Q.P. Code : **21729**

(3 Hours) [ Total Marks : 70

**N.B.:** (1) **All** questions are **compulsory**.

1. (a) Answer the following.
   (i) State the type of strains present in cyclopropane. 1
   (ii) Justify "Anthracene is more stable than napthalene". 1
   (iii) m-Nitrophenol is less acidic than p-nitrophenol. 1

   (b) Give distinguishing test for the following. 2
   (i) Aniline and dimethylamine.
   (ii) Acetophenone and benzophenone.

   (c) Complete the following reaciotns (Any 10). 10

   (i) Naphthalene $\xrightarrow[450-500^{\circ}C]{O_2,\ V_2\ O_5}$

   (ii) Phenol + $CHCl_3$ $\xrightarrow[heat]{OH^{\theta}}$

   (iii) Cyclopentanone $\xrightarrow[base]{NH_2 - NH_2}$

   (iv) $H_5C_2\ COCl + t-BuOH \longrightarrow$

   (v) Acetone $\xrightarrow{Ph_3P = CH\ (CH_3)}$

   (vi) $C_6H_5\ CH_2\ Br + C_2\ H_5OH \xrightarrow{Na}$

   (vii) Acetophenone $\xrightarrow[ii)\ H^{\oplus}]{i)\ NH_2OH}$

   (viii) Phthalic acid $\xrightarrow{200^{\circ}C}$

   (ix) Ethyl benzoate $\xrightarrow{aq.\ NaOH}$

   (x) Acetaldehyde + $CH_3NO_2$ $\xrightarrow{OH^{\theta}}$

   xi) Ethyl adipate $\xrightarrow{NaOCH_3}$

2. (a) Attempt the following coversions (any two) 4
   (i) 2 - Cholrocyclohexanone to ethyl cyclopentane carboxylate.
   (ii) 4 - Chlorobenzaldehyde to 4 - Chlorocinnamic acid.
   (iii) 3 - Methylaniline to 3 - Methylbenzoic acid.

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(b) Write products formed when 3

(i) Ethylene oxide reacts with phenylmagnesium bromide.

(ii) Anisole heated with 57% HI

(ii) Propanone treated with Zn (Hg) / HCl

(c) A molecule $C_4 H_8 O_2$ (A) on treatment with thionyl chloride gives $C_4H_7ClO$ (B) This on treatment with $CH_2 N_2$ and solid $Ag_2O$ gives an intermediate ketene (C) Which on hydrolysis gives $C_5 H_{10} O_2$ (D) Deduce A, B, C, & D. 4
(Note : Compound A gives strong efferevesence with sodium bicarbonate solution)

3. (a) Complete the reations with relevant mechanism (any two) 4

(i) 3 - Cyclopropyl - 2 - phenyl - butane - 2, 3, - diol $\xrightarrow{H^{\oplus}}$

(ii) Acetone + diethyl succinate $\xrightarrow{{}^{\theta}Ot-Bu}$

(iii) $H_5 C_2 O CO OCH_5 + C_6 H_5 CH_2 COOC_2 H_5 \xrightarrow{{}^{\theta}OC_2H_5}$

(b) Answer the following 4

(i) Discuss the optical activity for cis and trans 1,3-dimethylcyclohexane.

(ii) Cis-cyclohexane- 1, 4-diol predominantly exist in the boat or twist boat form - Justify.

(c) Complete the following. 3

(i) 2 - Butanone $\xrightarrow[\text{Isopropanol}]{\text{Al-isopropoxide}}$

(ii) Ethylbenzene $\xrightarrow{Na/Liq\ NH_3}$

(iii) Ethyl benzoate $\xrightarrow{NaBH_4}$

4. (a) Write the products formed. 3

(i) Anthracene $\xrightarrow[Ac_2O]{HNO_3}$ A + B

(ii) Phenanthrene + $H_3 C COCl \xrightarrow[0^0C]{AlCl_3}$

(iii) Naphthalene + $H_2 SO_4 \xrightarrow{160^0C}$

(b) Give mechanisms for **any two** of the following with suitable examples. 4

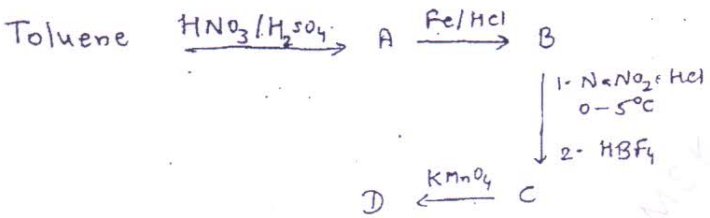
(i) Knovanagel condensation

(ii) Benzil-benzilic acid rearrangement.

(iii) Acid Hydrolysis of esters.

(iv) Crossed aldol condensation.

(c) From the following scheme, identify A, B, C & D. 4




5. (a) Attempt **any two** of the following coversions. 4

(i) Malonic acid to phenylacetic acid

(ii) Acetophenone to 2-hydroxy-2-phenylpropanoic acid.

(iii) t - Butyl alcohol to trimethylacetic acid

(b) Account for the reaction mechanism and stereochemistry for the following reations. 4

(i) (S) - 2 - Phenylpropionamide on action with $OBr^{\ominus}$ gives
(S) - 1- Phenylethylamine.

(ii) 2 - Pentyltrimethylammonium hydroxide on action of sodium ethoxide gives 1-pentene (96%) and 2 - pentene (4%) as products.

(c) Give the products of following reations. 3

(i) $C_6H_5CHO + NH_3 \xrightarrow{H_2/Ni}$

(ii) $(CH_3COO)_2Ca \xrightarrow{heat}$

(iii) $C_6H_5CH_2COOCH_2C_6H_5 + \text{excess } C_2H_5OH \xrightarrow{H^{\oplus}}$

6. (a) (i) Explain Gomberg reation by giving its mechanism and state any one application for the same. 2

(ii) Suggest suitable reagent for conversion of 1
$H_3CCH = CH - CHO$ to $CH_3CH = CH - CH_2OH$

(b) (i) Discuss any two pathways to synthesize 4 - Methoxy aniline from 4 - Methoxy benzoic acid. 2

(ii) Write the products : 2

Phenyl propanoate $\xrightarrow[CS_2]{AlCl_3}$ A + B

(b) (i) Give the products and mechanism for reation of 4 - nitrobenzaldehyde with 50% NaOH. 2

(ii) Complete the following scheme 2

Pthalic anhydride $\xrightarrow{KOH, C_2H_5Br}$ A $\xrightarrow{NH_2-NH_2}$ B + C