

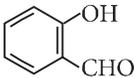
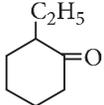
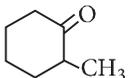
ASSIGNMENT OF ALDEHYDES, KETONES AND CARBOXYLIC ACID

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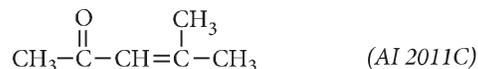
Previous Years' CBSE Board Questions

12.1 Nomenclature and Structure of Carbonyl Group

VSA (1 mark)

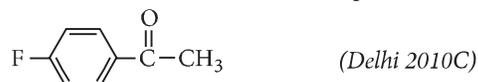
- Write the structure of 2-methylbutanal.
(1/5, AI 2015)
- Draw the structure of 3-methylpentanal.
(Delhi 2015C)
- Write the IUPAC name of the following :
 $\text{CH}_3-\text{CH}_2-\text{CHO}$ (AI 2015C)
- Write the IUPAC name of the compound :
 $\text{CH}_3-\underset{\text{OH}}{\text{CH}}-\text{CH}_2-\underset{\text{O}}{\text{C}}-\text{CH}_3$ (Delhi 2014)
- Write the structure of 4-chloropentan-2-one.
(AI 2014, 2008, Delhi 2013)
- Write the IUPAC name of the following compound :
 (Foregin 2014)
- Write the structure of 3-methyl butanal.
(Delhi 2013)
- Write the structure of *p*-Methylbenzaldehyde molecule.
(Delhi 2013)
- Draw the structure of the compound named 4-methylpent-3-en-2-one. (Delhi 2013C)
- Write the IUPAC name of the following :
 (AI 2013C)
- Write the IUPAC name of the following :
 $\text{CH}_3-\text{CH}_2-\text{CH}=\underset{\text{O}}{\text{C}}-\text{H}$ (AI 2012)
- Write the IUPAC name of $\text{Ph}-\text{CH}=\text{CH}-\text{CHO}$ (AI 2012)
- Write the IUPAC name of the following :
 (AI 2012C)

14. Write the IUPAC name of

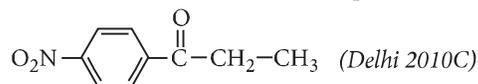


15. Draw the structural formula of 1-phenyl Propan-1-one molecule. (Delhi 2010)

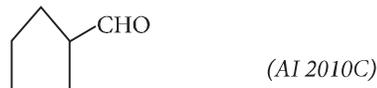
16. Write the IUPAC name of the compound :



17. Write the IUPAC name of the compound :



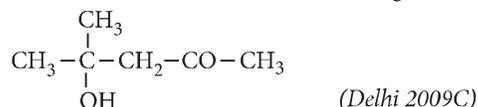
18. Write the IUPAC name of the following compound :



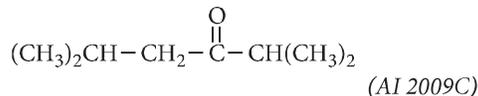
19. Write the structure of 3-oxopentanal.
(Delhi 2009)

20. Write the structural formula of 1-phenylpentan-1-one.
(AI 2009)

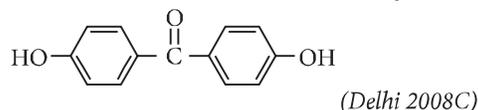
21. Write the IUPAC name of the following :



22. Write the IUPAC name of the following compound



23. Write the IUPAC name of the following :



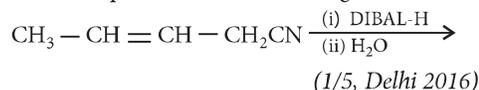
SA I (2 marks)

24. Draw the structures of the following :
(i) *p*-Methylbenzaldehyde
(ii) 4-Methylpent-3-en-2-one (2/5, AI 2015C)

12.2 Preparation of Aldehydes and Ketones

VSA (1 mark)

25. Write the product in the following reaction :



26. How do you convert the following :

Ethyne to Ethanal *(1/3, Foreign 2015)*

27. How will you obtain the following :

Benzaldehyde from Phenol *(1/5, AI 2013C)*

28. How is following obtained?

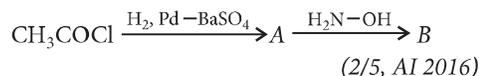
Benzaldehyde from toluene. *(1/5, Delhi 2009)*

