Full Test -Dose 6 | Chemistry X| All chapters I Time: 1.5h I Marks- 35

Q.1. Why should curd and sour substances not be kept in brass and copper vessels? **(1 Mark)**

Q.2. Metal compound A reacts with dilute hydrochloric acid to produce effervescence. The gas evolved extinguishes a burning candle. Write a balanced chemical equation for the reaction if one of the compounds formed is calcium chloride **(2 Marks)**

Q. 3. Plaster of Paris should be stored in a moisture proof container. Explain why? **(1 Mark)**

Q.4. Why does an aqueous solution of an acid conduct electricity ? **(1 Mark)**

Q.5. What will happen if a solution of sodium hydrogen carbonate is heated. Give the equation of the reaction involved ? **(1 Mark)**

Q.6. What are esters? Write an equation to show the formation of an ester **(2 Marks)**

Q.7. Name the raw materials that are required for the manufacture of washing soda by Solvay process. Describe the chemical reactions involved in the process **(3 Marks)**

Q.8. Write about different chemical processes used for obtaining a metal from its oxides, for metals low in the activity series, metals in the middle of activity series and metals towards the top of the activity series. **(5 Marks)**

Q.9. Explain the mechanism of the cleaning action of soaps. **(2 Marks)**

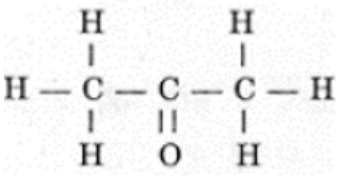
Q.10. a) Why is sulphuric acid called 'King of Chemicals'?

b) State two ways to prevent the rusting of iron.

c) Why should water be never added dropwise to concentrated sulphuric acid? **(3 Marks)**

Q.11. a) Why are covalent compounds generally poor conductors of electricity?

b) Name the following compound:



c) Name the gas evolved when ethanoic acid is added to sodium carbonate. How would you prove the presence of this gas? **(3 Marks)**

Q.12. a) What are amphoteric oxides? Choose the amphoteric oxides from amongst the following oxides: Na_2O, ZnO, Al_2O_3, CO_2, H_2O

b) Why is it that non-metals do not displace hydrogen from dilute acids? **(3 Marks)**

Q.13. What change in the colour of iron nails and copper sulphate solution you observe after keeping the iron nails dipped in copper sulphate solution for about 30 minutes. **(2 Marks)**

Q.14. Name the functional group of organic compounds that can be hydrogenated. With the help of suitable example, explain the process of hydrogenation mentioning the conditions of the reaction and any one change in physical property with the formation of the product. Name any one natural source of organic compounds that are hydrogenated **(3 Marks)**

Q.15. What is meant by refining of metals? Name the most widely used method of refining impure metals produced by various reduction processes. Describe with the help of a labelled diagram how this method may be used for refining of copper. **(3 Marks)**

Solution

1. Curd and sour substances contain acids which can react with the metal of the vessel to form poisonous metal compounds which can cause food poisoning.

2.

$$\underset{\text{Calcium carbonate}}{CaCO_3\,(s)} + 2HCl\,(aq) \longrightarrow \underset{\text{Calcium chloride}}{CaCl_2\,(aq)} + CO_2\,(g) + H_2O\,(l)$$

3.

Plaster of Paris should be stored in a moisture proof container because the presence of moisture can cause slow setting of plaster of Paris by bringing about its hydration. This will make the plaster of Paris useless after sometime.

4.

The aqueous solution of an acid conducts electricity due to the presence of charged particles called ions in it.

5.

$$\underset{\text{Sodium hydrogen carbonate}}{2\,NaHCO_3} \xrightarrow{\text{Heat}} \underset{\text{Sodium carbonate}}{Na_2CO_3} + H_2O + CO_2$$

6. Esters are sweet smelling organic compounds. Their functional group is R_1COOR_2 where R_1 and R_2 are alkyl groups.

$$\underset{\text{Ethanoic acid}}{CH_3COOH} + \underset{\text{(Ethanol)}}{C_2H_5OH} \xrightarrow[\text{Warm}]{H_2SO_4} \underset{\text{Ethyl ethanoate (An ester)}}{CH_3COOC_2H_5} + H_2O$$

7. The raw materials needed for the manufacture of washing soda are: NaCl (sodium chloride), water, ammonia gas and limestone to give CO_2 gas.

