

FYUGP/4th Sem/26(NEP)New

2026

Four Year Under Graduate Programme (FYUGP)

4th Semester Examination (Under NEP)

(New Session 2024-25)

CHEMISTRY (Major)

Paper Code : CEMMJ DC-401

(Organic-IV)

Full Marks : 30

Time : Two Hours

The figures in the margin indicate full marks.

*Candidates are required to give their answers
in their own words as far as practicable.*

1. Answer any four questions :

1×4=4

(a) Between methyl isobutyrate and methyl trimethylacetate, which is more reactive toward alkaline hydrolysis and why?

(b) Between cyclopentadiene and cyclohexadiene, which one absorbs at longer wavelength, and why? 1.

(c) Draw the most stable conformation of F-CH₂-CH₂-OH. 1.

P.T.O.

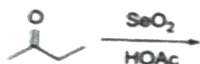
(2)

- (d) Which set of reagents will you use for α -bromination of carboxylic acids?
- (e) Mechanistically show how β -keto acids undergo ready decarboxylation on heating.
- (f) During directed aldol condensation, which type of enolate is exploited for synthetic purpose — thermodynamic or kinetic? Give one simple example.

2. Answer any six questions :

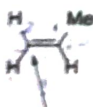
2×6=12

- (a) Write down the major product from the following reaction. Offer the plausible mechanism.



- (b) What happens when diethyl succinate is treated with sodium ethoxide? Offer mechanistic view of its formation.

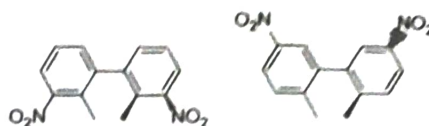
- (c) Justify whether the arrow-marked center of the following molecule is prochiral or prostereogenic center.



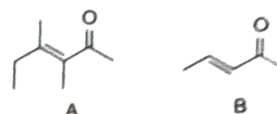
1.5

(3)

- (d) Explain buttressing effect with the following example.



- (e) How can you differentiate between the following molecules by UV-spectroscopy?



- (f) How will you carry out the following conversion?



- (g) Explain why benzophenone is obtained when phenyl magnesium bromide is reacted with excess benzaldehyde followed by hydrolysis.

- (h) Carry out the following conversion:

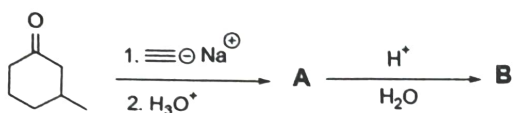


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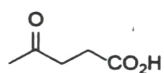
3. Answer any two questions : 7×2=14

- (a) (i) Write down the structure of A and B in the following synthetic sequence:



Write down the mechanism for conversion of 2nd step forming B.

- (ii) Use Reformatsky reaction to synthesize PhC(Me)=C(Me)COOH . Why magnesium cannot replace zinc in this synthesis?
- (iii) On going from non-polar to polar solvent $n \rightarrow \pi^*$ transition shows blue shift — Why? Explain diagrammatically.
- [(1½+1½)+2+2]
- (b) (i) Starting from EAA, how will you synthesize the following molecule?



- (ii) What happens when one equivalent of MeCH=CHCOMe in Et_2O is separately treated with one equivalent of the following reagents?

(a) EtMgBr in Ether

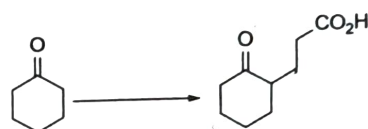
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(b) EtLi in Ether

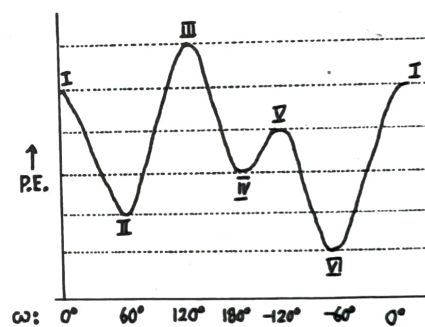
(c) Et_2CuLi in Ether

- (iii) Why the active form of 1,2-diphenyl-1,2-dichloroethane has higher dipole moment than its meso isomer? 3+2+2

- (c) (i) How will you carry out the following conversion?



- (ii) The following energy profile shows the conformations of (R)-2-chlorobutane. Identify and draw the corresponding conformations (I to VI) to each peak and trough.



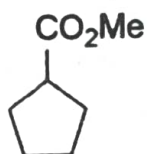
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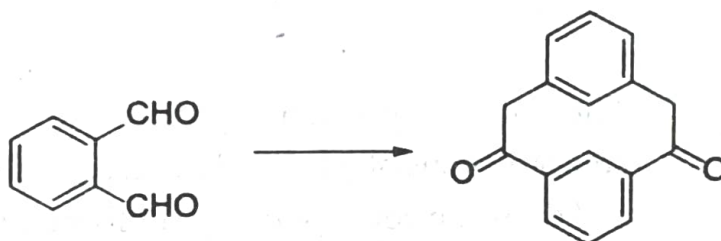
(6)

- (iii) What happens when acetaldehyde (2 moles) is treated with aluminium ethoxide? Justify mechanistically. 3+2+2

- (d) (i) How will you convert cyclohexanone to the following molecule in 2 steps?



- (ii) Using Umpolung methodology, how would you carry out the following conversion:



- (iii) UV-spectrum of aniline in acidic medium resembles that of benzene – Justify. 1.5
3+2+2
- _____