

(3 Hours)

N.B.: 1. All questions are compulsory**2. Answer all subquestions together****3. Figures to right indicate full marks****Total Marks: 70**

Q1) A] Answer the following questions

a) Discuss the following terms

[04]

i) Dihedral angle ii) Bayer strain iii) Torsional strain iv) Conformation

b) Give distinguishing test for primary, secondary and tertiary alcohol.

[03]

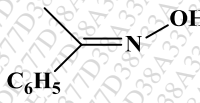
c) Draw possible resonating structures for the following compounds.

[02]

i) naphthalene ii) anthracene

B] Give the products for the following reactions (**Any six**)

[06]

a) 2 moles of acetaldehyde $\xrightarrow{\text{NaOC}_2\text{H}_5}$ b) benzoyl chloride $\xrightarrow[2. \text{H}_2\text{O}]{1. \text{NaN}_3, \text{CHCl}_3}$ c) acetophenone $\xrightarrow{\text{KOCl}}$ d)  $\xrightarrow{\text{conc. H}_2\text{SO}_4}$ e) 2,3-dimethylbutene $\xrightarrow{\text{CH}_3\text{OH}, \text{Hg}(\text{OOCF}_3)_2}$ f) anthracene $\xrightarrow{\text{Na, EtOH}}$ g) phenyl butanoate $\xrightarrow{\text{AlCl}_3, \text{CS}_2}$ Q.2 A] Give the reaction and mechanism of **any two** rearrangements.

[04]

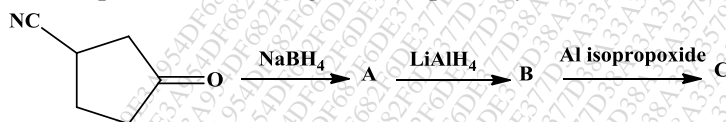
i) Lossen rearrangement reaction

ii) Pinacol-pinacolone rearrangement

iii) Favorski rearrangement

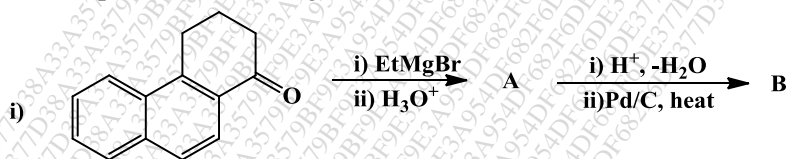
B] Complete the following reaction pathway. Give structures of A, B and C.

[03]



C) Complete the following conversions

[04]



Q.3 A) Justify, "Cis cyclohexane-1,4-diol predominantly exists in the boat form."

[02]

B) i) The preferred conformation of cis-3-tert-butyl-1-methylcyclohexane is the one in which

[01]

a) the tert-butyl group is axial and the methyl group is equatorial.

b) the methyl group is axial and the tert-butyl group is equatorial.

c) both groups are axial.

d) both groups are equatorial.

ii) Discuss the chirality of 1,3-dimethyl cyclohexane and draw all possible stereoisomers

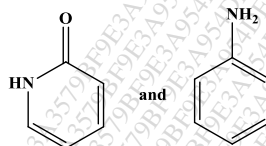
[02]

C) Convert the following. (any three) [06]

- p-hydroxybenzaldehyde to quinol
- 3-methylaniline to 3-methyl benzoic acid
- ethyl adipate to 2-oxy-cyclopentane carboxylic acid
- acetophenone to phenylhydrazone of acetophenone

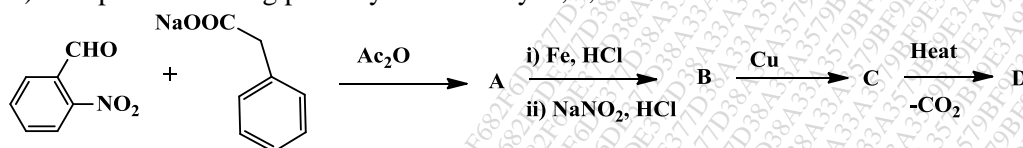
Q.4 A) i) Discuss **any two** synthetic methods involved in the preparation of ether. [02]

ii) Which hydrogen would be easily removed by the treatment of one equivalent of base from the



following compounds and justify your answer [02]

B) Complete following pathway and identify A,B,C and D. [04]

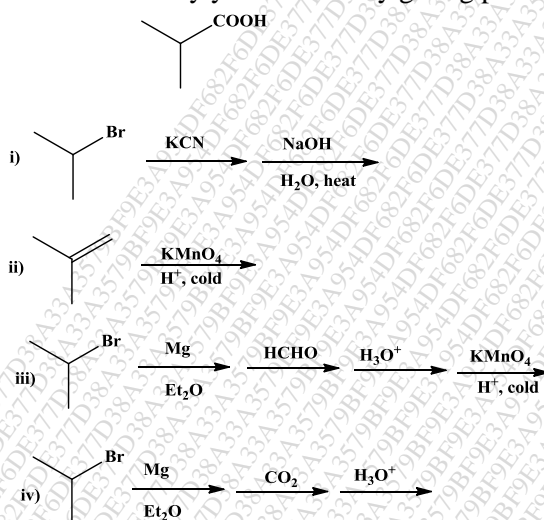


C) Illustrate all possible conformers of butane molecule and discuss the stability of conformers by depicting the energy profile diagram [03]

Q.5 A) How will you synthesize the following using toluene. [04]

- p-amino benzoic acid
- p-tolunitrile

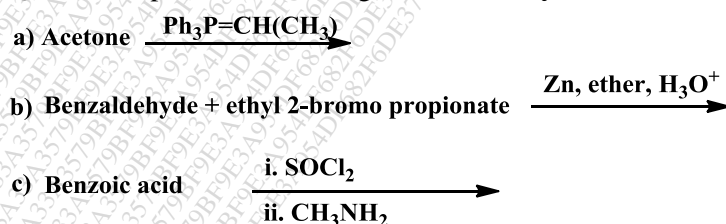
B) Judge the best synthetic method applicable for 2-methylpropanoic acid from the following given reactions. Justify your answer by giving products for each of the reactions. [04]



C) Write the mechanisms for the following. [03]

Reimer Tiemann reaction of phenol **OR** Friedel Craft's alkylation reaction of 4-hydroxybenzaldehyde

Q.6 A) Complete the following reactions (Any two). [04]



- B) i) Write reaction involved in conversion of benzoic acid to sodium benzoate and benzylalcohol[02]
ii) Draw the intermediate for the acid and basic hydrolysis of methyl ethanoate? [02]

C) Choose the correct alternatives and rewrite [03]

- i) Two moles of alcohols add to carbonyl group of aldehyde to give----- (acetoxime, aldol, acetal, ketal)
ii) ----- is a reagent of choice to convert alcohol selectively to an aldehyde (KMnO₄, 9-BBN, Lead acetate, DCC)
iii) In dissolving metal reductions ----- gets formed as a reaction intermediate (Benzyne, benzene, carbonium ion, nitronium ion)
