HETEROCYCLICS AND NATURAL PRODUCTS

UNIT – 1: Heterocyclic Synthesis and Properties:

Synthesis and reactivity of furan, thiophene, pyrrole, pyride, piperidine, quinoline, isoquinoline, and Indole.

UNIT – 2: Molecular Rearrangements & Named reactions:

Nucleophilic, electrophilic and free radical rearrangements – Wagner – Meerwein, Pinacol,Benzil-benzilic acid, Favorski, Fries, Nebee, Hofmann Curtius, Beckmann, Schmidt, Baeyer
– Villiger, Perkin, Stobbe, Dickmann condenstions.

UNIT – 3: Natural Products

Alkaloids – source and classification, extraction and general method for determining structure. Structure elucidation of papavarine.Terpenoids, Steroids and Hormones– classification and structure santonne, squaline, lanosterol and cholesterol, estrone, testosterone, and cortisone. Structural determination of cholesterol.Prostaglandins – Nomenculture, biosynthesis, metabolism and biological effects of prostaglandins.Synthesis of PG E1 & E2.

UNIT – 4: Photochemistry

Photochemistry of carbonyl compounds – n-II, II-II transitions, Norrish type 1 and norrish type II cleavages, Peteno-Buchi reactions, rearrangements of α :β - unsaturated ketones and cyclic hexadienes, photochemistry of p-benzoquinones photochemistry ofunsaturated system
– olefins, cis-trans isomerism and addition acetylenes dimerisation, dienes – photochemistry of 1,3-butadienes (2+2) additions leading to cage structures and photochemistry of cyclohexadienes.

Reference:

- Advanced organic chemistry: reaction mechanism and structure (McGraw HillandKogakush) by Jerry March.
- Molecular reactions and photochemistry (Prentice Hall) by Charles Dupey andO.Chapman. th
- Organic Chemistry, 5 edition (Prentice Hall of India) by R.T.Morrison and R.N.Boyd.
- Organic chemistry vol. I & II(ELBS Longmann group Ltd., London) by I.L.Finar.th
- Organic chemistry, 5 edition, (John Wiley and Sons, New York, 1992)byT.W.Graham Solomons.

ANDHRA UNIVERSITY
TRANS-DISCIPLINARY RESEARCH HUB

MODEL QUESTION PAPER

HETEROCYCLIC AND NATURAL PRODUCTS

Time: 3 hours Max. Marks: 100

Answer any five Questions

1. (a) Describe the synthesis and chemical reactions of i) Thiophene, ii) Quineline, iii) Indole and iv) Pyridine
2. Explain synthesis and chemical properties of Pyrrole, Isoquinoline, Piperdine.
3. Give the intermediate and discuss the classification of the following reaction with examples. I) Favorski reaction ii) Hofmann rearrangement
4. (a) Explain the following reaction with synthetic applications; Bayer – Villager oxidation , Beckmann reaction
5. Discuss in detail the structural elucidation of papavarine .
6. What are prostaglandins. Give the synthesis of biological effects PG E1 & E2 1.
7. Explain the following reactions with mechanism of Norrish type II reaction, PaternoBuchi reactions
8. Describe the photochemistry of 1, 3 butadine and cyclo hexadines.