M.Sc. CHEMISTRY
SEMESTER
Paper S-3044-B
Chemistry of Heterocyclic Compounds

Time: 3 Hrs. **M.M. 75 marks**

Note: The paper will be divided into two sections.

Section-A One question with 10 parts (short answer word limit 20) spread over whole syllabus. Each part will be of 1 mark and candidate is required to attempt all the ten parts

Total 10 marks

Section-B Five questions (answer not exceeding 500 words) are from each Unit with internal choice will be asked and the candidate is required to attempt all five questions. Each question will be of 13 marks

Total 65 marks

UNIT-I

Nomenclature of heterocycles: Replacement and systematic nomenclature (Hantzsch-Widman system) for monocyclic, fused and bridged heterocyclic.

Aromatic heterocycles: General Chemical behaviour of aromatic heterocyclic, classification (structural type), criteria of aromaticity (bond lengths, ring current and chemical shifts in ^{1}H-NMR spectra. Empirical resonance energy, delocalization energy, Dewar resonance energy and diamagnetic susceptibility exaltations).

UNIT-II

Small ring heterocycles: Three membered heterocycles with one and two heteroatoms synthetic methods, physical, spectroscopic and chemical properties of aziridines, oxiranes, Thiiranes, diaziridines, diazirines, oxaziridines. Four membered heterocyclic compounds synthetic methods, physical, spectroscopic and chemical properties of azetines, azetidines, oxetanes, thietanes and their carbonyl derivatives.

UNIT-III

Benzo-fused five membered heterocycles: Synthetic methods, physical and chemical properties of benzopyrroles, benzofuranes and benzothiophenes.

Six-membered heterocycles: Synthetic methods, physical and chemical properties of pyrilium salts, pyrones, quinolizinium salts, pyridazines, pyrimidines, pyrazines, acridines and phenanthridines, diazines and triazines

UNIT-IV

Seven and large membered heterocycles: Synthetic methods, physical and chemical properties of azepines, oxepines, thiepines and diazepins.

UNIT-V

Meso-ionic heterocycles: Synthetic methods, properties of 1,3-oxazolium-4-olates, 1,3-oxathiolium-4-olates, 1,3-diazolium-4-olates, 1, 2, 3, -oxadiazolium-5-olates and 1, 2-diathiolium-4-olates

Books Recommended-

1. Heterocyclic Chemistry, R.R Gupta, M. Kumar and V. Gupta, Springer Verlag.
2. The Chemsitry of Heterocycles, T. Eicher and S. Hauptmann, Thieme.
3. Heterocyclic Chemistry, J.A Joule, K. Mills and G.F. Smith Chapman and Hall
4. Heterocyclic Chemistry, T.L. Gilchrist, Longman Scientific Technical
5. An Introduction to the Hetrocyclic Compounds, R. M. Acheson, John Wiley.
6. Comprehensive Heterocyclic Chemistry, A.R Kartritzky and C.W Rees.
7. Stereoselective Synthesis: A Practical Approach, M. Nogradi.
8. New Trends in Natural Products Chemistry, Atta-ur-Rahman and M.I. Choudhary.
9. Chemistry of Natural Products, S.N. Bhat