SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES, COIMBATORE

CASE STUDY BASED PUZZLE

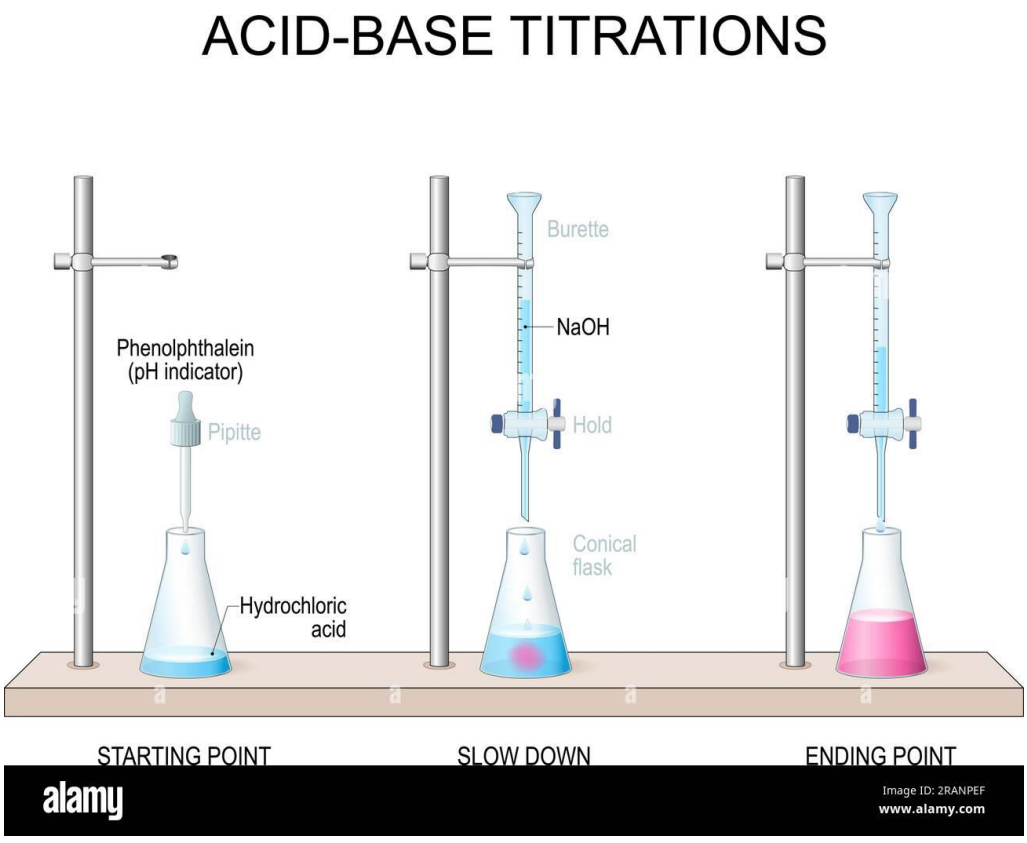
PHARMACEUTICAL ANALYSIS-I

UNIT 1

UNIT I: PREPARATION AND STANDARDIZATION OF VARIOUS MOLAR AND NORMAL SOLUTIONS.

Standardization of Sodium Hydroxide in Drug Formulation Testing:-

This is titrated against NaOH using phenolphthalein indicator, where the endpoint is a pink color change.



Puzzle Questions:

1. If 25 mL of 0.1 M oxalic acid requires 20 mL of NaOH for neutralization, calculate the molarity of the NaOH solution. Explain the concept of

equivalence point and why oxalic acid is preferred as a primary standard over other acid.

2. Suppose the oxalic acid is dihydrate (MW 126 g/mol). If 1.26 g is dissolved in 100 mL water, what is its normality? If this solution titrates 30 mL of NaOH, find the normality of NaOH (assume 1:1 equivalent for simplicity in basic conditions).
3. In a real lab, the NaOH solution absorbs CO2 from air, affecting its strength. Propose a hypothesis for how this impacts titration results and suggest storage methods to prevent it.
4. Preparation and Standardization of Hydrochloric Acid for pH Adjustment.

