

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.	Questions	K Level	CO
1	1	Alkyl substituted Olefins are stabilized by (i) Hyperconjugation (ii) Resonance (iii) Inductive effect (iv) Steric effect	K1	CO1
	2	Which one of the following statements is true about Taft equation? (i) only to m & p-substituted derivative (ii) only to aliphatic compounds (iii) only to steric compounds (iv) All of them	K2	CO1
2	3	Which of the following compound is aromatic in nature (i) cyclobutadiene (ii) cyclopentadiene (iii) cyclohepta trienyl cation (iv) cyclooctatetraene	K1	CO2
	4	The compound that gives precipitates on warming with aqueous AgNO ₃ is (i) Cyclopentadienyl Bromide (ii) Bromobenzene (iii) 3-Bromopyridine (iv) cyclohepta trienyl bromide	K2	CO2
3	5	Electrophilic substitution reaction of o-cresol gives mainly (i) meta to OH group (ii) meta to CH ₃ group (iii) ortho and para to OH group (iv) ortho and para to CH ₃ group	K1	CO3
	6	Salicylic acid is prepared from (i) Kolbe Schmitt reaction (ii) Gattermann Koch reaction (iii) Reimer -Tiemann reaction (iv) Hofmann Martius reaction	K2	CO3
4	7	Which of the following rearrangement involves a group migrate from nitrogen to carbon (i) Wagner-Meerwein (ii) Lossen rearrangement (iii) Curtius rearrangement (iv) Stevens rearrangement	K1	CO4
	8	Which Intermediate is formed in Wolff's reaction? (i) Carbene (ii) Ketene (iii) Carbocation (iv) Carbanion	K2	CO4
5	9	Atropisomerism shown by (i) Biphenyl (ii) spirane (iii) terphenyl (iv) allene	K1	CO5
	10	Configuration of ketoxime can be identified by (i) Beckmann rearrangement (ii) cyclisation reaction (iii) elimination reaction (iv) Curtius rearrangement	K2	CO5

SECTION - B (35 Marks)

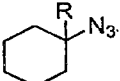
Answer **ALL** questions

ALL questions carry **EQUAL** Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	i. Explain the importance of intermediates in the determination of reaction mechanism. (4) ii. Write the principles of microscopic reversibility. (3)	K3	CO1
		(OR)		
	11.b.	i. What is primary and secondary kinetic isotopic effect? Explain with any one example. (5) ii. Account, o-Hydroxy benzoic acid is more acidic than p-hydroxy benzoic acid. (2)		
2	12.a.	i. Discuss the Frost-musulin diagram to evaluate aromatic character.(4) ii. What is Craig's rule? (2) iii.Explain, why all bonds in benzene have an equal length?(1)	K4	CO2
		(OR)		
	12.b.	i. What are non-benzenoid compounds? Explain their aromatic character. (4) ii. How ferrocene shows aromatic character? Explain. (3)		

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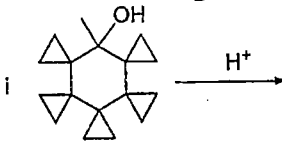
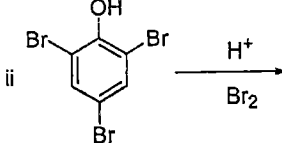
3	13.a.	i. Write the reaction and mechanism of Vilsmeier-Haack reaction. (4) ii. Compare and explain the order of halogens in Friedel crafts alkylation and acylation reactions. (3)	K4	CO3
	(OR)			
	13.b.	i. Explain the mechanism of electrophilic substitution reaction in allylic system? (4) ii. How will you prepare of 3-chloropyridine from pyrrole?(3)		
4	14.a.	i. What is benzidine rearrangement? Discuss mechanism for formation of <i>p</i> -benzidine and <i>p</i> -semidine. (4) ii. Write the possible products with mechanism. (3) i.  $\xrightarrow{H^+}$	K5	CO4
	(OR)			
	14.b.	i. Illustrate Wagner-Meerwein rearrangement with migratory aptitude. (4) ii. Compare Stevens and Sommelet-Hauser rearrangement reactions. (3)		
5	15.a.	i. illustrates absolute and partial asymmetric synthesis with examples. (4) ii. Write any one method for determination of configuration of aldoxime and ketoxime. (3)	K4	CO5
	(OR)			
	15.b.	i. Explain how alkylidene cycloalkanes and Spirane systems shows optical isomerism (4) ii. What is geometrical isomerism. Give examples of E/Z , Syn /anti and erythro/threo isomers(3)		

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	i. Explain nature of the products & its proportions, and stereochemistry of products in the determination of reaction mechanism. (4) ii. Why <i>p</i> -nitrophenol is more acidic than <i>m</i> -nitrophenol? Explain. (2) iv. Derive Hammett equation and explain physical significance of σ and ρ . (4)	K5	CO1
2	17	i. State Huckel's rule of aromaticity. (2) ii. Account the aromaticity of tropolone and [18]annulene. (5) iv. How induced ring current affect the aromaticity? (3)	K4	CO2
3	18	i. How enamines are prepared? Explain the mechanism and advantages of Stork -Enamine reactions. (4) ii. Explain the role of pH in diazonium coupling reactions of phenols and anilines. (4) iii. Compare nitration and nitrosation reactions of primary amines. (2)	K5	CO3
4	19	i. Complete the following and offer suitable mechanism. (4)  →  ii. Write the mechanism of Hoffmann rearrangement. (2) iii. Illustrate Quasi-Favorskii rearrangement with example. Explain why trifluoro acetic acid is best reagent over acetic acid for Favorski rearrangement. (4)	K4	CO4
5	20	Discuss conformational analysis of disubstituted cycloalkanes in detail.	K5	CO5

Z-Z-Z

END