29. How would you convert :

Ethanol to acetone. *(1/5, AI 2007)*

SA I (2 marks)

30. Write the structure of A and B in the following reaction :



31. Write the equations involved in the following reactions :

(i) Stephen reaction

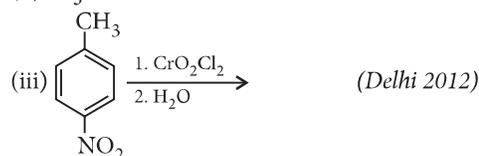
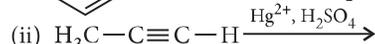
(ii) Etard reaction *(2/3, Foreign 2015)*

32. An organic compound A, having the formula, $\text{C}_3\text{H}_8\text{O}$, on treatment with copper at 573 K, gives B. B does not reduce Fehling's solution but gives a yellow precipitate of the compound C with I_2/NaOH . Deduce the structure of A, B and C.

(2/5, Delhi 2011C)

SA II (3 marks)

33. Write the structures of the main products of the following reactions :



34. How will you bring about the following conversions?

(i) Ethanol to acetone

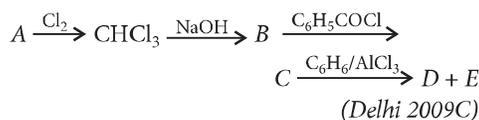
(ii) Benzene to acetophenone

(iii) Benzoic acid to benzaldehyde

(3/5, Delhi 2008)

LA (5 marks)

35. Identify A, B, C, D and E in following sequence of reactions :



12.3 Physical Properties

VSA (1 mark)

36. Aldehydes and Ketones have lower boiling points than corresponding alcohols. Why?

(AI 2012C)

37. How would you account for the following :

The boiling points of aldehydes and ketones are lower than of the corresponding acids.

(1/5, Delhi 2008)

12.4 Chemical Reactions

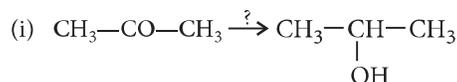
VSA (1 mark)

38. Distinguish between the following :

(i) $\text{C}_6\text{H}_5 - \text{COCH}_3$ and $\text{C}_6\text{H}_5 - \text{CHO}$

(1/2, AI 2016, 1/5, AI 2015)

39. Name the reagents used in the following reactions :



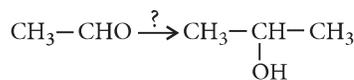
(Delhi 2015)

40. Give a simple chemical test to distinguish between the following pair of compounds:

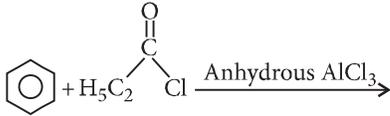
$\text{CH}_3\text{CH}_2\text{CHO}$ and $\text{CH}_3\text{CH}_2\text{COCH}_3$

(1/2 AI 2016, 1/5, AI 2015)

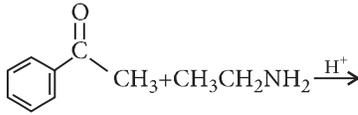
41. Name the reagents used in the following reactions :



(1/2, Foreign 2015)

