Full Test -Dose 5 | Chemistry X| All chapters I Time: 1.5h I Marks- 30

Q.1. 2 g of silver chloride is taken in a China dish and the China dish is placed in sunlight for some time. What will be your observation in this case? Write the chemical reaction involved in the form of a balanced chemical equation. Identify the type of chemical reaction. **(3 Marks)**

Q.2. Identify the type of reactions taking place in each of the following cases and write the balanced chemical equation for the reactions.

(a) Zinc reacts with silver nitrate to produce zinc nitrate and silver.
(b) Potassium iodide reacts with lead nitrate to produce potassium nitrate and lead iodide.

(3 Marks)

Q. 3. Identify the acid and the base from which sodium chloride is obtained. Which type of salt is it? When is it called rock salt? How is rock salt formed? **(3 Marks)**

Q.4. a) List in tabular form three chemical properties on the basis of which we can differentiate between a metal and a non-metal.

(b) Give reasons for the following:

(i) Most metals conduct electricity well.

(ii) The reaction of iron (III) oxide [Fe_2O_3] with heated aluminium is used to join cracked machine parts. **(5 Marks)**

Q.5. Write the chemical formula and name of the compound which is the active ingredient of all alcoholic drinks. List its two uses. Write chemical equation and name of the product formed when this compound reacts with

(i) sodium metal

(ii) hot concentrated sulphuric acid **(5 Marks)**

Q.6. What is methane? Draw its electron dot structure. Name the type of bonds formed in this compound. Why are such compounds:

(i) poor conductors of electricity? and

(ii) have low melting and boiling points?

What happens when this compound bums in oxygen? **(5 Marks)**

Q.7. Blue litmus solution is added to two test tubes A and B containing dilute HC1 and NaOH solution respectively. In which test tube a colour change will be observed? State the colour change and give its reason. **(2 Marks)**

Q.8. What is observed when 2 mL of dilute hydrochloric acid is added to 1 g of sodium carbonate taken in a clean and dry test tube? Write the chemical equation for the reaction involved. **(2 Marks)**

Q.9. In three test tubes A, B and C, three different liquids namely, distilled water, underground water and distilled water in which a pinch of calcium sulphate is dissolved, respectively are taken. An

equal amount of soap solution is added to each test tube and the contents are shaken. In which test tube will the length of the foam (lather) be longest? Justify your answer. **(2 Marks)**

Q.10. Identify the acid and base which form sodium hydrogen carbonate. Write a chemical equation in support of your answer. State whether this compound is acidic, basic or neutral. Also, write its pH value. **(3 Marks)**

Q.11. Explain the following:

1. Sodium chloride is an ionic compound which does not conduct electricity in solid state where as it does conduct electricity in molten state as well as in aqueous solution.
2. Reactivity of aluminium decrease if it is dipped in nitric acid.
3. Metals like calcium and magnesium are never found in their free state in nature.

(3 Marks)

Q.12. Write the molecular formula of the 2nd and the 3rd member of the homologous series whose first member is methane. **(3 Marks)**

Q.13. Write the structural formula of ethanol. What happens when it is heated with excess of conc. H_2SO_4 at 443 K? Write the chemical equation for the reaction stating the role of cone. H_2SO_4 in this reaction. **(3 Marks)**

Q.14. Distinguish between esterification and saponification reaction with the help of the chemical equations for each. State one use of each (i) esters, and (ii) saponification process. **(3 Marks)**

Q.15. Why are certain compounds called hydrocarbons? Write the general formula for homologous series of alkanes, alkenes and alkynes and also draw the structure of the first member of each series. Write the name of the reaction that converts alkenes into alkanes and also write a chemical equation to show the necessary conditions for the reaction to occur. **(5 Marks)**

Solution

1.

Initially, the colour of silver chloride is white but when it is kept in sunlight it breaks down to give silver and chlorine. Hence, the colour changes to grey.

$$2\,AgCl \xrightarrow{\text{Sunlight}} 2\,Ag + Cl_2$$

It is an example of Photo-Chemical Decomposition.

2. a. The given reaction is a displacement reaction.

$$\underset{(s)}{Zn} + 2\,\underset{(aq)}{AgNO_3} \rightarrow \underset{(aq)}{Zn(NO_3)_2} + 2\,\underset{(s)}{Ag}$$

b. It is a double displacement reaction

$$2\,KI_{(aq)} + Pb(NO_3)_{2(aq)} \rightarrow 2\,KNO_{3(aq)} + PbI_{2(s)}$$

3.

NaCl is made by reacting an acid and a base. The base is NaOH (Sodium hydroxide). So,

$HCl + NaOH \rightarrow NaCl + H_2O$

It is a Neutralization Reaction.

It is known as rock salt in crystalline form.

It is the result of the evaporation of ancient oceans millions of years ago. Sometimes pressure from deep inside the Earth forces up large masses of rocks to form salt-like domes.

4.a.

S. No.	Metals	Non Metals
1.	They react with oxygen to form basic oxides. $2\,Mg + O_2 \rightarrow 2\,MgO$ (Magnesium → Magnesium oxide)	They react with oxygen to produce acidic or neutral oxides. $4\,C(S) + O_2(g) \rightarrow CO_2(S)$ (Carbon → Carbondioxide)
2.	They react with water to produce metal hydroxide and hydrogen gas. $Mg + 2H_2O \rightarrow Mg(OH)_2 + H_2$	They do not react with water.
3.	Generally they do not combine with hydrogen except sodium, potassium, calcium which form ionic hydrides.	They react with hydrogen to form covalent hydrides.

