

# Sainik School Chandrapur

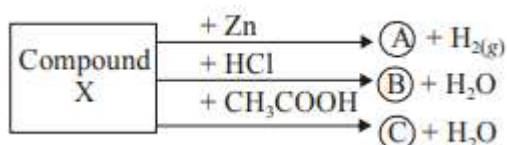
## Winter Vacation Work

CLASS X

Subject - Chemistry

### ACIDS, BASES AND SALTS

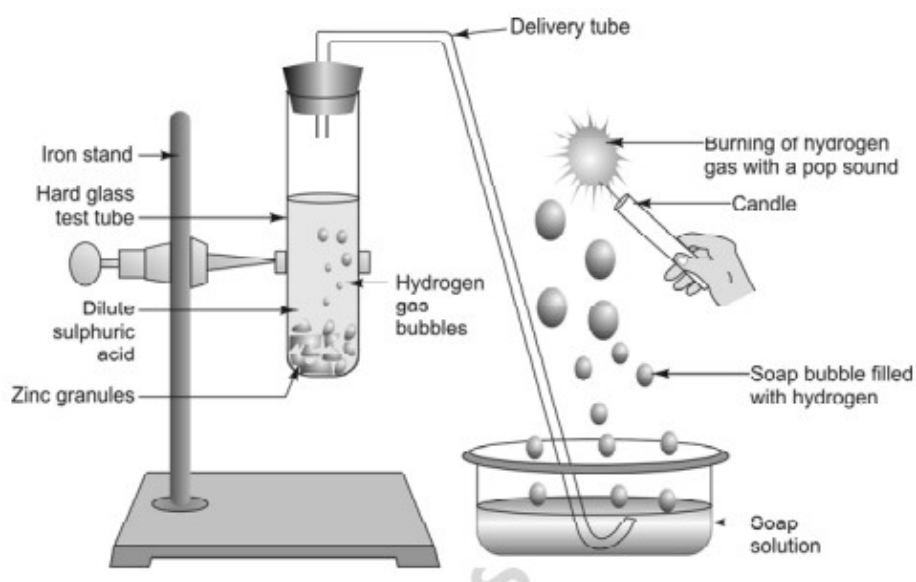
1. What will you observe when a spoonful of black copper oxide is placed in a beaker containing warm and dilute sulphuric acid? Write a balanced equation in support of your answer and state the nature of copper (II) oxide in this reaction.
2. In a test tube containing 4 ml of sodium hydroxide solution two drops of phenolphthalein and then hydrochloric acid is added drop by drop. State your observations and state the kind of reaction taking place.
3. A sodium salt is placed in a dry test tube. To this salt is added 5 ml of hydrochloric acid. Then a lot of effervescence takes place with the liberations of a colourless gas. The gas on passing through a colourless solution turns it milky. Answer the following questions.
  - (i) Which gas is produced during the chemical reaction?
  - (ii) What is the colourless solution and why does it turn milky?
  - (iii) Why is effervescence produced during the chemical reaction?
4. Identify the compound X on the basis of the reactions given below. Also, write the name and chemical formulae of A, B and C.



5. A metal carbonate X on reacting with an acid gives a gas which when passed through a solution Y gives the carbonate back. On the other hand, a gas (G) that is obtained at the anode during electrolysis of brine is passed on dry Y; it gives a compound Z, used for disinfecting drinking water. Identify X, Y, G and Z.
6. Fill in the missing data in the following table.

Name of the salt	formula	Salt obtained from	
		Base	Acid
(i) Ammonium chloride	NH <sub>4</sub> Cl	NH <sub>4</sub> OH	—
(ii) Copper sulphate	—	—	H <sub>2</sub> SO <sub>4</sub>
(iii) Sodium chloride	NaCl	NaOH	—
(iv) Magnesium nitrate	Mg(NO <sub>3</sub> ) <sub>2</sub>	—	HNO <sub>3</sub>
(v) Potassium sulphate	K <sub>2</sub> SO <sub>4</sub>	—	—
(vi) Calcium nitrate	Ca(NO <sub>3</sub> ) <sub>2</sub>	Ca(OH) <sub>2</sub>	—

7. A student prepared solutions of (i) an acid and (ii) a base in two separate beakers. She forgot to label the solutions and litmus paper is not available in the laboratory. Since both the solutions are colourless, how will she distinguish between the two?
8. Zinc granules are heated with conc. sodium hydroxide solution and the gas evolved is passed through soap solution, then the tiny bubbles of soap float up in the air. Answer the following questions.
  - (a) Which gas is evolved in the above reaction?
  - (b) Why do the soap bubbles rise up in the air?
  - (c) Write a word equation, and a fully balanced equation for the above reaction.
  - (d) Name three more metals which will show similar reaction as above.
9. In the following schematic diagram for the preparation of hydrogen gas as shown, what would happen if the following changes are made?

