2018

1. The catalyst used in Contact Process is V_2O_5

2. Write balanced eqn :-

i) Action of concentrated sulphuric acid on carbon.

$$C + 2H_2SO_4 \longrightarrow CO_2 + 2H_2O + 2SO_2$$
(conc)

ii) Action of dilute HCl on magnesium sulphite

$$MgSO_3 + 2HCl \longrightarrow MgCl_2 + H_2O + SO_2 \uparrow$$

3. Give one relevant observation :-

i) Lead nitrate solution is mixed with dilute hydrochloric acid and heated.

Initially a white ppt will be formed which will dissolves on heating.

ii) Barium chloride solution is slowly added to sodium sulphate solution

A white ppt of barium sulphate ($BaSO_4$) will be observed.

4. Name the gas evolved :-

i) Sulphur is oxidised by concentrated nitric acid — Nitrogen dioxide (NO_2)

ii) Action of dilute HCl on sodium sulphide — H_2S (Hydrogen sulphide)

iii) Action of cold and dilute nitric acid on copper — Nitric oxide (NO).

5. i) Name the acid used for the preparation of HCl gas in the laboratory. Why this acid is preffered to other acids?

concentrated sulphuric acid is used. It is preferred over other acids because it is a non-volatile acid.

ii) Give the balanced equation for the lab preparation of HCl gas.

$$NaCl + \underset{(conc)}{H_2SO_4} \xrightarrow[200^\circ C]{below} NaHSO_4 + HCl\uparrow$$

6. For the preparation of hydrochloric acid in laboratory –

i) Why direct absorption of HCl gas in water is not feasible?

This is because HCl gas is highly soluble in water. If the gas is passed directly through the delivery tube to dissolve in water back suction will take place. Due to this water may enter the hot flask and hence may break it.

ii) What arrangement is done to dissolve HCl gas?

Funnel arrangement is used to dissolve HCl gas in water as it provides large surface area and avoids back suction.

7. Chemically distinguish between sodium chloride and sodium nitrate solution

Chemical used	NaCl	$NaNO_3$
$AgNO_3$ solution	white ppt of AgCl	No ppt

8. Give the balanced equation :-
Copper sulphate from copper carbonate

$$CuCO_3 + \underset{(dil)}{H_2SO_4} \longrightarrow CuSO_4 + H_2O + CO_2 \uparrow$$

9. i) What type of salt is formed when the reactants are heated at a suitable temperature for the preparation of nitric acid.

Metal bisulphite

$$NaNO_3 + H_2SO_4 \xrightarrow[200^\circ C]{\text{below}} NaHSO_4 + HNO_3$$

$$KNO_3 + H_2SO_4 \xrightarrow[200^\circ C]{\text{below}} KHSO_4 + HNO_3$$

ii) Why glass apparatus is used in the lab preparation of nitric acid?

Because nitric acid vapours being highly corrosive will attack rubber, cork, etc. Hence, all glass apparatus are used.

10. Which property of concentrated sulphuric acid is shown by its reaction with 1) ethanol 2) carbon?

1) Dehydrating agent 2) Oxidising agent.

2016

1. Identify the gas evolved and ~~the~~ give the chemical test in the following cases :-

i) Dil HCl acid reacts with sodium sulphite

SO_2 gas is evolved.

Test :- $Na_2SO_3 + 2HCl \rightarrow 2NaCl + H_2O + SO_2 \uparrow$

When to a solution of hydrogen chloride, sodium sulphite solution is added, a suffocating odour gas is evolved which turns lime water milky and turns orange colour acidified potassium dichromate solution green.

ii) Dil HCl acid reacts with iron(II) sulphide.

H_2S gas is evolved.

Test :- $FeS + 2HCl \longrightarrow FeCl_2 + H_2S \uparrow$

To the solution of hydrogen chloride, iron(II) sulphide is added, a rotten egg smelling gas is evolved which turns lead acetate solution black.

2. The aim of the fountain experiment is to prove that <u>HCl is highly soluble in water.</u>

3. State your observation, when, dilute HCl acid is added to copper carbonate.

The reaction occurs with effervescence with evolution of colourless, odourless gas which turns lime water milky but has no effect on acidified potassium dichromate solution.

4. Write balanced equation for action of HCl acid on sodium bicarbonate.

$NaHCO_3 + HCl \longrightarrow NaCl + H_2O + CO_2 \uparrow$

5. Write a balanced equation for action of hot and concentrated nitric acid on copper.

$$Cu + 4HNO_3 \longrightarrow Cu(NO_3)_2 + 2H_2O + 2NO_2\uparrow$$

6. a) Cold, dilute nitric acid reacts with copper to give nitric oxide.

b) Hot, concentrated nitric acid reacts with sulphur to form nitrogen dioxide and sulphuric acid.

7. Write balanced equation for when concentrated sulphuric acid is added to sugar crystals.

$$C_{12}H_{22}O_{11} \xrightarrow[H_2SO_4]{conc} 12C + 11H_2O$$

8. A, B, C and D summarise the properties of sulphuric acid depending on whether it is dilute or concentrated.

A = Typical acidic property
B = Non-volatile acid
C = Oxidising agent
D = Dehydrating agent

Choose the property in the following cases:-

i) Preparation of HCl gas

$$NaCl + H_2SO_4 \text{(conc)} \xrightarrow[200°C]{below} NaHSO_4 + HCl\uparrow \text{ (Non-Volatile acid)}$$

ii) Preparation of copper sulphate from copper oxide

$$CuO + H_2SO_4 \longrightarrow CuSO_4 + H_2O \text{ (Acidic Property)}$$

iii) Action of concentrated sulphuric acid on sulphur.

$$S + 2H_2SO_4 \text{(conc)} \longrightarrow 3SO_2 + 2H_2O \text{ (Oxidising agent).}$$

9. Give balanced equation each to show the following properties of sulphuric acid :-

i) Dehydrating property

$$C_{12}H_{22}O_{11} \xrightarrow[H_2SO_4]{conc} 12C + 11H_2O$$

ii) Acidic Nature

$$CuO + H_2SO_4 \longrightarrow CuSO_4 + H_2O$$

iii) Non-volatile acid

$$NaCl + \underset{(conc)}{H_2SO_4} \xrightarrow[200\,^\circ C]{below} NaHSO_4 + HCl\uparrow$$