

Acids Bases and Salts: NCERT In-Text Question

[Page – 18]

Q.1 You have been provided with three test tubes. One of them contains distilled water and the other two contain an acidic solution and a basic solution, respectively. If you are given only red litmus paper, how will you identify the contents of each test tube?

Sol. We identify the contents of each test tube through the red litmus paper. This can be done by changing its color.

Firstly, we pour the three solutions in the test tube on the red litmus paper separately. The solution which turns the red litmus to blue contains the basic solution. Now, we divide this blue litmus paper into two parts and pour solutions of the remaining test tubes on these two blue litmus papers. The solution which turns the blue litmus paper to red contains the acidic solution. And the solution which shows no change in blue litmus paper contains distilled water.

[Page – 22]

Q.1 Why should curd and sour substances not be kept in brass and copper vessels?

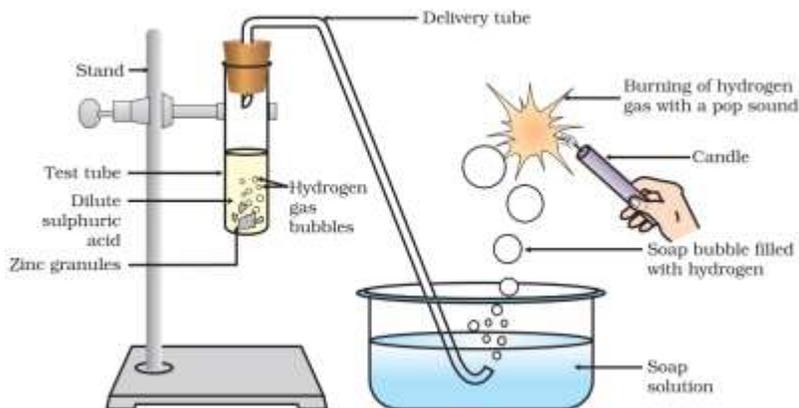
Sol. Since acids react with metals and give the salt and hydrogen gas. Curd and sour substances contain acids. If these substances are kept in copper container, the acid will react with this container and food item become poison which affect the health.

Q.2 which gas is usually liberated when an acid reacts with a metal? Illustrate with an example. How will you test for the presence of this gas?

Sol. When an acid reacts with a metals hydrogen gas is liberated.

Metal + zinc -----> Salt + Hydrogen gas

Let us take the example of reaction between zinc and sulphuric acid.

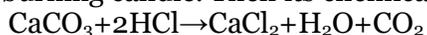


Required apparatus: a test tube, stand, delivery tube, soap solution, candle and matchbox etc.

Arrange the setup as shown in figure. Take about 5 ml of dil. H_2SO_4 in the test tube and a few granules of zinc are added to it. Now, cap the delivery in the test tube so that the evolved gas passes through the soap solution. Soap bubbles filled with the evolved gas come out from the solution. As we the flame of a lighted candle come in contact with the bubble. The gas in the bubble blasts with a pop sound. This activity proves that the gas evolved in the reaction between metal and acid is hydrogen.

Q.3 A Metal compound reacts with dilute hydrochloric acid to produce effervescence. The gas evolved extinguishes a burning candle. Write a balanced chemical equation for the reaction if one of the compounds formed is calcium chloride

Sol. A metal compound reacts with dilute hydrochloric acid to produce effervescence. The gas evolved extinguishes a burning candle. Then its chemical reaction is:

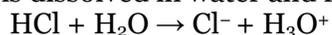


Q.1 Why do HCl, HNO₃, etc., show acidic characters in aqueous solutions while solutions of compounds like alcohol and glucose do not show acidic character?

Sol. When HCl, HNO₃, etc. are dissolved in water, the H⁺ ion gets separated and shows acidic character. But alcohol or glucose do not give H⁺ ion in water and do not show acidic character.

Q.2 Why does an aqueous solution of an acid conduct electricity?

Sol. When acid is dissolved in water and for aqueous solution, acids dissociate to form ions. Example:



These ions are responsible for conduction of electricity.

Q.3 Why does dry HCl gas not change the colour of the dry litmus paper?

Sol. In dry HCl, it does not give out H⁺ ions. So, it does not show acidic character and does not change the colour of the dry litmus paper.

Q.4 While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid?

Sol. While diluting an acid, it is recommended that the acid should be added to water and not water to the acid because the process of diluting an acid or a base is a highly exothermic. When we mix concentrated acid or base with water, the acid must always be added slowly to water with constant stirring. If water is added to a concentrated acid or base, it will release the huge amount of heat which may result splash out and cause acid burns on face, cloth and body parts. The glass container may also break due to this excessive amount of heat.

Q.5 How is the concentration of hydronium ions (H₃O⁺) affected when a solution of an acid is diluted?

Sol. Concentration of H₃O⁺ ion decreases when a solution of an acid is diluted.

Q.6 How is the concentration of hydroxide ions (OH⁻) affected when excess base is dissolved in a solution of sodium hydroxide?

Sol. Concentration of OH⁻ group increases when excess base is dissolved in a solution of sodium hydroxide.

Q.1 You have two solutions, A and B. The pH solution A is 6 and pH of solution B is 8. While solution has more hydrogen ion concentration. Which of this is acidic and which one is basic?

Sol. As we know that the pH of solution is inversely proportional to the concentration of hydrogen ion. So, the solution A with pH = 6 is acidic and has more hydrogen ion concentration than the solution B of pH = 8 which is basic.

Q.2 What effect does the concentration of H⁺(aq.) ions have on the nature of the solution?

Sol. Since, the concentration of H⁺ ions increases the solution becomes more acidic in nature.

Q.3 Do basic solutions also have H⁺ (aq.) ions? If yes, then why are these basic?

Sol. The basic solutions also have H⁺ (aq.) ions. But in basic solution, concentration of hydroxide ions (OH⁻) is more than hydrogen ions (H⁺). This H⁺ ion comes from water.

Q.4 Under what soil condition do you think a farmer would treat the soil of his fields with quick lime (calcium oxide) or slaked lime (calcium hydroxide) or chalk (calcium carbonate)?

Sol. If the farmer finds that his field' soil turns in to acidic, he should use the bases like quick lime (calcium oxide) or slaked lime (calcium hydroxide) or chalk (calcium carbonate) to neutralise it.

[Page – 33]

Q.1 What is the common name of the compound CaOCl_2 ?

Sol. The common name of the compound CaOCl_2 is Bleaching powder.

Q.2 Name the substance which on treatment with chlorine yields bleaching powder.

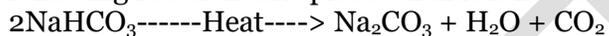
Sol. The substance which on treatment with chlorine yields bleaching powder is Calcium hydroxide or Dry slaked lime $[\text{Ca}(\text{OH})_2]$.

Q.3 Name the sodium compound which is used for softening hard water.

Sol. Washing soda or sodium carbonate (Na_2CO_3) is the sodium compound which is used for softening hard water.

Q.4 What will happen if a solution of sodium hydrocarbonate is heated? Give the equation of the reaction involved.

Sol. On heating sodium hydrogen carbonate, sodium carbonate and carbon di oxide gas is released. The following reaction take place when it is heated:



Q.5 Write an equation to show the reaction between Plaster of Paris and water.

Sol. The equation to show the reaction between Plaster of Paris and water:

