

SECOND YEAR - SEM - IV

ORGANIC CHEMISTRY - 2015-2016

Q.P. Code : 527500

O. C. II  
Sem IV  
First Half 2016

(3 Hours)

[Total Marks : 70]

- N.B. : (1) All questions are compulsory.  
(2) Attempt all subquestions together.

1. (a) Discuss the difference in acidity of benzoic acid and phenol and account for the same. 2
- (b) Among ethylamine and ethanol, the former is considered basic while the latter is called neutral, even though both Nitrogen and Oxygen atoms have lone pair of electrons. Explain. 2
- (c) Aldehydes are considered to be more reactive than ketones, account for the same. 2
- (d) Account for the fact that oxidation of ketones with strong oxidising agents is not an important method to synthesize carboxylic acids. 2
- (e) Using a mild oxidising agent convert an aldehyde to a carboxylic acid and write the reaction involved. 1
- (f) Answer the following (any three) and write the complete reaction : 6
  - (i) Butanone  $\text{KOCl}, \Delta, \text{H}_3\text{O}^+$ .
  - (ii) Formaldehyde + sec.butyl Magnesium bromide ether  $\text{H}_3\text{O}^+$ .
  - (iii) diethylester of hexanedioic acid  $\text{C}_2\text{H}_5\text{O}^-, \text{C}_2\text{H}_5\text{OH}$ .
  - (iv) Bromobenzene  $\text{Mg}, \text{THF}, \text{CO}_2, \text{H}_3\text{O}^+$ .
2. (a) Discuss the mechanism of the following : 4
  - (i) Benzoin condensation.
  - (ii) Benzaldehyde + ethyl 2-bromopropionate  $\text{Zn}, \text{ether}, \text{H}_3\text{O}^+$
- (b) Write the steps involved in the following conversions : 4
  - (i) diethyl malonate to 2,2-dimethylethanoic acid.
  - (ii) Salicylaldehyde to catechol.
- (c) Discuss two different methods of synthesis of ethers and write the reactions involved. 3

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3. (a) Give the mechanism for the following using suitable examples. 4
- Alkaline hydrolysis of an ester and account for the retention of configuration of alcohol formed.
  - Beckmann rearrangement and show the stereochemistry involved.
- (b) Answer the following and write reactions involved.
- Using Gabriel synthesis prepare n-propylamine.
  - Using Cannizzaro reaction prepare a mixture of formic acid and benzyl alcohol in good yields.
- (c) Bring about following conversions and write the reactions involved.
- Aniline to Chlorobenzene.
  - Ethyl benzoate to n-propyl benzoate.
  - Benzoic acid to benzamide.
4. (a) Complete the reactions and write the mechanism involved :
- 1,1 - Diphenyl 2-methyl propan - 1,2 - diol  $\underline{H^+}$ .
  - p-nitrobenzamide  $\underline{NaOBr}$ .
- (b) Discuss the conformational stability of 1-methyl 4-phenyl cyclohexane and 1-methyl 2-phenyl cyclohexane separately and comment on resolvability.
- (c) Write the reaction and the product formed in **any three** of the following :
- Propiophenone +  $\text{Ph}_3\text{P} = \text{CHCH}_3 \rightarrow$ .
  - Acetone + diethyl succinate  $\underline{t\text{-BuOK}}$ .
  - Phenyl propionate  $\underline{\text{AlCl}_3}$ , high temp.
  - 2, 4 - dinitro chlorobenzene  $\underline{\text{aq. NaOH, } \Delta}$ .
5. (a) Give the mechanism involved in the following :
- Reimer - Tiemann reaction.
  - Reaction involved when benzyltrimethylammonium bromide is treated with sodamide.

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- (b) Write the reactions involved in the following conversions. 4
- (i) o-toluidine to o-cresol.
  - (ii) ethyl pentanoate to pentanol.
  - (iii) cyclohexanol to 1-methyl cyclohexanol.
  - (iv) benzaldehyde to cinnamic acid.
- (c) Discuss Haworth synthesis of naphthalene. Also write the resonance structures of naphthalene. 3
6. (a) Write the mechanism in the following conversions : 4
- (i) Acetophenone to ethylbenzene using selective reducing agent.
  - (ii) Phenol to salicylic acid.
- (b) Write the product at the end of the reaction and name the reaction involved. 4
- (i)  $\text{C}_6\text{H}_5\text{C}(=\text{O})\text{NHOH} \xrightarrow[\text{H}_2\text{O}]{\text{acetic anhydride, } \text{OH}^-}$
  - (ii) p-toluidine  $\xrightarrow[\text{Na}_2\text{CO}_3 \text{ soln.}]{\text{HNO}_2} \text{C}_6\text{H}_4\text{OH}$
- (c) Write a note on two or three reducing agents and choose proper examples to explain their use. 3

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