Carboxylic Acid & its derivatives

1. Acid & its Preparation

Q 1. Which of the following acids is present in vinegar ?

(A) Formic acid (B) Acetic acid
(C) Tartaric acid (D) Butyric acid

Q 2. The general formula $C_nH_{2n}O_2$ could be for open chain

(A) diols (B) diketones
(C) carboxylic acids (D) dialdehydes

Q 3. The higher boiling points of carboxylic acids are due to

(A) their acidic nature
(B) intermolecular hydrogen bonding
(C) their dimerization
(D) both (B) and (C)

Q 4. Which of the following is not acid derivatives ?

(A) $R-CN$ (B) $RCOCl$
(C) $R-NC$ (D) $R-COOR'$

Q 5. Which of the following acids is the strongest ?

(A) CH_3COOH (B) $CH_2ClCOOH$
(C) $CHCl_2COOH$ (D) CCl_3COOH

Q 6. Among the acids,

$(I)\ HC\equiv C-COOH$

$(II)\ H_2C=CHCOOH$

(III) CH_3CH_2COOH

The acid strength follows the sequence

(A) $I > II > III$ (B) $I < II < III$
(C) $I = II = III$ (D) $I = II > III$

Q 7. Acetic acid exists in a dimer state in benzene due to

(A) condensation reaction
(B) presence of carbonyl group
(C) presence of carbonyl group
(D) presence of $\alpha-$ hydrogen

Q 8. Which $e^- - pair$ is more acidic in $R-\overset{\beta}{C}(=O)-\underset{\alpha}{O}-H$

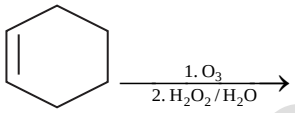
(A) l.p. At $\alpha-c-atom$

(B) l.p. at β c-atom

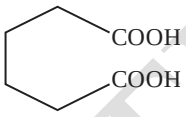
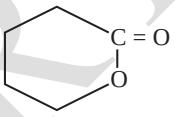
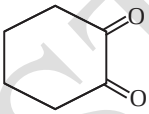
(C) Bothare equally acidic

(D) None of these

Q 9. The product in the reaction



Product, is

(A) 
(B) 
(C) 
(D) None of these

Q 10. In the reaction

$R-mgx + CO_2 \xrightarrow{H_3O^+}$ product, is

(A) $RCOOH$ (B) $R-CHO$
(C) $R-\overset{O}{\overset{\|}{C}}-R$ (D) $R-CH_2OH$

Q 11. In the given reaction:

$$C_6H_5-CH_3 \xrightarrow[hv]{NBS} A \xrightarrow{NaCN} B \xrightarrow[\Delta]{H_3O^{\oplus}} C$$

C is

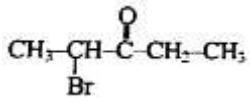
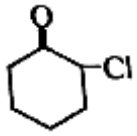
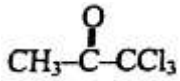
(A) $C_6H_5-CH_2-Br$

(B) $C_6H_5-CH_2-CN$

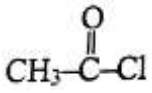
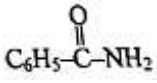
(C) $C_5H_5-CH_2-\overset{O}{\overset{\|}{C}}-NH_2$

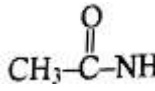
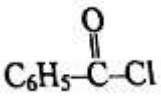
(D) $C_6H_5-CH_2-COOH$

Q 12. Which halo derivative(s) on treatment with $\overset{\oplus}{O}H$ will give carboxylic acid ?

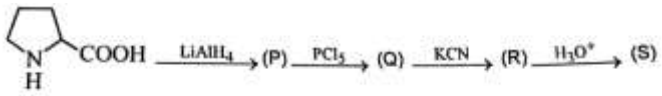
(A) 
(B) 
(C) 
(D) All of these

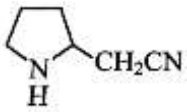
Q 13. Which one of the following compounds is least reactive with water ?

