Roll No. | | | | | | | | | | | | | **Total No. of Pages: 02**

Total No. of Questions: 11

M.Sc. (Chemistry) (Sem. – 1)

REACTIVE INTERMEDIATES-I

Subject Code: CHL402-18

M Code: 75114

Date of Examination : 12-01-2023

Time: 3 Hrs. **Max. Marks: 70**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains EIGHT questions carrying FIVE marks each and students have to attempt any SIX questions.**
3. **SECTION-C is COMPULSORY consisting of TWO questions with internal choice carrying TEN marks each.**

SECTION-A

1. Write Briefly:

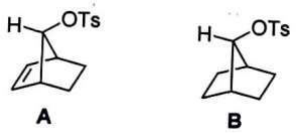
a) Define the terms: Kinetic and thermodynamic control of reactions.

b) Write a short note on Fullerenes (C60).

c) How singlet and triplet carbenes are synthesized?

d) Draw SET mechanism.

e) Compare the following compounds for their rate of reaction.

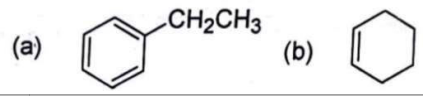


f) Mustard gas ($ClCH_2CH_2SCH_2CH_2Cl$) is hydrolyzed by water to $ClCH_2CH_2SCH_2CH_2OH$ much faster than expected for a primary alkyl halide. Why?

g) Draw the product for the reaction of $PhOH$ with $HCONMe_2$ and $O = PCl_3$ followed by addition of water. Suggest a mechanism.

h) Differentiate SE2 and SEi bimolecular mechanisms.

i) Predict the major product from the autoxidation of these compounds.



j) Draw the mechanism of Cope elimination.

SECTION-B

2. State Hammond's postulate. Explain with a suitable example the application of Hammond's postulate in determining the shape and geometry of transition state.

3. What are nitrenes? Discuss the synthesis, stability and shape of nitrenes.

4. What is SNi mechanism? Discuss the mechanism to explain the observed results of these reactions including stereochemistry. How SNi reaction is different from SN_1 and SN_2 reactions?

5. Discuss Von Richter and Sommelet-Hauser rearrangements.

6. How do you explain the *ortho-para* directing ability of alkyl groups in electrophilic aromatic substitution? Explain with suitable example.

7. Discuss the factors affecting the reactivity in aliphatic electrophilic substitution reactions.

8. Write a short note on allylic halogenation with NBS. How free radical is helpful for the oxidation of aldehyde?

9. Why E2 elimination is stereospecific but E1 is not stereospecific?

SECTION-C

10. What is neighbouring group participation? How do you distinguish phenonium ions, classicaland non-classical carbonium ions?

OR

What is effect of substrate, solvents and leaving group on aliphatic nucleophile substitution reaction?

11. Illustrate the kinetic and thermodynamic requirements of reaction.

OR

Write a short note on any two reactions:

i) Hoben-Hoesch reaction

ii) Sandmeyer rearrangement

iii) Smile rearrangement

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.