Class-X Chemistry

Topic - Question-Answer - 1 Chapter - 2

Q- You have been provided with three test tubes containing distilled water, acidic solution and basic solution separately. If you are given only red litmus paper how will you identify the contents of each test tube?

Ans- For the purpose, we put red litmus paper in all the three test tubes turn by turn. The solution which turns red litmus blue will be a basic solution. Now, we use this blue litmus paper. We put blue litmus paper in remaining two test tubes, the solution which turns blue litmus paper red will be acidic solution and the third test tube will contain distilled water.

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

Ans- When acid reacts with a metal hydrogen gas is evolved.

When dilute sulphuric acid reacts with zinc granules, then hydrogen gas is liberated with the formation of zinc sulphate.

$$Zn(s) + H_2SO_4(aq) \longrightarrow ZnSO_4(aq) + H_2(g)$$

Zinc Sulphuric acid Zinc sulphate Hydrogen.

In order to ~~check~~ test the gas

we bring a lighted stick near the gas jar containing hydrogen gas, it burns with a 'pop' sound making a little explosion.

Q. Metal compound A 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 compound formed is calcium chloride.

Ans. The metal compound is Calcium carbonate. When metal carbonate reacts with acid carbon dioxide gas is evolved with effervescence, which extinguishes burning candle. Since the compound produced is calcium chloride, so metal compound may also be calcium hydrogen carbonate.

$$CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + CO_2(g) + H_2O(l)$$

Q. Why do HCl, HNO_3 etc. show acidic character in aqueous solution while solutions of compounds like alcohol, and glucose do not show acidic character?

Ans. A substance shows acidic character due to presence of hydrogen ion (H^+) in its aqueous solution. When HCl, HNO_3 etc are dissolved in water, they produce hydrogen ion. So, they show acidic

character in aqueous solution. But the solutions of alcohol, glucose do not produce hydrogen ion in their aqueous solution and hence they do not show acidic character in aqueous solution.

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

Ans. In aqueous solution acids gets decomposed into ions. Due to presence of ions (charged particles) aqueous solution of acid conducts electricity.

For example, when HCl is dissolved in water, it gets dissociated into H^+ and Cl^- in its aqueous solution. Ions present in aqueous solution carry electric current.

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

Ans- Dry HCl gas does not change the colour of dry litmus paper because it has no H^+ ions, which is responsible for acidic character.

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

Ans The process of mixing water to a concentrated acid is highly

exothermic and i.e, large amount of heat is evolved. A concentrated acid is diluted by adding water.

When acid is added to water, the heat evolved is easily absorbed by large amount of water.

But when water is added to acid large amount of heat is evolved at once. This heat changes some amount of water into steam which can splash the acid on our body and may cause acid burns. Due to this it is suggested to add acid to water slowly during diluting it.

Q. How is the concentration of hydronium ion (H_3O^+) affected when the solution of an acid diluted?

Ans The concentration of hydronium ion (H_3O^+) decreases on diluting acid.

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

Ans The concentration of hydroxide ions (OH^-) increases when more sodium hydroxide is dissolved in its solution.