

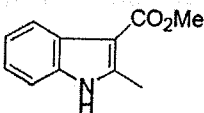
DEPARTMENT OF CHEMISTRY
SCHOOL OF CHEMICAL AND LIFE SCIENCES
M.SC. CHEMISTRY
SEMESTER-IV EXAMINATION 2024
PAPER TITLE: PAPER TITLE: HETEROCYCLIC CHEMISTRY
PAPER CODE: MCHCCCO – 403

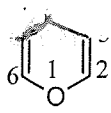
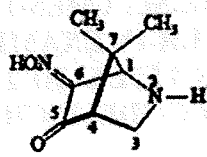
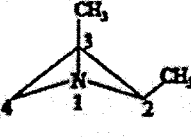
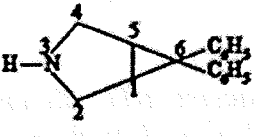
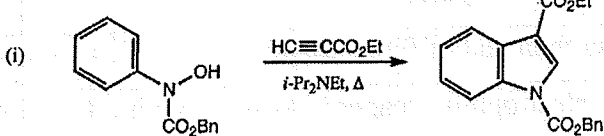
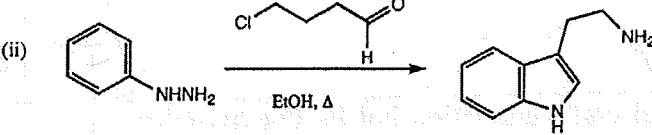
Time 2½Hrs

Maximum Marks 60

Abbreviations Used

CLO- Course Outcome, PLO- Program Outcome, BTL- Bloom Taxonomy Level: BT level 1-Remember; BT level 2-Understand; BT level 3-Apply; BT level 4-Analyse; BT level 5-Evaluate, BT level 6-Create

Q.1	Section A: Very short type questions: (1.5x10 = 15 Marks)	BTL	CLO	PLO
I.	Specify the most nucleophilic site on indole.	2	2	2
II.	Which heterocycle is present in tryptophan, tryptamine and melatonin?	3	3	3
III.	What are the different tautomeric forms of azepine system.	3	3	3
IV.	How does 4Hpyran-4-one isomerize to 2H-pyran-2-one?	3	2	2
V.	Indoles, like pyrroles, are very weak bases, justify	3	2	2
VI.	Why is pyridine a Pi-deficient aromatic heterocycle?			
VII.	The aromaticity of thiophene is greater than that of furan, justify	4	4	4
VIII.	Which is the most probable site for electrophilic reagents to react with pyridine?	4	4	4
IX.	What is diamagnetic susceptibility?	4	4	4
X.	Pyridine does not undergo Friedel crafts alkylation but its O-ethyl ether derivative does, justify?	4	4	4
Q2	SECTION B: Long Type questions (Attempt <u>any two</u> of four) : (10X2 = 20 Marks)			
A	Give a brief overview of Corey synthesis of oxiranes	2,3	2,3	2,3
B	Give two methods of synthesis for Benzothiophenes.	2,3	2,3	2,3
C	I) How can the synthesis of aziridines be achieved from substituted amines? II) Suggest a viable synthesis of the following indole derivative. 			
D	Lithiation of N-blocked indoles provides a means of the introduction of substituents at position 2, Justify.	3/4	3/4	3/4

Q3	SECTION C: Short type questions: (Attempt <u>all</u> questions) :	(5x 5= 25 Marks)		
a)	Name the following heterocycles I  II  III  IV  OR How does strain affect the reactivity of three and four membered rings? Explain with examples	4/5	4/5	4/5
b)	Suggest mechanisms for the following indole syntheses? (i)  (ii)  OR Suggest a route for the following transformation 	4/5	5	4/5
c)	Discuss the electrophilic substitution at pyrrole and predict the preferred site of attack of the electrophile OR Explain Paal-Knorr synthesis of pyrrole with a suitable mechanism	4/5	4/5	4/5
d)	Give the synthetic route that allows the replacement of any substituent at phosphorus, in phospholes, by a very wide range of other substituents? OR Give the mechanism of Pinner synthesis for pyrimidines?	3/4/5	3/4/5	3/4/5
e)	Phosphole is a non-aromatic compound and Borole is an antiaromatic compound., justify OR On the basis of retrosynthetic analysis of pyrylium ion suggest the synthetic routes for its preparation	2	2	2