

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
MSc DEGREE EXAMINATION DECEMBER 2023
(First Semester)

Branch - CHEMISTRY

ORGANIC REACTION MECHANISM AND STEREOCHEMISTRY

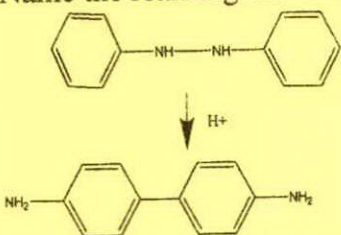
Time: Three Hours

Maximum: 75 Marks

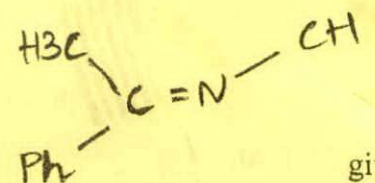
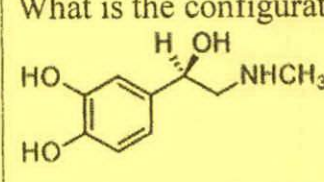
SECTION-A (10 Marks)

Answer ALL questions

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

Module No.	Question No.	Question	K Level	CO
1	1	Hyper conjugation is shown by molecule containing _____. a) C-H bond and a α C=C bond b) Only C-H bond c) Only C=C bond d) No C=C bond	K1	CO1
	2	Which of the following has more -I effect? a) -NO ₂ b) Only -COOH c) -Br d) C ₆ H ₅ -	K2	CO1
2	3	Azulene has ____ a) 18 π electrons b) 20 π electrons c) 10 π electrons d) 14 π electrons	K1	CO2
	4	Consider the following statements about aromatic compounds. Which of the statements are correct? i) They are planar compounds ii) They are annulenes having 4 π electrons iii) They retain a ring current iv) They contain a localized π -electron cloud having (2n+4) π -electrons. a) ii and iii b) i and iii c) i, ii and iv d) ii, iii and iv	K2	CO2
3	5	Choose the correct statements from the following regarding Stork-Enamine reaction. 1) Enamines are treated with alkyl halide followed by hydrolysis to give ketones, 2) The enamine reaction results in alkylation of ketone at α -position, 3) Alkylation takes place on the less substituted side of the original ketone and 4) the reaction cannot be stopped with mono alkylation. a) 1, 2, 4 b) 1, 3, 4 c) 1, 2, 3 d) 1, 2, 3, 4	K1	CO3
	6	The electrophile in the Sulphonation reaction is a) SO ₃ b) SO ₃ ⁺ c) HSO ₄ ⁻ d) SO ₃ H ⁺	K2	CO3
4	7	Name the rearrangement involving in the reaction of  a) Favorskii rearrangement b) Claisen rearrangement c) Benzidine rearrangement d) Schmitt's rearrangement	K1	CO4

Cont...

	8	<p>On Beckmann rearrangement  gives</p> <p>a) Ph-CH₂-CH₂-NH₂OH b) Ph-NH-CH₂-CH₃ c) Ph-CH₂-CH₂-NH₂ d) Ph-NH-CO-CH₃</p>	K2	CO4
	9	<p>Which the following compounds can show geometrical isomerism?</p> <p>1) 2-pentene 2) 1,3-dibromocyclobutane 3) 1,1,2-trichloropropene 4) 2-methyl-3-heptene a) 1, 4 b) 2, 3 c) 1, 2, 4 d) 1, 2, 3</p>	K1	CO5
5	10	<p>What is the configuration of the following structure?</p>  <p>a) 2R b) 1R c) 2S d) 1S</p>	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.	i) Construct the Hammond postulates. (5)	K3	CO1
		ii) State the principle of microscopic reversibility. (2)		
	(OR)			
	11.b.	Categorize the kinetic isotopic effects with examples.		
2	12.a.	Utilize the effects of aromaticity on bond length, resonance energies and induced ring current.	K3	CO2
		(OR)		
	12.b.	i) Make use of Frost-Musulin diagram to evaluate the aromatic character. (5) ii) State the Craig's rule. (2)		
3	13.a.	Analyze the mechanism of Sulphonation and nitration reactions in a step-by-step manner	K4	CO3
		(OR)		
	13.b.	Compare the SE1, SE2, and SEi reactions with examples.		
4	14.a.	Discover the mechanism behind the Wolf rearrangement through examples.	K4	CO4
		(OR)		
	14.b.	Examine the mechanism behind the Stevens rearrangement by utilizing examples.		

Cont...

5	15.a.	Compare the stereochemistry of sulphur and nitrogen compounds.	K5	CO5
	(OR)			
	15.b.	Explain the interconversion of Fisher, Newman and Sawhorse projection formula.		

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	Explain the following, a) Inductive and field effects, b) Resonance effect, c) Hyper conjugation, d) Hydrogen bonding	K5	CO1
2	17	Apply the Huckel's rule for following compounds, a) Sydnones, b) Ferrocene, c) [14]-Annulene, d) [18]-Annulene, e) Tropyllium ion	K4	CO2
3	18	Analyze the carbenes' structure, generation, and reactions.	K4	CO3
4	19	Inspect the compound's product and write down the mechanism, <div style="text-align: center;"> <p>a) $\text{R}-\text{C}(\text{NOH})=\text{R}' \xrightarrow[\text{reflux, 0.5-6 h}]{0.5 \text{ eq. I}_2, \text{ MeCN}}$</p> </div> <div style="text-align: center;"> <p>b) $\text{Ph}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{N}_3 \xrightarrow[\text{toluene, } \sim 65^\circ\text{C, 1-4 h}]{} \text{Product (5)}$</p> </div>	K4	CO4
5	20	Interpret with examples the following, a) Erythro and threo nomenclature (4) b) R-S system of nomenclature (6)	K5	CO5

Z-Z-Z

END