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 theeffect 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	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. OR B) Identify the major nitration product of benzoic acid and justify the meta-directing nature of –COOH.	AP	1, 1
12	A) Examine how product analysis, and detection of intermediates, contribute to the elucidation of reaction mechanisms. OR B) Analyze any three methods employed to determine reaction mechanisms.	AN	2, 2
13	A) 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. OR B) 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.	EV	3, 3
14	A) 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. OR B) 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.	CR	4, 4