

# Chapter - 1

## Chemical reactions and equations

---

1. Which one is a chemical change – rusting of iron or melting of iron? (1)
2. Name and state the law which is kept in mind while we balance a chemical equation. (1)
3. State one basic difference between a physical change and a chemical change. (1)
4. What happens when quick lime is added to water? (1)
5. What happens when  $\text{ZnCO}_3$  is heated in the absence of air? Give the relevant equation. (1)
6. Is burning of a candle, a physical change or a chemical change? (1)
7. Write a balanced chemical equation:  
$$\text{FeSO}_4(\text{s}) \xrightarrow{\Delta} \text{Fe}_2\text{O}_3(\text{s}) + \text{SO}_2(\text{g}) + \text{SO}_3(\text{g})$$
 (1)
8. Write the chemical equation for reactions that takes place when lead nitrate and potassium iodide solutions are mixed. (1)
9. Write a balanced chemical equation for the following reaction.  
Ethanol is warmed with ethanoic acid to form ethyl acetate in the presence of concentrated  $\text{H}_2\text{SO}_4$ . (1)
10. Why decomposing reactions are called the opposite of combination reactions? (1)
11. Why is photosynthesis considered an endothermic reaction? (1)
12. State the type of chemical reaction used for the extraction of metals from their naturally occurring chlorides or oxides. (1)
13. Why is hydrogen peroxide kept in coloured bottles? (1)
14.  $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$ , name the type of reaction. (1)
15. Why do silver articles become black after sometime when exposed to air? (1)
16. Give reasons why do chips manufactures usually flush bags of chips with gas such as nitrogen? (1)
17. Identify the substance that is oxidized and substance that is reduced in the reaction.  
$$\text{CuO}(\text{s}) + \text{H}_2(\text{g}) \rightarrow \text{Cu}(\text{s}) + \text{H}_2\text{O}(\text{l})$$
 (1)
18. Write a balanced chemical equation for a chemical combination reaction. (1)
19. Give an example of a double displacement reaction. (1)
20. Identify the reducing agent in the following reaction:  
$$\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$$
 (1)
21. List four observations that help us to determine whether a chemical reaction has taken place. (2)
22. (i) State the law which is followed in balancing a chemical equation.  
(ii) Balance the following chemical equation:  
$$\text{Fe} + \text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + \text{H}_2$$
 (2)
23. What is observed when carbon dioxide gas is passed through lime water?  
(i) For a short duration.  
(ii) For a long duration? Also write the chemical equations for the reaction involved. (2)
24. A copper plate was dipped into a solution of silver nitrate. After sometime, a black layer was observed on the surface of copper plate. State the reason for it and write chemical equation of the reaction involved. (2)

## Chapter – 2

# Acids, Bases & Salts

---

1. What is the common name of the compound  $\text{CaOCl}_2$ ? (1)
2. Write an equation to show the reaction between Plaster of Paris and water. (1)
3. Name the acid present in ant sting. (1)
4. Fresh milk has a pH of 6. When it changes into curd (Yogurt), will its pH value increases or decreases? Why? (1)
5. What would be the colour of litmus in a solution of sodium carbonate? (1)
6. Which gas is usually liberated when an acid reacts with a metal? (1)
7. Which is a stronger acid, with pH 5 or with pH = 2? (1)
8. Name a salt which does not contain water of crystallization. (1)
9. Name the sodium compound which is used for softening hard water. (1)
10. What is the effect of an increase in concentration of  $\text{H}^+$  ions? 1M HCl or 1M  $\text{CH}_3\text{COOH}$ . (1)
11. Why does tooth decay start when the pH of mouth is lower than 5.5? (1)
12. How is the concentration of hydronium ions ( $\text{H}_3\text{O}^+$ ) affected, when a solution of an acid is diluted? (1)
13. Classify the following salts as acidic, basic or neutral:
  - (i) NaCl
  - (ii)  $\text{Na}_2\text{SO}_4$
  - (iii)  $\text{CaCl}_2$
  - (iv)  $\text{K}_2\text{CO}_3$(2)
14. What is bleaching powder? How is it prepared? List two uses of bleaching powder. (2)
15. What is meant by the term pH of a solution? The pH of rain water collected from two cities A and B was found to be 6 and 5 respectively. The water of which city is more acidic? (2)
16. What is alkali? Give an example. (2)
17. Classify the following into acidic oxides and basic oxides:  
 $\text{Na}_2\text{O}$ ,  $\text{SO}_2$ ,  $\text{MgO}$ ,  $\text{CO}_2$  (2)
18. Classify the following salts into acidic, basic and neutral:  
Potassium sulphate, ammonium chloride, sodium carbonate, sodium chloride. (2)
19. Explain why, an aqueous solution of sodium sulphate is neutral while an aqueous solution of sodium carbonate is basic nature. (2)
20. Write the chemical name and formula of gypsum. What happens when gypsum is heated at 373 K. Write chemical equation for the reaction. (2)
21. Write one word/term for the following:
  - (i) Water soluble base
  - (ii) A substance which dissociates on dissolving in water to produce hydrogen ions
  - (iii) A reaction between an acid and a base to form salt and water.
  - (iv) A substance which dissociates on dissolving in water to produce hydroxide ions. (2)
22. Explain why, an aqueous solution of sodium sulphate is neutral while an aqueous solution of sodium carbonate is basic in nature. (2)

