

29/1/24

(Pages : 4)

W – 5623

Reg. No. :

Name :

First Semester M.Sc. Degree Examination, January 2026

Chemistry/Analytical Chemistry/Polymer Chemistry/Chemistry With
Specialisation in Drug Design and Development

CH 51225/CL 51225/PC 51225/CHDD 51225 : ORGANIC CHEMISTRY I

(2025 Admission)

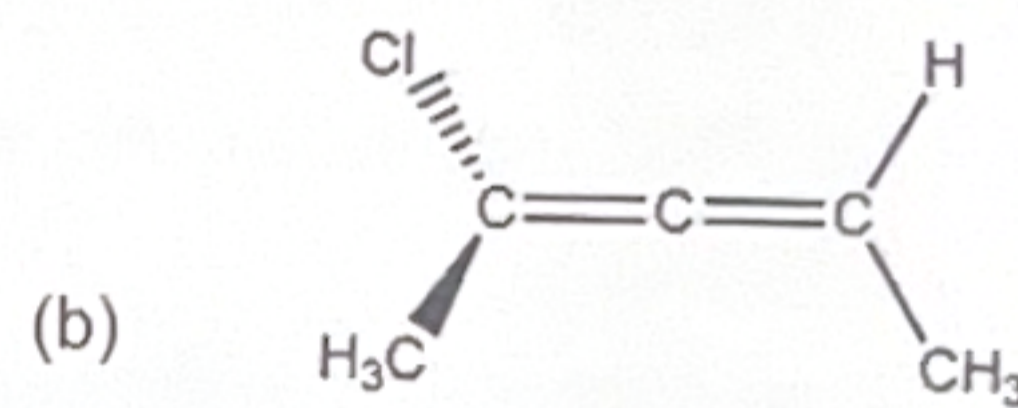
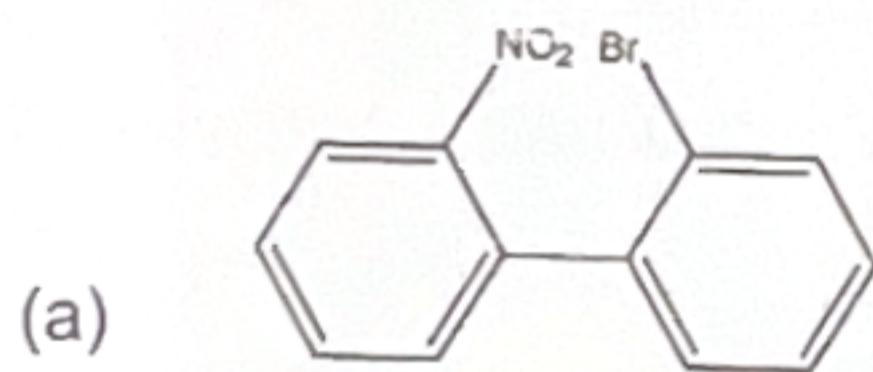
Time : 3 Hours

Max. Marks : 75

SECTION – A

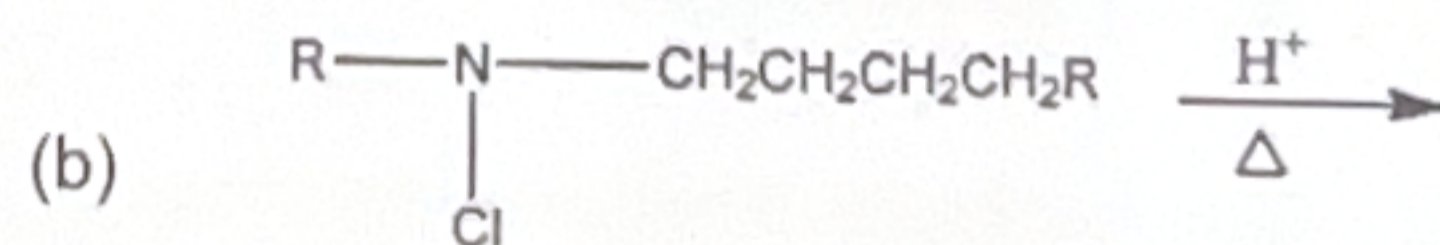
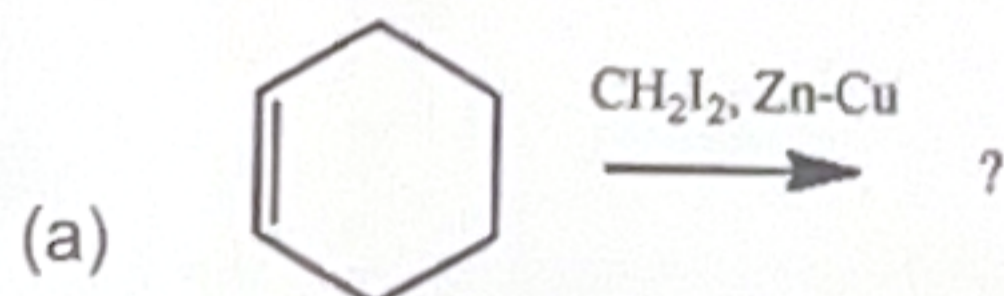
Answer any **two** questions from each unit. Each sub question carries **2** marks.

