beginning of the reproductive life of a woman?

- a) Fertilization b) menopause c) ovulation **d) menarche**

15. What is formed immediately after fertilization?

- a) A gamete b) An Ovum **c) A Zygote** d) An embryo

1. **Zygote:** Fusion of the male (sperm) and the female (egg) gametes.
2. **Seed:** The ovule develops a tough coat and is gradually converted into a seed.
3. **Puberty :** The rate of general body growth begins to slow down reproduction tissues begin to mature.
4. **Placenta** : The embryo gets nutrition from the mother's blood.
5. **Menstruation:** The process of bleeding in women in case fertilization does not occur in about 28 to 30 days.
6. **Pollination:** The transfer of pollen grains from anther to stigma.
7. **Self-Pollination** : Transfer of pollen occurs in the same flower / different flower in the same plant.
8. **Cross Pollination** : If the pollen is transferred from one flower to another.
9. **Germination:** development of embryo into a seedling under appropriate conditions.
10. **Fetus:** A fetus is formed by the growth and development of an embryo.
11. **Menopause:** Is the stoppage of menstruation at about 45-50 years of age.
12. **Menarche:** Is the onset of menstruation.
13. **Fertilization:** Fusion of male gamete with female gamete
14. **Gestation period:** Starts from fertilization till delivery.

15. How is the process of pollination different from fertilization?

Pollination is defined as the process of transfer of pollens from anther to stigma. The process takes place with the help of pollinators like air, water and some insects.

Fertilization is defined as the fusion of male and female gametes. It takes place in the ovule and leads to the formation of zygote.

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

Lubrication of sperms and providing of a fluid medium for the easy transportation of sperms takes place with the help of secretions from the seminal vesicles and the prostate gland. These secretions also provide nutrients in the form of fructose, calcium and some enzymes.

17. If a woman is using a Copper-T, will it help in protecting her from sexually transmitted diseases?

No, because usage of copper-T cannot stop the contact of body fluids. Hence, it cannot protect her from getting sexually transmitted diseases.

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

Following are the functions performed by the testis in human beings:

- Apart from the production of sperms, it also produces the male hormone known as androgens.
- They also produce hormone called testosterone, which is responsible for secondary sexual characters in boys.

19.Give example of two bacterial and two viral diseases which are transmitted through sexual contact?

Bacterial diseases;- gonorrhoea and syphilis . Viral diseases;- AIDS and genital warts

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

The reason why the variation is beneficial to the species than individuals is because sometimes the climatic changes have a drastic effect on the species, which makes their survival difficult. For examples, if the temperature of the water body increases, then there might be certain species of microorganisms which might die. This may result in disturbance in the environment. So, variation is beneficial to species and not for the individuals.

21. Why is DNA copying an essential part of the process of reproduction?

DNA copying is an essential part of the process of reproduction because it carries the genetic information from the parents to offspring. A copy of DNA is produced through some chemical reactions resulting in two copies of DNA. Along with the additional cellular structure, DNA copying also takes place which is then followed by cell division into two cells.

22. What are the changes seen in girls at the time of puberty?

Following are the changes seen in girls at the time of puberty:

- In genital area, hair growth appears.
- Hair growth in other areas like underarms, face, hands and legs.
- The size of uterus and ovary increases.
- The size of the breast increases followed by darkening of the nipple skin that is present at the tip of the breast.
- Beginning of menstrual cycle.
- Appearance of pimples, as the oil secretion is more from the skin.

23. How does the embryo get nourishment inside the mother's body?

The lining of the uterus thickens after fertilization. The blood flow is good so as to nourish the growing embryo. Placenta is a special tissue which is embedded in the

uterine wall and helps the embryo get the nourishment from the mother's tissue. Placenta has villi on the embryo side and blood space on the mother's side. This spacing provides a large area between the mother and the embryo and also for waste removal.

24. Why does menstruation occurs?

Menstruation is the normal bleeding of the vaginal line which starts between puberty and lasts till menopause. During this period, the body prepares itself for pregnancy. Every month an egg is released from one of the ovaries at the same time where the uterus prepares itself for fertilized egg. The inner lining of the uterus gets thickened and is supplied with sufficient amount of blood for the embryo. Since there is no interaction between the egg and the sperms, the fertilization of egg doesn't take place. So, when the egg doesn't get fertilized, the uterus lining breaks down slowly resulting in menstruation.

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

Reproduction is the process of producing the same kind of species by the existing species. This is done so as to maintain the population of that species and also to take forward their species to next generations. Stability is maintained by keep a check of rate of births and rate of deaths.

26. What could be the reason for adopting contraceptive methods?

Following are the reasons for adopting contraceptive methods:

- To control population
- To avoid unplanned pregnancy
- To avoid transfer of sexually transmitted diseases

27. What are the different methods of contraception?

Following are the different methods of contraception:

- **Natural method:** In this method, the main focus is to avoid the meeting of sperms and ovum. This can be achieved by avoiding the mating from 10th to 17th day of the menstrual cycle. During this period, there are high chances of fertilization as ovulation is expected.
- **Barrier method:** In this method, the meeting of sperms and ovum is avoided by using a barrier. These barriers are available for males as well as for females. Condoms for both male and female, diaphragms for female, cervical cap and contraceptive sponge for females.
- **Oral contraceptives:** In this method, pills are taken orally. These pills contain small portion of hormones that block the eggs so that fertilization doesn't takes place.
- **Implants and surgical method:** In this method, contraceptive devices like copper-T or a loop can be used to block the meeting of sperms and ovum. In surgical method, the fallopian tubes are blocked in females to stop flow of eggs and vas deference is blocked in men to stop the flow of sperms.

