

CHEMISTRY
UK4DSCCHE202 - ORGANIC CHEMISTRY - II

Academic Level: 200-299

2024 Admission

Time: 1 Hour 30 Minutes(90 Mins.)

Max. Marks: 42

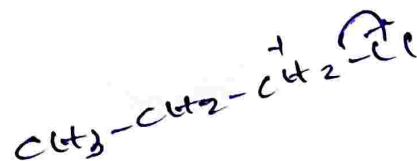
Part A. 6 Marks. Time: 6 Minutes. (Cognitive Level: Remember(RE)/Understand(UN)) Objective Type. 1 Mark Each. Answer all questions

Qn No.	Question	CL	CO
1	State the effect that causes anti-Markovnikov addition of HBr in the presence of peroxides.	RE	4
2	Write the reagents used for nitration of benzene.	RE	1
3	Describe why Meisenheimer complex is formed in S_NAr mechanism.	UN	3
4	Explain inverse kinetic isotopic effect.	UN	2
5	Demonstrate the key steps involved in the E1 reaction mechanism.	UN	4
6	Give an example for secondary kinetic isotopic effect.	UN	2

Part B. 8 Marks. Time: 24 Minutes. (Cognitive Level: Understand(UN)/Apply(AP)) Short Answer. 2 marks each. Answer all questions

Qn No.	Question	CL	CO
7	Illustrate the general mechanism of aromatic electrophilic substitution reaction.	UN	1
8	Compare the hybridization of the carbons in a normal benzene ring versus the two carbons involved in the triple bond of a benzyne intermediate.	UN	3
9	Using a specific reaction of your choice, demonstrate how stereochemical evidence is used to determine its reaction mechanism.	AP	2
10	Predict whether substitution or elimination will dominate when a secondary alkyl halide reacts with a weak nucleophile in a polar protic solvent. Justify your answer.	AP	4

Part C. 28 Marks. Time: 60 Minutes (Cognitive Level: Apply(AP)/Analyse(AN)/Evaluate(EV)/Create(CR)) Long Answer marks each. Answer all 4 Questions choosing among options * within each question



11	<p>a) Identify the position of bromination in phenol and explain the activating effect of the $-OH$ group. b) Classify the following groups as activating or deactivating and predict their directing effects: $-OH$, $-CH_3$, $-COOH$. 3</p> <p>OR</p> <p>B)</p> <p>Identify the major nitration product of benzoic acid and justify the meta-directing nature of $-COOH$.</p>	AP	1, 1
12	<p>A)</p> <p>Examine how product analysis, and detection of intermediates, contribute to the elucidation of reaction mechanisms. 3</p> <p>OR</p> <p>B)</p> <p>Analyze any three methods employed to determine reaction mechanisms.</p>	AN	2, 2
13	<p>A)</p> <p>Argue why S_N1 reactions exhibit two energy maxima while S_N2 reactions show only one. Describe the mechanisms involved, assess the role of intermediates and transition states. 5</p> <p>OR</p> <p>B)</p> <p>Assess whether the rate-determining step always controls product formation in S_N1 reactions. Describe the mechanism. Evaluate the role of carbocation intermediate in determining the products, and justify your answer with suitable examples.</p>	EV	3, 3
14	<p>A)</p> <p>Design reaction schemes using substituted alkene substrates of your choice to demonstrate how electron-donating and electron-withdrawing substituents influence the rate and regiochemical outcome of electrophilic addition. Predict the major product obtained in each case. 3</p> <p>OR</p> <p>B)</p> <p>Compare the mechanisms of bromine addition and hydrogen addition to alkenes, highlighting stereochemical outcomes. Formulate mechanistic pathways for bromination and hydrogenation of alkenes highlighting stereochemical outcomes.</p>	CR	4, 4