(3 Hours) **[Total Marks: 70]**

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

Q1) A] Answer the following questions (09)

a. Briefly discuss the following terms: Conformation, Trans annular strain, Ring Flipping

b. Give distinguishing test for primary, secondary and tertiary aromatic amines

c. Draw possible resonating structures for the following compounds

i) Naphthalene ii) Anthracene iii) Phenanthrene

B] Give the products for the following reactions (Any six) (06)

1. 2 Moles of C_6H_5CHO $\xrightarrow{\text{Strong NaOH}}$

2. C_6H_5Br $\xrightarrow[2.\ CO_2,\ H_3O^+]{1.\ Mg}$

3. C_2H_5COCl $\xrightarrow{\text{t-BuOH}}$

4. Phenol + $CHCl_3$ $\xrightarrow{OH^-,\ Heat}$

5. Naphthalene $\xrightarrow[450\ -500\ \text{Deg. C}]{O_2,\ V_2O_5}$

6. Acetaldehyde + CH_3NO_2 $\xrightarrow{OH^-}$

7. Aniline $\xrightarrow[2.\ CuCN]{1.\ NaNO_2,\ HCl,\ \ 0-5\ \text{Deg. C}}$

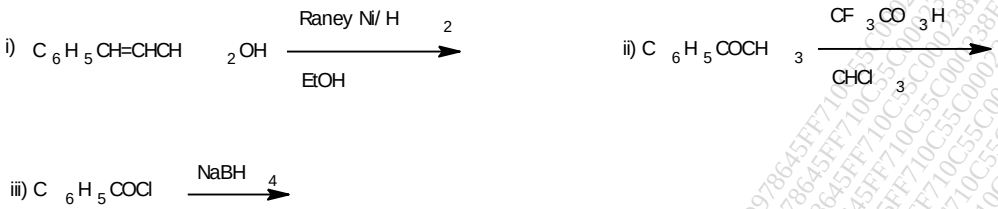
Q2)A] Give the mechanism of any two rearrangements (04)

i) Hoffman Rearrangement

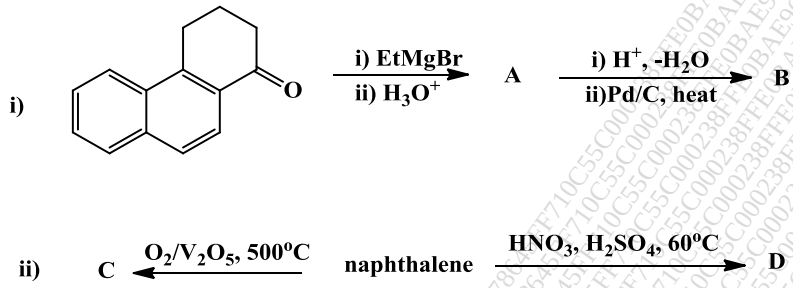
ii) Steven Rearrangement

iii) Pinacol- pinacolone

B] Complete the following reaction pathway (03)



C] Attempt the following conversions (04)



Q3)A] Draw all possible structures of **Cis-1,3-dimethyl cyclohexane** and **Trans-1,3-dimethyl cyclohexane** and state which is most stable and why? [03]

B] Draw important conformers of n-butane and arrange them in the order of relative stability [02]

C] Covert the following [06]

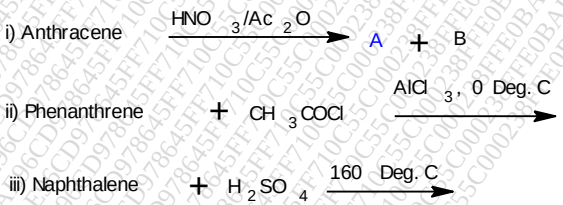
i) 3-Methylaniline to 3- methylbenzoic acid

ii) Phenol to ethylphenyl ether

iii) Benzil to benzilic acid

Q4) A] Discuss any two synthetic methods for synthesizing 2-pentanone **OR** ethyl methyl ether [04]

B] Write structures of products formed (04)



C] State True or False [03]

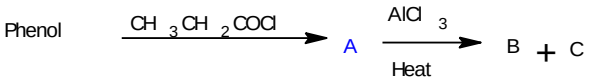
a. 1,4-dimethylcyclohexane is optically active

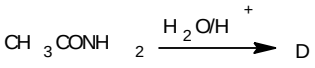
b. 1-t-butylcyclohexane prefers axial conformation

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

Q5) A] Complete the following reaction pathway (04)

a.



b. 

B) Give the mechanism of acid catalyzed Beckman's rearrangement using suitable example (04)

C) Explain Hinsberg's test for aliphatic amines with suitable examples (03)

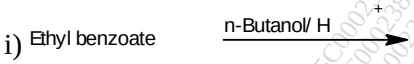
Q6)A] Convert the following (Any 2) (04)

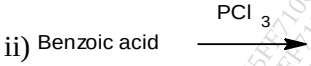
a. Benzaldehyde to cinnamic acid

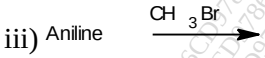
b. Salicyladehyde to o-hydroxybenzene

c. Napthalene to naphthalene-2-sulfonic acid

B] Complete the following reactions (03)

i) 

ii) 

iii) 

C] Write reactions to show steps involved in conversion of 4-chlorobenzoic acid to (04)

I) sodium 4-chlorobenzoate

ii) 4-chloro benzamide

iii) 4-chloro benzyl alcohol

iv) 4-chloro benzoyl chloride