28. Explain with an example showing the variations is an inherent tendency of an organism.

Using the ability to reproduce, living organisms increase their population and feed on available resources in their niche. Changes in DNA and body design may result in difficulty to sustain themselves in their habitat. But we know that the environment is not consistent. It changes with the change in different factors like climate, temperature, availability of resources, etc. During these environmental changes, if a particular species is too adamant to change, it can't survive in that habitat. Here comes the role of variation. Variations in species help them to adapt themselves to that particular environment and give them a chance of survival. Thus variation during reproduction is an inherent tendency and it lays a pathway for evolution.

For example, thermophilic bacteria are variants that are resistant to extreme temperature. They have a chance of survival in high temperate zones while others die.

CHAPTER 10 : HEREDITY AND EVOLUTION

01. What is a gene?

A section of the DNA that provides information for one protein Synthesis is called the gene for that protein

02. Who is the father of heredity ?

Gregor Johann Mendel.

03. Who is the father of evolution?

Charles Darwin

04. What are fossils?

Preserved traces of living organisms are called as fossils

05. How many sex chromosomes are seen in humans and which are they?

23 pairs or 46 chromosomes

06. Write the methods of calculating the age of fossils?

Relative method : When we dig into the earth the fossils we find closer to the surface are more recent than the fossils we find in deeper layers .

Fossil dating method : Detecting the ratio of different isotopes of the elements in the fossil material

07. List out the methods of evolutionary relationships study.

1. Study of analogous organs

2. Study of homologous organs

3. Study of fossils variations

4. Comparison of similarities and

5. Direct estimation of DNA changes

6. Age of fossils

7. Genetic drift

8. Natural selection

08. Formation of New species will not make disappearance of the old species. How?

It depends on the environment. The natural selection and gene flow totally form the populations of species which do not Reproduce each other.

09. Explain the analogous and homologous organs with examples

Homologous organs are those organs which have the same basic structural designs and origin, but have different functions.

Example: Forelimbs of humans and the wings of birds look different externally but their skeletal structures are similar.

Analogous organs are those Organs which have the different basic structural design and origin but have similar functions.

Example: The wings of birds and insects.

10. Explain how genetic drift and natural selection shapes new species.

The selection of nature is one of the most common qualities that make organisms survive.

- **Life clusters dictates the evolution of life by natural selection**
- **These causes adaptations to be better for the environment**
- **It is the genetic quality that provides diversity without any compromises is the genetic drift.**
- **Each sub group combines several changes in the face of several statements of inheritance.**
- **The natural selection works differently in different geographical areas**
- **Gene flow and natural selection jointly get differentiated together which cannot reproduce each other**
- **Variations carry occasionally by natural selection**
- **New variations undergo powerful natural selection.**
- **Old species do not disappear with the emergence of a new species**
- **Natural selection and gene flow together creates a non-reproductive life group with the original species.**
- **The two evolving species may have taken the form of the majority on their own separate paths.**

19. How anatomical studies are helpful in detecting biochemical relationships?

. Anatomical analysis of fossils helps to determine biological relationships with age

- **It reveals that complex structures arise from simple structures.**

- The relationship between species is known.

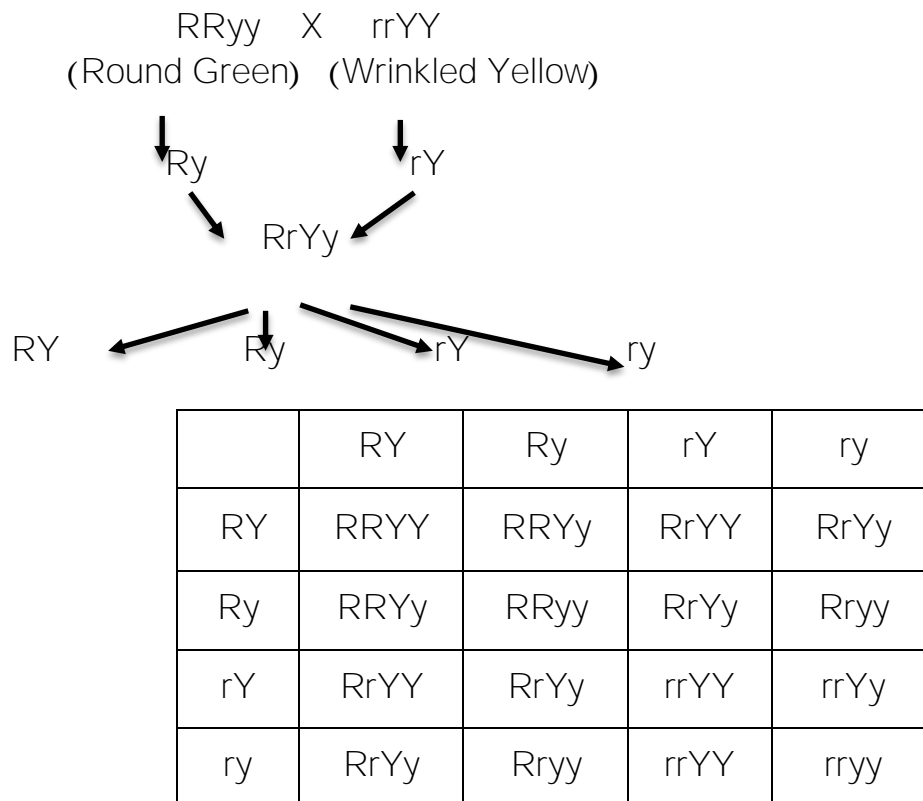
It reveals the formation of new and old species