42. Draw the structure of the following derivatives :
 (i) Propanone oxime
 (ii) Semicarbazone of the CH_3CHO
 (2/5, AI 2015C)
43. Give chemical tests to distinguish between the following pairs of compounds :
 Benzaldehyde and Acetophenone.
 (1/5, Delhi 2015C, AI 2012C)
44. Give simple chemical tests to distinguish between the following pairs of compounds :
 (i) Benzaldehyde and benzoic acid
 (ii) Propanal and propanone.
 (1/5, Delhi 2014, AI 2009)
45. Account for the following :
 CH_3CHO is more reactive than CH_3COCH_3 towards reaction with HCN . (Delhi 2014)
46. Give simple chemical tests to distinguish between the following pair of compounds :
 Propanal and Propanone (1/5, AI 2014)
47. Give simple chemical tests to distinguish between the following pair of compounds.
 Propanal and Butan-2-one (1/5, Foreign 2014)
48. Give simple chemical tests to distinguish between the following pair of compounds :
 Ethanal and Propanal
 (1/5, Delhi 2013, Delhi 2012C, AI 2009)
49. Given reason :
 pH of reaction should be carefully controlled while preparing ammonia derivatives of carbonyl compounds. (1/5, Delhi 2013C)
50. Give reason :
 Aldehydes are more reactive than ketones towards nucleophilic reagents. (1/5, AI 2013C)
51. Arrange the following compounds in an increasing order of their reactivity in nucleophilic addition reactions : ethanal, propanal, propanone, butanone.
 (Delhi 2012)
52. Give chemical tests to distinguish between Benzophenone and acetophenone
 (1/5, Delhi 2012)
53. Arrange the following compounds in an increasing order of their property as indicated :
 Acetaldehyde, acetone, methyl *tert*-butyl ketone (reactivity towards HCN) (1/5, AI 2012)
54. Write the structure of the product formed in the following reaction :
- 

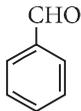
$$\text{C}_6\text{H}_6 + \text{H}_3\text{C}-\overset{\text{O}}{\parallel}{\text{C}}-\text{Cl} \xrightarrow{\text{Anhydrous AlCl}_3}$$
- (AI 2012C)
55. Predict the organic product of the following reactions :
- 

$$\text{C}_6\text{H}_4(\text{CHO})(\text{COOH}) \xrightarrow[\text{HCl}]{\text{NaCN}}$$
- (1/2, AI 2011C)
56. Predict the products of the following reactions:
- 

$$\text{C}_6\text{H}_5-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3 + \text{CH}_3\text{CH}_2\text{NH}_2 \xrightarrow{\text{H}^+}$$
- (1/5, AI 2011C)
57. What is Tollens' reagent? Write one usefulness of this reagent. (AI 2010)
58. Describe how the following conversions can be brought about :
 Cyclohexanol to cyclohexan 1-one
 (1/5, AI 2010)
59. Illustrate the following name reaction :
 Wolff-Kishner reduction reaction
 (1/5, AI 2010)
60. Write chemical equations to illustrate the following name bearing reaction :
 Cannizzaro's reaction. (1/5, AI 2009)
61. State chemical tests to distinguish between the following pairs of compounds :
 Propanal and propanone
 (1/5, AI 2008, Delhi 2007)
62. Write Cannizzaro reaction giving an example.
 (AI 2008C)

SA I (2 marks)

63. Predict the products of the following reactions :
- (i) $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3 \xrightarrow[\text{(ii) KOH/Glycol, } \Delta]{\text{(i) H}_2\text{N}-\text{NH}_2}$?
- (ii) $\text{C}_6\text{H}_5-\text{CO}-\text{CH}_3 \xrightarrow{\text{NaOH/I}_2}$? + ?
 (2/3, Delhi 2015)

