

(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

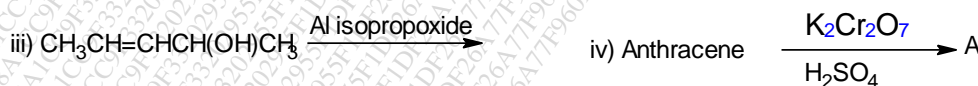
- i) Discuss the following terms : Conformation, Ring Flipping (2)
 ii) Give **any one** functional group identification test of **Phenol** and **Ester** (2)
 iii) Draw all possible resonating structures for Phenanthrene (1)
 B] State true or false with justification (4)

- i) Cis-cyclohexane-1,4-diol exist predominantly in chair form
 ii) Aldehydes undergo electrophilic addition reaction
 iii) Electrophilic substitution of naphthalene is preferred at α -position
 iv) m-Nitrophenol is less acidic than p-nitrophenol

C] Give the products for the following reactions (**Any six**) (6)Q2) A] Give the mechanism of **any two** rearrangement of the following (4)

- i) Benzil-benzilic acid rearrangement
 ii) Pinacol-pinacolone rearrangement
 iii) Steven alkylation

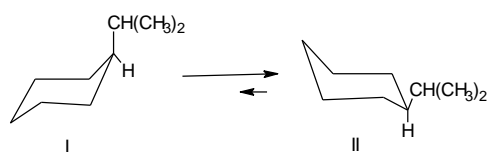
B] Complete the following reactions (4)



C] A compound 'A' (Molecular formula: $\text{C}_6\text{H}_7\text{N}$) is basic and gives carbylamines test positive. On treatment with NaNO_2/HCl it forms 'B', which on treatment with CuCN gives 'C' (Molecular formula: $\text{C}_7\text{H}_5\text{N}$) Identify compounds **A**, **B** and **C** (3)

Q3) A] Draw important conformers of n-butane and arrange them in the order of relative stability (2)

B] i) Account for the following observation



For Isopropyl cyclohexane conformer I is present only 3% while II is 97% at room temperature (1)

ii) Cis and trans-isomers of 1,4-dimethyl cyclohexane are optically inactive, Justify (2)

C] Attempt the following conversions (Any three) (6)

i) Ethyl acetate to ethyl acetoacetate

ii) Trimethylbenzylammonium chloride to ortho-methyl dimethyl benzylamine

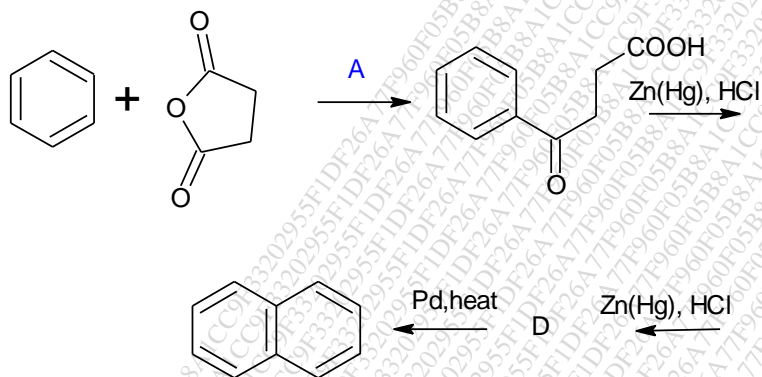
iii) ortho methylbenzophenone to anthracene

iv) Butanal to pentan-2-ol

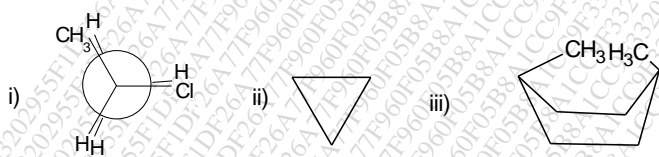
Q4) A] i) Give **any two** methods of preparation of methyl ethyl ether (2)

ii) By using diethyl malonate as a starting material how will you obtain 2,2-dimethylethanoic acid (2)

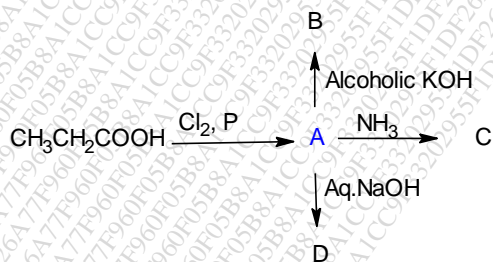
B] Complete the following pathway and identify A,B, C and D (4)



C] State the type of strain in each the following (3)



Q5) A] Complete the following reaction pathway (Alcohol, phenol and amide conversions) (4)



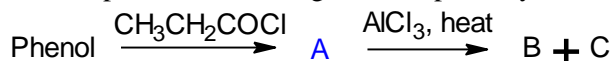
B] Give the mechanism of acid catalyzed Beckman's rearrangement by giving suitable example. Can we replace acid with any other catalyst? (4)

C] Explain Hinsberg's test for aliphatic amines with suitable examples (3)

Q6) A] Convert the following (4)

- i) Aniline to Iodobenzene
- ii) Ethyl pentanoate to pentanol
- iii) Salicylaldehyde to catechol
- iv) Benzaldehyde to cinnamic acid

B] Complete the following reaction pathway (3)



C] A hasty chemist forgot to label the containers and now wants to use basics in organic chemistry to solve the problem. He has four containers namely A, B, C and D. Help him to identify which of them contains propionic acid, benzamide, o-toluidine and acetophenone. He carried out following four reactions to arrive at conclusion: (4)

Container A: Compound + NaOH, boil and smell of ammonia

Container B: Added NaHCO₃ to compound and observed a brisk effervescence

Container C: Added 2,4-DNP and observed thick orange precipitate

Container D: Compound in Conc. HCl + NaNO₂ in HCl at 0-5°C, mix and add beta-naphthol in NaOH gave orange dyestuff

Identify Contents of container A, B, C and D.