20. How can we determine that reptiles are very close relatives to birds?

.Feathers began to protect the bird's body from the cold but were later useful to the birds in flying and body temperature maintenance.

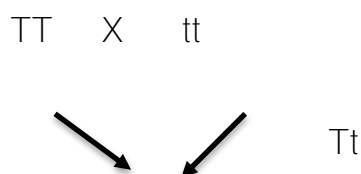
- Dinosaurs have an inability to fly but lately birds used the wings to fly
- Dinosaurs are the reptiles which are close relatives of birds.

21. Explain the Mendel experiment with checker board the round green and wrinkled yellow colours in Pea plant.



Round yellow : 9
 Round green: 3
 Wrinkled yellow : 3
 Wrinkled green : 1

22. In Mendelian experiments how the parental plants and F1 plants reproduced in Monohybrid cross.





	T	t
T	TT	Tt
t	Tt	tt

Tall : Dwarf = 3 : 1

Pure Tall : Mixed Tall : Dwarf = 1 : 2 : 1

T : Dominant

t : Recessive

CHAPTER 11 :SOURCES OF ENERGY

1. What is a fuel?

Ans. Any substances which may be burn in air to produce heat and light is known as fuel

2. What are fossil fuels?

Ans. The fuels which are obtained from the remains of plants and animals are called fossil fuels.

3.What is a good fuel?

- a. It has a high calorific value
- b. produces less smoke on burning

4. Why main thermal power plants are set up near coal or oil fields ?

Because transmission of electricity is more efficient than transporting coal and petroleum.

5. Define Biomass?

The material contained in the bodies of plants and animals

6. Name two combustible components of biogas?

Methane and hydroge

7. Name the elements used in the solar cell?

Silicon and silver

8. Name the two major components present in the left over slurry of a biogas plant?

Nitrogen and phosphorus.

9. List any two advantages of using wind energy?

- . Environmental friendly
- .Efficient sources of renewable energy

10.What is geothermal energy?

Heat energy stored in the hot spot of the earths crust.

11. Define nuclear fission?

The heavy nucleus splits into two or more smaller nucleus with the evolution of large amount of energy when it is bombarded with slow moving neutron.

12. Why is solar cooker painted black from outside?

A black surface absorb more heat when compared to White.

13. What are the advantages of nuclear energy?

.It does not releases harmful gases

.Small amount of nuclear fuel produces a large amount of energy

14.Mention the two limitations in harness in windenergy?

.Wind energy farm can be established only at those places where wind blow greater part.

. The wind speed should maintain 15 kilometre per hour.

15. Write any two advantages of bio energy?

.It maintain an unpolluted environment

.Reduces the carbon dioxide in the atmosphere

16. What are the two disadvantages of burning fossil fuels?

Ans. Air pollution and acid rain which affect soil and water.

17. Why is charcoal considered to be a better fuel than wood?

Ans. a. It is smoke less and leaves no Residue of combustion

b. It has a higher heat

18.Fossil fuels are classified as renewable sources of energy why?

Ans. Fossil fuels like coal Petroleum natural gas if exhausted cannot be generated rapidly as they take millions of years to form again.

19. What is good source of energy?

.Easily accessible

.Easy to store and transport

.Is economical
work per unit volume

.It would be a large amount of

20. Mention the limitations of the hydropower plants?

.Construction of a big dams have certain problems associated with it

.Dams can be constructed only in the Limited number of places preferably in hilly terrains

21. Mention the four gases generated in biogas plant?

.Methane

.Carbon dioxide

.Hydrogen

. Hydrogen sulphide

22. What are the limitations of establishment of wind energy farms?

- .1Mv generator the form need about 2hectares of land
- .Cost of establishment is very high
- .The towers and blades are exposed to the various of nature like rain sun and stroms
- .They need high level of maintenance

23. Can any source of energy be pollution free?

- .No, because the uses of any source of energy will disturb environment in one or other way.
- Example: solar cell it is free of pollution but installation may cause some damage to environmen

24.state any two major hazards associated with a nuclear power plant?

- .Storage and disposal of spent are used fuels the uranium still leaking into a powerful subatomic particles.
- .Improper nuclear waste storage and disposal result in Environmental contamination.

