WORKSHEET 2

CHAPTER 11 – STUDY OF COMPOUNDS – SULPHURIC ACID

A. Fill in the blanks from the choices given within the brackets.

1. The common name of sulphuric acid is _____ (oil of vitriol/aqua regia)
2. Concentrated sulphuric acid is a less volatile acid because it has a _____ (high boiling point/low boiling point)
3. Sulphuric acid changes the colour of alkaline phenolphthalein from _____ (pink/blue) to _____ (colourless/red)
4. Concentrated sulphuric acid oxidizes hydroiodic acid to _____ (iodine/iodate)
5. Concentrated sulphuric acid is used in the laboratory preparation of nitric acid and hydrochloric acid because it is _____ (non-volatile/volatile) in comparison to these two acids.

B. Answer these questions.

1. Name all the products formed when copper is heated with conc. sulphuric acid.
2. Name all the products formed when chlorine gas is passed through sulphurous acid.
3. Write a balanced equation when sulphur dioxide gas is passed through iron(III) chloride solution.
4. What is the function of concentrated sulphuric acid in the preparation of carbon monoxide from oxalic acid?
5. Concentrated sulphuric acid should be kept in air-tight bottles. Why?

C. Write down the word equations for each of the following reactions:

1. Conc. sulphuric acid + Copper →
2. Conc. sulphuric acid + Sodium chloride →
3. Conc. nitric acid + Copper →
4. Conc. hydrochloric acid + Manganese dioxide →
5. Sodium hydroxide solution + Zinc →

D. Write chemical equations for obtaining the following from dil. sulphuric acid.

1. Hydrogen
2. Carbon dioxide
3. Sulphur dioxide
4. Hydrogen sulphide
5. A normal salt

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E. Answer the following.

1. What is the structure of sulphuric acid molecule?
2. How sulphuric acid is prepared from sulphur?
3. Draw the flowchart of the Contact Process for the production of sulphuric acid.
4. Write any three physical properties of sulphuric acid.
5. Write any three uses of sulphuric acid.

ANSWERS

WORKSHEET 2

A. Fill in the blanks.

1. oil of vitriol
2. high boiling point
3. pink to colourless
4. iodine
5. non-volatile

B. Answer these questions.

1. Products formed are copper sulphate, sulphur dioxide gas and water.
2. Products formed are sulphuric acid and hydrochloric acid.
3. $2FeCl_3 + SO_2 + H_2O \rightarrow H_2SO_4 + 2FeCl_2 + 2HCl$
4. Sulphuric acid acts as a dehydrating agent.
5. Conc. sulphuric acid is highly hygroscopic in nature. Thus, it absorbs large amount of moisture from air and changes to dilute form. Thus, it must be kept in air-tight bottles.

C. Write down the word equations for each of the following reactions:

1. Conc. sulphuric acid + Copper → Copper sulphate + Water + Sulphur dioxide gas
2. Conc. sulphuric acid + Sodium chloride → Sodium sulphate + HCl gas
3. Conc. nitric acid + Copper → Copper nitrate + Nitrogen dioxide + Water
4. Conc. hydrochloric acid + Manganese dioxide → Manganese chloride + Water + Chlorine
5. Sodium hydoxide solution + Zinc → Sodium zincate + Hydrogen

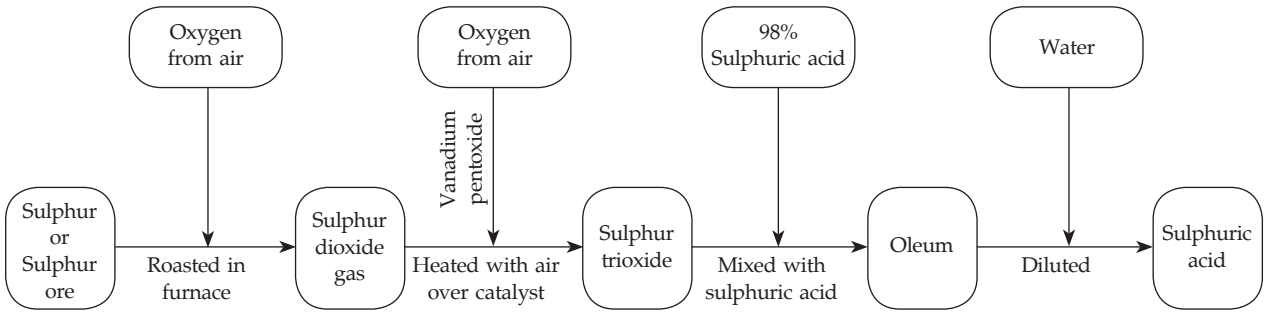
D. Write chemical equations for obtaining the following from dil. sulphuric acid.

1. $Zn + \text{dil. } H_2SO_4 \rightarrow ZnSO_4 + H_2$
2. $Na_2CO_3 + \text{dil. } H_2SO_4 \rightarrow Na_2SO_4 + H_2O + CO_2$
3. $Na_2SO_3 + \text{dil. } H_2SO_4 \rightarrow Na_2SO_4 + H_2O + SO_2$
4. $FeS + \text{dil. } H_2SO_4 \rightarrow FeSO_4 + H_2S$
5. $2NaOH + \text{dil. } H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

E. Answer the following.

1. The sulphuric acid molecule consists of one sulphur atom bonded to two oxygen atoms by double bonds and to two more by single bonds. The single bonded oxygen atoms are then bonded to hydrogen atoms.
2. When sulphur is warmed with concentrated nitric acid, it forms sulphuric acid as a byproduct.
   $S + 6HNO_3 \rightarrow H_2SO_4 + 2H_2O + 6NO_2$

3.



Flow chart for Contact process

4. Three physical properties of sulphuric acid:

   i. **Physical appearance:** Sulphuric acid is a colourless, odourless and oily liquid.

   ii. **Taste:** It has a slight sour taste.

   iii. **Nature:** Concentrated sulphuric acid is highly corrosive and hygroscopic in nature. When exposed to air, it absorbs moisture and increases in volume. So, it should be kept in stoppered bottles.

5. Three uses of sulphuric acid.

   i. It is used in lead storage batteries as H_2SO_4 undergoes electrolysis.

   ii. It is used in the manufacture of dyes, drugs and disinfectants.

   iii. It is used in the manufacture of explosives like nitroglycerine.