

L- SCHEME I- SEMESTER**ENGINEERING CHEMISTRY PRACTICAL-I****Objectives:**

1. At the end of the program the student will have knowledge about volumetric analysis in acidimetric, Alkali metric and permanaganametric titrations and their applications.
2. To give knowledge of estimation of total Hardness, temporary and permanent hardness in the hard water sample.
3. To study the alkalinity of a sample of water.
4. To study the Chloride content of drinking Water.
5. To get knowledge about measurement of pH and to calculate Hydrogen ion concentration in a solution.

SCHEME OF INSTRUCTIONS AND EXAMINATION:

Subject	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Internal assessment/ Record	Board Examination	Total	Duration
Engineering Chemistry Practical-I	3	48	25	75	100	3 Hours

1. Internal Assessment/ Record: 25 Marks**2. Examination Evaluation:****Volumetric analysis:**

Procedure	5 Marks
Viva	5 Marks
I-Titration	25 Marks
II Titration	25 Marks
Calculations	3x5= 15 Marks
Total	75 Marks

2. Determination of PH:

Answer for short Question on pH	5 Marks
Viva-voce	5 Marks
Determination of pH (5 Samples)	40 Marks
Calculation of H ⁺ ion concentration	25 Marks
Total	75 Marks

SEMESTER-I

ENGINEERING CHEMICAL PRACTICAL - I

Practical: Content

Intellectual Skills:

1. Titrations and Calculation of masses.
2. Knowing units for concentration of solutions

Motor Skills:

1. Measure the quantities accurately
2. Handling the apparatus carefully.

Acidimetry and Alkalimetry:

1. Estimation of Sulphuric acid, using a standard solution of oxalic acid and NaOH as Link solution - Phenolphthalein indicator.
[Test solution should be made up to 100ml]
2. Estimation of sodium hydroxide using a standard solution of sodium carbonate Using sulphuric acid-as link solution -Methyl orange indicator.
[Test solution should be made up to 100ml]
3. Comparison of strengths of two acid solutions using a link solution of NaOH- Phenolphthalein Indicator.
4. Comparison of strengths of two alkaline solutions using an acid (oxalic acid).

Permanganometry:

5. Estimation of Mohr's salt solution using a standard solution of ferrous sulphate and link solution of potassium permanganate
[Test solution should be made up to 100ml]
6. Estimation of ferrous Sulphate using standard solution of Mohr's salt solution and link solution of potassium permanganate
(Test solution should be made up to 100 ml).
7. Comparison of potassium permanganate solution with a link solution of ferrous ammonium sulphate .

Water Analysis:

8. Estimation of alkalinity of a Water sample.
9. Estimation of total hardness of a water sample using EDTA .
10. Estimation of temporary and permanent hardness of a water sample.
11. Estimation of chloride ion in water using standard solution of silver nitrate.
12. Determination of pH using a pH-meter [for five given samples] and to calculate the hydrogen ion concentration in the solutions.[This question may be given to any two students per batch].

MODEL QUESTION PAPER

MODEL: 1

1. Estimate the mass of Sulphuric acid Present in whole of the given solution. You are supplied with a standard solution of oxalic acid of strength 0.098N and an approximately decinormal solution of Sodium hydroxide.

MODEL: 2

2. Calculate the total hardness of the given sample of water. You are given a standard Hard water Solution of 0.01M and an approximately 0.01M EDTA solution.

MODEL: 3

3. Calculate pH of given five samples, using pH meter and Calculate the H⁺ ion Concentration of samples. (Any two Students only in a batch).

SCHEME OF VALUATION**I. Volumetric Analysis:-**

Short Procedure (Common to all titration). For pH determination question, any two part A questions -in

pH chapter may be asked.

- 5 Marks

Viva Voce (common to all)

- 5 Marks

Titration Value accuracy for I & II----- ± 0.2 ml

- 25x2=50

above ± 0.2 to 0.4 ml

- 21 Marks

above ± 0.4 to 0.6 ml

- 17 Marks

above ± 0.6 ml

- 5 Marks

Calculations:

Titration I

- 5 Marks

Titration II

- 5 Marks

Result

- 5 Marks

For Arithmetic errors, 25 % marks may be reduced

DETERMINATION OF pH VALUES:

Determination of pH for 5 Samples

- 5x8=40 Marks

Accuracy ± 0.2

- 8 Marks

Accuracy ± 0.2 to 0.4

- 6 Marks

Accuracy ± 0.4 and above

- 4 Marks

Calculation of H^+ ions concentration

5x5 - 25 Marks

EDTA TITRATION

Titration-I

- 25 Marks

Titration-II

- 25 Marks

Calculation

- 15 Marks

Error in calculation 25% less

Accuracy on par with ordinary titration (as above)

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