(d) Why is benzoin condensation catalyzed by cyanide ion, not by hydroxide ion?

(e) Write the reaction for nucleophilic addition of HCN, ROH to ketones. (3×5)

5. (a) Why are phenols acidic? And write the factors that affect their acidity.

(b) Distinguish between aldol condensation and Cannizaro reaction.

(c) Arrange the following in decreasing order of their acidity and justify your answer.

CH_3COOH, CCl_3COOH, $Cl_2CHCOOH$

(d) Briefly discuss about Gattermann Koch reaction.

(e) What is the difference between Clemmenson and Wolf-Kishner reaction? (3×5)

6. Write short notes on the following :

(a) Schotten-Baumann reaction

(b) Meerwein-Ponndorf-Verley reduction

(c) Reformatsky reaction

(d) Benzoin condensation

(e) Addition of ammonia derivatives to carbonyl compounds (3×5)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 5049 **J**

Unique Paper Code : 2174001204

Name of the Paper : GE : Chemistry of Oxygen-Containing Functional Groups and their Applications to Biology

Name of the Course : **B.Sc. (H) / B.Sc. Programme**

Semester : II / IV / VI

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Answer **four** questions in all.
3. Each question carries **15** marks.

1. Give a reason for the following :

(a) Relative reactivity of carboxylic acid derivatives towards nucleophilic attack is

acid halides > acid anhydrides > amides

(b) Cyclohexanal gives an aldol product while benzaldehyde does not.

(c) Phenol is a weaker acid than *p*-nitrophenol.

(d) Acidity order:

$CH_3OH > C_2H_5OH > CH_3CH(CH_3)OH > (CH_3)_3COH$

(e) *p*-Chlorobenzoic acid is more acidic than benzoic acid. (3×5)

2. (a) Write the reaction mechanism of Riemer-Tiemann reaction.

(b) Explain Claisen condensation and its biological application.

(c) 2, 2-dimethylpropanal gives the Cannizaro reaction. Explain.

(d) Discuss the mechanism for the nitration of phenol.

(e) 2, 4, 6-trinitrophenol gives effervescence with sodium bicarbonate while phenol does not. Explain. (3×5)

3. (a) Why do methanal and propanal not undergo the iodoform test?

(b) Explain effect of oxidising agent on primary, secondary, and tertiary alcohols.

(c) Discuss Hauben-Hoesch condensation reaction.

(d) Mention a reagent to which benzaldehyde and Acetophenone react similarly and another reagent to which they react differently.

(e) Write the reaction conditions with reagents required for the following reactions:

(i) Hell-Volhard-Zelinsky reaction

(ii) Oppenauer oxidation

(iii) Iodoform reaction (3×5)

4. (a) Carboxylic acids do not form oxime, though they have a carbonyl group (C=O) in their structures. Explain

(b) Complete the following reaction :

(i) 2 PhCHO $\xrightarrow{\text{Cone. NaOH}}$

(ii) $CH_3CH_2COOH + Br_2 \xrightarrow{\text{Red P}}$

(iii) $CH_3COCH_3 \xrightarrow{\text{Iz/NaOH}}$

(c) Discuss the mechanism of Perkin condensation reaction.