I. 1. Assign R and S configuration to the following compounds

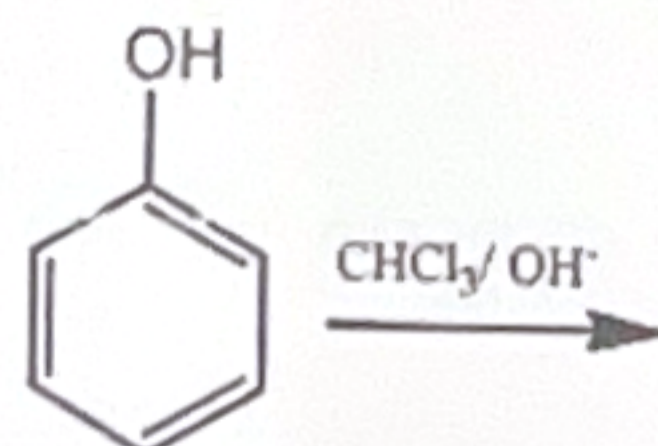


2. Discuss the face selectivity (Re and Si) in hydride ion attack for the reduction of prochiral acetophenone by NaBH₄.
3. What is Cram's rule?

II. 4. Give the product and name the reaction



5. Write the mechanism and product of the reaction



6. Define captodative effect with suitable example.

P.T.O.



- III. 7. Write a short note on LDA and its role in organic synthesis.
8. What is the product of the Henry (nitro-aldol) reaction?
9. Give one example each of base-catalysed and acid-catalysed C-C bond-forming reactions.
- IV. 10. Define phase transfer catalysis and give one example.
11. Why does methyl bromide undergo S_N^2 faster than tert-butyl bromide?
12. What are non-classical carbocations? Give an example.
- V. 13. Write one example each of syn and anti - elimination.
14. Explain Chugavu elimination.
15. What is the product of oxidation of secondary alcohol to ketone followed by Wolff-Kishner reduction?

(10 × 2 = 20 Marks)

SECTION – B

Answer **all** question. Each question carries **5** marks.

16. Explain the mechanism and stereochemical course of epoxide ring opening under acidic and basic conditions.

OR

17. Describe enantioselective synthesis using chiral reagents and catalysts such as [(S)-BINAP]Ru(OAc)₂, DIPAMP-RhL₂⁺ and OsO₄ systems.
18. Discuss the SRN1 mechanism and its significance in aromatic substitution reactions.

OR

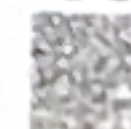
19. Predict the products and give the equations of the following reactions
(a) Reaction of diazomethane with alkene.
(b) Photolysis of azide compound.
(c) Kolbe electrolysis of sodium propionate.
20. Give an account of
(a) Knoevenagel reaction
(b) Cannizaro reaction.

OR

21. Discuss the mechanism of the Prins and Mannich reactions with examples.
22. Explain the effect of
(a) solvent
(b) leaving group, and
(c) substrate on the rate of substitution reactions.

OR

23. Predict the major product(s) and justify:
(a) Bromination of anisole under mild conditions.
(b) Nitration of nitrobenzene.