# Chapter – 3

## Metal & Non-metals

---

1. Name one metal and non-metal which exists in liquid state at room temperature? (1)
2. A non-metal X exists in two different forms Y and Z. Y is the hardest natural substance, where as Z is a good conductor of electricity. Identify X, Y and Z. (1)
3. A metallic ore 'X' reacts with dilute HCl to liberate a gas which turns lime water milky. Another ore 'Y' gives off a gas with the smell of rotten eggs on treatment with same acid. Which metallurgical processes are used for the extraction of the metals X and Y? (1)
4. Give an example of a metal which is the best conductor of heat. (1)
5. What happens when  $ZnCO_3$  is heated in the absence of air? Give the relevant equation. (1)
6. State two physical properties of gold which are of extreme use to jewelers. (1)
7. What is meant by metallurgy? (1)
8. Name the metal which has very low melting point and can melt with heat of your palm? (1)
9. An element X forms an oxide which turns red litmus blue. Identify whether X is a metal or non-metal. (1)
10. What is thermite reaction? (1)
11. Name a non-metal which is lustrous and a metal which is non-lustrous. (1)
12. Make a distinction between metals and non-metals with respect to the nature of their oxide. (1)
13. Aluminium and zinc do not corrode easily even though they are reactive metals. Give reason for your answer. (1)
14. Which gas is usually liberated when an acid reacts with a metal? (1)
15. Name the metal which reacts with a very dilute  $HNO_3$  to evolve hydrogen gas. (1)
16. Why is carbon not used for reducing aluminium from aluminium oxide? (1)
17. Why do we apply paint on iron articles? (1)
18. Why do silver articles become black after sometime when exposed to air? (1)
19. Name two solid metals and two solid non-metals along with their symbols. (2)
20. Define amphoteric oxides. Give two examples of such oxides. (2)
21. What are ionic compounds? List two properties of these compounds. (2)
22. Explain the steps for extraction of copper from its sulphide ore. Write the balanced equations involved in the process. (2)
23. Name two metals that start floating after sometime when immersed in water and explain why they do so. (2)
24. Ionic compounds conduct electricity only in the molten state and not in solid state. Why? (2)
25. Why do ionic compounds have high melting points? State reason. (2)
26. Explain why calcium metal after reacting with water starts floating on its surface. Write the chemical equation for the reaction. (2)
27. What is meant by refining of metals? In the electrolytic refining of metal M, name the cathode, anode and the electrolyte. (2)
28. Differentiate roasting and calcinations process giving one example of each. (2)

