

Chemistry Practical Class 11 Determination of Strength of a Given Solution of Hydrochloric Acid by Titrating it Against Standard Sodium Carbonate Solution Viva Questions with Answers

Q1: What is Titration?

Answer:

Volumetric Analysis, a regularly used laboratory technique, is one of the most essential methods in Quantitative Analysis. It's used to figure out a sample's unknown concentration by measuring its volume. Titration is another name for this procedure. In titration, an unknown concentration solution reacts with a known concentration solution. The titrant is the solution used in the burette, while the analyte is the solution used in the conical flask.

Q2: Name a few common indicators.

Answer:

Some common indicators used to determine the endpoint in the volumetric analysis include phenolphthalein, methyl orange, and starch.

Q3: What is meant by the end point of a titration?

Answer:

End point refers to the point in a titration when the reaction is nearly complete. The chemical reaction is said to be finished when it reaches the end point. Indicators are used to determine the end point accurately.

Q4: What is the use of burette?

Answer:

A burette is a titration instrument made of glass. It's used to distribute any volume of liquid within a particular range of controlled circumstances.

Q5: What is normality?

Answer:

The amount of gram equivalents dissolved per litre of solution is referred to as normality.

$$N = \frac{\text{Strength of solution in g/L}}{\text{Equivalent weight of solute in grams}}$$

Q6: What is the difference between an end point and an equivalence point?

Answer:

The end point of a reaction occurs when the indicator indicates a visible change, indicating that it has been completed. The point at which stoichiometric amounts of the two reactants have been introduced is called the equivalence point. The visible end point and the equivalence point may or may not be the same.

Q7: What is a standard solution?

Answer:

The standard solution is a solution with a known concentration. A standard solution is made by dissolving a known amount of a substance in a specific volume of a solvent. The substance used to make the standard solution is divided into primary and secondary standards.

Q8: What is meant by the term 'concordant readings'?

Answer:

Concordant readings are volumetric analysis readings that differ by less than 0.05 mL.

Q9: Why must the burette and pipette be washed with the fluid they were filled with?

Answer:

The burette and pipette are rinsed with the solution they were filled with to eliminate any substance that can attach to their sides and reduce the volume of liquids that can be taken in them.

Q10: Why a titration flask should not be rinsed?

Answer:

This is because some liquid will adhere to the titration flask during rinsing, causing the pipetted volume taken in the titration flask to increase.

Q11: What is the principle of volumetric analysis?

Answer:

The concentration of a solution is determined via volumetric analysis by allowing a known volume of it to react quantitatively with another solution of known concentration.

Q12: What are the different types of Acid-Base titrations?

Answer:

1. Strong acid-Strong base titration: Titration of HCl versus NaOH
2. Strong acid-weak base titration: Titration of HCl versus NH_4OH
3. Strong base-weak acid titration: Titration of CH_3COOH versus NaOH
4. Weak acid-weak base titration: Titration of CH_3COOH versus NH_4OH

Q13: Why HCl is treated with standard sodium carbonate?

Answer:

The alkalinity of the solution is gradually reduced by HCl until the pH reaches 7. We can use more than one indicator since the reaction between sodium carbonate and hydrochloric acid occurs in two stages. The first stage should be done using phenolphthalein, and the second should be done with methyl orange.

Q14: Why isn't hydrogen chloride used as a primary standard?

Answer:

Because both hydrochloric acid, HCl, and sulfuric acid, H_2SO_4 , are commercially available as concentrated solutions that can be readily diluted, the concentration of the "concentrated" solution is not exactly known, they are not suitable for use as primary standards.

Q15: Why is methyl orange used in carbonate titration?

Answer:

We usually use strong acids for titrating carbonates, which are weak acids. The colour change corresponds to the initial reaction when using phenolphthalein as an end-point indicator. Because of its apparent and vivid colour change, methyl orange is an often used pH indicator in titrations.