64. A compound 'A' of molecular formula C_2H_3OCl undergoes a series of reactions as shown below. Write the structure of A, B, C and D in the following reactions :
- $$(C_2H_3OCl)A \xrightarrow{H_2/Pd-BaSO_4} B \xrightarrow{dil. NaOH} C \xrightarrow{Heat} D$$
- (AI 2015)
65. Describe the following reactions :
- Acetylation
 - Aldol condensation (2/5, Delhi 2015C)
66. Write the main product in the following equations :
- $CH_3-C(=O)-CH_3 \xrightarrow{LiAlH_4} ?$
 -  $\xrightarrow[273-283K]{HNO_3/H_2SO_4} ?$ (2/5, Delhi 2015C)
67. (i)  + $H_2N-OH \xrightarrow{H^+} ?$
- (ii) $2C_6H_5CHO + conc. NaOH \longrightarrow ?$ (2/5, Delhi 2014)
68. Account for the following :
- CH_3CHO is more reactive than CH_3COCH_3 towards reaction with HCN.
 - There are two $-NH_2$ groups in semicarbazide ($H_2NNHCONH_2$). However, only one is involved in the formation of semicarbazone. (2/5, Foreign 2014)
69. Write the chemical equation to illustrate each of the following name reactions :
- Rosenmund reduction
 - Cannizzaro reaction (2/5, Foreign 2014)
70. Complete the following reactions :
- $2H-C(=O)-H \xrightarrow{Conc. KOH} ?$
 -  $\xrightarrow[273-283 K]{HNO_3/H_2SO_4} ?$ (2/5, Delhi 2013)
71. How will you convert the following :
- Propanone to Propan-2-ol
 - Ethanal to 2-hydroxy propanoic acid (2/5, AI 2013)
72. Give simple chemical test to distinguish between :
- Pentan-2-one and Pentan-3-one.
 - Ethanal and Propanal (2/5, AI 2013)
73. Write the products of the following reactions :
- $CH_3-C(=O)-CH_3 \xrightarrow[conc. HCl]{Zn-Hg} ?$
 - $CH_3-C(=O)-Cl + H_2 \xrightarrow{Pd-BaSO_4} ?$ (2/5, AI 2013)
74. Give chemical tests to distinguish between
- Propanal and propanone
 - Benzaldehyde and acetophenone (2/5, AI 2012)
75. Predict the products of the following reactions :
-  $\xrightarrow{H_2CrO_4} ?$
 -  $\xrightarrow{Pd-BaSO_4, H_2} ?$ (2/5, AI 2011C)
76. Explain the mechanism of a nucleophilic attack on the carbonyl group of an aldehyde or a ketone. (2/5, Delhi 2010)
77. How will you bring about the following conversions?
- Ethanal to but-2-enal
 - Propanone to propene (2/5, Delhi 2010)
78. Illustrate the following name reactions giving a chemical equations in each case :
- Clemmensen reaction
 - Cannizzaro's reaction (AI 2010)
79. Complete each synthesis by giving the missing material, reagent or products:
- $C_6H_5COCl \xrightarrow{Pd-BaSO_4, H_2} \dots$
 -  + $\dots \longrightarrow \text{C}_6\text{H}_5\text{COC}_6\text{H}_5$ (2/5, Delhi 2009)
80. How will you bring about the following conversions :
- Ethanol to 3-hydroxybutanal
 - Benzaldehyde to Benzophenone (2/5, AI 2009)

81. How would you bring about the following conversions :
- Propanone to Propene
 - Bromobenzene to 1-phenylethanol
(2/5, AI 2009)
82. How would you account for the following
- Aldehydes are more reactive than ketones toward nucleophiles.
 - The aldehydes and ketones undergo a number of addition reactions.
(2/5, Delhi 2008)
83. Give chemical tests to distinguish between :
- Acetaldehyde and benzaldehyde
 - Propanone and propanal. (2/5, Delhi 2008)
84. Give a chemical equation for each, illustrate the following processes :
- Cannizzaro reaction
 - Acetylation (2/5, AI 2008)
85. Write the chemical tests to distinguish between the following pairs of compounds :
- Acetophenone and Benzophenone
 - Ethanal and Propanal (2/5, AI 2008)
86. Write one chemical equation for each to illustrate the following reactions :
- Rosenmund's reduction
 - Cannizzaro reaction (AI 2007)
- SA II (3 marks)**
87. (a) Write the chemical equation for the reaction involved in Cannizzaro reaction.
(b) Draw the structure of the semicarbazone of ethanal.
(c) How can you distinguish between propanal and propanone? (3/5, Delhi 2016)
88. (a) Write the chemical reaction involved in Wolff-Kishner reduction.
(b) Arrange the following in the increasing order of their reactivity towards nucleophilic addition reaction.
 $C_6H_5COCH_3$, CH_3-CHO , CH_3COCH_3
(c) A and B are two functional isomers of compound C_2H_6O . On heating with NaOH and I_2 , isomer B forms yellow precipitate of iodoform whereas isomer A does not form any precipitate. Write the formulae of A and B. (3/5, AI 2016)
89. Write the structures of the main products when acetone ($CH_3-CO-CH_3$) reacts with the following reagents :
- Zn—Hg/conc. HCl
 - $H_2N-NHCONH_2/H^+$
 - CH_3MgBr and then H_3O^+ (3/5, AI 2015)
90. How will you convert ethanal into the following compounds? Give the chemical equations involved.
- CH_3-CH_3
 - $CH_3-\underset{\substack{| \\ OH}}{CH}-CH_2-CHO$
 - CH_3CH_2OH (3/5, Delhi 2015C)
91. Write the chemical equations to illustrate the following name reactions :
- Wolff-Kishner reduction
 - Aldol condensation
 - Cannizzaro reaction (3/5, Delhi 2014)
92. Write the products formed when CH_3CHO reacts with the following reagents :
- HCN
 - H_2N-OH
 - CH_3CHO in the presence of dilute NaOH (3/5, AI 2014)
93. (a) Write the chemical equations to illustrate the following name reactions :
- Rosenmund reduction
 - Cannizzaro's reaction
- (b) Out of $CH_3CH_2-CO-CH_2-CH_3$ and $CH_3CH_2-CH_2-CO-CH_3$, which gives iodoform test? (3/5, AI 2014)
94. Write the products formed when ethanal reacts with the following reagents :
- CH_3MgBr and then H_3O^+
 - Zn-Hg/conc. HCl
 - C_6H_5CHO in the presence of dilute NaOH (3/5, Foreign 2014)
95. How will you bring about the following conversions?
- Propanone to propane
 - Benzoyl chloride to benzaldehyde
 - Ethanal to but-2-enal (3/5, Delhi 2013)
96. An organic compound (A) which has characteristic odour, on treatment with NaOH forms two compounds (B) and (C). Compound (B) has the molecular formula C_7H_8O which on oxidation with CrO_3 gives back compound (A). Compound (C) is the sodium salt of the acid. Compound (C) when heated with soda lime yields an aromatic hydrocarbon (D). Deduce

