

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, JUNE 2022

SECOND YEAR (BATCH 2020-23)

CHEMISTRY (HONOURS)

Date : 23/06/2022

Time : 11.00 am – 1.00 pm

Paper : IX [CC9]

Full Marks : 50

[Use one Answer book for Unit I & II and another Answer book for Unit III & IV]

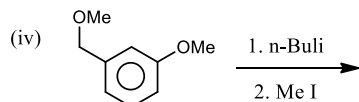
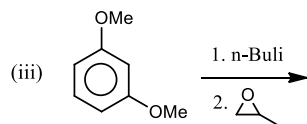
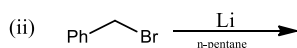
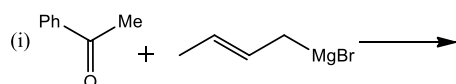
Unit : I

Attempt **any one** question:

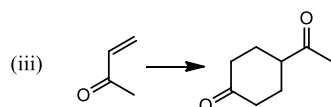
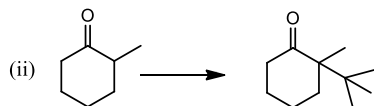
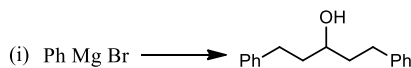
[13 marks]

1. a) Use Reformatsky reaction to synthesise $\text{PhC}(\text{Me})=\text{C}(\text{Me})\text{CO}_2\text{H}$. Why Mg cannot be used in place of Zn in this synthesis. [3]

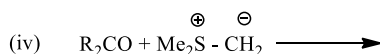
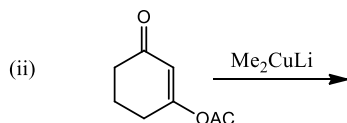
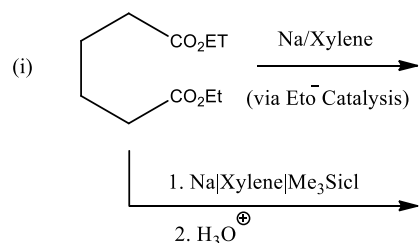
b) Predict the major product in the following reactions. [4×1]



c) Carry out the following conversions : [3×2]



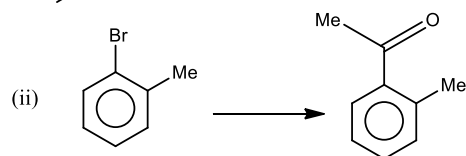
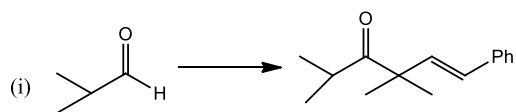
2. a) Predict the major product of the following reactions: [1×5]



b) Give one example mentioning use of the following reagents. Give chemical reaction and mechanism. [2×2]

i) Me_3SiI ii) Me_3SiCN

c) Carry out the following conversions: [2×2]

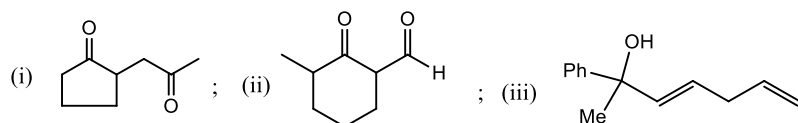


Unit : II

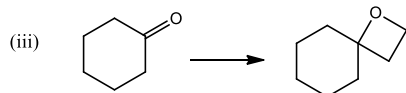
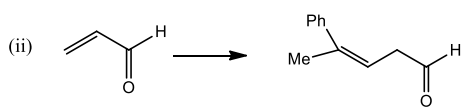
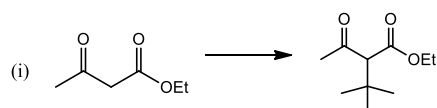
Attempt **any one** question:

[12 marks]

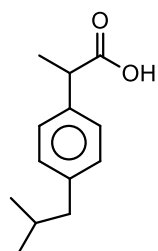
3. a) Show the retrosynthetic analysis of the following compounds and then carry out the synthesis: [3×2]



b) How will you carry out the following transformations? [3×2]

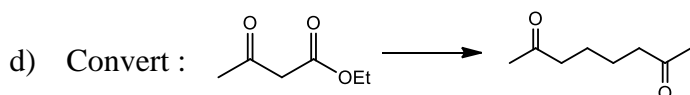
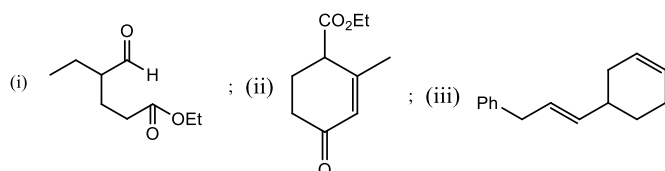


4. a) Outline the synthesis of the following molecule from RASM. [3]



b) Give one example of a³ synthon and its synthetic equivalent. [1]

c) Give retrosynthetic analysis and an efficient synthesis of each of the following compounds. [3×2]



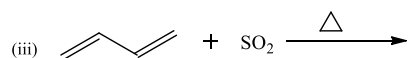
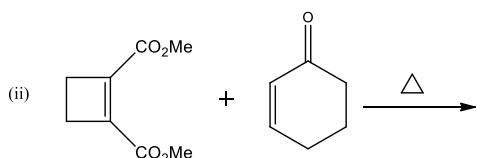
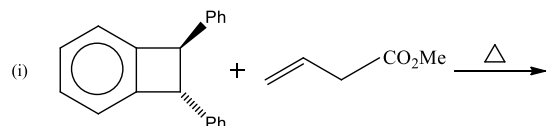
[2]

