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22CHP101N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Branch - **CHEMISTRY**

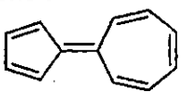
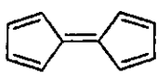
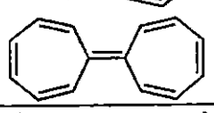
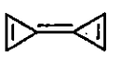
ORGANIC REACTION MECHANISM AND STEREOCHEMISTRY

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	*N,N*,2,6-Tetramethyl aniline does not couple with diazonium salt, due to a) Hyperconjugation b) Resonance effect c) Inductive effect d) Steric inhibition of resonance	K1	CO1
	2	Among the following compounds, which is more acidic in nature? a) Benzoic acid b) *o*-Hydroxy benzoic acid c) *m*-Hydroxy benzoic acid d) *p*-Hydroxy benzoic acid	K2	CO1
2	3	Which one of these is aromatic? a)  b)  c)  d) 	K1	CO2
	4	Cyclo-octatetraene is an example for a) Aromatic b) Non-aromatic c) Anti-aromatic d) Homo-aromatic	K2	CO2
3	5	Which of the following electrophilic substitution proceed very rapidly at bridge head carbons? a) SE2 (back) b) SE2(front) c) *SEi* d) SE1	K1	CO3
	6	Nitration of *p*-bromotoluene leads to formation of a) 2-nitro-4-bromotoluene b) 4-nitro-4-bromotoulene c) 3-nitro-4-bromotoluene d) 2,3-dinitro-4-bromotoluene	K2	CO3
4	7	When acyl azide is heated with phenol gives a) urethane b) Amine c) Substituted urea d) Amide	K1	CO4
	8	The major product in Favorskii rearrangement of α-haloketone with NaOH is a) Ester b) Carboxylic acid c) β-OH ester d) Amine	K2	CO4
5	9	Which one of the following compounds does not show geometrical isomerism? a) 2,3-dichloro-2-butene b) 1,1-dichloro-2-butene c) 1,2-dichloro-2-butene d) 1,1-dichloro-1-butene	K1	CO5
	10	Ring flip of trans 1,2-dimethylcyclohexane generates a) Enantiomers b) Diastereomers c) Homomers d) same isomer	K2	CO5

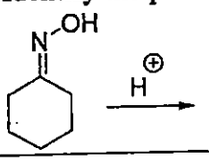
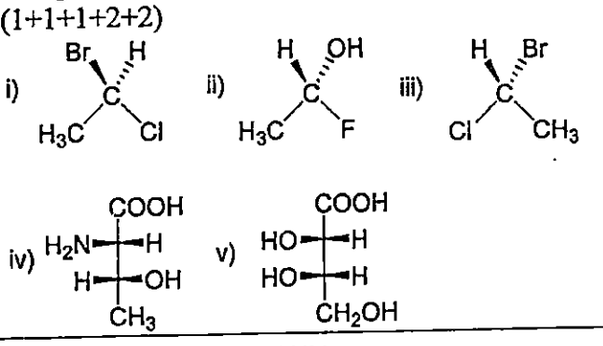
SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain how nature of the products & its proportions, and intermediates are useful in the determination of reaction mechanism?	K3	CO1
		(OR)		
	11.b.	What is primary and secondary kinetic isotopic effect? Explain with any one example.		

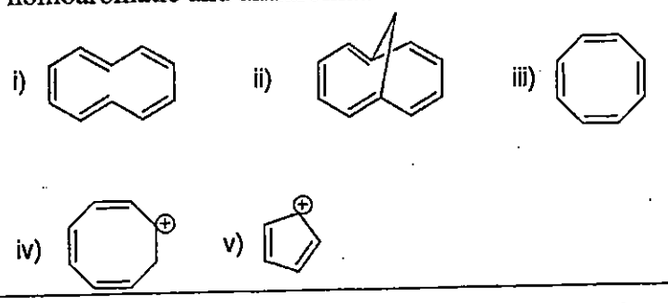
Cont...

2	12.a.	Illustrate the Frost-musulin diagram to evaluate aromatic character.	K4	CO2
		(OR)		
	12.b.	What is craig's rule? Explain the aromatic character of pentalene and azulene by using it.		
3	13.a.	How enamines are prepared? Explain the mechanism and reactivity of *1°*-, *2°*-, & *3°*-alkyl halides in Stork-Enamine reactions.	K4	CO3
		(OR)		
	13.b.	Explain the role of *p*H in diazonium coupling reactions of phenols and anilines.		
4	14.a.	Identify the product with proper mechanism. 	K4	CO4
		(OR)		
	14.b.	Discuss the mechanism of Baeyer-Villiger rearrangement with migratory aptitudes.		
5	15.a.	Assign the R/S configuration for the following compounds. (1+1+1+2+2) 	K4	CO5
		(OR)		
	15.b.	Discuss the stereochemistry of biphenyl, spirane and oximes compounds.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Derive Hammett equation and explain the physical significance of σ and ρ with example.	K4	CO1
2	17	Label the following compounds as aromatic, non-aromatic, homoaromatic and antiaromatic with reason. 	K5	CO2
3	18	Discuss any two formylation reaction with mechanism.	K4	CO3
4	19	Discuss the mechanism of Hoffman and Fries rearrangement and explain whether they are follow inter or intramolecular mechanism.	K4	CO4
5	20	Discuss conformational analysis of disubstituted cycloalkanes in detail.	K5	CO5

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