Subject Code : P8CHE7

GREEN CHEMISTRY

UNIT-I

Introduction to green chemistry:

Green chemistry-relevance and goals, Anastas' twelve principles of green chemistry - Tools of green chemistry: alternative starting materials, reagents, catalysts, solvents and processes with suitable examples.

UNIT-II

Microwave mediated organic synthesis (MAOS):

Microwave activation – advantage of microwave exposure – specific effects of microwave – Neat reactions – solid supports reactions _ Functional group transformations – condensations reactions – oxidations – reductions reactions – multi-component reactions.

UNIT III

Ionic liquids and PTC

Introduction – synthesis of ionic liquids – physical properties – applications in alkylation – hydroformylations – expoxidations – synthesis of ethers – Friedel-craft reactions – Diels-Alder reactions – Knoevengal condensations – Wittig reactions – Phase transfer catalyst - Synthesis – applications.

UNIT IV

Supported catalysts and bio-catalysts for Green chemistry

Introduction – the concept of atom ecomomy – supported metal catalysts – mesoporous silicas – the use of Biocatalysts for green chemistry - modified bio catalysts – fermentations and biotransformations – fine chemicals by microbial fermentations – vitamins and amino acids – Baker's yeast mediated bio-transformations – Bio-catalyst mediated Baeyer-Villiger reactions – Microbial polyester synthesis.

UNIT V

Alternative synthesis, reagents and reaction conditions:

A photochemical alternative to Friedel-crafts reactions - Dimethyl carbonate as a methylating agent – the design and applications of green oxidants – super critical carbon dioxide for synthetic chemistry.

References:

1. Green Chemistry – Environmentally benign reactions – V. K. Ahluwalia. Ane Books India (Publisher). (2006).
2. Green Chemistry – Designing Chemistry for the Environment – edited by Paul T. Anastas & Tracy C. Williamson. Second Edition, (1998).
3. Green Chemistry – Frontiers in benign chemical synthesis and processes- edited by Paul T. Anastas & Tracy C. Williamson. Oxford University Press, (1998).
4. Green Chemistry – Environment friendly alternatives- edited by Rashmi Sanghi & M. M. Srivastava, Narora Publishing House, (2003).