

**JEE CHEMISTRY**

**Topic - Carboxylic Acid**

- Q.1** The general molecular formula of acid anhydrides is  
 [1]  $C_nH_{2n-1}O_3$       [2]  $C_nH_{2n+2}O_3$       [3]  $C_nH_{2n-2}O_3$       [4]  $C_nH_{2n+1}O_3$
- Q.2** An aliphatic carboxylic acid of molecular formula  $C_2H_4O_2$  on reaction with  $PCl_5$  gives a compound Y. Y when heated with sodium salt of the acetic acid produces  
 [1] Ethyl acetate      [2] Ethyl acetoacetate      [3] Methyl methanoate      [4] Ethanoic anhydride
- Q.3** One mole of each of the following compounds is heated with water in a sealed test tube, the lowest pH will be shown by  
 [1]  $CH_3COOH$       [2]  $\begin{array}{c} CH_2COOH \\ | \\ Cl \end{array}$       [3]  $C_6H_5OH$       [4]  $CH_3COCl$
- Q.4** Hydrolysis of an amide with alkali involves  
 [1] Nucleophilic attack of the hydroxide ion on acyl carbon  
 [2] Deamination of the amide  
 [3] Dehydration of the amide  
 [4] Slow decarboxylation of the amide
- Q.5** Following reagent is capable of converting ethyl acetate to ethanol  
 [1]  $Zn-Cu/H_2O$       [2]  $P/HI$       [3]  $LiAlH_4$       [4] None of these
- Q.6** On heating sodium methoxide and CO the compound formed is  
 [1] Methyl acetate      [2] Ether      [3] Sodium acetate      [4] Sodium methanoate
- Q.7** Amides are dehydrated to alkyl cyanides by heating with  
 [1]  $PCl_5$  only      [2]  $SOCl_2$  only      [3]  $POCl_3$  only      [4]  $PCl_5/SOCl_2/POCl_3$
- Q.8** Except one all other names represent the same compound  
 [1] Ethyl acetoacetate      [2] Acetoacetic ester  
 [3] Ethyl-3-oxobutanoate      [4] Ethyl-2-ketobutanoate
- Q.9** Acetic anhydride is capable of reacting with the following triad  
 [1]  $>C=O, -CHO, -COOH$       [2]  $-OH > NH > C-OH$   
 [3]  $\rightarrow N > C=O, -NH_2$       [4]  $>C=C<, >O, -NH$

**Q.10** Acetic anhydride reacts with nitrogen pentoxide to form  
 [1] Nitroacetic acid      [2] Acetonitrile      [3] Acetyl nitrate      [4] Acyl nitrene

**Q.1** The electronegativity order of Y in  $R-\overset{\overset{O}{||}}{C}-Y$  is-

- [1]  $-OR' > -NH_2 > -Cl > OCOR$       [2]  $-OCOR > -Cl > OR > -NH_2$   
 [3]  $-OCOR > -OR' > -Cl > -NH_2$       [4]  $-Cl > -OCOR > -OR' > -NH_2$

**Q.12** Which of the following is a correct statement

- [1] Ethyl acetate has an odour of pineapple  
 [2] Acetamide has an odour of fish  
 [3] Acetic anhydride can be prepared by heating acetic acid with  $P_2O_5$   
 [4] Acetyl chloride is a gas at ordinary temperature in a tropical country like India

**Q.13** Detaching H atom from the carboxylic acid, the remainder portion is called

- [1] Acyl group      [2] Acetyl group      [3] Acyl oxy group      [4] None of these

**Q.14** Match list I with list II and then select the correct answer from the codes given below the lists

**List I**

**List II**

- |   |                                  |
|---|----------------------------------|
| (A) Organic acid + alcohol $\longrightarrow$      | (a) Irreversible reaction        |
| (B) $RCOOH + \text{Diazomethane} \longrightarrow$ | (b) Preparation of ethyl acetate |
| (C) $RCOCl + H_2O \longrightarrow$                | (c) Reversible Reaction          |
| (D) $CH_3CHO \xrightarrow{Al(OC_2H_5)_3}$         | (d) Preparation of methyl esters |

Code	A	B	C	D
[1]	c	d	a	b
[2]	c	b	a	d
[3]	c	a	b	d
[4]	d	b	c	a

**Q.15** Hydrolysis and decarboxylation of ethylacetoacetate gives

- [1] Methyl ketone + formic acid      [2] Acetone + dry ice  
 [3] Butanone +  $CO_2$       [4] Acetic acid + dry ice