$$NaCl + H_2O + CO_2 + NH_3 \longrightarrow NH_4Cl + NaHCO_3$$

$$2NaHCO_3 \xrightarrow{\text{Heat}} Na_2CO_3 + CO_2 + H_2O$$

$$\underset{\text{Sodium carbonate}}{Na_2CO_3} + 10H_2O \longrightarrow \underset{\text{Crystals of Washing Soda}}{Na_2CO_3.10H_2O}$$

8

Metals low in the activity series:

$$2HgS + \underset{(air)}{3O_2} \xrightarrow{\text{Heat}} 2HgO + 2SO_2 \uparrow$$

$$2HgO \xrightarrow{\text{Heat}} 2Hg + \underset{\text{Mercury metal}}{O_2}$$

Metals in the middle of activity series:

$$2ZnS + 3O_2 \longrightarrow 2ZnO + 2SO_2$$

$$ZnO + \underset{(coke)}{C} \xrightarrow{\text{Heat}} 2Zn + CO \uparrow$$

Metals on the top of the activity series:

$$\underset{\text{Enriched Bauxite ore}}{2Al_2O_3} \xrightarrow{\text{Current}} 4Al^{3+} + 6O^{2-}$$

$$\text{At cathode } 4Al^{3+} + 12e^- \longrightarrow 4Al$$

$$\text{At anode: } 6O^{2-} \longrightarrow 3O_2 + 12e^-$$

9. Most of the dirt is oily in nature. The oil does not dissolve in water. Moreover, soap molecules are sodium or potassium salts of long chair carboxylic acids. Each soap molecule has two parts which are (i) ionic part and (ii) hydrocarbon chain. Ionic part is water-loving or hydrophilic and soluble in water. The hydrocarbon chain is hydrophobic and is not soluble in water. Inside water, the soap molecules have a unique orientation in which its clusters of molecules form a structure called micelle. In the micelle, the ionic parts of soap molecules are oriented towards water and hydrocarbon chain tails away from water

10. a) Sulphuric acid is used for the manufacture of many types of industrial compounds, so, it is called the 'King of Chemicals'.

b) Two ways to prevent rusting of iron:

i) By changing the iron metal to its alloys like stainless-steel, cobalt steel etc.

ii) By painting the iron articles with paint etc.

c) Water should never be added to concentrated sulphuric acid, as this reaction is highly exothermic and the heat generated may splash out solution from the container and cause some accident in the laboratory.

11. a) Covalent compounds do not provide ions in aqueous solutions hence they do not conduct electricity.

b) Propanone/acetone

c) CO2 gas is obtained when ethanoic acid is reacted with sodium carbonate. Presence of the gas can be tested by passing the gas through lime water. Carbon dioxide gas turns lime water milky.

12. a) Amphoteric oxides are metal oxides which show both basic as well as acidic behaviour. ZnO, Al_2O_3

b) Non-metals cannot lose electrons to H+ to form H2 gas because nonmetals are electron-acceptors hence they do not react with dilute acids.

13.

$$\underset{\text{Iron (Grey)}}{Fe(s)} + \underset{\text{Copper sulphate (Blue)}}{CuSO_4(aq)} \rightarrow \underset{\text{Iron sulphate (Light green)}}{FeSO_4(aq)} + \underset{\text{Copper (Brown)}}{Cu(s)}$$

14. The functional groups of organic compounds that can be hydrogenated are alkenes and alkynes.

$$\underset{\text{Ethene}}{H_2C=CH_2} \xrightarrow[\text{Nickel Catalyst}]{H_2} \underset{\text{Ethane}}{CH_3-CH_3}$$

Unsaturated hydrocarbons undergo addition reactions with hydrogen in the presence of catalysts such as palladium or nickel to give saturated hydrocarbons. During this reaction, unsaturated compounds like vegetable oils which are in liquid state are converted to animal fats in solid state. Vegetable oil is an example of natural source of organic compound that are hydrogenated.

15. n electrolytic refining of copper, electrolyte is a solution of acidified copper sulphate. Anode is made up of impure copper. Cathode is made up of a strip of pure copper metal.

On passing current through the electrolyte, pure copper metal from the anode dissolves into the electrolyte i.e., acidified copper sulphate.

$$\underset{\text{(Impure copper)}}{Cu} \rightarrow Cu^{2+} + 2e^-$$

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

$$Cu^{2+} + 2e^- \rightarrow \underset{\text{(Pure copper)}}{Cu}$$

The soluble impurities go into the solution, whereas, the insoluble impurities settle down at the bottom of the anode and are known as anode mud.