24. Predict and Justify with mechanism which reaction follows $E_{1c}B$ mechanism:

- (a) α halo carbonyl compound + base
- (b) Benzyl chloride + weak base

OR

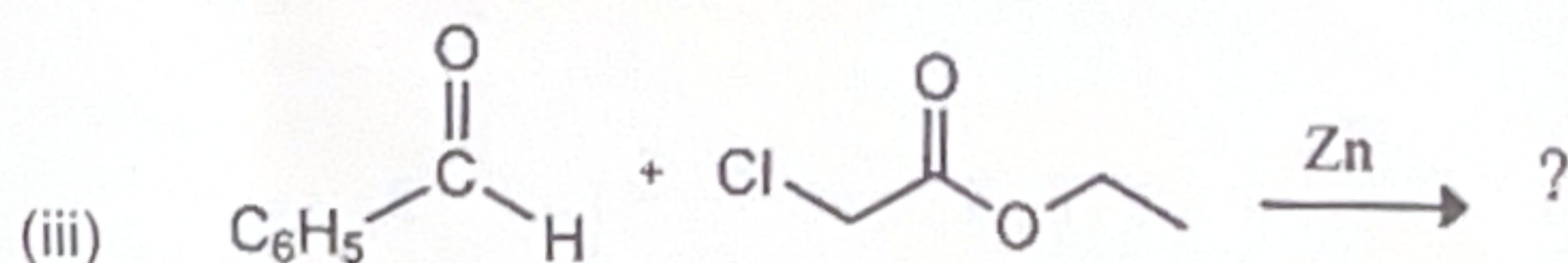
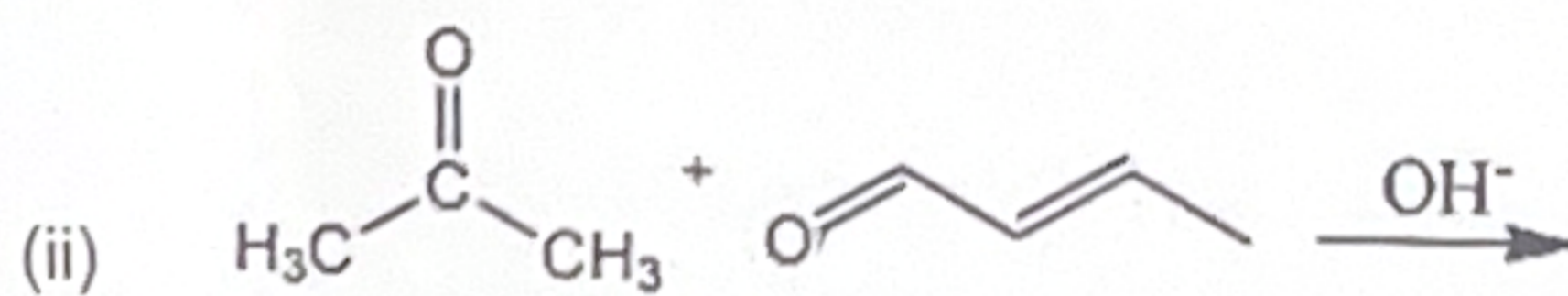
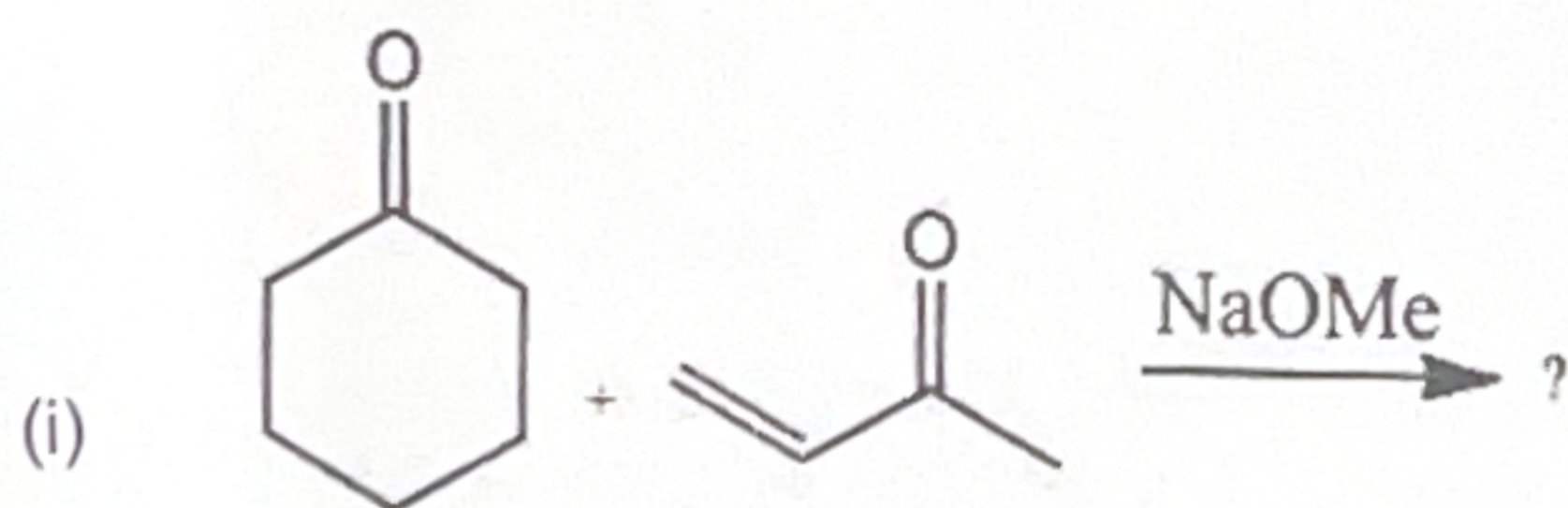
25. Write the mechanism of Cope elimination and discuss the transition state involved.

(5 × 5 = 25 Marks)

SECTION – C

Answer any **three** questions. Each question carries **10** marks.

26. (a) Explain the concept of diaxial interactions and anomeric effect in substituted cyclohexane systems.
- (b) Explain how hydrogen bonding and dipole-dipole interactions influence conformational stability in open-chain systems.
27. (a) Give an account on the following
- (i) McMurry coupling
 - (ii) Barton reaction
 - (iii) Acyloin condensation
- (b) What are carbanions? How is it formed?
28. (a) Give the product(s) and mechanism



- (b) Compare the basicity of NaH and t-BuOK, as deprotonating agents.

29. (a) Explain the benzyne mechanism for nucleophilic aromatic substitution and give experimental evidence.
- (b) Predict the major product and justify the mechanism:
- (i) (S)-2-bromobutane + NaOH \rightarrow ?
- (ii) tert-butyl bromide + H₂O \rightarrow ?
30. (a) Discuss Bredt's rule and its implications on double bond formation in bicyclic systems.
- (b) Discuss the effect of base strength, solvent polarity, temperature, and substrate structure on elimination mechanisms.

(3 × 10 = 30 Marks)