(A)  (B) 

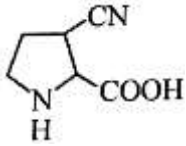
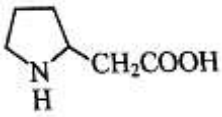
(C)  (D) 

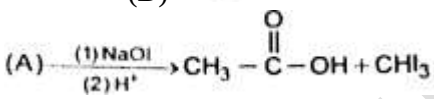
Q 14. Predict the final product (S) formed in the following reaction sequence

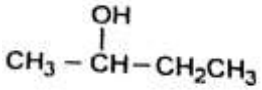
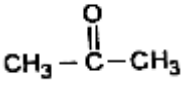


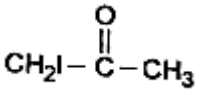
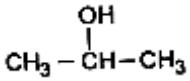
(A) 

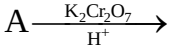
(D) $H_2N(CH_2)_3CH_2CH_2COOH$

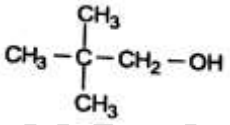
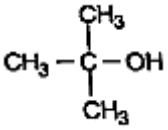
(C)  (D) 

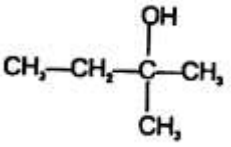
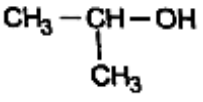
Q 15. Compound  A would not be

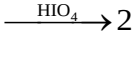
(A)  (B) 

(C)  (D) 

Q 16.  carboxylic acid A would be

(A)  (B) 

(C)  (D) 

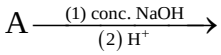
Q 17. A (one mole)  mole of formic acid, A would be

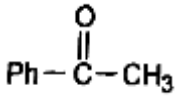
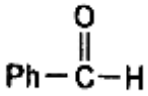
(A) Butane -2, 3-diol

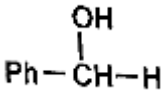
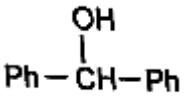
(B) pentan-2, 3, 4- triol

(C) hexane-2,3,4,5-tetraol

(D) hexane-2,3,5- triol

Q 18.  benzoic acid, A would be

(A)  (B) 

(C)  (D) 

2. Preparation of Acid Derivatives

Q 1. In the reaction $R-N\equiv C+H_2O/H^+ \rightarrow$ Products are

(A) $R-COOH, NH_3$

(B) $R-NH_2, HCOOH$

(C) $R-CONH_2$

(D) $R-NH-\overset{\overset{O}{\|}}{C}-H$

Q 2. Hydrolysis of Amide is taster in

(A) Basic medium

(B) Acidic medium

(C) Neutral medium

(D) None of these

Q 3. In the reaction $R-COOH+PCl_5 \rightarrow$ Products are

(A) $RCOCl+HOCl_3$

(B) $RCOCl+P_2O_5$

(C) $RCOCl+H_3PO_4$

(D) $RCOCl+H_3PO_3$

Q 4. Which one of the following acids of thermally most unstable ?

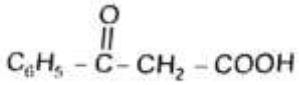
(A) CH_3-CO-COOH

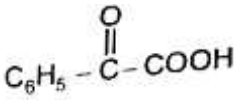
(B) CH_3-CO-CH_2-COOH

(C) CH_3-CO-CH_2-CH_2-COOH

(D) CH_3-CO-CH_2-CH_2-CH_2-COOH

Q 5. For the following acids the rate of decarboxylation on heating would be

I 

(II) 

(III) $NO_2 - CH_2 - COOH$

(IV) $HOOC - CH_2 - COOH$

(A) III > I > IV > II (B) I > III > IV > II

(C) III > IV > I > II (D) I > IV > III > II

Q 6. Ease of esterification of following alcohol with HCOOH is

$CH_3 - CH_2OH$ $(CH_3)_2CH - OH$ $(CH_3)_3C - OH$

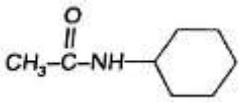
I *II* *III*

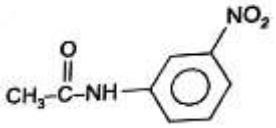
(A) III > II > I (B) I > II > III

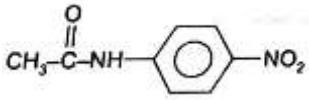
(C) II > I > III (D) II > III > I

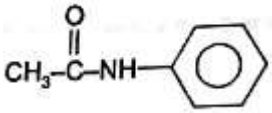
Q 7. Consider the following compounds

The decreasing order of reactivity towards hydrolysis by aqueous NaOH is

(I) 

(II) 

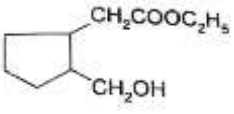
(III) 

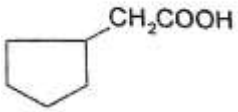
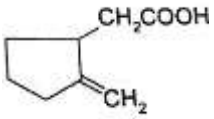
(IV) 