(b)

(i) Metals, for example, Na has an electronic configuration of 2, 8, 1 i.e. It has one free electron. This electron moves through the metal and conducts electric current due to the presence of free electron.

(ii) Fe_2O_3 (s) + 2Al (s) → Al_2O_3 (s) + 2Fe (l) + Heat

It is thermite reaction

This reaction is an exothermic reaction the reaction produces a large amount of heat due to which iron metal is produced in molten form and use to join the tracks.

5. The name of the ingredient of the alcoholic drink is ethanol.

Its formula is C_2H_5OH.

Two uses of ethanol (C_2H_5OH) are:

1. It is used as a solvent in various industries.

2. It is also used as an antiseptic solution.

(i) Reaction of ethanol with sodium metal

$$\underset{\text{Ethanol}}{C_2H_5OH} + Na \rightarrow \underset{\text{Sodium ethanoate}}{C_2H_5ONa} + H_2$$

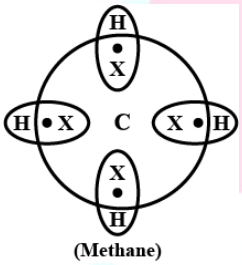
(ii) Reaction of ethanol with conc. H_2SO_4

$$\underset{\text{Ethanol}}{C_2H_5OH} \xrightarrow[H_2SO_4]{\text{Conc.}} \underset{\text{Ethene}}{CH_2 = CH_2} + H_2O$$

6. Methane is a Hydrocarbon formed by the combination of carbon with Hydrogen.

Its molecular formula is CH_4. It is the main greenhouse gas. The type of bond formed in methane is a covalent bond.

Electron dot structure of methane (CH_4):



(Methane)

(i) Covalent compounds are poor conductors of electricity because it has no free electrons to conduct electricity. Moreover, this compound is formed by sharing of electrons. So, no electron is available for the conduction.

(ii) They have weak forces of attraction between them so less energy is required to break the force of binding. Thus, they have low melting and boiling points. When this compound burns in oxygen, the combustion reaction takes place.

$$CH_4 \xrightarrow{O_2} CO_2 + H_2O + \text{Heat} + \text{light}$$

7. Test tube A will show colour change because acids turn blue litmus to red. So the final colour of the test tube would be red.

8

A brisk effervescence would be observed if HCl is added to Na2CO3 due to the evolution of CO2 gas.

$Na_2CO_3 + HCl \rightarrow NaCl + H_2O + CO_2$

9. Length of foam would be longest in test tube A. It is because it does not have any ions, so the length of the foam would be longest.

10.

The acid and base that forms Sodium Hydrogen Carbonate are as follows:

Acid – H_2CO_3

Base – NaOH

The chemical equation for its formation will be

$$\underset{\text{Sodium Hydroxide}}{NaOH} + \underset{\text{Hydrogen Bicarbonate}}{H_2CO_3} \rightarrow \underset{\text{Sodium Hydrogen carbonate}}{NaHCO_3} + H_2O$$

The compound will be basic and its pH value will be around 8.

11.

1. Sodium chloride is an ionic compound but it conducts electricity only in molten and aqueous state because in molten and aqueous form the compound liberate to give ions. These ions move freely and hence conduct electricity.
2. Reactivity of aluminium decreases if it is dipped in nitric acid because it is a strong oxidising reagent. The layer of aluminium oxide prevents further reaction of aluminium due to which its reactivity decreases.
3. Metals like calcium and magnesium are never found in their free states in nature because these metals are present on the top of the reactivity series. They are so reactive that they react with gases and surrounding elements, form compounds and thus are not found in free state.

12. Ethane – C_2H_6

Propane – C_3H_8

13.

Structural formula of ethanol is:

CH_3CH_2OH

When ethanol is heated with excess of conc. H_2SO_4 at 443K it results in the dehydration of ethanol to give ethene.

$$\underset{\text{Ethanol}}{CH_3CH_2OH} \xrightarrow[443\,K]{\text{Conc. } H_2SO_4} \underset{\text{Ethene}}{CH_2=CH_2} + H_2O$$

Role of conc. H_2SO_4: Conc. H_2SO_4 acts as a dehydrating agent which removes water from the ethanol.

14. Esterification is opposite of saponification. In esterification:

RCOOH + R'OH → RCOOR' + H2O

Whereas in saponification:

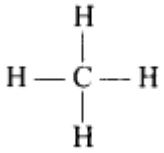
RCOOR' + NaOH → RCOONa + R'OH

(i) Uses of Esters: Esters are used in making perfumes.

(ii) Uses of saponification reaction: Used in making soaps and soap products on a large scale.

15. Compounds consisting of carbon and hydrogen are known as hydrocarbons.

1. Saturated hydrocarbons: Alkanes (CnH2n+2) are the compounds of carbon which have single bond.



2. Unsaturated hydrocarbons: The compounds of carbon having double bonds are alkene (CnH2n) and those having triple bonds are alkyne (CnH2n-2).

The reaction which converts unsaturated hydrocarbons to saturated hydrocarbons i.e., alkenes to alkane is known as hydrogenation reaction. It is used to obtain ghee from oil.