

(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. Explain the following terms

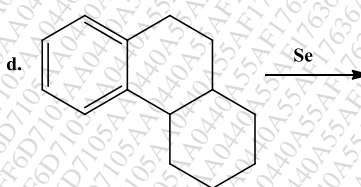
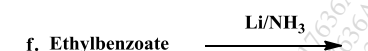
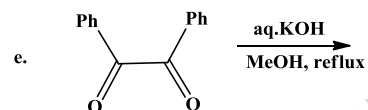
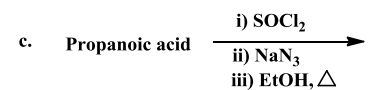
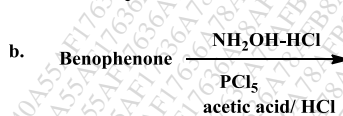
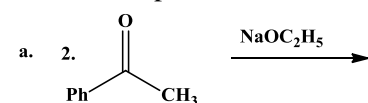
i. Pitzer strain ii. Transannular strain iii. Conformation

b. Distinguishing test for primary, secondary and tertiary aromatic amines

c. Draw possible resonating structures for the following compounds

i) phenanthrene ii) anthracene iii) naphthalene

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



Q2) A] Give the mechanism of any two rearrangement

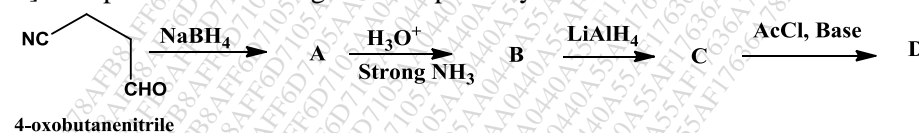
i) Hoffman rearrangement

ii) Favorskii rearrangement

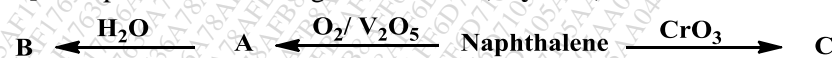
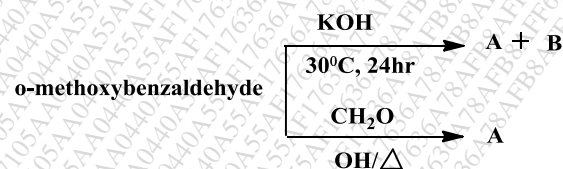
iii) Pinacol-pinacolone

rearrangement

B] Complete the following reaction pathway

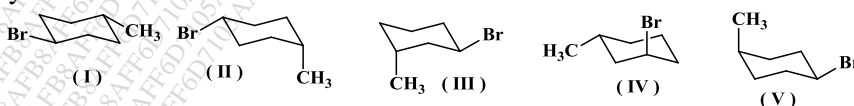


C] Complete the following conversions (any One)

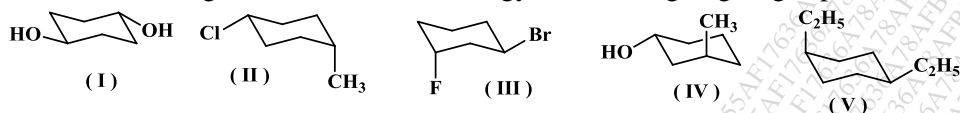
OR

Q3) A] Answer the following questions

i) Which conformation represents the most stable conformation of trans-1-bromo-4-methyl cyclohexane?



ii) Which of the following will have the same energy after undergoing ring flip?



B] Name the least stable and most stable conformation of cyclohexane and justify your answer by drawing the energy profile diagram [03]

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

i) tert-butyl methyl ketone to Trimethylacetic acid /acetamide

ii) phenol to ethylphenyl ether

iii) Ethyl 5-oxohexanoate to 1,3-cyclohexanedione

iv) Benzaldehyde to benzoin

v) Salicylaldehyde to catechol

Q4) A] i) Discuss **any two** synthetic methods involved for preparation of 3-Methyl-2-butanone [03]

ii) $\text{PhCH}_2\text{OCH}_3 \xrightarrow{\text{LiNH}_2} ?$ [01]

B]. Using appropriate Grignard reagent show the schematic representation for synthesizing following compounds 2-methyl-1-phenylpropan-2-ol (Lilac perfume) **OR**

B] Discuss the Pschorr synthesis of Phenanthrene [04]

C] State True or False and justify your answer by giving suitable explanation [03]

a. Cis cyclohexan-1,3-diol prefers diaxial conformation

b. 1-t-butylcyclohexane prefers axial conformation

c. 1,4-dimethylcyclohexane is optically active

Q5) A] Outline the synthetic steps for the following compounds using benzene/toluene/any other aliphatic or inorganic reagents (**any two**) [04]

i) m-bromophenol

ii) 4-methylacetanilide

iii) p-tolunitrile

B. Give detailed mechanism of acid and base catalysed benzamide/methylbenzoate [04]

C] Discuss Lucas test for 1°, 2° and 3° alcohol [03]

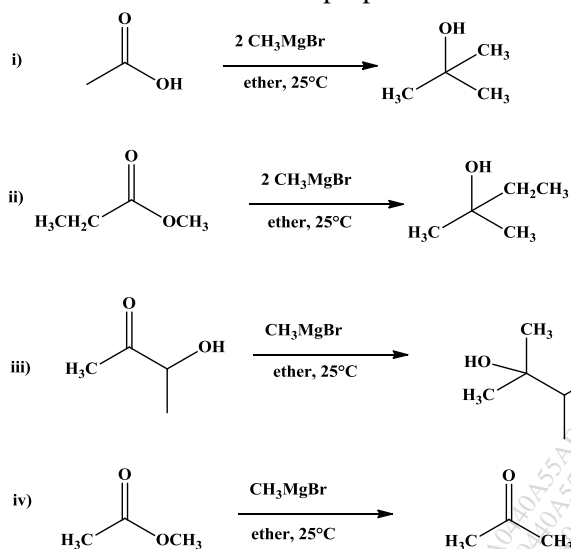
Q6) A] Suggest suitable synthetic method for preparation of diethylmalonate from malonic acid [02]

Complete the following reaction [01]



B] Which of the following reactions **would proceed as written**? A mild acidic workup can be assumed to follow each proposed reaction.

[04]



C] Identify A, B, C and D in the given reaction pathway

[04]