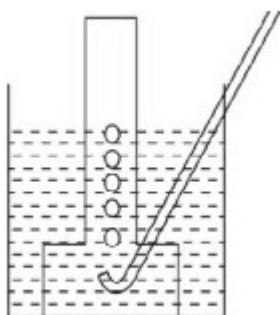


- (a) In place of zinc granules, same amount of zinc dust is taken in the test tube.
  - (b) Instead of dilute sulphuric acid, dilute hydrochloric acid is taken.
  - (c) In place of zinc, copper turnings are taken.
  - (d) Sodium hydroxide is taken in place of dilute sulphuric acid and the tube is heated.
10. Account for the following.
- (a) Dry HCl gas does not change the colour of dry blue litmus paper.
  - (b) Antacid tablets are used by a person suffering from stomach pain.
  - (c) Toothpaste is used for cleaning teeth.

11. (i) What are strong acids and weak acids? Give an example for each.
- (ii) While diluting an acid, why is it recommended that the acid should be added to water and not water to acid? (iii) A dry pellet of a common base 'B' when kept in open absorbs moisture and turns sticky. The compound is also formed by Chloralkals process. Identify B. What type of reaction occurs when B is treated with dilute hydrochloric acid? Write the chemical equation.
12. a) Make a pictorial chart of organic acids, showing the fruit and the acid contained in it.
- b) Make a chart showing: (i) Four strong inorganic acids  
(ii) Four weak inorganic acids  
(iii) Four organic acids.
- c) Make a pictorial chart of elements/compounds which can be obtained from common salt and state two or more uses of each product.

## ***Chemical Reactions and Equations.***

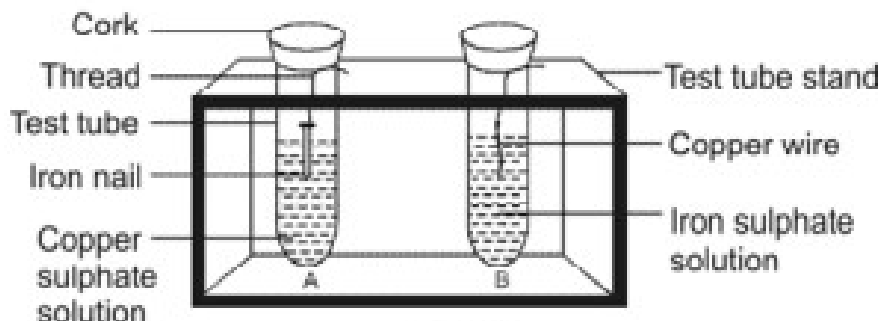
1. A metal is treated with dil.  $\text{H}_2\text{SO}_4$ , the gas evolved is collected by the method shown in the figure. Answer the following :



- (i) Name the gas.
- (ii) Name the method of collection of the gas.
- (iii) Is the gas soluble or insoluble in water?
- (iv) Is the gas lighter or heavier than air?
2. Write balanced equations for the reaction of :
- i) Iron with steam.
- ii) Calcium with water.
3. Write the balanced chemical equation for the following reaction and write the name of the reaction:

Barium chloride + Aluminium sulphate.  
Barium sulphate + Aluminium chloride.

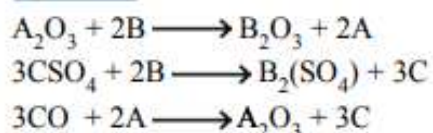
4. Observe the two test tubes A and B in the diagram given below and answer the following questions:



- (a) In which test tube will the reaction takes place?  
(b) Write a balanced equation of the reaction.  
(c) Name the type of reaction.
5. What happens when a piece of :
- (a) Zinc metal is added to copper sulphate solution?  
(b) Aluminium metal is added to dilute hydrochloric acid?  
(c) Silver metal is added to copper sulphate solution?

