

**GROUP - (B) ELECTIVE PAPER
PAPER III. HETEROCYCLIC CHEMISTRY**

M.M. - 75

60 Hrs. (2 Hrs./Week)

Units	Topics	
I	Nomenclature of Heterocycles Replacement and systematic nomenclature (Hantzsch-Widman system) for monocyclic, fused and bridged heterocycles.	4 Hrs.
II	Aromatic Heterocycles General chemical behaviour of aromatic heterocycles, classification (structural type), criteria of aromaticity (bond lengths, ring current and chemical shifts in ¹ H NMR-spectra, empirical resonance energy, delocalization energy and Dewar resonance energy, diamagnetic susceptibility exaltations). Heteroaromatic reactivity and tautomerism in aromatic heterocycles.	5 Hrs.
III	Non-aromatic Heterocycles Strain - bond angle and torsional strains and their consequences in small ring heterocycles. Conformation of six - membered heterocycles with reference to molecular geometry, barrier to ring inversion, pyramidal inversion and 1, 3 - diaxial interaction. Stereo-electronic effects - anomeric and related effects. Attractive interactions - hydrogen bonding and intermolecular nucleophilic - electrophilic interactions.	6 Hrs.
III	Heterocyclic Synthesis Principles of heterocyclic synthesis involving cyclization reactions and cycloaddition reactions.	4 Hrs.
	Small Ring Heterocycles Three-membered and four-membered heterocycles-synthesis and reactions of aziridines, oxiranes, thiiranes, azetidines, oxetanes and thietanes.	5 Hrs.
	Benzo-Fused Five-membered Heterocycles Synthesis and reactions including medicinal applications of benzopyrroles, benzofurans and benzothiophenes.	5 Hrs.
IV	Meso-ionic Heterocycles General classification, chemistry of some important meso-ionic heterocycles of type - A and B and their applications.	5 Hrs.
	Six-membered Heterocycles with One Heteroatom Synthesis and reactions of pyrlum salts and pyrones and their comparison with pyridinium & thiopyrylium salts and pyridones. Synthesis and reactions of quinolizinium and benzopyrylium salts, coumarins and chromones.	6 Hrs.
	Six-membered Heterocycles with Two or More Heteroatoms Synthesis and reactions of diazines, triazines, tetrazines and thiazines.	5 Hrs.
V	Heterocyclic Systems Containing P, As, Sb and B Heterocyclic rings containing phosphorus: introduction, nomenclature, synthesis and characteristics of 5- and 6- membered ring systems- phosphorinanes, phosphorines, phospholanes and phospholes. Heterocyclic rings containing As and Sb: introduction, synthesis and characteristics of 5 - and 6 - membered ring systems. Heterocyclic rings containing B : introduction, synthesis, reactivity and spectral characteristics of 3-, 5- and 6- membered ring systems.	10 Hrs.