

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, AUGUST 2021

SECOND YEAR (BATCH 2019-22)

CHEMISTRY (Honours)

Paper : IX [CC 9]

Date : 09/08/2021

Time : 11 am – 1 pm

Full Marks : 50

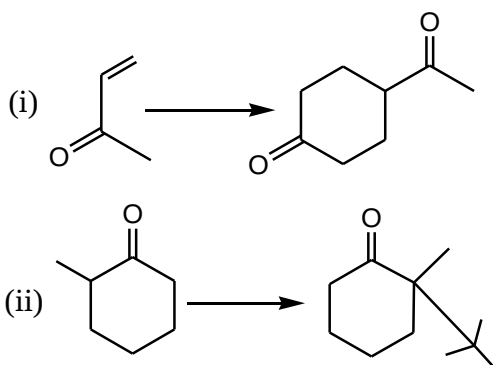
[Attempt one from each unit]

UNIT - I

[13 marks]

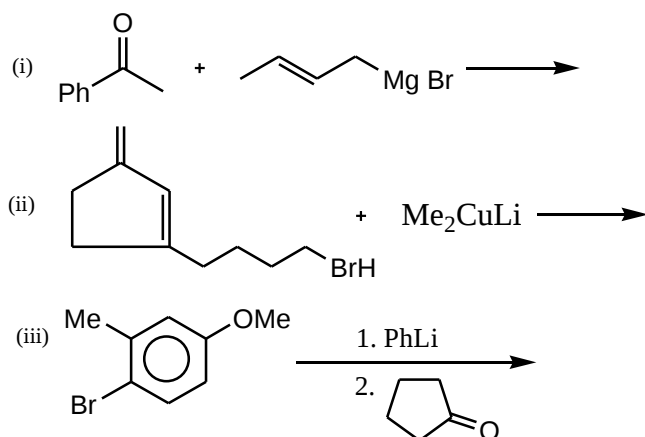
1. a) Carry out the following conversions using organosilicon reagent :

[2×2]



b) Predict the product of the following reactions: Give mechanism.

[2×3]



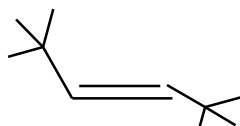
c) Reformatsky reaction is a method for the synthesis of β - Hydroxyester. Give an example with mechanism. Why Zn is used in place of Mg? [3]

2. a) Indicate the use of :

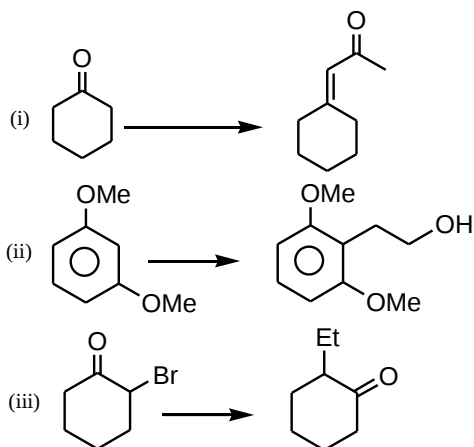
[2×2]

- (i) Me_3SiCl in small alicyclic ring compound synthesis.
(ii) Me_3SiCN in Benzoin condensation reaction.

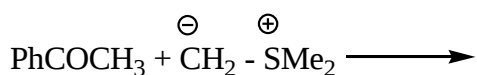
- b) Explain why the synthesis of the following molecule is not possible by applying wittig reaction. [2]



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



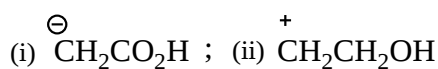
- d) Predict the product of the following reaction : [1]



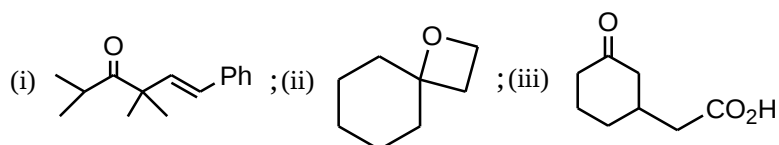
UNIT - II

[12 marks]

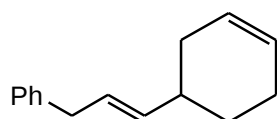
3. a) Write the synthetic equivalent of the following synthons. [1]



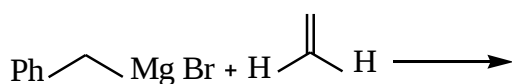
- b) Give retrosynthetic analysis and outline an efficient synthesis of the following molecules: [3+3+2]



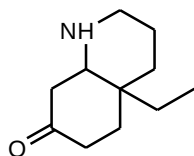
- c) Outline the synthesis of the following molecules. Start from PhMgBr. [2]



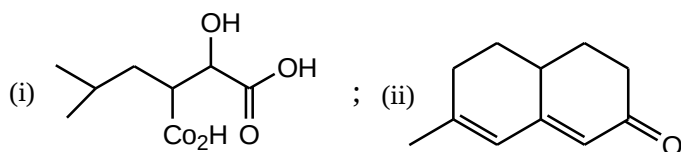
- d) Predict the major product of the following reaction: [1]



4. a) Outline the total synthesis of the following molecule starting from n-butanal. [3]



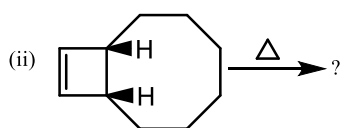
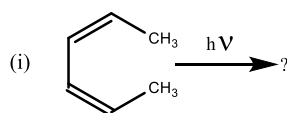
- b) "Propargyl bromide can be used as illogical electrophile" – Justify this statement showing the disconnection and forward synthesis of a γ -ketoacid. [2]
 c) Give example of a 3 synthase and its synthetic equivalent. [1]
 d) Give retrosynthetic analysis and outline an efficient synthesis of the following molecules. [3×2]