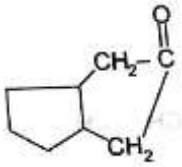
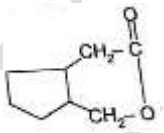
(A) I > II > III > IV (B) III > II > IV > I

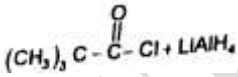
(C) IV > I > II > III (D) I > IV > II > III

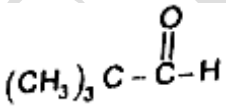
Q 8. In the given reaction

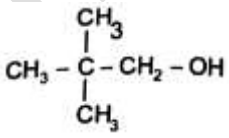
 $\xrightarrow{H^{\oplus}}[X]$, [x] is :

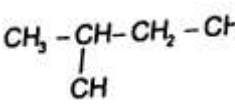
(A)  (B) 

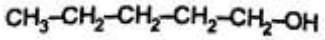
(C)  (D) 

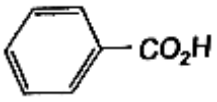
Q 9.  $\xrightarrow{H_2O}$ X, X is

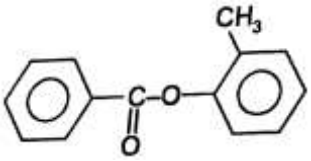
(A) 

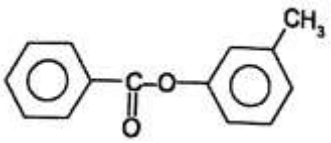
(B) 

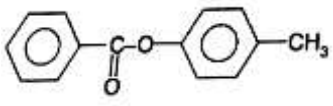
(C) 

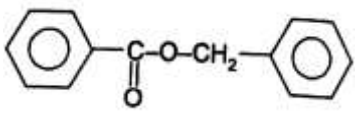
(D) 

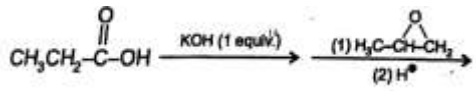
Q 10.  $\xrightarrow{KOH}$ $\xrightarrow{PhCH_2Cl}$ X, X is

(A) 

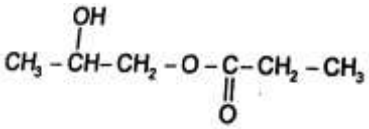
(B) 

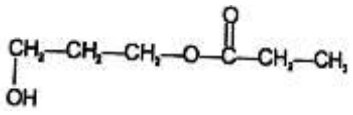
(C) 

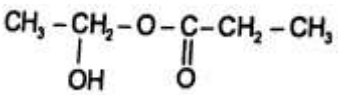
(D) 

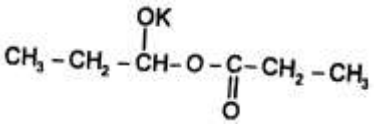
Q 11.  X,

X is

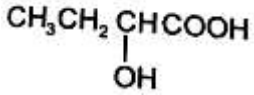
(A) 

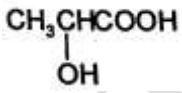
(B) 

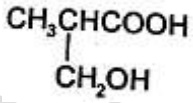
(C) 

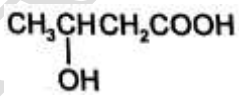
(D) 

Q 12. An optically active compound 'x' has molecular formula $C_4H_5O_3$. It evolves CO_2 with aq. $NaHCO_3$. 'X' reacts with $LiAlH_4$ to give achiral compound 'x' is

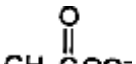
(A) 

(B) 

(C) 

(D) 

Q 13. Peroxyacetic acid (CH_3CH_3H) is a weaker acid than acetic acid (CH_3CO_2H) since

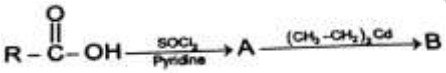
(A) negative charge in  can't be delocalized into the carbonyl group

(B) CH_3 group in CH_3CO_3H shows +I effect

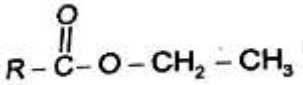
(C) both are correct

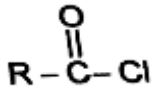
(D) none is correct

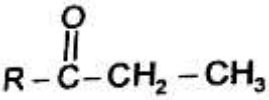
Q 14. In the given reaction:

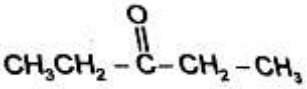


B will be

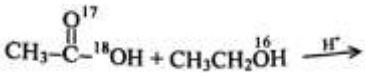
(A) 

(B) 

