

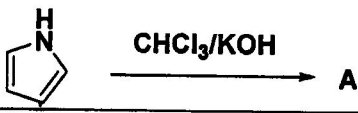
Roll No. _____

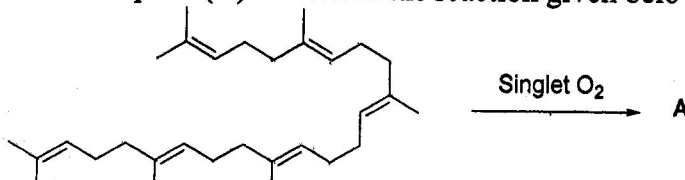
Jamia Hamdard
Department of Chemistry
School of Chemical & Life Sciences
BSc. Hons. Chemistry (FYUP), Chemistry
Semester-VI Examinations, May 2025
Paper Title: Heterocyclic and Natural Product Chemistry
Paper Code: BCH-DSC-602

Time: 2 ½ hours

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. No.		BTL	CLO	PLO
SECTION A				
Very Short Type Questions (Attempt any ten):		(1.5x10=15 marks)		
A1	Define heterocycle with an example.	2	2	1-2
A2	What is a Chromophore?	2	2	1-2
A3	Give the structure of Aziridine.	1	2	2
A4	State the criteria for aromaticity in heterocycles.	2	2	3
A5	What is an Oxetane?	1	1-2	1-2
A6	Name one method for the synthesis of Pyrrole.	2	3	3
A7	Complete the reaction below: 	1	2	2
A8	What are Diazines? Give one example.	1	2	3
A9	Define Terpenoids.	1	1-2	1-2
A10	What is the relationship between <i>p</i> -cymene and mono-terpene?	2	2-3	2-3
A11	Classify Nicotine as an alkaloid type.	1	1-2	1-2
A12	Give an example of a Vat Dye.	2	2-3	3
A13	What functional group is present in Phthalein dyes like Phenolphthalein?	2	3	2-3
SECTION B				
Long Type Questions (Attempt any two out of four):		(10x2=20 marks)		
B1	Discuss the nomenclature using the Hantzsch-Widman system of (a) fused heterocycle (b) bridged heterocycles. Provide suitable examples for each type.	3	1-3	1-3
B2	(a) Explain the general methods for structure determination of alkaloids. (b) Outline the synthesis of Nicotine.	4-6	2-6	4-6
B3	(a) Compare the aromaticity and reactivity of Furan, Pyrrole, and Thiophene towards electrophilic substitution reactions.	3-4	3-5	3-5

	(b) Give mechanisms for nitration of Pyrrole.			
B4	(a) What are Carotenoids? Discuss the structure elucidation and biosynthesis of β -Carotene. (b) Explain its biological significance in relation to Vitamin A.	4-5	3-6	3-6
SECTION C				
Short Type Questions (Attempt all Questions):		(5x5=25 marks)		
C1	Describe the synthesis and key reactions of Aziridines and Oxiranes. Highlight their differences. Or Describe the synthesis and reactions of Azetidines and Oxetanes.	3-5	4-5	4-5
C2	Outline the synthesis of Pyridine (any one method) and discuss its basicity compared to Pyrrole. Or Outline the synthesis of Furan (any one method) and discuss its Diels-Alder reaction.	3	4	3-4
C3	Discuss the classification and general methods of isolation for Terpenoids. Give the synthesis of Citral. Or Name the triterpene (A) formed in the reaction given below:  Justify, with the help of reaction that A is responsible for the formation of cholesterol.	4-6	4	4-5
C4	Explain the "Colour and Constitution" concept for dyes. Give the synthesis and application of Azodyes. Or Explain the chemistry of dyeing, differentiating between Mordant and Vat dyes with examples.	3-4	2-3	3-5
C5	Describe the structure elucidation and synthesis of Indigotin. Classify it as a dye type and mention its application. Or Give the structure elucidation and synthesis of Alizarin. Mention its source and use as a dye.	5-6	3-6	4-6