25. Which reaction takes place in the biogas plant?

- The reaction takes place in the biogas plant is an aerobic fermentation.
- Biomass _digester anaerobic digestion_ biogas _energy.

26. What kind of mirror would be best suited for use in a solar cooker. why?

- .Concave mirror would be suited for use in a solar cooker
- .Concave mirror concentrate sunlight to produce the heat in solar furnace

27. Compare and contrast Biomass and energy hydroelectricity as sources of energy?

Ans. Biomass

- .Causes pollution
- .It is renewable sources of energy

.Hydroelectricity

- .Do not cause pollution
- .It is non renewable sources of energy

28.Explain the principle and working of a biogas plant?

- .The waste of living organisms like cow dung
- Various plant materials like the Residue vegetable waste sewage etc.
- .During the decay of Biomass in the absence of oxygen biogas is produced in biogas plant

.A slurry of cow dung and water is made into the mixing tank from while it is fed into the digester

.In the digester tank anaerobic microorganisms decomposers Complex molecules of cow dung slurry and produces biogas

29. List two ways in which animal dung can be utilised as a fuel out of these two which one do you think is better. justify your answer?

Ans. a..As cow dung cake b. .as biogas

Biogas is better than cow dung cake because it has I heating capacity and are non polluting as it burns without smoke and leaves no Residue like Ash slurry left in the biogas plant is a good manure for fields

30. What is solar cell?list out the application of the solar cell and limitation of the solar cell?

Ans .Solar cell it is a device that converts solar energy into electrical energy

Application of solar cell

- . Artificial satellites
- . Traffic light calculator
- . Radio and wireless transmission
- . TV relay stations

Limitations

- . Highly expensive
- . Low efficiency

31.What are the limitations of can be shown in single main energy form

A. Wind B. Waves C. Tides

Ans Wind. The windmills required wind speed more than 15 km per hour to generate electricity

Waves. Wave energy would be commercially viable only at place where waves are strong the energy produced from waves as to transmitted through long distance

Tides. The Rise and fall of water during Tides is not very large large scale generation of electricity is not possible

32. On what basis would you classify energy source as

a. Renewable and non-renewable **b)Exhaustible and**
inexhaustible

Are the option in a and b the same?

Ans. Renewable and nonrenewable

Renewable energy sources are those which reproduce on their own and are easily available in nature like solar energy tidal energy wind energy Biomass

Non renewable energy sources which do not represent their own and have limited availability in nature like fossil fuels which include petroleum coal and natural gas

Exhaustible and inexhaustible Classified on the basis of

Exhaustible sources of energy are those which deplete after few hundred years why coal and petroleum

Inexhaustible source of energy are those which do not deplete and are available in abundant quantity like solar and wind energy

Does the option given in A and B are essentially same

33. What are the advantages and disadvantages of using solar cooker? Are there places where solar cookers would have limited utility?

Ans. Advantages of solar cooker

. Solar cooker does not causes more pollution
wood LPG . Solar cooker save fuel like

Disadvantages of solar cooker

- . Food cannot be cooked on a cloudy day and at night
- . Large amount of food cannot be cooked using solar cooker
- .Solar cooker will Limited utility where Sun shines for a shorter period of time.

34.What are the environmental consequences of the increasing demand for energy what steps would you suggest to reduce energy consumption?

Ans. Industrialisation demand for more energy and to fulfill this demand fossil fuels are used as they are rapidly available due to their Harsh uses it has an impact on Environment too much exploitation of fossil fuels as lead to the greenhouse effect resulting in global warming

Steps to reduce energy consumption

- . Reducing the usage of fossil fuels and opting for alternative sources of energy
- . Reduce the unnecessary usage of electricity and water
- . Option for public transportation and less using one vehicles

CHAPTER 12 :ELECTRICITY

1. Define ohms law?

Ans: The potential difference, V across the ends of a given metallic conductor in a electric circuit is directly proportional to the current flowing through it. Provided its temperature remains same. $V=IR$

2. Define joules law of heating?

Ans: The heat produced in a conductor due to the flow of current is directly proportional to the time duration of current flow when the electrical resistance and the magnitude of current are constant. $H= VIt$ $H=I^2Rt$

3. List any two applications of joules law of heating

Ans: 1. The electric iron, electric oven, electric toaster, electric heater etc.. are based on Joule's heating effect.

2. The fuse works on the principle of Joule's heating effect.

3. The electric bulb works on the principle of Joule's heating effect.

4. list any two advantages of fuse in domestic electric circuits.

Ans: Prevents damage to the appliances and the circuit due to overloading.

Avoids short circuit

5. A current of 2A is drawn by a filament of electrical bulb for 5 minutes, find the amount of electric charge flows through the circuit.

Ans: $Q=It$ $Q=2 \times 300$ $Q=600C$

6. The resistivity of materials A and B are 2.63×10^{-8} and 1.84×10^{-6} which one is good conductor of electricity.

Ans: A is good conductor of electricity

7. An electrical gadget is connected to a 220V source battery. The current is 2A. calculate its power.

Ans: $P=VI$ $P=220 \times 2$ $P=440W$

8. Why are copper and aluminum wires are usually employed for electricity transmission.

Ans: Copper and aluminum wires are usually employed for electricity transmission because they are good conductors of electricity.

