

**End Term (Even) Semester Examination May-June 2025**

Name of the Course and semester: B. Pharm IVth semester  
 Name of the Subject: Pharmaceutical Organic Chemistry-III  
 Subject Code: BP-401-T

Time: 3 hour

Roll no. ....

Maximum Marks: 75

**Note:**

- (i) This question paper contains three sections
- (ii) All the sections are compulsory.

S.N	MULTIPLE CHOICE QUESTION	Section A CONTENTS	20 X 1 = 20 MARKS
			CO's
1.	Optical Activity is associated with which of the following? A) Chiral molecules B) Achiral molecules C) Both A and B D) Neither A nor B		CO-1
2.	Which of the following is true for meso compounds? A) Meso compounds are optically active. B) Meso compounds are mirror images of each other. C) Meso compounds have an internal plane of symmetry. D) Meso compounds cannot exist in racemic mixtures.		
3.	Enantiomers are best characterized as: A) Non-superimposable mirror images B) Compounds with the same physical properties C) Compounds that differ in their melting points but not boiling points D) Compounds with no chiral centers		
4.	What is the term used for a mixture containing equal amounts of two enantiomers? A) Racemic mixture B) Stereoisomer mixture C) Diastereomeric mixture D) Geometrical isomer mixture.		
5.	In the conformational analysis of ethane, the most stable conformation is: A) Staggered B) Eclipsed C) Chair D) Boat		CO-2
6.	The system used to name geometrical isomers where the functional groups are on opposite sides of a double bond is: A) Cis B) Trans		

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	C) Syn D) Anti	
7.	For optical activity to occur in biphenyl compounds, which condition must be fulfilled? A) No internal plane of symmetry B) Two chiral centers in the molecule C) All bonds must be single bonds D) Both A and B.	
8.	Atropisomerism can be seen in which of the following molecules? A) Biphenyl B) Butane C) Methane D) Propane	
9.	Pyrrole contains which of the following heteroatoms? A) Oxygen B) Nitrogen C) Sulfur D) Carbon	CO-3
10.	What is the reaction between pyrrole and an electrophile such as bromine called? A) Nucleophilic substitution B) Electrophilic substitution C) Radical substitution D) Free radical addition	
11.	Identify the compound that is classified as a heterocyclic compound. A) Benzene B) Pyrrole C) Cyclohexane D) Methane	
12.	Select the correct statement regarding the reactivity of pyrrole, furan, and thiophene. A) Pyrrole is the least reactive due to its electron density B) Furan is more reactive than pyrrole in electrophilic substitution C) Thiophene is less reactive than both pyrrole and furan D) All three compounds exhibit similar reactivity	
13.	Which of the following compounds contains a nitrogen atom in its heterocyclic ring? A) Imidazole B) Oxazole C) Thiazole D) All of the above	CO-4
14.	Quinoline and isoquinoline are related in that they both:	

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	<p>A) Contain an aromatic ring fused with a nitrogen-containing heterocycle          B) Are derived from pyridine          C) Are only used in the synthesis of pharmaceuticals          D) Contains sulfur in the heterocycle</p>	
15.	<p>Which of the following is a medicinal use of acridine derivatives?</p> <p>A) Antifungal agents          B) Antibacterial agents          C) Anticancer agents          D) Anti-spermatogenic agents</p>	
	<p><b>Basics of quinoline is primarily attributed to:</b></p> <p>A) The lone pair of electrons on the nitrogen atom in the ring          B) The electron-donating ability of the methyl group          C) The resonance stabilization of the pyridine ring          D) The conjugation of the nitrogen lone pair with the aromatic ring</p>	
17.	<p>Clemmensen reduction is used to:</p> <p>A) Reduce carbonyl groups to alcohols in the presence of acids          B) Reduce ketones and aldehydes to hydrocarbons using zinc amalgam and hydrochloric acid          C) Reduce esters to aldehydes          D) Reduce aromatic rings by hydrogenation</p>	CO-5
18.	<p>The Wolff-Kishner reduction is used to reduce:</p> <p>A) Ketones to aldehydes          B) Alcohols to alkenes          C) Carbonyl groups to methylene groups (<math>-CH_2-</math>)          D) Aromatic compounds to cyclohexane</p>	
19.	<p>In the Dakin reaction, the carbonyl group of a hydroxy ketone undergoes oxidative cleavage in the presence of:</p> <p>A) Sodium borohydride          B) Zinc dust          C) Potassium permanganate          D) Copper salt</p>	
20.	<p>Chaisen-Schmidt condensation typically results in the formation of:</p> <p>A) A <math>\beta,\beta</math>-unsaturated ketone or aldehyde          B) A primary alcohol          C) A carboxylic acid          D) An ester</p>	

**Section II**

Short Questions: Attempt any seven questions.

7x5 = 35 marks

SN	QUESTIONS	CO's
1.	Explain the concept of racemic mixtures and their resolution.	CO 1
2.	Explain the DL system of nomenclature for optical isomers. Illustrate with an example.	CO 1



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3.	Describe methods of determining the configuration of geometrical isomers.	CO2
4.	Explain stereospecific and stereoselective reactions with examples.	CO2
5.	Define heterocyclic compounds. Classify them based on the number of heteroatoms in the ring.	CO3
6.	Compare the aromaticity and reactivity of Pyrrole, Furan, and Thiophene.	CO3
7.	Discuss the basicity of Pyridine and the medicinal uses of Pyridine derivatives.	CO4
8.	Describe the medicinal uses of Pyrimidine, Purine, azepines, and their derivatives.	CO4
9.	Describe the Schiffs base formation and Knoeven-Schmidt condensation reactions.	CO5

### Section C

Long questions: Attempt any two questions

$2 \times 10 = 20$  marks

SN	QUESTIONS	CO's
1	Discuss the RS system of nomenclature for optical and geometrical isomers with suitable examples.	CO1, CO2
2	Describe the synthesis, reactions, and medicinal uses of Pyrazole, Imidazole, Oxazole, and Thiazole.	CO3, CO4
3	Outline the following reductions with suitable examples: * Metal hydride reduction ( $\text{NaBH}_4$ and $\text{LiAlH}_4$ ) * Clemmensen reduction * Birch reduction	CO5