MSc DEGREE EXAMINATION MAY 2026

(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)

Module No.	Question No.	Question	K Level	CO
1	1	Which of the following solvent is best for SN1 reactions? (i) Nitrobenzene (ii) alcohol (iii) ether (iv) DMF	K1	CO1
	2	Neighbouring group participation leads to (i) carbocation (ii) cyclic intermediate (iii) free radical (iv) carbonation	K2	CO1
2	3	In E2 elimination some compounds follow Hofmann's rule, which means (i) The double bond goes to the most substituted position (ii) the compound is resistant to elimination (iii) no double bond is formed (iv) double bond goes toward the least substituted carbon	K1	CO2
	4	Birch reduction uses (i) Li /liquid ammonia (ii) $NaBH_4$ (iii) Ozone (iv) SeO_2	K2	CO2
3	5	Michael addition is caused due to (i) Nucleophilic substitution (ii) Electrophilic substitution (iii) Elimination reaction (iv) carbocation	K1	CO3
	6	Betaine is an intermediate of (i) Robinson annulation (ii) Wittig reaction (iii) Stobbe reaction (iv) Reformatsky reaction	K2	CO3
4	7	Tetrabutylammonium halide is a (i) Phase transfer catalyst (ii) Crown ether (iii) Gilman's reagent (iv) LDA	K1	CO4
	8	What factor required for the ability of crown ether to complex a cation? (i) Electronegativity (ii) oxidation (iii) size of cavity (iv) temperature	K2	CO4
5	9	Robinson annelation forms (i) six-membered ring (ii) three-membered ring (iii) five-membered ring (iv) four-membered ring	K1	CO5
	10	Retro-acyloin transformation is example for (i) Heterolytic cleavage (ii) Homolytic Cleavage (iii) C-X disconnection (iv) Carbonyl synthesis	K2	CO5

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ALL questions carry EQUAL Marks (3 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Recall the effect caused by the leaving group in a nucleophilic substitution reaction.	K1	CO1
		(OR)		
	11.b.	State Ziegler alkylation and Chichibabin reaction.		
2	12.a.	Apply Hoffmann and Saytzeff rules to predict the product formed in elimination reactions.	K3	CO2
		(OR)		
	12.b.	Construct a reduction reaction using Clemmensen and Wolf-Kishner reduction.		
3	13.a.	Examine the mechanism: i) Aldol condensation reaction ii) Wittig reaction	K4	CO3
		(OR)		
	13.b.	Analyse i) Markownikow rule ii) Epoxidation		
4	14.a.	Explain Gilman's reagent and $NaBH_3CN$.	K5	CO4
		(OR)		
	14.b.	Justify the role of the $LiAlH_4$ reagent in organic synthesis.		
5	15.a.	Evaluate synthons and synthetic equivalents in retrosynthesis.	K5	CO5
		(OR)		
	15.b.	Determine 1,5 difunctional compounds in detail.		

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	Recall the factors affecting the rate of Nucleophilic Substitution reaction.	K1	CO1
2	17	Explain the mechanism off E1 and E2 Elimination reactions.	K4	CO2
3	18	Analyse the electrophilic, nucleophilic and free radical mechanisms of addition to double and triple bonds.	K4	CO3
4	19	Assess the following reagents in organic synthesis i) DDQ ii) Crown ether iii) Wilkinson's Catalyst	K5	CO4
5	20	Discuss briefly the protecting groups of alcohol, carbonyl and amino groups.	K6	CO5

Z-Z-Z END