9. An electric Iron of resistance 20Ω takes a current of 5A calculate the heat developed in 30S.

Ans: $H=I^2Rt$ $H=5^2 \times 20 \times 30$ $H=25 \times 600$ $H=15000 j$

10. What potential difference must be applied across a 10Ω wire in order that a current of 2.5A flows through it.

Ans: $R=10\Omega$ $V=IR$
 $I=2.5 A$ $V=2.5 \times 10$
 $V=?$ $V=25 v$

11. Calculate the amount of charge that flows through a conductor when a current of 5A flows through it for 2 minutes.

Ans: $Q=?$
 $I=5A$
 $t=2 \text{ min} = 2 \times 60 = 120 \text{ sec}$
 $Q= It$ $Q=5 \times 120$ $Q=600C$

12. Compute the heat generated while transferring 96000 C of charge in two hours through a potential difference of 40V.

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

$$I = \frac{96000}{2 \times 3600} = 13.33 \text{ A}$$

$$H = VIt$$

$$H = 40 \times 13.33 \times 7200$$

$$H = 3.84 \times 10^6 \text{ J}$$

13. An electric iron of resistance 20Ω takes a current 5A. Calculate the heat developed in 30s.

Ans: $V = IR$

$$V = 5 \times 20$$

$$V = 100 \text{ V}$$

$$H = VIt$$

$$H = 100 \times 5 \times 30$$

$$H = 1.5 \times 10^4 \text{ J}$$

14. Why series arrangement is not used for domestic circuits.

Ans: 1. The current is constant throughout the electric circuit

2. Different gadgets need currents of widely different values to operate properly

3. when one component fail the entire circuit is broken and none of the components

works

15. What are the advantages of connecting electrical devices in parallel with a battery .

Ans: 1. Parallel circuit divides the current through the electrical gadgets.

2. The total resistance in a parallel circuit decreases and helps each gadget having different resistance and requires different current to operate properly.

16. How is ammeter connected in an electric circuit ? Why.

Ans: Ammeter is connected in series in an electric circuit, to measure the current in the circuit

17. How is voltmeter connected in an electric circuit ? Why.

Ans: Voltmeter is connected in parallel in an electric circuit, to measure the potential difference across the ends of conductor.

18. Why tungsten is used as filament in electrical bulbs.

Ans: Tungsten is used for filament of electric bulbs because,

1. Tungsten retain as much of the heat generated as possible, so that it gets very hot and emits light.

2. It has high melting point.

19. How does the resistance of a wire vary with it's length and area of cross section?.

Ans: The resistance of the wire increases as its length increases and decreases as its area of cross section increases

20. Which uses more energy a 250W TV set or a 1200W heater is 10minutes.

Ans: Energy consumed by TV

$$E = P \times t$$

$$E = 250 \times 600$$

$$E = 150000 \text{ J}$$

Energy consumed by heater

$$E = P \times t$$

$$E = 1200 \times 600$$

$$E = 720000 \text{ J}$$

Heater consumes More energy

21. A bulb is marked 220 V and 40 W. Calculate the current flowing through the bulb and its resistance.

Ans: $V = 220 \text{ V}$ $P = 40 \text{ W}$ $I = ?$ $R = ?$

$$P=VI \quad 40 = 220 \times I \quad I=0.1818$$

$$R=V/I \quad R=220/0.1818 \quad R= 1210 \text{ ohm}$$

22. The resistivity of two conductors 'A' and 'B' are $1.62 \times 10^{-8} \Omega \text{ m}$ and $5.20 \times 10^{-8} \Omega \text{ m}$ respectively. Which of them is used in : (i) Transportation of electricity (ii) The making of heating coils? Why?

Ans: i) Conductor A is used in transportation of electricity, because it's resistance is low.
 ii) Conductor B is used in making of heating coils, because it's resistance is high.

23. How much work is done in moving a charge of 2C across two points having a potential difference 12V?

Ans: $Q= 2C \quad V= 12v \quad W= ?$
 $W=VQ \quad W=12 \times 2 \quad W= 24J$

24. Compare the power used in 2Ω resistor in each of the following circuits.

i) 6V battery in series with 1Ω and 2Ω resistors

ii) a 4V battery in parallel with 12Ω and 2Ω resistors.

Ans: i) 6V battery in series with 1Ω and 2Ω resistors

$$V=6V$$

$$R= R_1 + R_2 = 1 \Omega + 2 \Omega = 3 \Omega$$

$$I=V/R=6/3=2A$$

$$P=I^2R= 2^2 \times 2 = 4 \times 2 = 8W$$

ii) a 4V battery in parallel with 12Ω and 2Ω resistors.

$$P=V^2/R=4^2/2 = 16/2 = 8W$$

25. Name the commercial unit of electric energy , express it in terms of SI unit of energy.

Ans: The commercial unit of electric energy is kWh(kilowatthour) commonly known as unit.

$$1kWh= 1000W \times 3600sec$$

$$=3.6 \times 10^6 \text{ wattsec}$$

$$=3.6 \times 10^6 \text{ joules.}$$

26. On what factors does the resistance of a conductor depends.

Ans: The factors on which the resistance of a conductor depends are

1. on its length
2. on its area of cross section
3. temperature
4. nature of the material

27. How fuse is helpful in domestic electric circuits .On what principle fuse works.

Ans: Fuse stops the excess current through the circuit avoids short circuit.

