Aldehydes, Ketones and Carboxylic Acids

Q.No.1:
Draw the structural formula of 1-phenylpropan-1-one molecule.

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Q.No.2:
(a) Explain the mechanism of a nuclophilic attack on the carbonyl group of an aldehyde or a ketone.
(b) An organic compound (A) (molecular formula $C_8H_{16}O_2$) was hydrolysed with dilute sulphuric acid to give a carboxylic acid (B) and an alcohol (C). Oxidation of (C) with chromic acid also produced (B). On dehydration (C) gives but-1-ene. Write the equations for the reactions involved.
OR
(a) Give chemical tests to distinguish between the following pairs of compounds:
(i) Ethanal and Propanal
(ii) Phenol and Benzoic acid
(b) How will you bring about the following conversions?
(i) Benzoic acid to benzaldehyde
(ii) Ethanal to but-2-enal
(iii) Propanone to propene
Give complete reaction in each case.

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Q.No.3:
Arrange the following compounds in an increasing order of their reactivity in nucleophilic addition reactions: ethanal, propanal, propanone, butanone.

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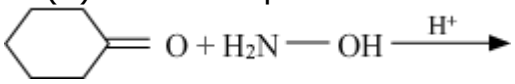
Q.No.4: (a) Write the products of the following reactions:

(i) 

(ii) $2C_6H_5CHO + \text{conc.NaOH} \longrightarrow$

(iii) $CH_3COOH \xrightarrow{Cl_2/P}$

(b) Give simple chemical tests to distinguish between the following pairs of compounds:

(i) Benzaldehyde and Benzoic acid

(ii) Propanal and Propanone

OR

(a) Account for the following:

(i) CH_3CHO is more reactive than CH_3COCH_3 towards reaction with HCN.

(ii) Carboxylic acid is a stronger acid than phenol.

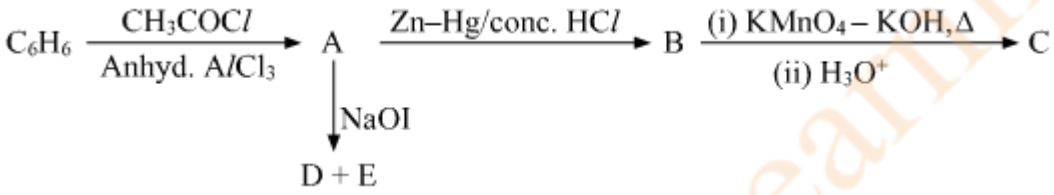
(b) Write the chemical equations to illustrate the following name reactions:

(i) Wolff-Kishner reduction

(ii) Aldol condensation

(iii) Cannizzaro reaction **CBSE Board Paper 2014**

Q.No.5: Write the structures of A, B, C, D and E in the following reactions:



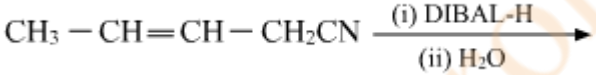
OR

(a) Write the chemical equation for the reaction involved in Cannizzaro reaction.

(b) Draw the structure of the semicarbazone of ethanal.

(c) Why pKa of F-CH_2-COOH is lower than that of Cl–CH_2–COOH?

(d) Write the product in the following reaction:



(e) How can you distinguish between propanal and propanone?

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Q.No.6:

Draw the structure of 3-methylbutanal.

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Q.No.7:

(a) Give chemical tests to distinguish between

(i) Propanal and propanone,

(ii) Benzaldehyde and acetophenone.

(b) How would you obtain

(i) But-2-enal from ethanal,

(ii) Butanoic acid from butanol,

(iii) Benzoic acid from ethylbenzene?

OR

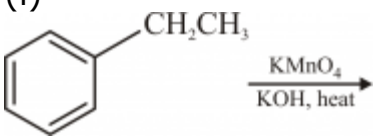
(a) Describe the following giving linked chemical equations:

(i) Cannizzaro reaction

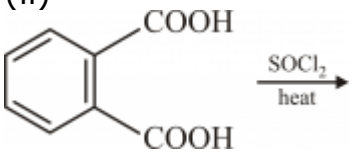
(ii) Decarboxylation

(b) Complete the following chemical equations:

(i)



(ii)



(iii)

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Q.No.8:

(a) Although phenoxide ion has more number of resonating structures than Carboxylate ion, Carboxylic acid is a stronger acid than phenol. Give two reasons.

(b) How will you bring about the following conversions?

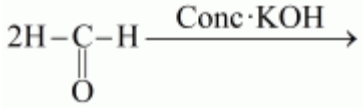
(i) Propanone to propane

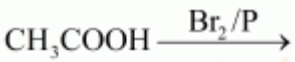
(ii) Benzoyl chloride to benzaldehyde

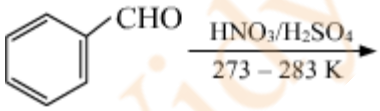
(iii) Ethanal to but-2-enal

OR

(a) Complete the following reactions:

(i) 

(ii) 

(iii) 

(b) Give simple chemical tests to distinguish between the following pairs of compounds:

(i) Ethanal and Propanal

(ii) Benzoic acid and Phenol

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Q.No.9:

Write the structure of p-Methylbenzaldehyde molecule.

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Q.No.10:

(a) Illustrate the following name reaction giving suitable example in each case:

(i) Clemmensen reduction
(ii) Hell-Volhard-Zelinsky reaction
(b) How are the following conversions carried out?
(i) Ethylcyanide to ethanoic acid
(ii) Butan-1-ol to butanoic acid
(iii) Benzoic acid to m-bromobenzoic acid

OR

(a) Illustrate the following reactions giving a suitable example for each.
(i) Cross aldol condensation
(ii) Decarboxylation
(b) Give simple tests to distinguish between the following pairs of compounds
(i) Pentan-2-one and Pentan-3-one
(ii) Benzaldehyde and Acetophenone
(iii) Phenol and Benzoic acid

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Q.No.11:

Name the reagents used in the following reactions:

(i) $CH_3-CO-CH_3 \longrightarrow CH_3-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_3$

(ii) $C_6H_5-CH_2-CH_3 \longrightarrow C_6H_5-COO^-K^+$

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Q.No.12:

Predict the products of the following reactions :

(i) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{C}}=O \xrightarrow[\text{(ii) KOH/Glycol, } \Delta]{\text{(i) } H_2N-NH_3} ?$

(ii) $C_6H_5-CO-CH_3 \xrightarrow{NaOH/I_2} ? + ?$

(iii) $CH_3COONa \xrightarrow[\Delta]{NaOH/CaO} ?$

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