- the structures of (A), (B), (C) and (D). Write chemical equations for all reactions taking place. (3/5, AI 2013C, 2012C)
97. An organic compound with molecular formula $C_9H_{10}O$ forms 2,4-DNP derivative, reduces Tollen's reagent and undergoes Cannizzaro's reaction. On vigorous oxidation it gives 1,2-benzenedicarboxylic acid. Identify the compound. (3/5, AI 2012, 2012C)
98. An organic compound (A) with molecular formula C_8H_8O forms an orange red precipitate with 2, 4-DNP reagent and gives yellow precipitate on heating with I_2 and NaOH. It neither reduces Tollens' reagent nor Fehling's reagent, nor does it decolourise bromine water or Baeyer's reagent. On drastic oxidation with chromic acid, it gives a carboxylic acid (B) having molecular formula $C_7H_6O_2$. Identify the compounds (A) and (B) and explain the reactions involved. (3/5, Delhi 2012C)
99. An organic compound with molecular formula $C_5H_{10}O$ does not reduce Tollens' reagent but forms an addition compound with sodium hydrogen sulphite and gives a positive iodoform test. On vigorous oxidation, it gives ethanoic acid and propanoic acid. Identify the compound and write all chemical equations for the reactions. (3/5, AI 2012C)
100. An organic compound A has the molecular formula $C_8H_{16}O_2$. It gets hydrolysed with dilute sulphuric acid and gives a carboxylic acid B and an alcohol C. Oxidation of C with chromic acid also produced B. C on dehydration reaction gives but-1-ene. Write equations for the reactions involved. (3/5, AI 2009)
101. An organic compound contains 69.77% carbon, 11.63% hydrogen and the rest is oxygen. The molecular mass of the compound is 86. It does not reduce Tollens' reagent but forms an addition compound with sodium hydrogen sulphite and gives a positive iodoform test. On vigorous oxidation it gives ethanoic and propanoic acids. Deduce the possible structure of the organic compound. (3/5, AI 2009, 2008, Delhi 2008)
- LA (5 marks)**
102. (a) Give a plausible explanation for each one of the following :
- (i) There are two $-NH_2$ groups in semicarbazide. However, only one such group is involved in the formation of semicarbazones
- (ii) Cyclohexanone forms cyanohydrins in good yield but 2,4,6-trimethylcyclohexanone does not.
- (b) An organic compound with molecular formula $C_9H_{10}O$ forms 2,4-DNP derivative, reduces Tollen's reagent and undergoes Cannizzaro's reaction. On vigorous oxidation it gives 1,2-benzene-di-carboxylic acid. Identify the compound. (Delhi 2012)
103. (a) Identify A, B and C in the following sequence of reactions :
- $$CH_3CHO \xrightarrow[(ii) H_2O]{(i) C_2H_5MgCl} A \xrightarrow{conc. H_2SO_4} B \xrightarrow{HBr + Peroxide} C$$
- (b) Predict the structures of the products formed when benzaldehyde is treated with
- (i) conc. NaOH
- (ii) HNO_3/H_2SO_4 (at 273–383 K) (Delhi 2011C)
104. A ketone A (C_4H_8O), which undergoes a haloform reaction gives compound B on reduction. B on heating with sulphuric acid gives a compound C which forms monozonide D. D on hydrolysis in presence of zinc dust gives only acetaldehyde E. Identify A, B, C, D and E. Write the reactions involved. (Delhi 2010C)
105. Identify A and E in the following series of reactions :
-
- (AI 2010C)
106. (a) Illustrate the following name reactions by giving example :
- (i) Cannizzaro's reaction
- (ii) Clemmensen reduction
- (b) An organic compound A contains 69.77% carbon, 11.63% hydrogen and rest oxygen.