Prevents damage to the appliances and the circuit due to overloading.

Fuse works on the principle of joules law of heating

28. On what factors resistance of substance depends. Observe the following table which of the material is used for transmission of electricity , heating material and insulator why?

Material	Specific resistance(Ωm)
A	1.62×10^{-8}
B	100×10^{-6}
C	1×10^{10}

Ans: The material is used for transmission of electricity is A, because its resistance is low.

The material is used for heating is B because it has high resistance and high melting point. The material is used for insulator is C because they do not conduct electricity .

29. Find the number of electron in 1C of charge.

Ans: $1C = 1/1.6 \times 10^{-19}$

$$1C = 10^{19}/1.6$$

$$1C = 6.25 \times 10^{18} \text{ electrons.}$$

30. Why heating elements made of alloys rather than metals-Give reason.

Ans: Alloys are used in the electrical heating device because,

1. the resistivity alloys are generally higher than that of its constituent metals.
2. alloys do not oxidize readily at high temperatures

31) Three bulbs of 50W each are connected in series in an electrical circuit

i) Will the bulbs glow the same brightness . Justify your answer.

ii) When one bulb get fused what happens to the circuit? Will other bulbs glow.

iii) To overcome this problem how should the bulbs be connected .

iv) How electrical gadgets are connected in domestic circuits.

Ans: i) The bulbs will glow with the same brightness , as it is connected in series the flow of current is same

ii) When one bulb get fused the circuit will be broken. Other bulbs do not glow.

iii) To overcome this problem the bulbs are to be connected in parallel.

iv) Parallel

Sl.No.	Physical quantity	Definition	Formula	SI Unit	
1	Electric charge (Q)		$Q = It$	Coulomb (C)	6×10^{18}
2	Electric current (I)	The amount of charge flowing through a particular area in unit time	$I = Q/t$ $I = V/R$	Ampere (A) (Flow of one coulomb of charge per second)	Ammeter
3	Potential Difference (V)	Electric circuit carrying some current as the work done to move a unit charge from one point to another	$V = IR$ $V = \text{workdone}/\text{electric charge}$ $V = W/Q$	Volt (V) (One volt is the Potential difference between two points in a current carrying conductor when 1 joule of work done	Voltmeter

				to move a charge of 1 Coulomb from one point to the another)	
4	Resistance (R)	Property of a conductor to resist the flow of charges through it	$R = V / I$	Ohm (Ω)	
5	Electric resistivity (ρ)			Ohm Meter (Ωm)	
6	Electric Power (P)	The rate at which electricity is consumed in an electric circuit	$P = VI$ $P = I^2R$ $P = V^2/R$ $P = E/t$ $P = W/t$	Watt (W) Watt is power consumed by device that carries 1A current when operated at a potential difference of 1V	
7	Total Resistance (Rs) (series circuit)		$R_s = R_1 + R_2$		
9	Total Resistance (Rp) (parallel circuit)		$R_p = 1/R_1 + 1/R_2$		

CHAPTER 13: Magnetic effects of electric current

1. What is magnetic field?

The region surrounding a magnet in which the force of the magnet can be experienced is called magnetic field.

2. mention the properties of magnetic lines of force.

- #. Magnetic lines originate from North pole and end at its south pole
- #. Magnetic lines of force are closed and continuous curve
- #. Magnetic lines never intersect each other
- #. Magnetic lines of force are denser near the poles of a magnet

3. Why two magnetic lines of force never intersect each other?

if two magnetic lines of force intersect then there will be two tangents and hence two directions of the magnetic field at the point of intersection, this is not possible

4 why the needle of compass?

deflects when it is brought near a bar magnet?

Compass is a bar magnet. Magnetic lines of force interact with a bar magnet hence the middle of a compass deflects.

5. Find the magnetic field around straight conductor carrying current?

Right hand thumb rule

6. Write the pattern of magnetic field lines in the following.

- a) Straight conductor carrying current - concentric circles
- b) Current carrying circular loop- straight lines
- c) Current carrying circular coil-two concentric circles
- d) Solenoid- parallel straight lines

7. What is solenoid?

a coil of many circular turns of insulated copper wire wrapped closely in the shape of a cylinder is called a solenoid.

8. What is an electromagnet?

Soft iron placed inside a current carrying solenoid it magnetizes, this is called an electromagnet.

9. How a magnitude of magnetic field is related to current carrying conductor?

Magnitude of the magnetic field is directly proportional to the current passing through the wire

10. State right hand the rule?

Imagine that you are holding a current carrying straight conductor in your right hand such that thumb points towards the direction of the current. Then your fingers will wrap around the conductor in the direction of the field lines of the magnetic field.

11. Define electric motor?

The device which converts electrical energy into mechanical energy is called electric motor.