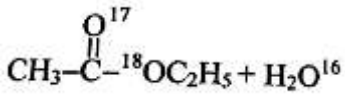
(C) 

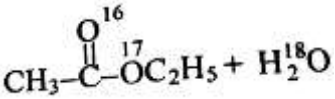
(D) 

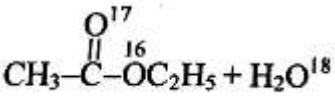
Q 15. Consider the reaction,

 (A) and (B)

(A) and (B) respectively are

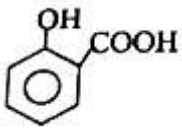
(A) 

(B) 

(C) 

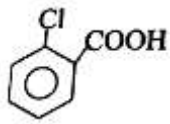
(D) Both (A) and (B)

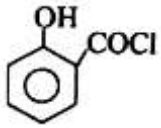
Q 16. In the given reaction,

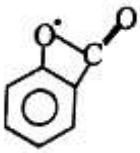


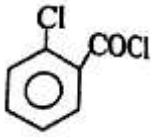
$\xrightarrow{PCl_5(excess)}$ [P],

[P] will be

(A) 

(B) 

(C) 

(D) 

3. Hundsdiecker Reaction, curtius Reaction, HVZ Reaction, Hoffmann bromamide reaction

Q 1. The reaction,

$RCOOAg + Br_2 \xrightarrow{CCl_4} RBr + AgBr + CO_2$ is called

(A) HVZ
(B) Hunsdiecker reaction
(C) Hofmann's reaction
(D) Carbylamine reaction

Q 2. $RCOOH + N_3H \xrightarrow{H_2SO_4(conc.)} RNH_2 + CO_2 + N_2$ The above reaction is called

(A) HVZ reaction
(B) Hunsdiecker reaction
(C) Schmidt reaction
(D) decarboxylation reaction

Q 3. The product (C) in the following reactions is

$RCOOH \xrightarrow{NH_3} (A) \xrightarrow{Heat} (B) \xrightarrow[\Delta]{P_2O_5} (C)$

(A) RNH_2 (B) RCN

(C) RNC (D) $RCONH_2$

Q 4. In the reaction

$R-COOH \xrightarrow[3.Ag_2O\ 4.R'NH_2]{1.SOCl_2\ 2.\ NaN_3}$ Product, is

(A) $R-\overset{O}{\overset{\|}{C}}-NH-R'$ (B) $R-\overset{O}{\overset{\|}{C}}-NH_2$

(C) $R'-\overset{O}{\overset{\|}{C}}-NH_2$ (D) RNH_2

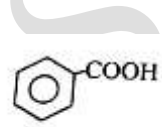
Q 5. In the reaction

$R-COOH \xrightarrow[3.\Delta\ \ 4.H_2O]{1.SOCl_2\ 2.\ NaN_3}$ Product, is

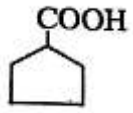
(A) $R-CH_2COOH$ (B) $R-COOR$

(C) RNH_2 (D) None of these

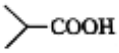
Q 6. Which of the following compound(s) will give HVZ reaction ?



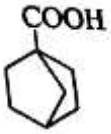
(I)



(II)



(III)

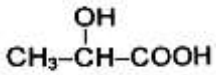


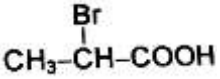
(IV)

(A) (II) Only (B) (III) Only
(C) Both (II) and (III) (D) All four

Q 7. $CH_3CH_2-COOH \xrightarrow{P/Br_2} (A) \xrightarrow{aq.KOH} (B) \xrightarrow{H^+/\Delta}$ (D), compound (D) is

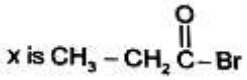
(A) $CH_2=CH-COOH$

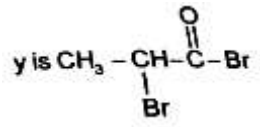
(B) 

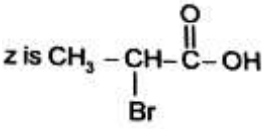
(C) 

(D) $CH\equiv C-COOH$

Q 8. In the reaction sequence $CH_3-CH_2-COOH \xrightarrow{PBr_3} X \xrightarrow{Br_2} Y \xrightarrow{H_2O} Z$

(A) 

(B) 

(C) 

(D) All are Correct

Q 9. Which of the following will not give HVZ reaction ?

