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III Semester M.Sc. Degree Examination, March/April - 2025

CHEMISTRY

Organic Synthesis

(CBCS Scheme 2019-20 Onwards)

Paper : CH 302-OC



Time : 3 Hours

Maximum Marks : 70

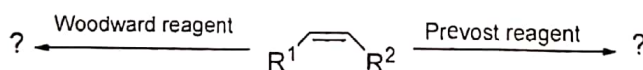
Instructions to Candidates:

Answer question No. 1 and any Five of the remaining questions.

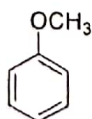
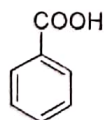
Answer any TEN sub divisions from the following:

(10×2=20)

1. a) What are the major and minor products when isobutylene reacts with 60% sulfuric acid?
- b) Explain briefly the formation of sigma adducts with respect to Chichibabin reaction.
- c) Formulate Skraup synthesis.
- d) LDA is a kinetic base. Justify with a suitable example
- e) Provide the mechanism of allylic bromination with NBS reagent.
- f) Predict the products with stereochemical outcome in the following reactions:



- g) Mention any two advantages of diimide reduction over catalytic hydrogenation.
- h) Suggest the products when these substrates are subjected to Birch reduction?



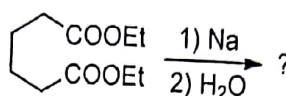
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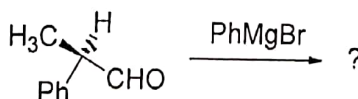
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- i) List two specific uses of DIBAL-H
- j) Calculate the *ee* of a mixture containing 12.8 mol and 3.2 mol of dextrorotatory and levorotatory forms respectively.
- k) What are chiral auxiliaries? Give an example.
- l) Write the stereochemical structure of alpine borane.
2. a) Predict the product of the following reaction and provide a suitable mechanism:



- b) Write a note on synthetic utility of nucleophilic nitrogen. (5+5)
3. a) Describe the principle of umpolung. Citing suitable example, delineate the use of 1, 3- dithiane as umpolung reagent.
- b) Providing mechanism, explain the application of DCC as peptide coupling agent. Mention an important shortcoming of DCC. (5+5)
4. a) Explain the working of Wilkinson's catalyst.
- b) Describe the mechanism of Corey-Bakshi-Shibata reduction. Mention any two advantages of this catalyst. (5+5)
5. a) Predict the outcome of the following reaction using Cram's rule and provide a suitable explanation:



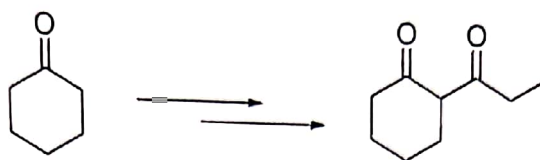
- b) Write a note on:
 - i) Double asymmetric induction.
 - ii) Asymmetric amplification.(5+5)



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6. a) How do you bring about the following transformation? Write all the steps involved.



- b) Explain how benzylic oxidations are carried out using DDQ.
- c) Write a note on wolff-kishner reduction. (4+3+3)
7. a) Illustrate the synthetic application of mCPBA.
- b) Discuss the use of Raney nickel in desulfurization reactions.
- c) Sketch a free energy plot of an enantioselective addition reaction. (4+3+3)
8. a) What is Fischer-Hepp rearrangement? Write its mechanism.
- b) Outline the mechanism of LiAlH_4 reduction.
- c) Write a note on effect of steric bulkiness of hydride donors with respect to the reduction of the following ketone: (4+3+3)

