MANIPAL UNIVERSITY

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DEPARTMENT OF SCIENCES
I SEMESTER M.Sc. (CHEMISTRY) END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: ORGANIC CHEMISTRY I [CHM 603]

REVISED CREDIT SYSTEM

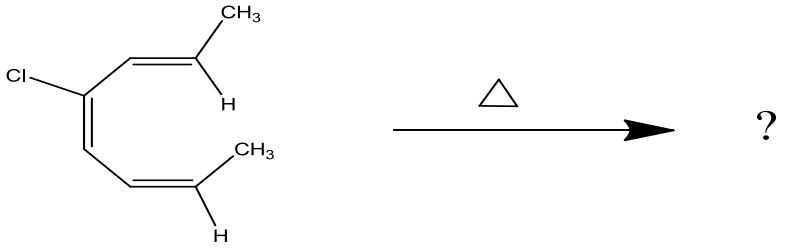
Time: 3 Hours Date: 25/11/2016 MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Write chemical equations wherever necessary.

1A. Explain the symmetry allowed mode of [2+2] cycloaddition reaction using Woodword-Hoffman correlation diagram.

B. Predict the major product and explain the mechanism of the following reaction.



C. Describe the nomenclature pattern used for sigmatropic reaction using suitable examples.

[4+4+2]

2A. i) Describe the origin of chirality in compounds other than tetravalent carbon.

ii) Illustrate Prelog's rule using an example.

B. Deduce Currtin-Hammett equation for a system under conformational equilibrium. Write its significance in explaining isomeric product distribution.

C. Give reasons for the following;

i) Molecules with plane of symmetry is achiral even if they possess asymmetric carbons.

ii) Symmetry allowed pericyclic reaction are more common.

[4+4+2]

3A. i) Discuss how Cram's open chain and cyclic models are different.

ii) Explain the use of Cotton effect for conformational analysis.

B. Describe the axial chirality present in biphenyl derivatives. How is it different from asymmetric tetrahedral compounds?

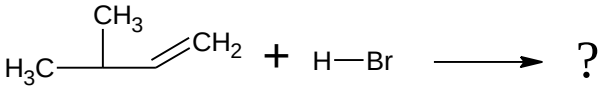
C. Explain suprafacial and antarafacial shift of methyl group. Comment on the symmetry allowed pathway for 1,3-shift of methyl group.

[4+4+2]

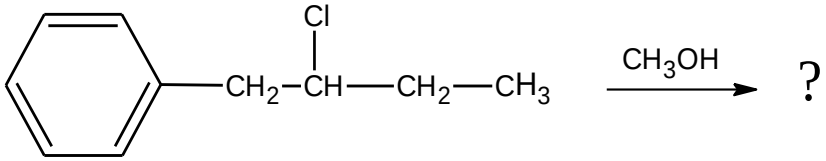
4A. Discuss the structure and chemical properties of starch.

B. Predict the products and write the mechanism for the following reactions;

i)



ii)



C. Give reasons for the following;

i) Ketones cannot be oxidized by Tollen's reagent but ketoses can.

ii) S_N2 reaction of ethyl chloride with hydroxide ion is irreversible.

[4+4+2]

5A. Arrange the following series of compounds in the increasing order of their acidities and basicities by giving appropriate reasons;

i) $CH_3CH_2CHClCOOH$, $CH_3CHClCH_2COOH$, $ClCH_2CH_2CH_2COOH$

ii) O-nitro benzoic acid, m-nitro benzoic acid, p-nitro benzoic acid

iii) Acetamidine, methyl amine and ammonia

iv) Pyrrole, piperidine and pyridine

B. i) Explain how each of the following factors affect S_N1 and S_N2 reactions

a) Structure of alkyl halide

b) Reactivity of the nucleophile

ii) Write the comparison between S_N1 and S_N2 reactions.

C. How do you prove that the structure of glucose and fructose differ only at the first two carbons?

[4+4+2]

6A. Discuss the classification and chemical properties of lipids with illustrative examples. Write their applications.

B. Explain the mechanism of nitration of acetophenone. Comment on the ratio of products formed. Compare the reactivity of acetophenone and benzene towards nitration reaction.

C. How do you synthesize phe-ala?

[4+4+2]

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