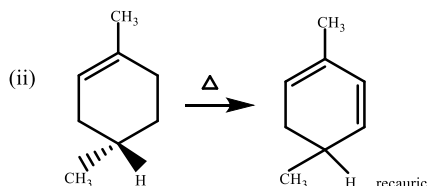
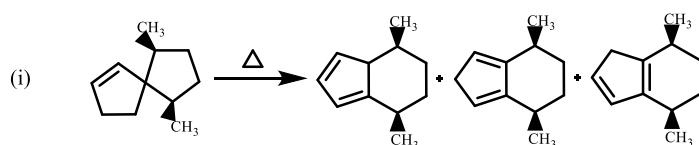
UNIT - III

[13 marks]

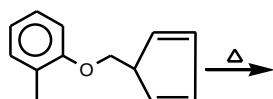
5. a) Explain the regioselectivity in Diels-Alder Reaction. [2]
 b) Explain the results of the following clatrocyclic reactions by FMO approach. [2.5×2]



- c) Explain the following observations: [2×2]

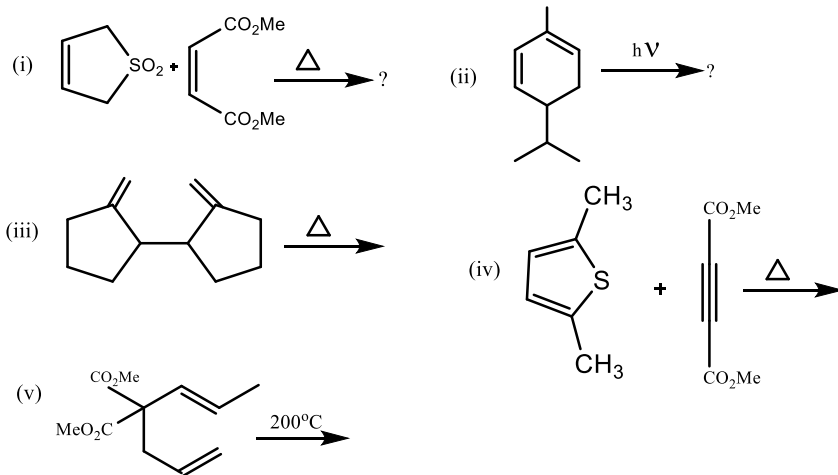


- d) Predict the product and explain with mechanism. [2]

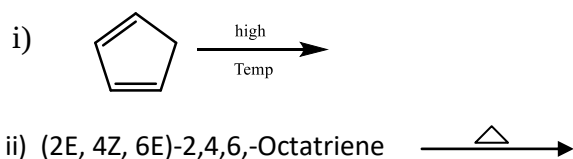


6. a) Predict the products of the following reactions (no mechanism required).

[5]



b) Predict the products with stereochemistry in the following reaction and also explain with FMO. [2×3]



c) [2+2] cycloaddition in always supra-supra addition – Explain.

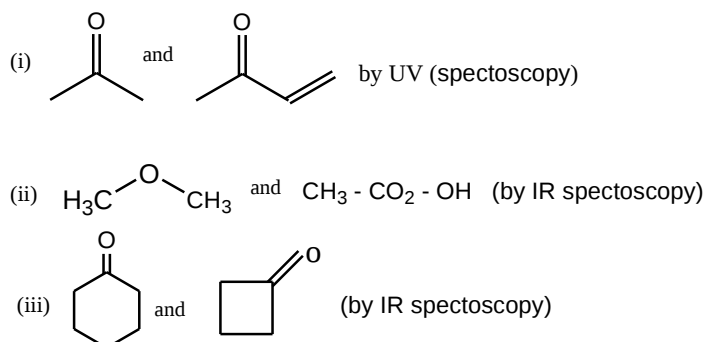
[2]

UNIT – IV

[12 marks]

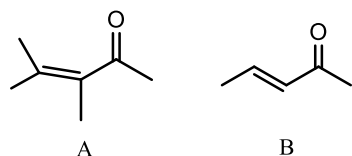
7. a) Differentiate the following pairs of molecules from each other with reasons.

[2×3]



b) Which of the following molecules should show absorption at higher wave lengths? Calculate λ_{max} value for molecules A.

[1+3]



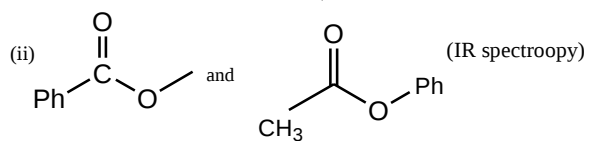
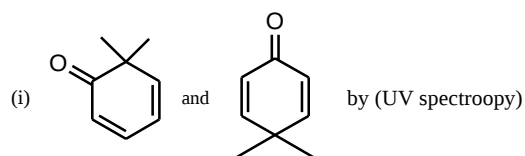
c) Explain the following observation

(i) 1,3 – butadiene shows the UV absorptions at 217 nm (ϵ 21000) While 1,3,5 – hexatriene exhibits maxima at 258 nm (ϵ 35000).

[2]

8. a) Explain the effect of solvent polarity in α,β -unsaturated keto in uv spectrum. [3]

b) How would you distinguish between the following compounds by using spectroscopic method: [3×2]



(iii) vinylacetatl and methylactale (IR spectroopy)

c) How does O – H absorption frequency will change in IR spectra if H is replaced by D. [1]

d) Acetone shows UV absorption maxima at $\lambda_{\max}$ 280 nm (ϵ 15) and 190 nm (ϵ 100). Identify the electronic transition for each case. [2]

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