The molecular mass of the compound is 86. It does not reduce Tollens' reagent but form an addition compound with sodium hydrogen sulphite and gives positive iodoform test. On vigorous oxidation it gives ethanoic and propanoic acids. Derive the possible structure of compound A. (Delhi 2009)

107. An organic compound A (C_3H_6O) is resistant to oxidation but forms compound B (C_3H_8O) on reduction. B reacts with HBr to form the compound C. C with Mg forms Grignard reagent D which reacts with A to form a product which on hydrolysis gives E. Identify A and E. (AI 2008C)

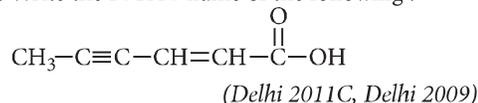
12.6 Nomenclature and Structure of Carboxyl Group

VSA (1 mark)

108. Write the IUPAC name of the compound :

$$\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{COOH} \\ | \\ \text{OH} \end{array}$$
 (Delhi 2014, Delhi 200C)

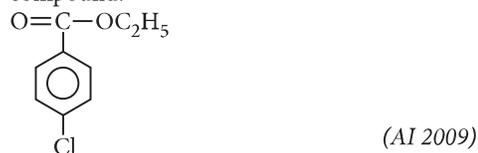
109. Write the IUPAC name of the following :



110. Write the IUPAC name of



111. Write the IUPAC name of the following compound:



12.7 Methods of Preparation of Carboxylic Acids

VSA (1 mark)

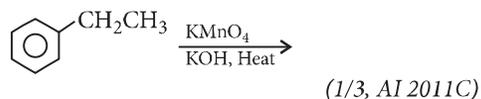
112. Name the reagents used in the following reaction :

$$\text{C}_6\text{H}_5 - \text{CH}_2 - \text{CH}_3 \xrightarrow{?} \text{C}_6\text{H}_5 - \text{COO}^- \text{K}^+$$
 (1/2, Delhi 2015)

113. How will you convert the following :
Ethanal to 2-hydroxy propanoic acid (1/5, AI 2013)

114. How will you obtain the following :
Benzoic acid from Aniline (1/5, AI 2013C)

115. Predict the organic products of the following reaction :



116. How is the following obtained?
Benzoic acid from ethyl benzene. (1/5, Delhi 2009)

SA II (3 marks)

117. How are the following conversions carried out?
 (i) Ethyl cyanide to ethanoic acid.
 (ii) Butan-1-ol to butanoic acid.
 (iii) Benzoic acid to *m*-bromobenzoic acid. (Delhi 2012)

118. How are the following conversions carried out :
 (i) Ethylcyanide to ethanoic acid
 (ii) Butan-1-ol to butanoic acid
 (iii) Methylbenzene to benzoic acid
 Write Chemical equations for the involved reactions. (AI 2010)

12.8 Physical Properties

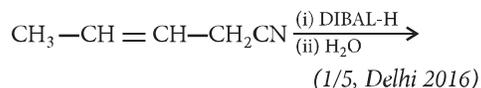
VSA (1 mark)

