Chemical Reactions and Equations: In-Text Questions

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Q.1 Why should a magnesium ribbon be cleaned before burning in air?

Sol. A magnesium ribbon should be cleaned before burning in air because it forms magnesium oxide layer when comes contact with oxygen present in air. It is layer of stable compound. In order to prevent further reactions with Oxygen, it is necessary to clean the magnesium ribbon to remove the layer of MgO.

Q.2 Write the balanced equation for the following chemical reactions.

(i) Hydrogen + Chlorine → Hydrogen chloride

(ii) Barium chloride + Aluminium sulphate → Barium sulphate + Aluminium chloride

(iii) Sodium + Water → Sodium hydroxide + Hydrogen

Sol. **The balanced equation for the following chemical reactions:**

(i) $H_2 + Cl_2 \rightarrow 2HCl$

(ii) $3BaCl_2 + Al_2(SO_4)_3 \rightarrow 3BaSO_4 + 2AlCl_3$

(iii) $2Na + 2H_2O \rightarrow 2NaOH + H_2$

Q.3 Write a balanced chemical equation with state symbols for the following reactions.

(i) Solutions of barium chloride and sodium sulphate in water react to give insoluble barium sulphate and the solution of sodium chloride.

(ii) Sodium hydroxide solution (in water) reacts with hydrochloric acid solution (in water) to produce sodium chloride solution and water.

Sol: The balanced chemical equation with state symbols for the following reactions:

(i) $BaCl_2(aq.) + NaSO_4(aq.) \rightarrow BaSO_4(s) + 2NaCl(aq.)$

(ii) $NaOH(aq.) + HCl(aq.) \rightarrow NaCl(aq.) + H_2O(l)$

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Q.1 A solution of a substance 'X' is used for white washing.

(i) Name the substance 'X' and write its formula.

(ii) Write the reaction of the substance 'X' named in (i) above with water.

Sol.

(i) The chemical name of substance X, which is used for white washing is Calcium oxide or quick lime. The chemical formula of Calcium Oxide is CaO.

(ii) $CaO + H_2O \text{ ----------> } Ca(OH)_2$

Calcium Oxide (X) water Calcium hydroxide

When calcium oxide reacts with water it forms calcium hydroxide or slake lime.

Q.2 Why is the amount of gas collected in one of the test tubes in Activity 1.7 double of the amount collected in the other? Name this gas.

Sol. The activity 1.7 in the text book shows Hydrolysis of water. When electric current is passed through water it breaks down into its constituent components hydrogen and oxygen gases. In electrolysis of water, hydrogen gas is collected double in one test tube than oxygen collected in another test tube because a water molecule is formed by the combination of two atoms of hydrogen and one atom of oxygen in the ratio of 2:1.

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Q.1 Why does the colour of copper sulphate solution change when an iron nail is dipped in it?

Sol. When an iron nail is dipped in the blue solution of copper sulphate, iron displaces the copper from the copper sulphate solution and forms ferrous sulphate solution and copper metal. The colour of ferrous sulphate is green. That's why the solution changes its color.

Fe	+	$CuSO_4$	→	$FeSO_4$	+	Cu
Iron nail		Blue solution		Greenish solution		Brown color

Q.2 Give an example of a double displacement reaction other than the one given in Activity 1.10.

Sol. ***An example of a double displacement reaction:***

$$Pb(NO_3)_2(aq.) + KI(aq.) \rightarrow KNO_3 + PbI_2$$

When aqueous solution of lead nitrate ($Pb(NO_3)_2$) reacts with potassium iodide (KI), the both the reactants exchanges their irons and form potassium nitrate (KNO_3) and lead iodide (PbI_2). This type of reaction is known as double displacement reaction.

Q.3 Identify the substances that are oxidised and the substances that are reduced in the following reactions.

(i) $4Na(S)+O_2(g) \rightarrow 2Na_2O(S)$

(ii) $CuO(S)+H_2(g) \rightarrow Cu(S)+H_2O(l)$

Sol.

(i) In first reaction, sodium is combined with oxygen and oxidize to form sodium oxide. And consequently oxygen is reduced.

(ii) In second reaction, hydrogen combines with oxygen and forms water, hence it is oxidised. While copper loses oxygen and hence, it is reduced.