Unit : III

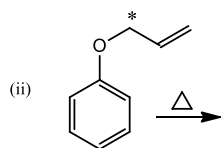
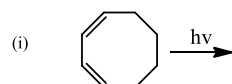
Attempt **any one** question:

[13 marks]

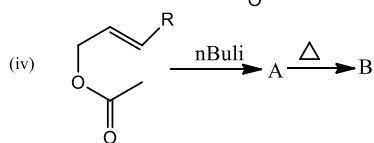
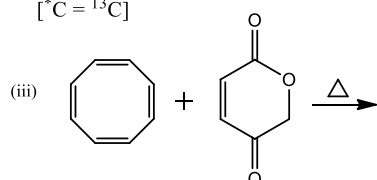
7. a) "Diels-Alder reaction is thermally allowed process" - Explain the statement by drawing proper orbital diagram. [2]
- b) Complete the following reactions also indicate the proper stereochemistry if required. (no mechanism needed) [3]



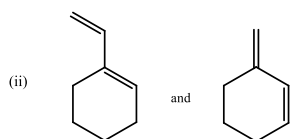
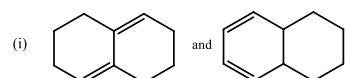
- c) In the following reactions predict the products with proper stereochemistry and also explain the formation by mechanism. [4×2]



[*C = ^{13}C]

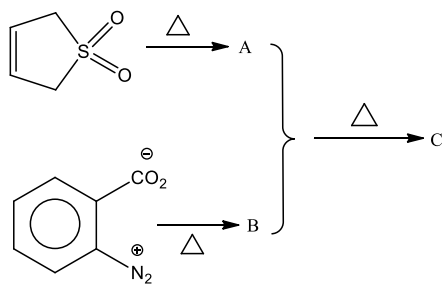


8. a) Which of the following pair will react faster with maleic anhydrides and why? [2]



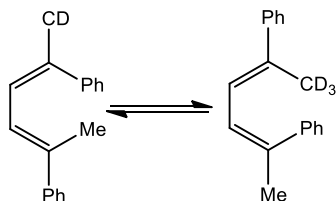
b) Predict the products in the following reactions (mechanism not needed)

[2]



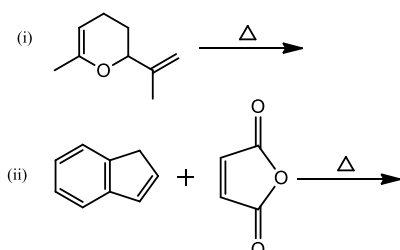
c) The following butadiene A and B are easily interconvertible under thermal condition - Explain.

[2]



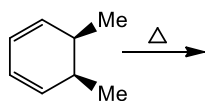
d) Predict the products for the following reactions and also give reasons for your answer.

[2×2]



e) Predict the product for the following reaction and also explain with orbital diagram.

[2+1]



Also, write down the product if the reaction was done under photochemical condition.

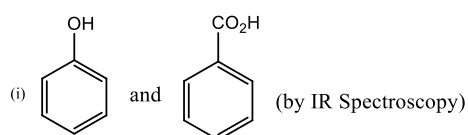
Unit : IV

Attempt **any one** question:

[12 marks]

9. a) Differentiate the following pair of molecular by spectroscopic method as mention.

[3×2]



(by IR Spectroscopy)

ii) PhCOOCH_3 and CH_3COOPh (by IR Spectroscopy)

iii) Cis-cinnamic acid and trans-cinnamic acid (by UV spectroscopy)

b) Describe the change in UV spectra for α,β -unsaturated keto when the solvent change from hexane to octanol.

[3]

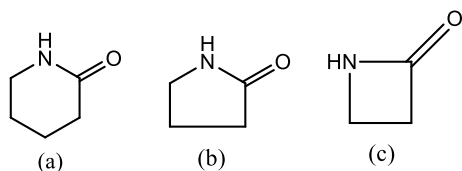
c) Describe the effect of intra molecular and intermolecular hydrogen bonding by dilution with non-polar solvent.

[2]

d) N_2 IR inactive molecular - Explain.

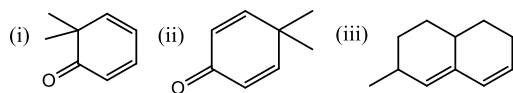
[1]

10. a) Arrange the following molecules in increasing order of ν_{co} frequency and also explain for your answer. [2]

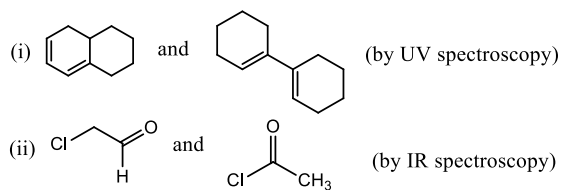


- b) State with example (i) Hyperchromic effect (ii) Auxochrome. [2]

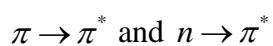
- c) Calculate λ_{max} for the following molecules :- [3]



- d) Distinguish between the give pair of molecular as directed. [2×2]



- e) For which transition ϵ should have higher value and why? [1]



_____ × _____