12. Name devices in which the electric motor is used.

Electric fan, refrigerator, mixer, washing machines

13. State Fleming's left-hand rule.

Stretch the thumb, forefinger and middle finger of your left hand such that they are mutually perpendicular. Middle finger shows the direction of current, fore finger shows the direction of the magnetic field then the thumb point in the direction of motion of conductor.

14. What is commutator?

A device that reverses the direction of flow of current through a circuit is called a commutator.

15. In a motor which part acts as a commutator?

Split rings

16. Define armature.

The soft iron core on which the coil is wound, plus the coils is called an armature

17. What is the principle of electric motor?

A conductor carrying current is placed in magnetic field experiences a mechanical force.

18. Name the instrument it used to detect the presence of electric current in a circuit.

Galvanometer

19. Mention the sources of direct current?

Dry cell, solar cell, acid battery

20. When does a conductor carrying current experiences maximum force in magnetic field?

When direction of current it is perpendicular to magnetic field

21. What is electromagnetic induction?

The process by which a changing magnetic field in a conductor induces a current in another conductor is called electromagnetic induction.

22. State Fleming's right-hand rule

stretch the thumb, forefinger and middle finger of right hand so that they are perpendicular to each other.

If the forefinger indicates the direction of the magnetic field and the thumb shows the direction of motion of conductor then the middle finger will show the direction of induced current

23. Define electric generator

Device used to convert mechanical energy into electrical energy is called electric generator.

24. Name the principal on which electric generator works

Electromagnetic induction

25. What is alternating current?

If the current changes its direction after equal intervals of time is called alternating current.

26. what is the difference between electric motor and generator

Electric motor	Electric generator
1. Converts electrical energy to mechanical energy	1. converts mechanical energy to electrical energy
2. Works on the principle, A conductor carrying current is placed in magnetic field experiences a mechanical force.	2. Works on the principle, Electromagnetic induction

27. What is direct current?

A current in which the magnitude and the direction do not change with time is called direct current.

28. Why alternating current is more preferred over direct current?

- The generation of alternating current is more economical than direct current
- Alternating current voltage can be easily step up or step down by using a transformer
- Alternating current can be transmitted to distant places with minimum loss

29. Which type of electric current is supplied to our homes, what is the voltage and frequency of that current?

Alternating current

Voltage is 220 V

Frequency is 50 Hertz

30. What is earthing?

Earthing is a wire usually connected to a metal plate deep into the earth near the house.

31. What is the significance of earthing?

Earthing ensure that any leakage of current to the metallic body of the appliance keeps its potential to that of the earth and the user may not get severe electric shocks.

32. What is the frequency of AC if it changes direction after every 1 /100 second?

50 Hertz.

33.what is the difference between direct current and alternating current?

Direct current flows in one direction where as the Alternating current reverses its direction periodically.

34. Which type of circuit used for geysers and air coolers?

15A

35. Which type of circuit is used for lighting and fans?

5A

36. What is the colour of insulation in the following

Live wire- Red

Neutral wire- black

Earth wire-green

37. when does overloading occur?

Overloading occurs

- when live wire and neutral wire come into direct contact
- Due to an accidental hike in the supply of voltage
- Connecting to many appliances to a single socket

38. What is short circuiting?

Due to overloading, loading the current in the circuit abruptly increases this is called short-circuiting.

39. What is the role of fuse in Electric circuit?

a fuse in a circuit prevents damage to the appliances and the circuit due to overloading

40.what precautions have to be taken to avoid overloading in domestic electric circuits?

- Too many appliances should not be connected to a single socket
- Too many appliances should not be used at the same time
- Fuse should be connected in the circuit
- Using separate circuits for high power and low power appliances

41. Mention any two safety measures taken in and domestic electric circuit

- Using fuse of appropriate rating
- Proper earthing
- separate circuits for high power and low power appliances

42. write the construction of eclectic motor and describe it's working.

Construction: rectangular insulated coil is kept perpendicular to the magnetic field the two

ends of coil is connected with split rings, which are connected to the outer circuit with carbon

brushes.

Working: the split rings make the flow of current it in the coil in one direction, the current is

supplied from outer circuit, according to the Fleming's left hand rule the coil in the magnetic

field experience the mechanical force which makes coil to rotate.

43. Write the construction of dynamo and describe it's working.

Construction: Rectangular insulated coil is kept perpendicular to the magnetic field the two

ends of coil is connected with slip rings which are connected to the outer circuit with carbon

brushes.

Working: When coil rotates in the magnetic field the electric current induced in the coil, the

slip rings make the flow of current it in the outer circuit in one direction or the full slip rings

makes current flow in alternate directions for every half rotation. According to the Fleming's

right hand rule the conductor attached to the changing magnetic field can induce electromotive

force in the conductor.

CHAPTER 14 :LIGHT - REFLECTION AND REFRACTION

1. What is refraction of light?

ANS: When light travel obliquely from one medium to another the direction of propagation of light in the second medium changes this phenomenon is known as refraction of light.