## Chapter – 4

# Carbon & Its Compounds

---

1. Why homologous series of carbon compounds are so called? Write chemical formula of two consecutive members of a homologous series and state the part of these compounds that determines their (i) physical properties, and (ii) chemical properties. (3)
2. Write two tests you would perform to detect, whether the given colourless liquid is Acetic Acid or not. (2)
3. A carboxylic acid  $C_2H_4O_2$  reacts with an alcohol in the presence of  $H_2SO_4$  to form a compound 'X'. The alcohol on oxidation with alkaline  $KMnO_4$  gives the same carboxylic acid,  $C_2H_4O_2$ . Write the name and structure of (i) Carboxylic acid, (ii) alcohol and (iii) the compound 'X'. (3)
4. An organic compound 'X' on heating with conc.  $H_2SO_4$  forms a compound 'Y' which on addition of one molecule of hydrogen in the presence of nickel forms a compound 'Z'. One molecule of compound 'Z' on combustion forms two molecules of  $CO_2$  and three molecules of  $H_2O$ . Identify giving reasons the compounds 'X' 'Y' and 'Z'. Write the chemical equations for all the chemical reactions involved. (5)
5. State the reason why carbon can neither form  $C^{4+}$  cations nor  $C^{4-}$  anions, but forms covalent compounds. Also state reasons to explain why covalent compounds:
  - (a) are bad conductors of electricity?
  - (b) have low melting and boiling points? (5)
6. What are homologous series of carbon compounds? Write the molecular formula of two consecutive members of homologous series of aldehydes. State which part of these compounds determines their (i) physical and (ii) chemical properties. (3)
7. Explain why carbon forms compounds mainly by covalent bond. Explain in brief two main reasons for carbon forming a large number of compounds. Why does carbon form strong bonds with most other elements? (5)
8. List two observations which you make when you add a pinch of sodium hydrogen carbonate to acetic acid in a test tube. Write the chemical equation for the reaction that occurs. (2)
9. Write the number of covalent bonds in the molecule of ethane. (1)
10. List two tests for experimentally distinguishing between an alcohol and a carboxylic acid and describe how these tests are performed. (3)
11. Both soap and detergent are some type of salts. What is the difference between them? Describe in brief the cleansing action of soap. Why do soaps not form lather in hard water? List two problems that arise due to the use of detergents instead of soaps. (5)
12. When you add sodium hydrogen carbonate to acetic acid in a test tube, a gas liberates immediately with a brisk effervescence. Name this gas. Describe the method of testing this gas. (2)
13. What are covalent compounds? Why are they different from ionic compounds? List their three characteristic properties. (3)
14. What are covalent compounds? Why are they different from ionic compounds? List their three characteristic properties. (3)

## Chapter – 5

# Periodic classification of elements

---

1. The elements of the third period of the Periodic Table are given below:

Group →	I	II	III	IV	V	VI	VII
Period ↓	Na	Mg	Al	Si	P	S	Cl

- (a) Which atom is bigger, Na or Mg? Why?  
(b) Identify the most (i) metallic and (ii) non-metallic element in Period 3.  
(c) Which is more non-metallic, S or Cl?  
(d) Which has higher atomic mass, Al or Cl? (5)
2. State modern periodic law of classification of elements. (1)
3. The electronic configuration of an element 'X' is 2, 8, 8, 2. To which (a) period and (b) group of the modern periodic table does 'X' belong? State its valency. Justify your answer in each case. (3)
4. Four elements P, Q, R and S have atomic numbers, 12, 13, 14 and 15 respectively. Answer the following questions giving reasons:  
(i) What is the valency of Q?  
(ii) Classify these elements as metals and non-metals.  
(iii) Which of these elements will form the most basic oxide? (3)
5. Based on the group valency of elements state the formula for the following giving justification for each:  
(i) Oxides of 1<sup>st</sup> group elements,  
(ii) Halides of the elements of group 13, and  
(iii) Compounds formed when an element of group 2 combines with an element of group 16. (3)
6. (a) Define the following terms:  
(i) Valency (ii) Atomic size  
(b) How do the valency and the atomic size of the elements vary while going from left to right along a period in the modern periodic table? (3)
7. Study the following table in which positions of six elements A, B, C, D, E and F are shown as they are in the modern periodic table:
- |          |   |   |        |    |    |    |    |    |    |
|----------|---|---|--------|----|----|----|----|----|----|
| Group →  | 1 | 2 | 3 – 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Period ↓ |   |   |        |    |    |    |    |    |    |
| 2        | A |   |        |    |    | B  |    |    | C  |
| 3        |   |   |        | D  | E  |    |    |    | F  |
- On the basis of the above table, answer the following questions:  
(i) Name the element which forms only covalent compounds.  
(ii) Name the element which is a metal with valency three.  
(iii) Name the element which is a non-metal with valency three.