

CHE-292-MNP: Organic and Analytical Chemistry Practical

Course Type: Minor (Practical)

No. of Credits: 2

Course Outcomes

At the end of the course, student will be able to

1. Remember the fundamental concepts, reagents, and functional group tests used in organic estimation, preparation, and volumetric analysis.
2. Explain the principles behind organic reactions, separation techniques, and titration methods used in qualitative and quantitative analysis.
3. Perform organic synthesis, separation of binary mixtures, and estimations using volumetric and chromatographic methods in laboratory settings.
4. Differentiate between organic functional groups in mixtures, interpret chromatograms, and analyze titration results to identify and quantify substances.
5. Assess the purity and identity of synthesized or separated compounds using melting point, TLC, and confirmatory tests; validate volumetric results through standardization.
6. Execute multi-step analytical procedures combining organic preparation, separation, and titration to solve real-world chemistry problems.

Course Contents

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Section-I: Organic Chemistry Practicals

D. Organic Estimations (any two)

4. Determination of molecular weight: Determination of molecular weight of organic acid by titration against standardized NaOH - a) monobasic acid or b) dibasic acid
5. Estimation of amides: Determine the amount of Acetamide in given solution by volumetric method. (Standardization of acid must be performed)
6. Estimation of Ethyl benzoate: To determine the amount of ethyl benzoate in give in solution volumetrically. (Standardization of acid must be performed).

E. Organic Qualitative Analysis (Two mixtures: solid-solid type)

Determination of type and separation of two components from given binary mixture of organic compounds containing mono-functional group (Ex. - carboxylic acid, phenols,

amines, amide, nitro, etc.) and systematic identification of any one component qualitatively.

F. Organic Preparations (Any two)

4. Preparation of benzoic acid from ethyl benzoate (Identification and confirmatory Test of – COOH group, M.P and purity by TLC)
5. Base catalysed Aldol condensation (Confirm the conversion by Wilson test in product, M.P and purity by TLC)
6. Preparation of Quinone from hydroquinone (Confirm the conversion by absence of phenolic –OH group in product, M.P and purity by TLC)

Section-II: Analytical Chemistry

C. Volumetric Analysis (Any Five)

8. Estimation of sodium carbonate content of washing soda.
9. Determination of acetic acid in commercial vinegar by titrating with standard NaOH.
10. Determination of amount of CaCO₃ in Chalk using standard HCl & NaOH Solution.
11. Estimation of Ca from calcium supplementary tablet by complexometric titration.
12. Determination of the strength of given H₂O₂ solution with standard KMnO₄ solution.
13. To study the neutralization of HCl by NaOH).
14. Estimation of Aspirin from a given tablet

D. Chromatography (Any One)

3. Separation of constituents of mixtures by Chromatography: Measure the R_f value in each case. Identify and separate the components of a given mixture of 2 amino acids (glycine, aspartic acid, glutamic acid, tyrosine or any other amino acids)/ pigments from plant extract / 2 organic compounds by paper chromatography.
4. Chromatography Separation of a mixture of two organic compound by ascending Thin Layer Chromatography.

References

Section-I : Organic Chemistry

3. Vogel's Textbook of Practical Organic Chemistry" by A. I. Vogel, 5th Edition, Pearson Education
4. Vogel's Textbook of Quantitative Chemical Analysis by G.H. Jeffery, J. Bassett, J. Mendham, and R.C. Denney, 5th Edition, Longman Scientific & Technical

Section-II : Analytical Chemistry

3. Vogel's Textbook of Practical Organic Chemistry" by A. I. Vogel, 5th Edition, Pearson Education
4. Vogel's Textbook of Quantitative Chemical Analysis by G.H. Jeffery, J. Bassett, J. Mendham, and R.C. Denney, 5th Edition, Longman Scientific & Technical