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[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1132

I

Unique Paper Code : 2172012302

**Name of the Paper : DSC: Carbonyls, Carboxylic
Acids, Amines, Nitro
Compounds, Nitriles, Isonitriles
and Diazonium Salts**

Name of the Course : B.Sc. (Hons.) Chemistry

Semester : III

Duration : 3 Hours

Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **SIX** questions out of **EIGHT**.
3. All parts of a question should be attempted together.
4. Each question carries **15** marks.

P.T.O.

1. (a) Write short notes on **any three** of the following Name Reactions.

(i) Wittig Reaction

(ii) Aldol Condensation

(iii) Baeyer-Villiger Oxidation

(iv) Perkin Reaction

- (b) Write the mechanism involved in acid catalyzed addition of methyl amine to benzaldehyde.

(4,4,4,3)

2. (a) Write final product when nitro benzene undergo reduction with following reagents

(i) Sn/HCl

(ii) $\text{Zn/NH}_4\text{Cl}$

(iii) Zn/NaOH

- (b) How will you distinguish primary, secondary and tertiary nitro alkanes on the basis of Victor Meyer's test.

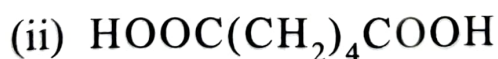
(c) Explain why aldehydes and ketones undergo nucleophilic addition reactions easily but carboxylic acid and their derivatives not.

(d) Why do α -hydrogens in nitroethane show acidic behaviour ? Write the product when nitro ethane reacts with Br_2 in alkaline medium.

(e) Write reactions involved in the catalytic reduction and MPV reduction of benzaldehyde.

(3,3,3,3,3)

3. (a) Suggest the reactions for the synthesis of any two of the followings using diethylmalonate (DEM):



(iii) Barbiturate

(b) Suggest a method for the synthesis of any two of the following using ethyl acetoacetate (EAA):

(i) Butane-1,4-dioic acid

(ii) 3-Methylpentan-2-one

(iii) Pent-3-en-2-one

(c) Distinguish between the given acids on the basis of action of heat:

(i) Propane-1,3-dioic acid and Pentane-1,5-dioic acid

(ii) Fumaric acid and maleic acid

(d) Explain why EAA does not give a positive Iodoform test in spite of having a methyl keto group? (4,4,4,3)

4. (a) Explain the following :

(i) *p*-Nitro benzoic acid is more acidic than *m*-nitro benzoic acid?

(ii) Acid anhydrides undergo hydrolysis more readily than acid amides?

(b) Discuss the mechanism of the followings :

(i) Curtius Rearrangement

(ii) Acid catalyzed hydrolysis of an ester.

(c) Give the product formed.

(i) When $\text{CH}_3\text{CH}(\text{Br})\text{COOEt}$ and CH_3CHO react in presence of Zinc catalyst. Name the reaction involved.

(ii) When phthalic acid combines with excess of ammonia. Write the structure of the compound formed when this product is heated at 300°C .

(d) Write a reaction to distinguish between the α -hydroxycarboxylic and β -hydroxycarboxylic acid.

(4,4,4,3)

5. (a) Give reasons for the followings with proper justification :

(i) Aromatic amines are much weaker bases than aliphatic amines.

(ii) Benzene diazonium salts are stable whereas alkane diazonium salts are unstable.

(b) By the use of diazotization how will you perform the following conversions (**any two**) :

(i) 2,4,6-Tribromophenol from aniline.

(ii) *p*-Toluic acid from *p*-toluidine (*p*-aminotoluene)

(iii) Nitrobenzene to phenol

(c) *n*-Butylamine when methylated exhaustively with methyl iodide gives compound A. When compound A is treated with silver hydroxide gives compound B. Compound B on β -elimination gives compound C. Write structures of compound A, B, C and name of reaction involved.

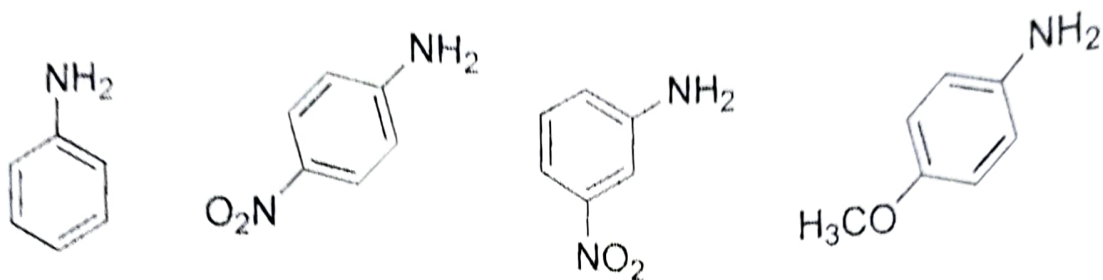
(d) Write all reactions involved in distinguishing primary, secondary and tertiary amines using Hinsberg's method. (4,4,4,3)

6. (a) Explain the followings :

(i) Coupling reactions of arenediazonium salts with phenol is carried out in mild basic conditions.

(ii) Tertiary amines with three different groups attached to nitrogen do not show optical activity.

(b) Give increasing order of basicity for followings :



(c) How will you prepare ethylamine from followings:

(i) Acetaldehyde

(ii) Acetyl chloride

(d) What do you understand by diazotization and coupling reactions? (4,4,4,3)

7. (a) Write preparations of alkyl cyanide from followings :

(i) Acid amides

(ii) Acid halides

(b) Explain acidic and alkaline hydrolysis of ethyl cyanide.

(c) Explain Thorpe nitrile condensation.

(d) How will you prepare acetaldehyde by hydrogen cyanide. (4,4,4,3)

8. (a) Explain mechanism of reaction when primary amine reacts with chloroform in presence of KOH.

(b) Write reactions given by nitriles and isonitriles.

(c) Write the name and structure of product when

(i) Methyl isocyanide is reduced with platinum in presence of $H_2(g)$.

(ii) Hydrolysis of methaneisonitrile undergoes in presence of acid

(d) Write at least four important physical properties of isocyanide. Write significance of ambident ion.

(4,4,4,3)