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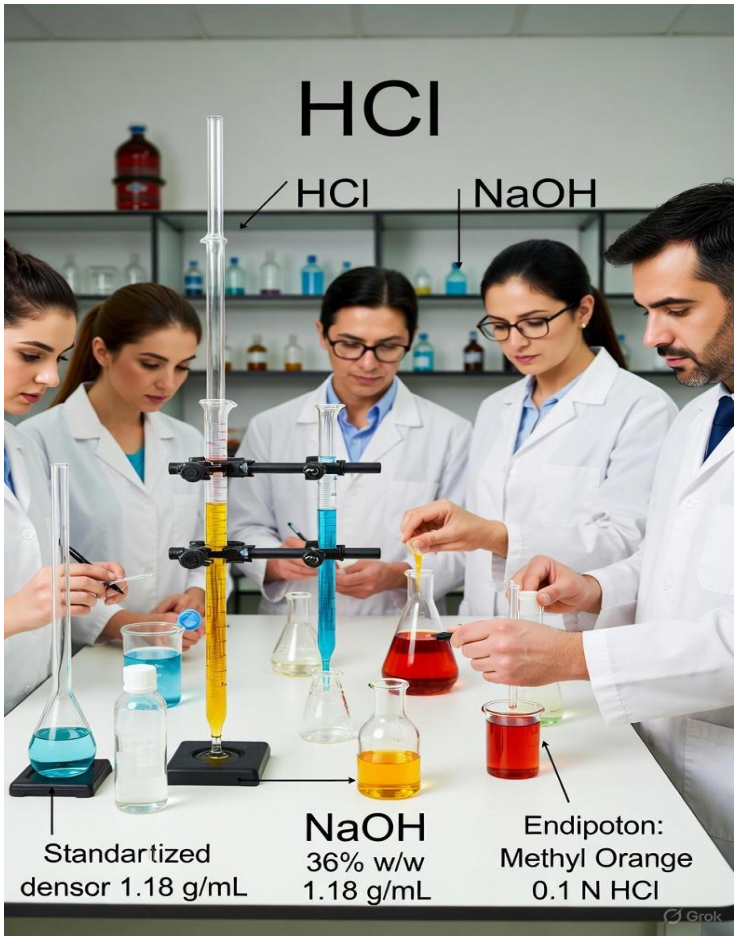
CASE STUDY BASED PUZZLE

PHARMACEUTICAL ANALYSIS-I

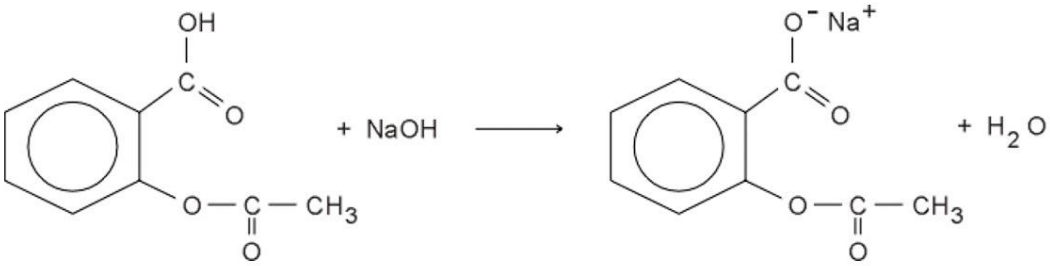
UNIT I: PREPARATION AND STANDARDIZATION OF VARIOUS MOLAR AND NORMAL SOLUTIONS.

Acid base titration:

A quality control team in a pharma company standardizes hydrochloric acid (HCl) for adjusting pH in injectable solutions. HCl is standardized against standardized NaOH using methyl orange indicator, where the endpoint is a color change from yellow to red. The reaction is: HCl + NaOH → NaCl + H_2O. A approximate 0.1 N HCl is prepared by diluting concentrated HCl (36% w/w, density 1.18 g/mL) with water.



TITRATION REACTION



Acid + Base → Salt + Water

Puzzle Questions:

1. If 10 mL of HCl requires 12 mL of 0.05 N NaOH for neutralization, calculate the normality and molarity of HCl. Differentiate between molarity and normality for HCl, and explain why normality is used in titrations.
2. To prepare 500 mL of 0.1 N HCl from concentrated HCl (36% w/w, MW 36.5 g/mol), how many mL of concentrated HCl are needed? If the titration shows the actual normality is 0.095 N, what error might have occurred during preparation?
3. During standardization, overheating the solution causes evaporation. How does this affect the calculated concentration? Suggest troubleshooting steps, like using a burette with precise volume markings, and predict outcomes.
4. Standardization of Sodium Thiosulphate in Iodometric Assays.