Experiment No. 01	Standardization of sodium hydroxide solution with standard oxalic acid solution

Questions for Report Writing-

1. What are primary standard substances? Give examples.
2. What are secondary standard substances? Give examples.
3. Why NaOH is a secondary standard substance?
4. Why oxalic acid is primary standard substance?
5. Why oxalic acid is a weak acid?
6. What is the color of phenolphthalein in acid solution? Draw the chemical structure of phenolphthalein in acid solution?
7. What is the color of phenolphthalein in basic solution? Draw the chemical structure of phenolphthalein in basic solution?
8. Why the equivalent point pH is 8 for the neutralization of oxalic acid with sodium hydroxide?
9. Draw a figure showing the acid base neutralization pH curve of oxalic acid and sodium hydroxide.
10. What is the molarity?
11. How can you prepare a solution of 0.05 M oxalic acid?
12. What is the concentration of NaOH, if 12 mL 0.05 M oxalic acid from a burette is required to titrate 10 mL of NaOH in conical flask? (use moles calculation)

Experiment No. 02	Standardization of hydrochloric acid with standard sodium hydroxide solution

Questions for Report Writing-

1. Why hydrochloric acid is a secondary standard substance?
2. Draw the chemical structure of methyl orange in acidic solution.
3. Draw the chemical structure of methyl orange in basic solution.
4. Draw the acid-base neutralization curve of hydrochloric acid and sodium hydroxide.
5. Why the equivalent point pH is not at 7 for the neutralization of hydrochloric acid with sodium hydroxide?
6. Distinguish the terms end point and equivalence point.

Experiment No. 03	Standardization of hydrochloric acid with standard sodium carbonate solution

Questions for Report Writing-

1. Why Na_2CO_3 is a primary standard substance?
2. What are the uses of Na_2CO_3?
3. What are the uses of HCl?
4. Why aqueous solution of Na_2CO_3 is basic?
5. Draw the pH neutralization of curve of Na_2CO_3 when HCl is added to it.
6. Why there is two neutralization points in in neutralization curve?
7. Why we are using two indicators here?
8. What are the advantages of phenolphthalein to identify the first end point?
9. Why methyl orange is added later, instead of using at the beginning of the reaction?
10. Is it possible to calculate the concentration of hydrochloric acid considering the first neutralization volume (phenolphthalein)?

Experiment No. 04	Standardization of sodium thiosulphate solution with standard potassium dichromate solution

Questions for Report Writing-

1. What is oxidizing agent and reducing agent?
2. Categorize potassium dichromate and sodium thiosulphate as oxidizing agent and reducing agent.
3. Why sodium thiosulphate is a secondary standard substance?
4. What is the difference between acid-base titration and a redox titration?
5. What is iodometric titration and iodimetric titration?
6. Why iodometric titration has been used for the standardization of thiosulphate by potassium dichromate?
7. Calculate the oxidation number of Cr in potassium dichromate.
8. Calculate the oxidation number of S in sodium thiosulphate.
9. Write down the balanced chemical reaction of potassium dichromate and potassium iodide.
10. Write down the balanced chemical reaction between iodine and sodium thiosulphate.
11. Write down the overall iodometric reaction of potassium dichromate and sodium thiosulphate.
12. What is the function of starch and why is the necessary to add starch just before the end point of the titration?
13. Why $NaHCO_3$ is added in iodometric titration?
14. Why it is necessary to keep your experimental solution in the dark?
15. Why you should cover the conical flask after adding $NaHCO_3$?

Experiment No. 05	Estimation of copper in a supplied solution by iodometric method

Questions for Report Writing-

1. Write down the balanced ionic reaction for the determination of copper by iodometric method using sodium thiosulphate.
2. Name some industrial substances where copper metal is used.
3. What is the purpose of adding the Na_2CO_3 and CH_3COOH in solution?
4. Why HCl is not used for acidification of solution?
5. What is the desirable pH for the reaction between Cu^{2+} and KI?
6. What is the purpose of adding NH_4SCN solution?
7. Do you know why most of the copper salts have blue color?

Experiment No. 06	Determination of ferrous ion by titration with standard potassium dichromate solution

Questions for Report Writing-

1. Write down the balanced chemical reaction of potassium dichromate and ferrous ion.
2. What is the formula of Mohr's salt?
3. Why it is necessary to use both the sulfuric acid as well as phosphoric acid in the experiment?
4. Draw the structure of diphenylamine.
5. Why diphenylamine changes color during redox process?
6. Do you know the equation corresponding to the color changes of diphenyl amine indicator?
7. What causes the intense purple or violet coloration of the experimental solution?
8. Could you use $KMnO_4$ instead of $K_2Cr_2O_7$ in this titration?
9. What are the advantages of using $K_2Cr_2O_7$ has over $KMnO_4$?
10. Why the solution shows light bottle green color after addition of $K_2Cr_2O_7$ and also after the end point is achieved?

Experiment No. 07	Standardization of potassium permanganate solution by titration with standard oxalate solution

Questions for Report Writing-

1. Write down the balanced chemical reaction of potassium permanganate and sodium oxalate.
2. Why you don't have to use any indicator in this experiment?
3. Why slow reaction cannot be used for titration?
4. How can you conclude that initial reaction between potassium permanganate and sodium oxalate is slow?
5. Why you have to heat the experimental solution?
6. Write down the effect of heat on reaction rate?
7. Explain that reaction of potassium permanganate and sodium oxalate is an auto-catalyst reaction
8. What happens if you do not shake solution properly?

Experiment No. 08	Determination of ferrous ion in a supplied solution by titration with standard potassium permanganate solution

Questions for Report Writing-

1. Write down the balanced chemical reaction of potassium permanganate and ferrous ion.
2. Why you don't have to use any indicator in this experiment?
3. What would happen if you use HCl or HNO_3 acid instead of H_2SO_4 in this titration?
4. What are the advantages and disadvantages of using $KMnO_4$ in this titration?
5. Why potassium permanganate shows color in aqueous solution even in very small concentrations?