22CHP205N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

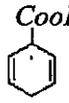
MSc DEGREE EXAMINATION DECEMBER 2025
(Second Semester)

Branch - **CHEMISTRY**

ORGANIC REACTION MECHANISM AND RETRO-SYNTHESIS

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Question No.	Question	K Level	CO
1	In SN_2 reaction there is: a) Partial racemisation b) Complete racemisation c) Complete inversion d) Partial inversion	K1	CO1
2	Which of the mechanism does go via Benzyne intermediate? a) Elimination-Addition b) Addition- Elimination c) Deprotonation d) None of these	K2	CO1
3	When meso-2,3-dibromobutane undergoes elimination of two bromines with zinc in acetone, it yields a) trans-2-butene b) cis-2-butene c)1-butene d) 1-butyne	K1	CO2
4	Predict the product when benzoic acid is treated with $Na/NH_3/EtOH$ a)  b)  c)  d) 	K2	CO2
5	Treatment of 2-methyl-2-butene with HBr in the presence of peroxide yields a) 1°-alkyl bromide b) 2°-alkyl bromide c) 3°-alkyl bromide d) Dibromide	K1	CO3
6	1,2-dimethyl cyclopentene in the presence of H_2O_2 and OH^- by hydroboration yields a) cis-1,2-dimethyl cyclopentanol b) trans-1,2-dimethylcyclo pentanol c) 1,2-dimethyl cyclopentane d)1,2-dimethyl cyclopentadiol	K2	CO3
7	Wilkinson's catalyst used in a) Oxidation of alkenes b) Hydrogenation of alkenes c) Ozonolysis of alkenes d) Reduction of alkenes	K1	CO4
8	Which of the following reagents is Umpolung reagent? a) 1,2-Dithiane b) 1,3-Dithiane c) LDA d) DCC	K2	CO4
9	The synthetic equivalent of the given synthon is  a) t-butyl isocyanide b) t-butyl cyanide c) t-butyl cyanate d)t-butyl isocyanate	K1	CO5
10	The two reactions involved in the Robinson annulations are a) Hydroboration and oxidation b) Perkin reaction and Michael reaction c) Michael reaction and Aldol condensation d) None of these	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

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

Question No.	Question	K Level	CO
11.a.	What is NGP? Discuss the mechanism and stereochemistry of the reaction involving neighbouring group participation.	K4	CO1
	(OR)		
11.b.	Write a note on: i) Chichibabin reaction ii) Zeigler alkylation	K4	CO1
12.a.	Outline the mechanism of E1cB.	K5	CO2
	(OR)		
12.b.	Explain the uses of SeO_2 and chromic acid in organic synthesis.	K5	CO2
13.a.	State and explain the Markownikov rule and anti- Markownikov rule.	K3	CO3
	(OR)		
13.b.	Explain the mechanism of Wittig reaction and Mannich reaction.	K3	CO3
14.a.	What are Gilman reagents? Give its three synthetic applications.	K4	CO4
	(OR)		
14.b.	Give a brief account on: i) Crown ethers ii) Wilkinsons catalyst	K4	CO4
15.a.	Illustrate the regioselectivity and chemoselectivity.	K5	CO5
	(OR)		
15.b.	Write a brief account on: i) Retrosynthesis ii) Robinson annelation	K5	CO5

SECTION -C (30 Marks)

Answer **ANY THREE** questions

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

Question No.	Question	K Level	CO
16	Discuss the various factors that govern the extent of SN_1 and SN_2 mechanism.	K5	CO1
17	Explain the mechanism of i) Chugave reaction ii) Birch reduction	K4	CO2
18	Suggest a suitable mechanism of i) Hydroboration ii) Michael addition	K4	CO3
19	Give any two synthetic uses of the following compounds in organic synthesis. i) DDQ ii) LDA iii) $NaBH_3CN$ iv) PTC v) Me_3SiI	K6	CO4
20	Describe the interconversions of $-NH_2$, -SH, -CHO, -COOR and – CONHR groups in organic reactions.	K5	CO5

Z-Z-Z END