

M.Sc Sem I June 2018

Organic Chemistry III (Rev)

Q.P. Code : 29461

[Time: 2½ Hours]

[Marks:60]

Please check whether you have got the right question paper.

- N.B: 1. All questions are compulsory.
2. Figures to the right indicate full marks.

1. A Answer any two of the following:-

- a) Using a potential energy diagram, explain kinetic and thermodynamic control in organic reactions. 04
b) Write a note on: 04
i) Principle of Microscopic Reversibility
ii) Curtin – Hammett principle
c) Explain, using suitable example, PKIE and SKIE. 04
d) How do the following techniques help in determining the mechanism of a reaction? 04
i) Product Analysis
ii) Trapping of intermediates

B) Answer any one of the following:-

- a) Compare the basicity of pyridine, pyrrole and aniline. 04
b) Arrange the following in decreasing order of acidity and justify your answer. 04
benzoic acid, o-nitrobenzoic acid, m-nitrobenzoic acid, p-nitrobenzoic acid.

2. Answer any two of the following:-

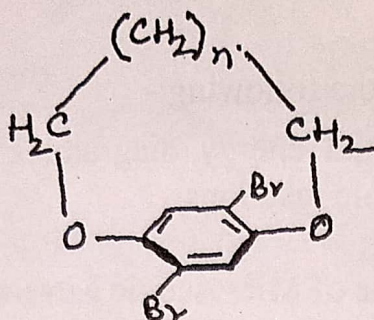
- a) What are the factors which affect S_N^1 vs. S_N^2 mechanism? Discuss any two in detail. 04
b) Give the mechanism of B_{AC}^2 mechanism of ester hydrolysis? Why is it called saponification? 04
c) Write notes on: 04
i) Cine and ipso substitution
ii) SET mechanism for S_N reactions
d) Draw the Frost Musulin diagrams of cyclopentadienyl anion and cyclopropenyl cation and show the distribution of electrons in the MOs. Comment on its aromaticity. 04

B) Answer any one of the following:-

- a) Give one example of each of the following nucleophilic substitution reactions: 04
i) S_N1 ii) S_{NCA}
b) Explain the aromaticity of: 04
i) Furan ii) Azulene

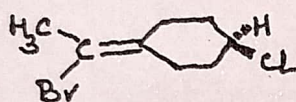
A) Answer any two of the following:-

- a) Explain the optical activity in ansa compounds and assign configurational descriptor to the following compound: 04

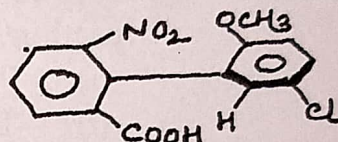


- b) i) Explain any one principle of axial chirality. 04
 ii) Assign configurational descriptors to the following compounds:

I)

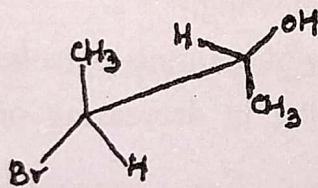


II)

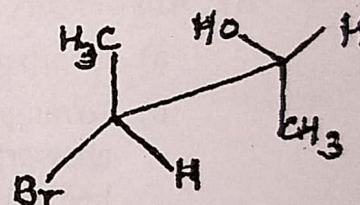


- c) i) Assign erythro and threo nomenclature to the following compounds: 04

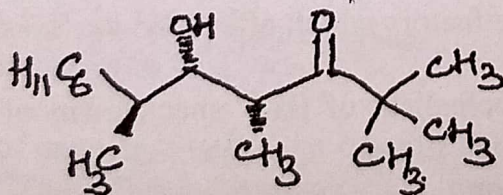
I)



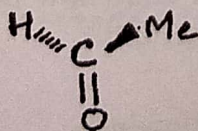
II)



- ii) What is anti-syn nomenclature? Assign anti-syn prefixes to the asymmetric centre(s) in the following molecule:



- d) Explain the substitution and symmetry criteria for identifying enantiotopic faces in the following compound and assign stereochemical descriptors to the same: 04



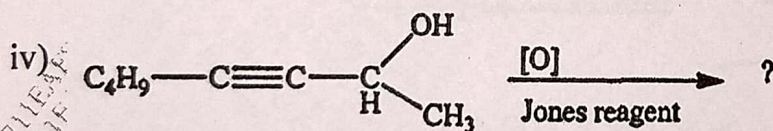
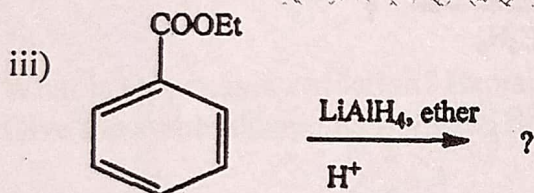
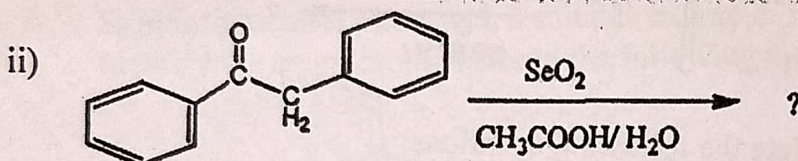
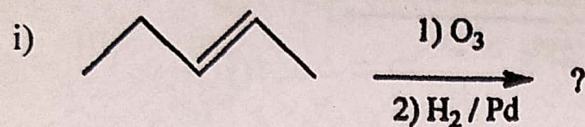
B) Answer any one of the following:-

- a) Explain 'Principle axis' with an example. Draw the structure of tetrabromo allene and identify the axis of symmetry and label the principle axis. 04

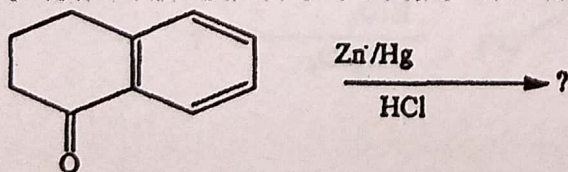
- b) Explain the enantiomerism of the following with suitable examples: 04
- Phosphines
 - Sulfoxides

4. A) Attempt any two of the following:-

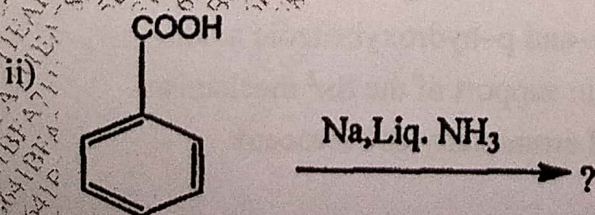
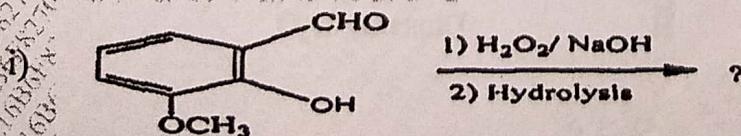
- a) Predict the products in the following reactions: 04



- b) Complete the following reaction, name it and give its mechanism: 04



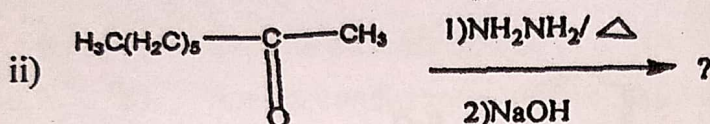
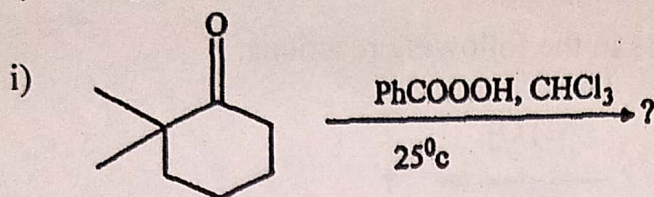
- c) Complete the following reactions and name them: 04



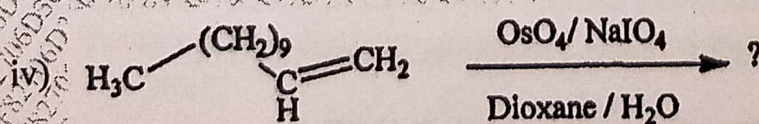
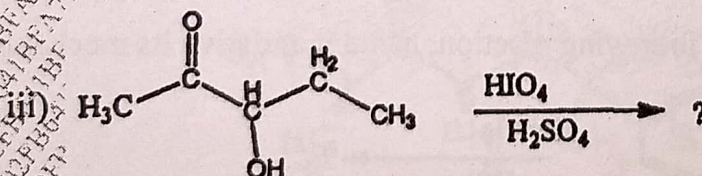
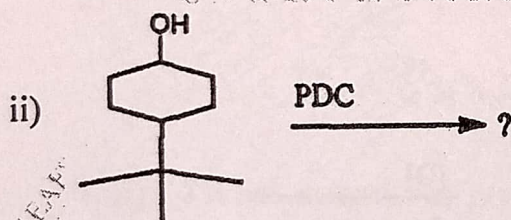
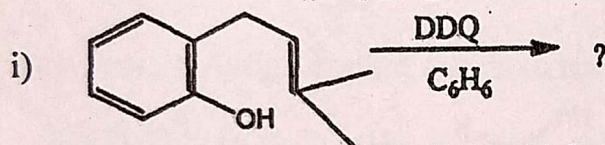
d) What is Corey's reagent? Give two applications. 04

B) Attempt any one of the following:-

a) Complete the following reactions and give the mechanism of any one: 04



b) Complete the following equations:

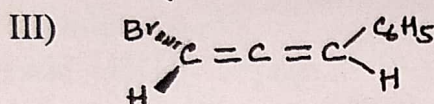
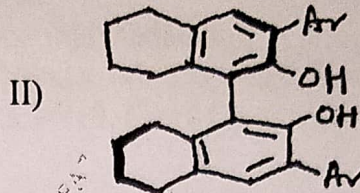
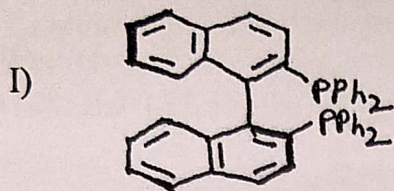


5. Answer any four of the following questions:

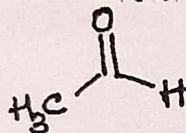
- What is a transition state? How is its geometry determined?
- Compare the acidity of o- and p-hydroxybenzoic acid.
- Give any two evidences in support of the S_N2 mechanism.
- Explain the structure and aromaticity of Ferrocene.

12

E) Assign configurational descriptors to the following compounds:



- F) i) Explain prochiral plane with a suitable example.
 ii) Identify the enantiotopic faces in the following molecule:



- G) What is Oppenauer oxidation? Explain its mechanism.
 H) Give the synthetic applications of DMSO.