119. Arrange the following in the increasing order of their boiling points.
 CH_3CHO , CH_3COOH , $\text{CH}_3\text{CH}_2\text{OH}$ (1/5, AI 2016, 2015)

12.9 Chemical Reactions

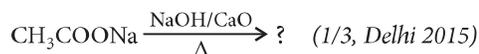
VSA (1 mark)

120. Write the product in the following reaction :

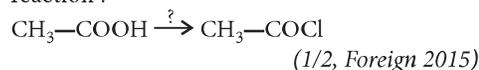


121. Why carboxylic acid does not give reactions of carbonyl group? (1/5, AI 2016)
122. Distinguish between CH_3COOH and HCOOH (1/2, AI 2016)

123. Predict the products of the following reaction :



124. Name the reagent used in the following reaction :



125. Write the main product in the following equation :



126. Describe the following giving chemical equation :

De-carboxylation reaction
(1/5, Delhi 2015C, 2012, 2008)

127. How will you bring about the following conversion?

Benzoic acid to Benzaldehyde
(1/5, Delhi 2015C)

128. Account for the following :

Carboxylic acids do not give reactions of carbonyl group.
(1/5, AI 2014)

129. Give simple chemical tests to distinguish between the following pairs of compounds :

Benzoic acid and Phenol
(1/5, AI 2014, Delhi 2013C, 2012, 2012C, 2010, 1/5 AI 2009)

130. Give simple chemical tests to distinguish between the following pairs of compounds:

Benzoic acid and Ethyl benzoate
(1/3, Foreign 2014, 1/5 AI 2009)

131. Write the chemical equation to illustrate the following name reaction :

Hell-Volhard-Zelinsky reaction
(1/5, Foreign 2014, Delhi 2012, AI2010)

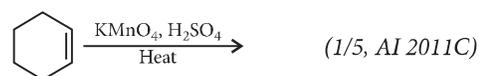
132. Write the products of the following reaction :



133. Give reasons :

Chloroacetic acid is stronger than acetic acid.
(1/5, Delhi 2013C)

134. Predict the products of the following reaction :



135. Arrange the following compounds in increasing order of their acid strengths

$(\text{CH}_3)_2\text{CHCOOH}$, $\text{CH}_3\text{CH}_2\text{CH}(\text{Br})\text{COOH}$,
 $\text{CH}_3\text{CH}(\text{Br})\text{CH}_2\text{COOH}$ (Delhi 2008)

136. How are the following conversions carried out
Acetic acid to methylamine. (1/5, Delhi 2007)

137. Write one chemical equation for each to illustrate the following reaction :

Fischer esterification. (AI 2007)

138. How would you convert :

Benzoic acid to benzamide. (1/5, AI 2007)

SA I (2 marks)

139. (a) Write the product of the following reaction :



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

Benzaldehyde and benzoic acid
(2/5, Delhi 2014)

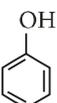
140. Account for the following :

$\text{Cl—CH}_2\text{COOH}$ is a stronger acid than CH_3COOH .
(2/5, AI 2014)

141. Although phenoxide ion has more number of resonating structures than carboxylate ion, carboxylic acid is a stronger acid than phenol. Give two reasons. (2/5, Delhi 2013)

142. Which acid of each pair shown here would you expect to be stronger?

(i) $\text{F—CH}_2\text{—COOH}$ or $\text{Cl—CH}_2\text{—COOH}$

(ii)  or CH_3COOH (2/5, AI 2013)

143. How will you carry out the following conversions?

(i) Acetylene to Acetic acid
(ii) Toluene to *m*-nitrobenzoic acid
(2/5, Delhi 2013C)

144. Give reasons :

(i) Electrophilic substitution in benzoic acid takes place at meta position.

