Sonochemistry: Introduction, instrumentation, the phenomenon of cavitation, Sonochemicalesterification, substitution, addition, oxidation, reduction and coupling reactions. **Microwave induced organic synthesis:** Introduction, reaction vessel and reaction medium,concept, specific effect, atom efficiency, % atom utilisation, advantages and limitations, alkylation of active methylene compounds, N-alkylation, condensation of active methylene compounds with aldehydes, Diels-Alder reaction, Leuckardt reductive amination of ketones, ortho ester Claisen rearrangement.

References:-

1. Organic Spectroscopy-3rd Ed.-W.Kemp (Pagrave Publishers, New York), 1991.
2. Spectrometric Identification of Organic Compounds - Silverstein, Bassler&Monnill (Wiley)1981.
3. Applications of Absorption Spectroscopy of Organic Compounds-Dyer(Prentice Hall,NY) 1965.
4. Spectroscopy of Organic Compounds-3rd Ed.-P.S.Kalsi (New Age, New Delhi) 2000.
5. Spectroscopic Methods in Organic Chemistry - Williams and Fleming, TMH.
6. A.K. De : Environmental Chemistry, (Wiley Eastern).
7. S.K.Banerji : Environmental Chemistry, (Prentice Hall India), 1993.
8 S.D. Faust and O.M. Aly : Chemistry of Water Treatment, (Butterworths),1983.
9. Sawyer and McCarty, Chemistry for Environmental Engineering(McGraw Hill) 1978
10. I.Williams, Environmental Chemistry, John Wiley, 2001.
S.M.Khopkar, Environmental Pollution Analysis, (Wiley Eastern).
10. Organic Synthesis-Special Techniques, V.K.Ahluwalia& R. Aggarwal, Narosa, 2001.
11. Green Chemistry-Environment friendly alternatives- R.Sanghi&M.M.Srivatsava, Narosa, 2003. 14. Green Chemistry-Environment benign reactions- V.K.Ahluwalia, Ane Books India, 2006.

AC P 507: INORGANIC CHEMISTRY PRACTICALS

COURSE OUTCOME:

- The students will have hands on experience in the Analysis of Brass, Cu-Ni alloy, Stainless Steel,
- Type Metal and quantitative analysis of the constituents & mixtures containing the following radicals Fe + Ni, Fe + Ca, Cr + Fe.
- This course also train the students in Separation and determination of Mg^{2+}/Zn^{2+}, Zn^{2+}/Cd^{2+} by Ion-Exchange Chromatography and ion exchange capacity of a resin.

1. Analysis of brass–Cu gravimetrically using ∝-Benzoinoxime& Zn complexometrically.
2. Analysis Cu-Ni alloy .
3. Analysis of Stainless Steel – Insoluble residue by gravimetry, Ni gravimetrically using DMG, Fe volumetrically using Ce(IV) & Cr volumetrically by persulphate oxidation.
4. Analysis of Type metal –Sn gravimetrically, Pbelectrogravimetrically and Sb titrimetrically using $KBrO_3$
5. Quantitative analysis of the constituents & mixtures containing the following radicals.
   Cu(II) + Fe(II) - Cu gravimetrically as CuSCN and Fe using Ce(IV).
   Fe(II) + Ni(II) – Fe gravimetrically as Fe_2O_3 and Ni using EDTA.
8. Fe(III) + Ca(II) - Fe gravimetrically as Fe_2O_3 and Ca using EDTA.
9. Cr(III) + Fe(III) – Using EDTA by Kinetic masking method.
6. Analysis of chalcopyrites, magnetite and ilmenite.
7. Ion-exchange chromatography: Separation and determination of Mg^{2+} / Zn^{2+}, Zn^{2+} /Cd^{2+}; Cl^-/ Br^- 8. Separation of cations using column and paper chromatography

9. Determination of the ion exchange capacity of a resin

References:-

1. A.I. Vogel : A Text book of Quantitative Inorganic Analysis, (ELBS), 1978.
2. I. M. Kolthof and E.P. Sandell: Quantitative Chemical Analysis.McMillan,1980.
3. Lobinski and Marczenko, Comprehensive Analytical Chemistry, Vol.30, Elsevier,1996.

AC P 508: Organic Chemistry Practicals – III

COURSE OUTCOME:

- Enable the students to understand and learn the principle of quantitative estimation of different types of organic molecules,
- methods of organic preparations using multistep synthetic protocol,
- isolation and purification of intermediate and final products,
- use of computers in the study of conformation and geometry of some simple organic molecules.

Quantitative Determination: of sugars, amino acids, phenols, amines by various methods. Determinations of acid & ester and acid & amide in the given mixtures.
Multi Step Organic Synthesis: Synthesis ofEthyl resorcinol from Resorcinol, ε-Caprolactamfrom cyclohexanone, p-Amionobenzoic acid from p-Nitrotoludine, s-Tribromobenzene from aniline, Benzanilide from Benzophenone, Benzylic acid from Benzoin, 2,5-Dihydroxy acetophenone from Hydroquinone, 2,4-Dinitrophenylhydrazine from Chlorobenzene, m-Nitrobenzoic acid from Benzoic acid, 2,4-Dinitrophenol from Chlorobenzene, o-Aminobenzoic
acid from Phthalic anhydride .
Separation Techniques: Separation of components from mixture of organic compounds byfractional crystallization, fractional distillation, adsorption, Paper and TLC. Their purification and characterization.
Applications of computers in the study of conformation and geometry of some simple organicmolecules

References:

1. Elementary Practical Organic Chemistry-Vol. III quantitative Organic Analysis- A.I. Vogel
2. Experimental Organic Chemistry- Vol. I &II- P.R.Singh, Tata McGraw-Hill, 1981.
3. Practical Organic Chemistry- IV Ed- Dey&.Sitaraman (Allied)
4. Laboratory Experiments in Organic Chemistry-Adam, Johnson &Wicon(McMillan, London), 1979.
5. Experimental Organic Chemistry- H.D.Durst&G.E.Goke (McGraw-Hill)1980.
6. Computers and their applications to Chemistry, Ramesh Kumari (Narosa).
7. Short Manual to the Chemical Drawing Program-ChemDraw®- Stefan Bienz (CambridgeSoft).

AC P 509: PHYSICAL CHEMISTRY PRACTICALS – III

COURSE OUTCOME: