

SYNTHETIC METHODS IN ORGANIC CHEMISTRY

Time: 3 Hrs

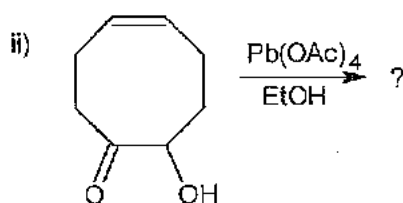
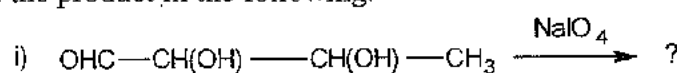
Max. Marks: 70

PART - A

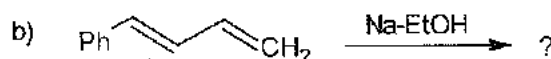
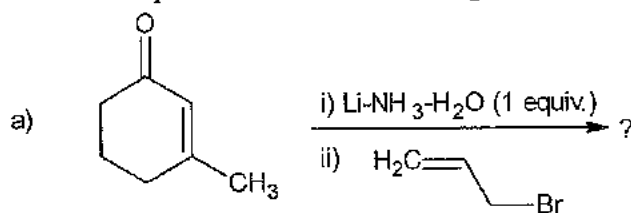
I Answer any TEN of the following

(2×10=20)

- Give the preparation of LDA and DCC.
- Illustrate any two synthetic applications of Trimethyl silyl iodide.
- Write the synthesis of 18-crown-6
- How is m-CPBA prepared? Write the mechanism of epoxidation reaction of alkenes with m-CPBA.
- With an example, illustrate that ozonolysis can be used to determine the position of a double bond in organic compounds.
- Predict the product in the following.

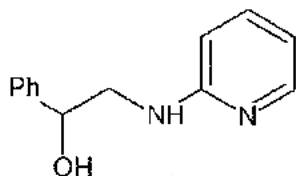


- Comment on the functional group and protecting group sensitivity of LiAlH_4 .
- Briefly explain the functional group selectivity in catalytic hydrogenation reaction.
- Predict the product/s in the following.



- What are donor and acceptor synthons? Give suitable examples.
- Give an example for carboxyl group protecting reagent. Write the protection and deprotection reactions.

1) Perform retrosynthetic analysis of the following.



PART B

Answer any FIVE questions selecting any ONE question from each unit. (10×5=50)

UNIT - I

- 2) a) Explain the synthetic applications of LDA and DDQ.
b) What are phase transfer catalysts? With suitable examples, explain the role of phase transfer catalysts in organic synthesis. (5+5)
- 3) Discuss the applications of following reagents in organic synthesis.
a) Baker's yeast b) 1,3-dithiane c) Selenium dioxide (3+3+4)

UNIT - II

- 4) a) Suggest suitable reagents for the following transformations and write the reaction mechanism.
i) Conversion of secondary alcohols to ketones
ii) Cyclic ketones to lactones.
iii) α -Ketols to α -dicarbonyl compounds. (4+3+3)
- 5) Write short notes on the following.
Halogenation of carbonyl compounds and ii) Allylic halogenation (5+5)

UNIT - III

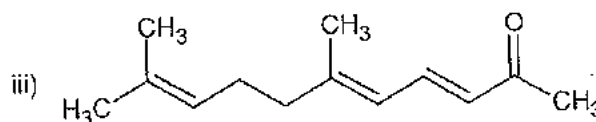
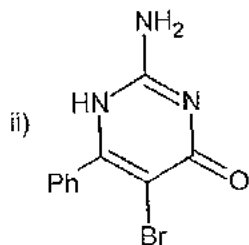
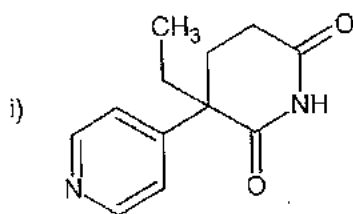
- 6) a) With an example, explain the mechanism of homogeneous catalytic hydrogenation. What are the merits and demerits of this method?
b) With suitable examples, explain the metal hydride reduction of carbonyl compounds. (5+5)
- 7) a) What is Birch reduction? Write the reaction mechanism. Explain, with suitable examples, the effect of nature of the substituent groups on the reduction reaction.
b) Explain the following with suitable examples.
i) Reduction of α, β - unsaturated carbonyl compounds
ii) Wolf-Kishner reduction. (5+5)

UNIT - IV

- 8) a) Explain the retrosynthetic analysis of p-methoxyacetophenone and 6-methylquinoline.

b) Give two examples each for amino and hydroxyl protecting reagents. Write the protection and deprotection reactions. (5+5)

9) Perform the retrosynthetic analysis of the following. (3+4+3)



MCHE 404

REG.NO:.....

CREDIT- BASED FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, JANUARY 2021

M.Sc. CHEMISTRY

POLYMER AND SOLID STATE CHEMISTRY

Time : 3 Hrs

Max. Marks: 70

PART - A

I Answer any TEN of the following:

(10 x 2 =20)

- a) What are linear and cross linked polymers? Explain with an example each.
- b) Give the principle of Gel permeation chromatographic technique.
- c) Explain the term 'living polymers'.
- d) What are conducting polymers? Explain with an example.
- e) Explain the Q-e scheme of Alfrey and Price.
- f) Give the criteria for polymers to conduct electricity and mention their uses.
- g) Explain the pulling method of preparation of solids.
- h) Differentiate between Tg & Tm of glass.
- i) What are fullerenes? Explain with examples.
- j) A monochromatic beam of x-ray of wavelength 1.54 \AA shows first order diffraction from a cubic crystal. If the Bragg's angle is 2.4° , Calculate the interplanar distance.
- k) Differentiate between XPS & UVPS.
- l) How are the electron and neutron diffractions different? Explain.

PART - B

Answer FIVE questions selecting at least ONE question from each unit.

(5x10=50)

UNIT I

- 2 a) Outline the principle of ultra centrifugation methods of molecular weight determination of polymers.
- b) In a polymer, there are 100 molecules of molecular weight 1000, 200 molecules of 10000 and 400 molecules of molecular weight 100000. Find \overline{M}_n , \overline{M}_w , and PDI. (5+5)
- 3 a) Calculate the weight average molecular weight of polymer sample consisting of 10% by weight of macromolecules of molecular weight 1,000 and 90% by weight of macromolecules of molecular weight 10,000.
- b) Explain the classification of polymers based on the structure.
- c) Discuss the membrane osmometry method of determination of molecular weight of polymers.

(4+3+3)

UNIT II

- 4 a) Discuss the mechanism & kinetics of free radical polymerization.
b) Explain the mechanism of acid catalysed condensation polymerization. (6+4)
- 5 a) Explain the mechanism of Zeigler-Natta catalyst (monometallic) polymerization.
b) Discuss the kinetics of copolymerization. (4+6)

UNIT III

- 6 a) Describe the chemical vapour deposition (CVD) method of preparation of solids.
b) Discuss the principle and technique of cathode sputtering for the preparation of thin films.
c) What are zeolites? Discuss their applications. (3+3+4)
- 7 a) Write a note on a) high Tc superconductors.
b) Factors affecting glass formation.
c) Microstructure & sintering of refractory materials. (3+4+3)

UNIT - IV

- 8 a) Describe the oscillating crystal method of x-ray diffraction studies.
b) Explain the principle and applications of DSC.
c) Discuss the principle and technique of AES (Auger Electron spectroscopy) (4+3+3)
- 9 a) Explain the principle, technique and applications of scanning tunnelling microscopy (STM).
b) Discuss the applications of X-ray diffraction. (6+4)