(ii) Carboxylic acids do not give the characteristic reactions of carbonyl group.
(2/5, AI 2013C, Delhi 2012C)

145. Write a suitable chemical equation to complete each of the following transformations :

(i) Butan-1-ol to butanoic acid

- (ii) 4-Methylacetophenone to benzene-1,4-dicarboxylic acid (2/5, AI 2012)
146. Arrange the following compounds in an increasing order of their property as indicated :
- (i) Benzoic acid, 3,4-dinitrobenzoic acid, 4-methoxybenzoic acid (acid strength)
- (ii) $\text{CH}_3\text{CH}_2\text{CH}(\text{Br})\text{COOH}$, $\text{CH}_3\text{CH}(\text{Br})\text{CH}_2\text{COOH}$, $(\text{CH}_3)_2\text{CHCOOH}$ (acid strength) (2/5, AI 2012)
147. Write the mechanism of esterification of carboxylic acids. (2/5, Delhi 2012C)
148. Describe how the following conversions can be brought about :
- (i) Ethylbenzene to benzoic acid
- (ii) Bromobenzene to benzoic acid (2/5, AI 2010)
149. Arrange the following compounds in an increasing order of their indicated property :
- (i) Benzoic acid, 4-Nitrobenzoic acid, 3,4-Dinitrobenzoic acid, 4-Methoxybenzoic acid (acid strength)
- (ii) $\text{CH}_3\text{CH}_2\text{CH}(\text{Br})\text{COOH}$, $\text{CH}_3\text{CH}(\text{Br})\text{CH}_2\text{COOH}$, $(\text{CH}_3)_2\text{CHCOOH}$, $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$ (acid strength) (2/5, AI 2009)
150. State reasons for the following :
- (i) Monochloroethanoic acid has a higher pK_a value than dichloroethanoic acid.
- (ii) Ethanoic acid is a weaker acid than benzoic acid. (Delhi 2008)
151. (a) Giving a chemical equation for the following process :
Decarboxylation
- (b) State chemical tests to distinguish between the following pairs of compounds :
Phenol and Benzoic acid (AI 2008)
152. Give chemical tests to distinguish between the following pairs of compounds :
- (i) Methyl acetate and ethyl acetate.
- (ii) Benzaldehyde and benzoic acid. (Delhi 2007)

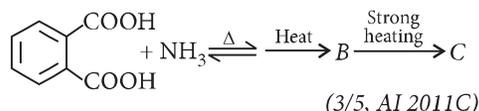
SA II (3 marks)

153. Two moles of organic compound 'A' on treatment with a strong base gives two compound 'B' and

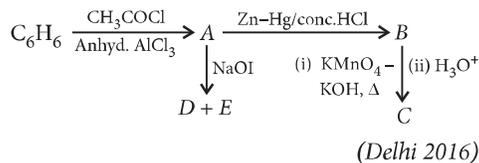
'C'. Compound 'B' on dehydrogenation with Cu gives 'A' while acidification of 'C' yields carboxylic acid 'D' with molecular formula of CH_2O_2 . Identify the compounds A, B, C and D and write all chemical reactions involved.

(3/5, Delhi 2013C)

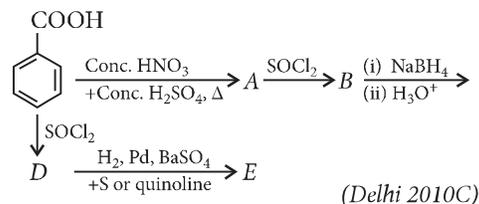
154. Identify, A, B and C in the following sequence of reactions :

**LA (5 marks)**

155. Write the structures of A, B, C, D and E in the following reactions :



156. Identify A to E in the following reactions :



157. An organic compound (A) on treatment with ethyl alcohol gives a carboxylic acid (B) and compound (C). Hydrolysis of (C) under acidified conditions gives (B) and (D). Oxidation of (D) with KMnO_4 also gives (B). (B) on heating with $\text{Ca}(\text{OH})_2$ gives (E) having molecular formula $\text{C}_3\text{H}_6\text{O}$. (E) does not give Tollen's test and does not reduce Fehling's solution but forms a 2,4-dinitrophenylhydrazone. Identify (A), (B), (C), (D) and (E). (AI 2010C)

158. An organic compound (A) on treatment with acetic acid in the presence of sulphuric acid produces an ester (B). (A) on mild oxidation gives (C). (C) with 50% KOH followed by acidification with dilute HCl generates (A) and (D). (D) with PCl_5 followed by reaction with ammonia gives (E). (E) on dehydration produces hydrocyanic acid. Identify the compounds A, B, C, D and E. (Delhi 2009C)