**Q.16** Pick up the incorrect statement

- [1] Amides ( $RCONH_2$ ) are reduced by sodium and ethanol into primary amines ( $RCH_2NH_2$ )  
 [2] Amides are dehydrated with  $PCl_5$  into alkanenitriles  
 [3] Amide on treatment with nitrous acid evolve  $CO_2$   
 [4] Amides are formed by heating ammonium carboxylates

**Q.17**  $CH_3COOCH_3 + Br^- \rightarrow CH_3COBr + \overset{-}{O}CH_3$ . The above reaction is

- [1] Possible      [2] Not possible      [3] Difficult to predict      [4] None of these

- Q.18** Which of the following statements is incorrect  
 [1] Acetyl chloride is a colourless fuming liquid with irritating odour.  
 [2] AcOH, Ac<sub>2</sub>O and AcCl respectively represent acetic acid, acetic anhydride and acetyl chloride.  
 [3] Amides of the structure RCO–NH–CO–R are called tertiary amides.  
 [4] Dimethylformamide is a very good solvent for polar and non-polar compounds.
- Q.19** Select the wrong statement. Amides are hydrolysed  
 [1] Slowly by water [2] Rapidly by acids  
 [3] Far more rapidly by alkalis [4] Very slowly by acids or alkalis.
- Q.20**  $\text{RCOOAg} + \text{Br}_2 \xrightarrow[\Delta]{\text{CCl}_4} \text{R}-\text{Br} + \text{AgBr} + \text{CO}_2$  This reaction is called  
 [1] Wurtz reaction [2] Hundiecker reaction [3] Friedel-Craft reaction [4] Kolbe reaction
- Q.21** Which is incorrect in regard to the formation of ester –  
 [1] It can be obtained by heating silver acetate and ethyl bromide  
 [2] It can be obtained by the action of ethyl alcohol on CH<sub>3</sub>COCl or acetic anhydride  
 [3] It can be obtained by heating CH<sub>3</sub>CHO in presence of aluminium ethoxide  
 [4] None of these
- Q.22** When acetic acid reacts with ethylene in presence of BF<sub>3</sub> we get  
 [1] Ethyl acetate [2] Acetic anhydride [3] Methyl alcohol [4] Ethylalcohol
- Q.23** Arrange acetyl chloride (I), ethyl acetate (II), acetamide (III) and acetic anhydride (IV) in order of reactivity towards nucleophilic acyl substitution -  
 [1] I > IV > II > III [2] I > II > III > IV [3] III > II > IV > I [4] IV > III > II > I
- Q.24** Reaction between CH<sub>2</sub>=C=O and C<sub>2</sub>H<sub>5</sub>OH forms  
 [1] Methyl acetate [2] Methyl formate [3] Ethyl acetate [4] Acetic acid
- Q.25** Synthetic flavours contain -  
 [1] Unsaturated acids [2] Esters [3] Dicarboxylic acids [4] Hydroxy acid
- Q.26** Ethyl acetate reacts with hydrazine forming -  
 [1] Acetamide [2] Acid hydrazide [3] Acid anhydride [4] Hydrazoic acid
- Q.27** The reaction,  $\text{CH}_3\text{COOC}_2\text{H}_5 \xrightarrow[4[\text{H}]]{\text{Na} + \text{C}_2\text{H}_5\text{OH}} \text{C}_2\text{H}_5\text{OH} + \text{CH}_3\text{CH}_2\text{OH}$ , is called  
 [1] Claisen reduction [2] Claisen condensation  
 [3] Bouveault-Blanc reduction [4] Tischenko reduction
- Q.28** The reaction of acetaldehyde in the presence of Al(OC<sub>2</sub>H<sub>5</sub>)<sub>3</sub> produces  
 [1] CH<sub>3</sub>CH(OH)CH<sub>2</sub>CHO  
 [2] CH<sub>3</sub>CH=CH-CHO  
 [3] CH<sub>3</sub>COOC<sub>2</sub>H<sub>5</sub>  
 [4] No reaction

**Q.29** Which of the following is not an inorganic acid ester

[1] Dimethyl sulphate [2] Ethyl nitrate [3] Nitroglycerine [4] Ethylorthoformate

**Q.30** Which of the following test is not carried out to examine the presence of -COOH groups

[1] Litmus test [2] Sodium bicarbonate test  
[3] Ester test [4] Bromine water test

## *Answer Key*

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	3	4	4	1	3	3	4	4	2	3
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	4	3	3	1	2	3	2	3	4	2
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	4	1	1	3	2	2	3	3	4	4