Also, write balanced chemical equation if the reaction occurs

6. A, B and C are three elements which undergo chemical reactions according to the following equations.



Answer the following questions with reasons:

- (a) Which element is the most reactive?  
(b) Which element is the least reactive?  
(c) What is the type of reactions listed above?
7. i). Zinc and aluminium are very high in metal activity series, yet they resist corrosion to a great extent. Explain.
- ii). Why are halides (chloride, bromide, and iodide) of silver kept in dark brown or black bottles?
8. i) State two uses of chemical decomposition reaction in industry.  
ii) What kind of chemical reaction takes place during the digestion of food?

9. i). Brightly polished iron nails are placed in copper nitrate solution. Describe all that you will observe after one hour.
- ii) A substance X, which is an oxide of a group 2 element, is used intensively in the cement industry. This element is present in bones also. On treatment with water it forms a solution which turns red litmus blue. Identify X and also write the chemical reactions involved.
- iii) Grapes hanging on the plant do not ferment but after being plucked from the plant can be fermented. Under what conditions do these grapes ferment? Is it a chemical or a physical change?
10. When the powder of a common metal is heated in an open china dish, its colour turns black. However, when hydrogen is passed over the hot black substance so formed, it regains its original colour. Based on the above information answer the following questions:
- (i) What type of chemical reaction takes place in each of the two given steps?
- (ii) Name the metal initially taken in the powder form. Write balanced chemical equations for both reactions.
11. "Oxidation and reduction processes occur simultaneously." Justify this statement with the help of an example. List out the differences between Oxidation and reduction process. With the help of suitable example, explain oxidation and reduction in terms of gain or loss of oxygen.
12. Which among the following changes are exothermic or endothermic in nature?
- (a) Decomposition of ferrous sulphate.
- (b) Dissolution of sodium hydroxide in water
- (c) Dissolution of ammonium chloride in water.

## **METALS AND NON METALS**

1. i) What important properties of aluminium are responsible for its great demand in the industry?
- ii) Give an example of a metal which
- a) Can be easily cut with a knife
- b) Is a liquid at room temperature.
2. i) Explain, why most of the metals do not displace hydrogen from Nitric acid.
- ii) A copper plate was dipped into a solution of  $\text{AgNO}_3$ . After sometime, a black layer was deposited on the copper plate. State the reason for it. Write the chemical equation of the reaction involved.
3. State reasons for the following observations:
- i) Electric wires are covered with rubberlike material.
- ii) The shining surface of some metals becomes dull when exposed to air for a long time.
- iii) Gold and silver are used to make jewellery.

4. i) Most metals do not react with bases but zinc metal does. Suggest a reason and write an equation for the reaction between zinc and NaOH.  
ii) metal which
- will react vigorously with cold water.
  - will react with only hot water.
  - will only react with steam.
  - will not react with water or even with steam.
5. Metal compound A reacts with dilute hydrochloric acid and to produce effervescence. The gas evolved extinguishes a burning candle and turns the limewater milky. Write balanced chemical equations for the reactions.
6. A non-metal A which is the largest constituent of air, when heated with  $H_2$  in 1 :3 ratio in the presence of catalyst (Fe) gives a gas B. On heating with  $O_2$  it gives an oxide C. If this oxide is passed into water in the presence of air it gives an acid D which acts as a strong oxidising agent. Identify A, B, C and D.

## **ACTIVITIES**

- List out four different type of chemical reactions in your daily routine, write the observations and conclusions.
- Make an olfactory indicator using finely chopped onion and vanilla essence and check the nature(acidic or basic) of following:  
Ghee, Curd, Milk, Vinegar, Lemon juice, Tomato juice, Tamarind filtrate and Soap solution.
- Name the constituents of the following alloys:  
Brass, Stainless steel, Bronze, Gun metal, German silver

## **PROJECTS**

- Prepare a poster for extraction of metals (metallurgy).
- List out the uses of following compounds.  
Sodium chloride, bleaching powder, washing soda, baking soda, plaster of paris and gypsum.