

(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

- a) Explain terms : Dihedral angle , Conformation, Ring Flipping , 1,3-diaxial interaction (4M)  
b) Draw all possible resonating structures of Anthracene and Phenanthrene (2M)  
(c) Give identification test for (3 M)

- i) An alcohol            ii) Carboxylic acid        iii) Aromatic primary amine

C] Give the products for the following reactions (Any six) (6 M)

- i) p-Nitrobenzaldehyde  $\xrightarrow{\text{Strong NaOH}}$             ii) Anthracene  $\xrightarrow{\text{Na, EtOH}}$   
iii) 2 Moles of Benzaldehyde  $\xrightarrow{\text{Aq. alc. KCN}}$             iv) Ethyl benzoate  $\xrightarrow{\text{Aq. NaOH}}$   
v)  $\text{CH}_3\text{CH}_2\text{COCl} + \text{t-BuOH} \longrightarrow$             vi)  $\text{C}_6\text{H}_5\text{NH}_2 + \text{C}_6\text{H}_5\text{COCl} \longrightarrow$   
vii)  $\text{CH}_3\text{COOH} \xrightarrow[\text{ii) H}_2\text{O}]{\text{i) HN}_3}$

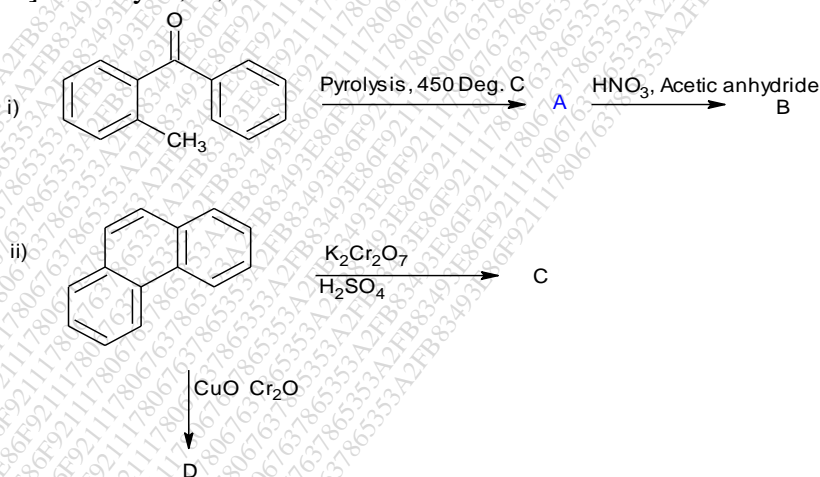
Q2) A] Give the mechanism of any two rearrangements of the following (4 M)

- i) Steven alkylation            ii) Favorski rearrangement  
iii) Hoffman rearrangement

B] Complete the following reactions (3 M)

- i)  $\text{C}_6\text{H}_5\text{CH}=\text{CHCH}_2\text{OH} \xrightarrow[\text{EtOH}]{\text{Raney Ni/ H}_2}$             ii)  $\text{C}_6\text{H}_5\text{COCH}_3 \xrightarrow[\text{CHCl}_3]{\text{CF}_3\text{CO}_3\text{H}}$   
iii)  $\text{C}_6\text{H}_5\text{COCl} \xrightarrow{\text{NaBH}_4}$

C] Identify A, B, C and D (4 M)



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

B] Draw neatly the cis and trans conformers of cyclohexane-1,2-diol and briefly discuss stability for them **(3 M)**

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

- i) Benzoic acid to phenylacetic acid      ii) Salicylic acid to catechol  
 iii) o—Methylbenzophenone to anthracene      iv) Phenol to ethylphenyl ether

Q4) A] Discuss any two methods of preparation of carboxylic acid **(4 M)**

B] Write structure of products formed

i) When naphthalene is reacted with **(3 M)**

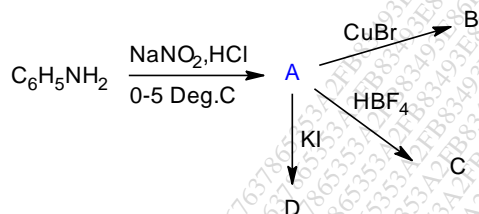
- a) Na+ Ethanol      b) O<sub>2</sub>/ V<sub>2</sub>O<sub>5</sub>, Heat, c) H<sub>2</sub>, Ni, 200°

ii) Which product gets formed when beta-naphthol reacts with benzene diazonium chloride in cold **(1 M)**

C] Give detailed mechanism for alkaline hydrolysis of ester **(3 M)**

Q5) A] Explain electrophilic substitution on phenol with respect to activation of ring and orientation. Cite example of nitration and bromination **(4 M)**

B] Suggest products for following **(4 M)**



C] A molecule C<sub>4</sub>H<sub>8</sub>O<sub>2</sub>(A) on treatment with thionyl chloride gives C<sub>4</sub>H<sub>7</sub>ClO (B). This on treatment with ethyl alcohol in presence of H<sup>+</sup> gives C<sub>5</sub>H<sub>12</sub>O<sub>2</sub> (C). C on hydrolysis reverts back to product A. Write structures for A, B and C **(3 M)**

Q6)A] Give mechanisms for the following (Any 2) **(4 M)**

- i) Reformatsky reaction      ii) Claisen condensation      iii) Beckman alkylation

B] Give any three methods for the preparation of alcohols **(3 M)**

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 and wants to identify which of them contains propionic acid, benzamide, o-toluidine and acetophenone. He carried out following four reactions to arrive at conclusion:

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

Container B: Added NaHCO<sub>3</sub> to compound and observed a brisk effervescence

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

Container D: Compound in Conc.HCl + NaNO<sub>2</sub> in HCl at 0-5 deg.C, mix and add beta-naphthol in NaOH gave orange dyestuff. Identify Contents of container A, B, C and D **(4 M)**