

Long Question Answer

Question 1.

State the number of water molecules present in crystals of washing soda and plaster of paris.

What are these water molecules called as?

(2013)

Answer:

Washing soda crystals contain 10 molecules of water ($\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$).

Plaster of Paris crystals contain $\frac{1}{2}$ molecule of water ($\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$ or $2\text{CaSO}_4 \cdot \text{H}_2\text{O}$).

The water molecules, which form part of the structure of a crystal, are called water of crystallization.

Question 2.

Two solutions A and B have pH 3 and 5 respectively. Which of the two solutions has more hydrogen ion concentration and which one is more acidic? Give reason for your answer. (2013)

Answer:

pH of solution A = 3,

pH of solution B = 5

Solution A is more acidic as solution A has more hydrogen ion concentration, because the pH of a solution is inversely proportional to the concentration of hydrogen ions in it. That is, a solution having low concentration of hydrogen ions has a higher pH value.

Question 3.

Explain why an aqueous solution of sodium sulphate is neutral while an aqueous solution of sodium carbonate is basic in nature. (2014)

Answer:

Aqueous solution of sodium sulphate gets hydrolysed to form sodium hydroxide and sulphuric acid which are strong base and strong acid respectively. So its aqueous solution is neutral.

When sodium carbonate is dissolved in water, it gets hydrolysed to some extent and forms sodium hydroxide and carbonic acid. Now sodium hydroxide is a strong base which is fully ionised and gives a large amount of hydroxide ions $[\text{OH}^- (\text{aq})]$. On the other hand, carbonic acid is a weak acid which is only slightly ionised and hence gives a small amount of hydrogen

ions $[H^+ (aq)]$. The mixture contains more of hydroxide ions than hydrogen ions, so it is basic in nature.

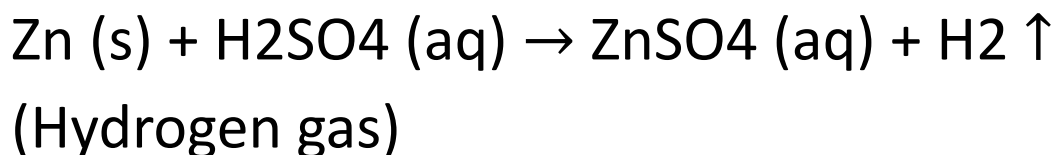
Question 4.

Name the gas which is usually produced when dil. sulphuric acid reacts with a metal. Illustrate it with an example. How will you test the evolution of this gas? (2015)

Answer:

Metals react with dil. sulphuric acid to give metal sulphates and hydrogen gas.

For example,



Test for hydrogen gas: Take about 5 ml of dilute sulphuric acid in a test tube and add a few pieces of zinc granules to it. Hydrogen gas is evolved which forms bubbles in the soap solution. Bring a burning candle near hydrogen gas-filled bubble. It burns with a pop sound.

Question 5.

Write a chemical equation to describe how baking soda is produced on a large scale. Also write chemical name of the products obtained.
(2014)

Answer:

The chemical name of baking soda is sodium bicarbonate (NaHCO_3) or sodium hydrogen carbonate. Sodium hydrogen carbonate is produced on a large scale by reacting a cold and concentrated solution of sodium chloride

(called brine) with ammonia and carbon dioxide.