

Roll No.

Total Pages : 3

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322303

December 2023

B.Sc. (Chemistry)- III SEMESTER

Organic Chemistry-II (BCH-302)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.
2. Answer any four questions from Part-B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.

PART-A

1. (a) Haloalkanes are polar in nature but are still insoluble in water. Explain. (1.5)
(b) Benzoic acid is a weaker acid than formic acid. Explain. (1.5)
(c) What is Malaprade reaction? (1.5)
(d) Why are α -hydrogens of aldehydes and ketones acidic in nature? (1.5)
(e) Name the reagent commonly used for epoxidation of alkenes. (1.5)
(f) How will you convert benzyl chloride into phenylacetic acid? (1.5)

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- (g) What is a Wittig reagent? How is it prepared? (1.5)
(h) What is a haloform reaction? (1.5)
(i) Unlike ethers, epoxides are highly reactive, give suitable reasons. (1.5)
(j) Carboxylic acids do not give the characteristic reactions of carbonyl group. Why? (1.5)

PART-B

2. (a) Discuss the mechanism and stereochemistry of S_N^1 and S_N^2 reactions. (8)
(b) Explain why allyl halides are more reactive than alkyl halides towards nucleophilic substitution reactions. (4)
(c) How will you prepare acetaldehyde using Grignard's reagent? (3)
3. (a) Give the elimination-addition mechanism of conversion of chlorobenzene into aniline. (5)
(b) Discuss 1,2- and 1,4-additions to α,β -unsaturated aldehydes and ketones. (5)
(c) Starting from diethyl malonate how will you synthesize *n*-Valeric acid and Adipic acid? (5)
4. (a) Discuss the relative stability and order of reactivity of acid derivatives towards nucleophilic acyl substitution reactions. (7)
(b) Give the mechanism of Hofmann-bromamide reaction. (4)

- (c) Compare the acid strength of *o*, *m* and *p*-chlorobenzoic acids with that of benzoic acid. (4)

5. (a) Discuss the mechanism of Pinacol-Pinacolone rearrangement. (5)
(b) Give the reaction and mechanism of Claisen rearrangement. (5)
(c) How is diethyl ether prepared by Williamson's synthesis? (3)
(d) Write the equation for the reaction of isobutylene oxide with CH_3OH in acidic medium. (2)
6. (a) Discuss two methods by which primary, secondary and tertiary alcohols can be distinguished. (6)
(b) Comment upon the statement "Reactivity of aldehydes and ketones towards nucleophilic addition reactions is governed by steric and electronic factors." (5)
(c) Explain why ketones form oximes and hydrazones but acids do not when both of them contain a CO group. (4)
7. (a) Give the mechanism of the following : (4)
(i) Benzoin condensation.
(ii) Perkin reaction.
(iii) Clemmensen reduction. (9)
(b) Draw the molecular orbital structure of the carbonyl group. (3)
(c) Write a note on keto-enol tautomerism. (3)