

## CHEMISTRY

### BOOKS - USHA CHEMISTRY (ODIA ENGLISH)

### ALDEHYDES, KETONES, MONOCARBOXYLIC ACIDS

#### Exercise

1. Arrange the following in decreasing order of Tencivity towards nucleophilic addition. (A) $CH_3 - CO - CH_3$ , (B) $CH_3 - CHO$ , (C)  
 $H - CHO$

A.  $A > B > C$

B.  $C > B > A$

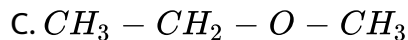
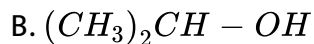
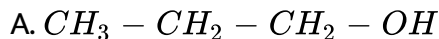
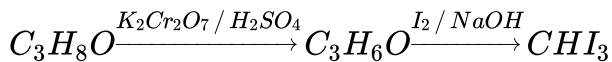
C.  $C > A > B$

D.  $A > C > B$

Answer:

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2. In this reaction the first compound is -



Answer:

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3. The reaction of acetaldehyde with  $Ba(OH)_2$  solution is known as -

- A. Aldol condensation
- B. Oxidation reaction
- C. Cannizzaro's reaction
- D. Claisen-Schmidt reaction

**Answer:**

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4. The general formula of aldehyde and ketone is -

- A.  $C_nH_{2n+2}O$
- B.  $C_nH_{2n}O$
- C.  $C_nH_{2n-2}O$
- D.  $C_nH_{2n}O_2$

**Answer:**

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5. Acetone can be obtained by the oxidation of -

- A. ethyl alcohol
- B. Propyl alcohol
- C. isopropyl alcohol
- D. all of these

**Answer:**



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6. What happens when calcium acetate is dry distilled ?

- A. acetaldehyde
- B. acetone
- C. acetic acid

D. ethane

**Answer:**

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7. In Rosenmund reduction the catalyst used is -

A. Pd- BaSO<sub>4</sub>

B. Sn-HCl

C. Zn-HCl

D. Raney Nicker

**Answer:**

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8. Which of the following does not respond Fehling's solution ?

- A. Glucose
- B. acetaldehyde
- C. benzaldehyde
- D. none of these

**Answer:**

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9.  $CH_3 - CHO$  and H-CHO can be differentiated using -

- A. Fehling's solution
- B. Tollen's reagent
- C. Schiff's reagent
- D.  $I_2 + NaOH$  solution

**Answer:**

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10. A compound gives +ve iodoform test and +ve Fehling's test. The compound is

- A. acetaldehyde
- B. acetone
- C. formaldehyde
- D. ethyl alcohol

**Answer:**



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11. Urotropin is formed by the action of ammonia on-

- A. acetaldehyde
- B. acetone

C. formaldehyde

D. formic acid

**Answer:**

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**12.** Formaldehyde can be distinguished from acetaldehyde by the reagent-

A. Tollen's reagent

B. Fehling's solution

C.  $I_2$  and NaOH

D. Baeyer's reagent

**Answer:**

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13. Which is most difficult to oxidise ?

A. H-CHO

B.  $CH_3 - CO - CH_3$

C.  $CH_3 - CHO$

D.  $C_2H_5 - CHO$

Answer:



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14. Ethylmethyl ketone can be obtained by the oxidation of -

A. butan-2-ol

B. propan-2-ol

C. pentan-2-ol

D. tert-butyl alcohol

**Answer:**



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15.  $CH_3C \equiv CH \xrightarrow[\text{HgSO}_4]{\text{dil H}_2\text{SO}_4}$  *product*. The product obtained in this reaction is-

A. formaldehyde

B. acetaldehyde

C. acetone

D. propionaldehyde

**Answer:**



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16. Formalin is an aqueous solution of -

- A. formic acid
- B. formaldehyde
- C. methyl alcohol
- D. formyl chloride

**Answer:**

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**17. Tollen's reagent is-**

- A. alkaline  $KMnO_4$
- B. ammoniacal  $Cu_2Cl_2$
- C. ammoniacal  $AgNO_3$
- D. alkaline  $HgCl_2$

**Answer:**

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18. Aldehydes and ketones form hydrocarbons by -

- A. Rosenmund reduction
- B. Clemmensen's reduction
- C. Aldol condensation
- D. Cannizzaro's reaction

**Answer:**



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19. The formation of cyanohydrins from aldehydes is an example of -

- A. electrophilic addition
- B. nucleophilic addition
- C. electrophilic substitution

D. nucleophilic substitution

**Answer:**

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20. Cannizzaro's reaction is not given by -

A. acetaldehyde

B. formaldehyde

C. benzaldehyde

D. all of these

**Answer:**

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21. Acetaldehyde on reaction with Grignards reagent and subsequent hydrolysis yields :

A.  $1^\circ$  - alcohol

B.  $2^\circ$  -alcohol

C.  $3^\circ$  alcohol

D. carboxylic acid  $H_2 / Pd - BaSO_4$

Answer:



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22. In the reaction  $CH_3COCl \xrightarrow{(A)} CH_3CHO + HCl$  the reagent 'A' is

-

A.  $LiAlH_4$

B.  $H_2 / Ni$

C.  $\text{Na} - \text{C}_2\text{H}_5\text{OH}$

D.

**Answer:**

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**23.** Clemmensen reduction of a ketone is carried out in presence of -

A.  $\text{H}_2$  with Pd - catalyst

B.  $\text{LiAlH}_4$  is ether

C. Zn- Hg and HCl

D. Na / alcohol

**Answer:**

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24. A mixture of formaldehyde and benzaldehyde on heating with aqueous NaOH solution gives -

- A. benzyl alcohol and sodium formate
- B. sodium benzoate and methyl alcohol
- C. sodium benzoate and sodium formate
- D. benzyl alcohol and methyl alcohol

**Answer:**



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25. Haloform reaction is not given by -

- A. isopropyl alcohol
- B. ethanol
- C. pentan-3-one



D. pentan-2-one

**Answer:**

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26. The reaction,  $R - COCl + H_2 \xrightarrow{Pd - BaSO_4} R - CHO + HCl$

- A. Rosenmund's reaction
- B. Cannizzaro's reaction
- C. Clemmensen's reaction
- D. Aldol Condensation

**Answer:**

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27. Reduction of  $-\overset{\text{O}}{\underset{\text{H}}{\text{C}}}-$  group of aldehyde to  $-\text{CH}_2-$  group can be done by —

A. Na / alcohol

B.  $\text{LiAlH}_4$

C.  $\text{H}_2 - \text{Ni}$

D. Wolff-Kishner reduction

**Answer:**

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28. Which of the following responds the Iodoform test ?

A. propanol

B. propanal

C. propanone

D. all of these

**Answer:**

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29. Acetaldehyde and formaldehyde react with which of the following reagents in a different way ?

A. Phenyl hydrazine

B. Fehling's test

C. Ammonia

D. Sodium bisulphite

**Answer:**

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30. Aldol reaction is not given by

- A. Benzaldehyde
- B. Trimethyl acetaldehyde
- C. Chloral
- D. All of these

**Answer:**



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31. Formic acid and formaldehyde can be distinguished from each other by

- A. Fehling's test
- B. Tollen's test
- C.  $HgCl_2$  solution

D.  $\text{NaHCO}_3$  solution

**Answer:**

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32. Which of the following gives an orange coloured product with acetone ?

A. Brady's reagent

B.  $\text{I}_2 / \text{KOH}$

C. Fehling's solution

D. None of these

**Answer:**

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33. Which of the following will not respond iodo form test ?

- A. Isopropyl alcohol
- B. Ethyl methyl ketone
- C. Diethyl ketone
- D. Dimethyl ketone

**Answer:**

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34. Alkaline hydrolysis of ester is an example of

- A. hydration
- B. esterification
- C. saponification
- D. none of these

**Answer:**

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**35.** Acetic acid forms acetyl chloride with -

A.  $PCl_5$

B.  $COCl_2$

C.  $Cl_2$

D. all of these

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**36.** Formic acid and acetic acid can be distinguished with -

A. Baeyer's reagent

B.  $\text{NaHCO}_3$

C. Tollen's reagent

D. Lucas reagent

**Answer:**

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37. The acidic strength of  $\text{HCOOH}$ ,  $\text{CH}_3\text{COOH}$  and  $\text{Cl} - \text{CH}_2 - \text{COOH}$  follows the order -

A.  $\text{HCOOH} > \text{Cl} - \text{CH}_2 - \text{COOH} > \text{CH}_3 - \text{COOH}$

B.  $\text{Cl} - \text{CH}_2 - \text{COOH} > \text{CH}_3 - \text{COOH} > \text{H} - \text{COOH}$

C.  $\text{Cl} - \text{CH}_2 - \text{COOH} > \text{H} - \text{COOH} > \text{CH}_3 - \text{COOH}$

D.  $\text{HCOOH} > \text{CH}_3 - \text{COOH} > \text{Cl} - \text{CH}_2 - \text{COOH}$

**Answer:**

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38. Which of the following acid was first obtained from red ant distillation ?

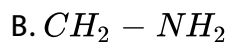
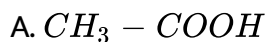
- A. formic acid
- B. acetic acid
- C. tartaric acid
- D. citric acid

Answer:

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39. The major product in the reaction,  $CH_3 - CONH_2 + HNO_2 \rightarrow$  is

-

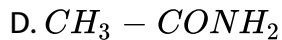
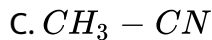
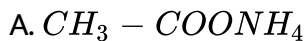
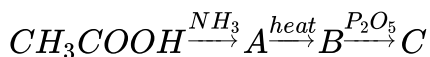




**Answer:**

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**40.** The end product (C) in the following reactions is -



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41. The reaction between acid and alcohol is known as -

- A. hydrolysis
- B. saponification
- C. esterification
- D. neutralisation

**Answer:**



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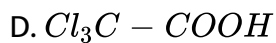
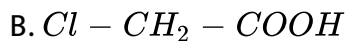
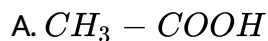
42. Monocarboxylic acids are the functional isomer of -

- A. esters
- B. alcohols
- C. aldehydes
- D. ethers

**Answer:**

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**43.** The weakest acid among the following is -



**Answer:**

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**44.** On strong heating ammonium acetate gives -

A. acetamide

B. Urea

C. formamide

D. methyl cyanide

**Answer:**

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**45.** Which acts as a reducing agent ?

A.  $CH_3 - COOH$

B.  $H - COOH$

C.  $H_2C_2O_4$

D. None of these

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46. Which of the following exists in dimeric form \_\_\_\_\_

A. ethyl alcohol

B. acetaldehyde

C. acetic acid

D. acetone

**Answer:**



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47. Benzaldehyde on chlorination in presence of  $FeCl_3$  produces

\_\_\_\_\_

A. o-chlorobenzaldehyde

B. m-chlorobenzaldehyde

C. p-chlorobenzaldehyde

D. Benzyl chloride

**Answer:**

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**48.** Benzaldehyde can be converted to benzyl alcohol by -

A. Claisen reaction

B. Perkin reaction

C. Wurtz reaction

D. Cannizzaro's reaction

**Answer:**

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**49.** Which of the following is called as ring activating group ?

A.  $-NO_2$

B.  $-CHO$

C.  $-OH$

D.  $-COOH$

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50. The oxidation of toluene by chromyl chloride in  $CCl_4$  giving benzaldehyde is called as -

A. Rosenmund's reaction

B. Etard's reaction

C. Reimer-Tiemann reaction

D. Kolbe's reaction

**Answer:**





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51. Write down the products of the following reactions : Toluene is treated with alkaline  $KMnO_4$  .

A. benzaldehyde

B. benzoic acid

C. benzyl alcohol

D. phenol

**Answer:**



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52. Benzaldehyde can't be oxidised by -

A. dil.  $HNO_3$

B. acidic  $KMnO_4$

C. Tollen's reagent

D. Fehling's solution

**Answer:**

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53. How many  $\sigma$ - and  $\pi$ -bonds are there in acetaldehyde ?

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54. Ethyl alcohol is oxidised to \_\_\_\_\_ when treated with Collin's reagent.

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55. What is Fehling's solution ?

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56. \_\_\_\_\_ is used to preserve biological specimens.

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57. Calcium formate on dry distillation yields \_\_\_\_\_.

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58. The precipitate formed when an aldehyde react with Fehling solution is \_\_\_\_\_.

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59. A compound with  $MF - C_3H_6O$  gives +ve iodoform test. Name the compound.

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60. Write two uses of acetone.

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61. Which type of compounds show aldol condensation reaction ?

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62. Name the Grignard's reagent used for preparation of acetone.

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63. An alkene on ozonolysis gives only acetone. What is the name of alkene.

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64. What happens when acetaldehyde is treated with semicarbazide in presence of dil. HCl ?

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65. Name the reagent used to distinguish between formaldehyde and acetaldehyde.

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66. Which class of compounds show Cannizzaro's reaction ?

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67. Write the IUPAC name of chloral.

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68. Give two uses of formaldehyde.

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69. How can you prepare alcohol from acetaldehyde without using reducing agent ?

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70. Which type of compounds show iodoform reaction ?

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71. Acetone can be obtained by the oxidation of -

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72. What happens when calcium acetate is dry distilled ?

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73. Arrange  $\text{HCHO}$  and  $\text{CH}_3\text{CHO}$  and  $\text{CH}_3\text{COCH}_3$  in increasing order of reactivity towards  $\text{HCN}$  ?

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74. Which type of aldehydes do not give Fehling test ?

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75. Complete the reaction,  $\text{HCHO} + \text{NH}_3 \rightarrow$

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76. Arrange the following in increasing order of their boiling point.

(Propane, propanone, propanoic acid)

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77. How does acetone react with hydrazine ?

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78. A compound with molecular formula  $C_4H_8$  gives acetone on ozonolysis. Name the compound ?

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79. Methyl cyanide on hydrolysis yields \_\_\_\_\_.

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80. The oil from which soaps are prepared belongs to a class of compound known as\_\_\_\_\_.

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81. Formic acid when heated with Tollen's reagent produces \_\_\_\_\_.

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82. Name the compound isomeric with propanoic acid.

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83. Name the reagent used to convert acetamide to methyl amine.

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84. Between acetic acid and acetone which has higher boiling point ?

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85. Between formic acid and acetic acid which is stronger acid ?

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86. Which of the following fumes in moist air ?

( $CH_3COOH$ ,  $CH_3COCl$ ,  $CH_3 - CHO$ )

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87. How can you get ethyl acetate from acetyl chloride ? Write the equation only.

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88. Grignard's reagent reacts with \_\_\_\_\_ to produce monocarboxylic acid.

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89. What happens with when acetic acid is heated with  $P_2O_5$  ?

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90. Between formic acid and acetic acid, which shows the characteristic property of aldehyde ?

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91. 7-8% dilute solution of acetic acid is called as \_\_\_\_\_ .

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92. \_\_\_\_\_ acid occurs in the sting of bees.

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93. What happens with when acetic acid is heated with  $LiAlH_4$  ?

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94. Acidic strength of acetic acid is \_\_\_\_\_ than chloroacetic acid.

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95. \_\_\_\_\_ acid is used for making pickles.

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96. What is saponification reaction ?



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97. What is the product obtained when acetyl chloride is reduced with  $LiAlH_4$ ?



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98. Identify A and B In this reaction,  $CH_3 - COOH \xrightarrow{PCl_5} A \xrightarrow{NH_3} B$



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99. Arrange the following in increasing order of reactivity. (Acid chloride, acid amide, ester)



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100. Name the reagent used to detect the presence of  $-COOH$  group in an organic compound.

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101. Complete the equation -  $CH_3 - COCl + C_2H_5OH \rightarrow$

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102. Ethyl alcohol is oxidised to \_\_\_\_\_ when warmed with acidified  $K_2Cr_2O_7$  solution .

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103. In the esterification reaction \_\_\_\_\_ of alcohol \_\_\_\_\_ and of carboxylic acid are removed as water.

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**104.** Give a reaction of carboxylic acid in which C-O bond breaks.

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**105.** Which type of aldehydes do not give Fehling test ?

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**106.** Name the reaction, when chromyl chloride is used to convert toluene to benzaldehyde

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**107.** Name the reagent used to convert toluene to benzoic acid.

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**108.** Between benzoic acid and acetic acid which is stronger acid ?

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**109.** Write two uses of benzoic acid.

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**110.** Between benzoic acid and p-nitrobenzoic acid which is stronger ?

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**111.** Name the reagent used to convert toluene to benzaldehyde.

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112. Name the reaction by which a -CHO group can be introduced into a benzene ring.

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113. Benzaldehyde on nitration results \_\_\_\_\_.

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114. What is Cannizzaro's reaction? Give equation.

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115. How the  $-\overset{|}{C} = O$  group of aldehydes differ from  $-\overset{|}{C} = \overset{|}{C} -$  group of alkene in chemical reactions ?

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116. What happens when vapours isopropyl alcohol are passed over heated copper?

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117. What happens when formaldehyde reacts with ammonia?

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118. What happens when  $H_2$  gas is passed through acetyl chloride containing  $Pd - BaSO_4$  catalyst?

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119. What happens when acetaldehyde reacts with iodine in presence of dilute NaOH solution?

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120. Explain why lower aldehydes and ketones are soluble in water.

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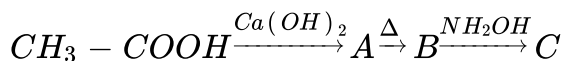
121. Explain why aldehydes are more reactive than ketones.

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122. What happens when acetone is treated with iodine in NaOH solution?

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123. Identify A,B,C in the following reaction sequence,



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124. What happens when acetaldehyde is treated with 2,3-dinitrophenylhydrazine ?

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125. How does acetaldehyde react with Phenyl hydrazine ?

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126. What happens when acetone reacts with sodium bisulphite?

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127. What is the product obtained when acetone reacts with phenylhydrazine?

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**128.** What happens when a mixture of calcium acetate and calcium formate is dry distilled?

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**129.** Why aldehydes and ketones show nucleophilic addition reaction?

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**130.** Do the conversation: Formaldehyde to Acetaldehyde

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**131.** Do the conversation: Acetaldehyde to Formaldehyde

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**132.** Do the conversation: Acetaldehyde to acetone

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**133.** Do the conversation: Acetone to acetaldehyde

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**134.** What happens when formaldehyde react mixture of HCl and NaCN?

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**135.** How can you prepare acetaldehyde from alcohol?

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**136.** What is Clemmensen reduction reaction?



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**137.** What is Rosenmund reduction reaction?



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**138.** Give one test to distinguish between acetaldehyde and acetone.



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**139.** Name the reagent used to distinguish between formaldehyde and acetaldehyde.



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**140.** Suggest a chemical test to distinguish between pentan-2-one and pentan-3-one. Give equation.



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141. Arrange the following in increasing order of their reactivity and also explain the reason ( $HCHO$ ,  $CH_3 - CHO$ ,  $CH_3 - CO - CH_3$ )



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142. What happens when formaldehyde is heated with potassium hydroxide solution?



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143. What happens when acetaldehyde is treated with sodium hydroxide solution?



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**144.** What happens when acetaldehyde is treated with hydrogen cyanide?

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**145.** How can you prepare mesityl oxide from acetone? Give the steps.

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**146.** How can you prepare lactic acid from acetaldehyde.

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**147.** Why formic acid reduces Tollen's reagent like aldehydes?

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148. Complete the equation-  $CH_3 - COCl + CH_3 - NH_2 \rightarrow$

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149. Complete the equation-  $CH_3 - COCl + CH_3COONa \rightarrow$

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150. What happens when sodium salt of propionic acid is heated with sodalime?

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151. How can acetic acid be prepared from methyl bromide in two step?  
Write the equation only?

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**152.** Write the chemical test to distinguish between formic acid and acetic acid.

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**153.** Explain the Hofmann bromamide reaction with one example.

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**154.** What happens when formic acid is treated with Fehling's solution?

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**155.** Carboxylic acids do not give the characteristic reactions of carbonyl group, explain.

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**156.** How can you distinguish between formic acid and formaldehyde?

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**157.** How can you get acetyl chloride from acetic acid?

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**158.** What happens when acetamide is treated with sodium and ethyl alcohol.

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**159.** How can you prepare acetic using Grignard reagent?

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**160.** What are the products formed when ethyl acetate is reduced with  $LiAlH_4$  ?

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**161.** What happens when acetic acid is treated with  $Na_2CO_3$  ?

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**162.** What is Bouveault-blanc reduction reaction?

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**163.** What is the function of conc.  $H_2SO_4$  in the preparation of ester from carboxylic acid and alcohol?

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**164.** What happens when acetamide is boiled with NaOH solution?

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**165.** Do the conversation: Formic acid to acetic acid

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**166.** Do the conversation: Acetic acid to formic acid

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**167.** What happens when acetaldehyde reacts with hydroxyl amine?

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**168.** How will you prepare acetamide from acetic acid?



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169. What happens when acetamide is heated with  $P_2O_5$



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170. What happens when acetic acid is treated with ammonia followed by heating?



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171. What happens when acetamide is treated with mixture of  $NaNO_2$  and HCL?



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172. How can you get acetamide from acetyl chloride?



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173. What is the product obtained when acetone reacts with hydroxyl amine?



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174. For the preparation of acetyl chloride from acetic acid, explain why  $SOCl_2$  is preferred to  $PCl_5$ .



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175. Write functional isomers of the compound with  $MF - C_3H_6O$ .



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**176.** How can you account for the fact that chloroacetic acid is stronger than acetic acid?

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**177.** How can you prepare methyl amine and ethyl amine from acetamide?

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**178.** How can you distinguish between acetamide and N-methyl acetamide?

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**179.** Write down the products of the following reactions : Toluene is treated with alkaline  $KMnO_4$ .



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180. How can you get benzoic acid from benzene?



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181. What happens when sodium benzoate is distilled with sodalime?



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182. What is acylation reaction in benzene?



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183. Arrange the following in decreasing order of acidic strength.

$C_6H_5 - COOH$ ,  $p - CH_3 - C_6H_4 - COOH$ ,  $p - CL - C_6H_4 - COOH$

and  $P - NO_2 - C_6C_4 - COOH$



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**184.** How can you prepare benzoic acid from Grignard reagent? Give equations only.



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**185.** What is Etard's reaction ?



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**186.** How can you distinguish between phenol and benzoic acid?



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**187.** Do the conversation: Benzene  $\rightarrow$  Benzaldehyde.



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**188.** What happens when benzaldehyde is heated with conc.NaOH solution?

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**189.** What happens when ethyl benzene is heated with alkaline potassium permanganate?

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**190.** Name the reaction by which a -CHO group can be introduced into a benzene ring.

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**191.** What is Stephen reduction reaction? Give an example.



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192. What happens when benzaldehyde is heated with mixture of cons.  $\text{HNO}_3$  and conc  $\text{H}_2\text{SO}_4$



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193. What happens when phthalic acid is treated with ammonia and the product is heated?



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194.  $\text{C}_2\text{H}_5\text{O}_2\text{N}$  on reaction with Sn and conc. HCL gives a compound 'B' which when treated with  $\text{NaNO}_2$  and HCL gave the compound 'C' having M.F  $\text{C}_2\text{H}_6\text{O}$ . Then compound 'C' when treated with 'Na' metal gives effervescence and when react with  $\text{CrO}_3$  gives a saturated aldehyde. Determine structures and name of A, B, C.

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**195.** What is Benzoin condensation reaction?

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**196.** Do the conversion: Benzene to m-dichlorobenzene

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**197.** Do the conversion: Nitrobenzene to Benzamide

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**198.** An organic compound (A) with molecular formula  $C_8H_8O$  forms an orange precipitate with 2, 4 dinitrophenyl hydrazine and gives yellow precipitate on heating with iodine in presence of sodium hydroxide. It

neither reduces Tollen's reagent nor Fehling solution and it also does not 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 compound (A) and (B) and explain in detail the reactions involved

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**199.** An organic compound containing C,H and O has molecular mass 86. It does not reduce Tollen's reagent but gives iodoform test. On vigorous oxidation it gives mixture of acetic acid and propionic acid. Write the possible structure of the compound giving explanations.

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**200.** How can acetaldehyde be prepared from acetyl chloride and acetylene?

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**201.** What happens when acetone react with sodium bisulphite?

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**202.** How can acetone be prepared from- acetic acid

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**203.** How can acetone be prepared from- acetyl chloride

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**204.** Why are the carbohydrate?

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**205.** Why can't aldehydes show position isomerism?

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**206.** Write short note on Iodoform reaction.

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**207.** Write short notes on: Aldol condensation reaction.

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**208.** Write short notes on: Cannizzaro's reaction.

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**209.** Discuss two general methods of preparation of monocarboxylic acid.

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**210.** Formic acid when heated with Tollen's reagent produces \_\_\_\_\_.

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**211.** What is urotropin?

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**212.** What happens when propionic acid is treated with thionyl chloride?

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213. What happens with when acetic acid is heated with  $P_2O_5$  ?

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214. How can you prepare formic acid from acetic acid?

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215. An organic compound (A) has M.F =  $C_3H_6O_2$ , on hydrolysis gives a monobasic acid (B) and a neutral compound (C). The acid 'B' reduces  $HgCl_2$  solution, while the compound 'C' gives iodoform test. Identify A, B, C giving explanation.

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216. Between ethyl amine and diethyl amine which is more soluble in water and why?



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217. What type of linkage is present between amino acid molecules in proteins?



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218. Write short notes on Hofmam's bromamide reaction.



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219. Write short notes on Esterification reaction.



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220. Write short notes on Carboxylation of Grignard's reagent.



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221. Write short note on : Gatterman-Koch reaction

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222. Write short notes on: Cannizzaro's reaction.

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223. Write short note on : Etard's reaction

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224. Write short note on : Friedel-Craft's reaction

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225. Write short note on : Ortho and para directing groups

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226. How can you prepare benzoic acid from Methyl benzene

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227. How can you prepare benzoic acid from Grignard reagent? Give equations only.

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228. Explain the acidic character of benzoic acid.

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229. How does benzoic acid react with  $PCl_5$

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230. How does benzoic acid react with Mixture of conc.  $HNO_3$  and conc.  $H_2SO_4$  ?

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