2. State Snell's law of refraction?

ANS: The ratio of sine of angle of incidence to the sine of angle of refraction is a constant for the light of a given colour and for the given pair of media

3. What is refractive index ?

ANS: The extent of the change in direction that takes place in a given pair of media is expressed as refractive index

4. Refractive index of water is 1.33, what does it mean ?

ANS: This means the ratio of the speed of light in air and the speed of light in water is equal to 1.33

5. Why convex lens is called converging lens?

ANS: Convex lens is the middle as compared to the edges and it can work and it converges the light rays.

6. Why concave lenses are called diverging lenses?

ANS: Concave lenses or thicker at the edge than at the middle so that diverge the light rays.

7. What is the SI unit of power of a lens?

ANS: Diopter

8. What is the meaning of 1 diopter.

ANS: 1 diopter is the power of a lens whose focal length is 1 meter

9. Lens having power +2D, which type of lens it is?

ANS: Convex lens

10. A lens is having power - 25 D, which type of lens it is?

ANS: Concave lens

12. Focal length of a lens is - 0.40m, what is its power?

ANS: $f = -0.40\text{m}$,

$$P = 1/f. \quad 1/-0.40 = -2.5\text{D}$$

13. A lens is having a power + 2.0 D, calculate its focal length?

ANS: $P = +2.0 \text{ D}$, $f = ?$

$$P = 1/f \quad 2.0 = 1/f \quad f = 1/2.0 \quad = 0.5\text{m}$$

14. State the laws of refraction of light

ANS: First law: The incident ray the refracted Ray and the normal to the interface of two transparent media at the point of incidence, all lie in the same plane

Second law: the ratio of sine of angle of incidence to the sine of angle of refraction is a constant for the light of a given colour and for the given pair of media

15. How real image is different from virtual image?

ANS: Real images can be obtained on a screen but virtual images cannot be obtained on screen.

Real images are inverted whereas virtual images are erect.

16. Name the factors that influence the refractive index.

- Nature of a medium
- Density of a medium
- Colour of light (wavelength)

17. What is the difference between convex lens and concave lens?

ANS:	Convex lens	Concave lens
	Thicker at the middle	Thinner at the middle
	Thinner at the edge.	Thicker at the edge
	Converging lens.	Diverging lens
	Bulged surface.	Curved inwards

18. Magnification of a 1-meter height object is 2. What is the magnification of image.?

ANS: $h = 1\text{m}$. $m = h'/h$

$$2 = h'/1. = 2$$

19. Focal length of a convex lens is 20 cm, at 15 cm image is formed. Find out the distance of a object?

ANS: $f = -20\text{cm}$ $v = -15\text{cm}$ $u = ?$

$$1/f. = 1/v - 1/u$$

$$1/-20 = 1/-15 - 1/u$$

$$1/u = 1/-15 - 1/20$$

$$1/u = -1/60$$

$$U = -60\text{cm}$$

20. State the laws of reflection of light .

ANS: 1st law :The Angle of incidence is equal to the angle of reflection

2nd law : The incident ray ,the normal to the mirror at the point of incidence and the reflected ray , all lie in the same plane

21.What are the properties of images formed by plane mirror.

ANS: * images are always virtual and erect

* The size of the image is equal to that of the object

* image is laterally inverted

* The image formed is as far behind the mirror as the object is in front of it.

22. Which type of spherical mirror forms erect and enlarged image?

ANS: Concave Mirror

23.Mention the 4 uses of concave mirror.

ANS: . *used in torches,search lights,and vehicle head lights *used as shaving mirrors

*dentists use to see larger image of teeth

* used in solar furnaces

24.Why concave mirrors are used solar furnaces ?

ANS: used to concentrate sunlight to produce heat

25.. Which type of mirror is used head lights of the vehicles and why it is used?

ANS:Concave mirrors . to get powerful parallelbeams of light



26. Why convex mirrors are used as rear view mirrors?

ANS: Convex mirrors always give an erect ,diminished image ,as they have a wider field of view thus enabling the vehicle driver to view much larger image .

27. A ray light travelling in the air enters obliquely into water. Towards which side the light bends and give suitable reason for your answer.

ANS: Light ray bends towards the normal . air is rarer medium comparatively water is denser medium when light travels from rarer medium to denser medium it bends towards the normal

28. In front of ambulance vehicles why it is written like this  ?

ANS: When an ambulance vehicle moves on road , in rear view mirror of vehicles in front of the ambulance  laterally inverts and visible as 

29. with suitable reason explain in which material medium the light travel fastest ?

Material medium	Refractive index
A	1.36
B	1.44
C	1.33
D	1.47

ANS: In water air travels faster . speed of light is inversely proportional to refractive index of medium , so according to this table since C has less refractive index its light travels faster in it

30. Refractive index of kerosene, diamond and crown glass is 1.44, 2.42, 1.52 respectively, which material medium has highest optical density and why?

ANS: optical density is directly proportional to refractive index of medium . Here diamond has greater refractive index hence its optical density is higher

Formula ;

$$\text{Radius of curvature (R)} = 2f$$

$$\text{Mirror formula: } 1/f = 1/v + 1/u$$

$$\text{Mirror Magnification: } m = h'/h = -v/u$$

$$\text{Lens formula : } 1/f = 1/v - 1/u$$

$$\text{Magnification : } m = h'/h = v/u$$

$$\text{Power of a lens : } P = 1/f$$