(A) $C_2H_5-\underset{\underset{OH}{|}}{CH}-COOH$

(B) CH_3CBr_2COOH

(C) $C_2H_5-\underset{\underset{Br}{|}}{CH}-COOH$

(D) $(CH_3)_2CHCOOH$

Q 10. In the reaction

$R-CH_2COOH+Cl_2 \xrightarrow{PBr_3}$ Product, is

(A) $R-\underset{\underset{Br}{|}}{CH}-COOH$ (B) $R-\underset{\underset{Br}{|}}{CH}\,COBr$

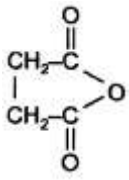
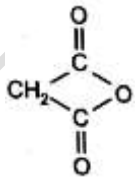
(C) $R-\underset{\underset{Cl}{|}}{CH}-COOH$ (D) $R-\underset{\underset{Cl}{|}}{CH}-COCl$

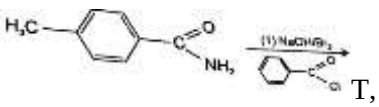
Q 11. In the given reaction

$CH_3COOH \xrightarrow[(iii)H_2O/H^+/\Delta]{(i)\ Br_2/P,\ (ii)NaCN}$ [X] , [X] will be

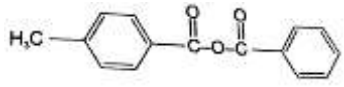
(A) CH_3-COOH

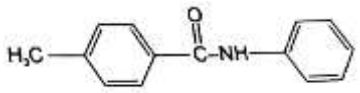
(B) $HOOC-CH_2-CH_2-COOH$

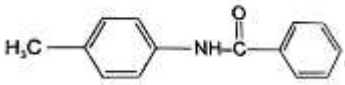
(C)  (D) 

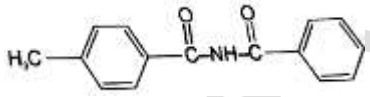
Q 12. In the reaction  T,

the structure of the Product T is

(A) 

(B) 

(C) 

(D) 

Q 13. During Hoffmann bromamide reaction, the intermediate formed is

(A) $R-\overset{+}{N}=\overset{-}{C}$ (B) $R-N=C=O$

(C) $R-C=N=O$ (D) $R-N=O$

Q 14. $CH_3CHI_2 \xrightarrow{KCN} \xrightarrow[\Delta]{H_2O}$?

Here the end product would be

(A) 2- cyanopropionic acid

(B) ethane -1, 1-dicarboxylic acid

(C) 2-methyl ethanoic acid

(D) propionic acid

Q 15. In a set of the given reaction, acetic acid yielded a product C.

$CH_3COOH+PCl_5 \rightarrow C$

The product C would be

(A) $CH_3CH(OH)C_6H_5$

(B) $CH_3-\underset{\underset{C_6H_5}{|}}{\overset{\overset{C_2H_5}{|}}{C}}(OH)$

(C) $CH_3CH(OH)C_2H_5$

(D) $CH_3COC_6H_5$

4. Tests of Acid & its derivatives

Q 1. Which of the following acid gives +ve silver mirror test

(A) CH_3COOH (B) $CH_3-\overset{\overset{O}{\|}}{C}-COOH$

(C) $HCOOH$ (D) $Ph-COOH$

Q 2. Which of the following acid decolourises $KMnO_4$

(A) $HCOOH$ (B) $PhCOOH$

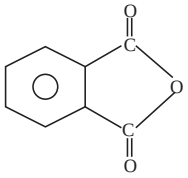
(C) CH_3COOH (D) None of these

Q 3. Which of the following acid produces poisonous gas on heating ?

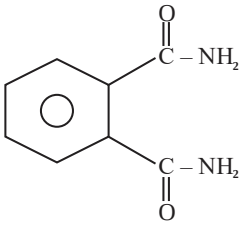
(A) $CHOOH$ (B) $(COOH)_2$

(C) $CH_2(COOH)_2$ (D) All of these

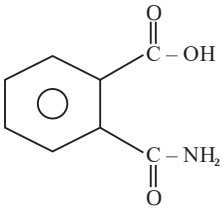
Q 4. In the reaction



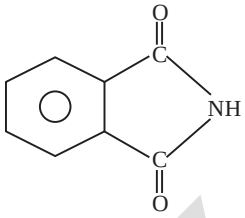
$+2NH_3 \xrightarrow[2.\Delta]{1.\ H+1H_2O}$ Product, is



(A)



(B)



(C)

(D) None of these

Q 5. $CH_3CH_2COOH \xrightarrow[\text{Red P}]{Cl_2} (A) \xrightarrow{\text{alc. KOH}} (B)$

The compound (B) is

(A) $CH_3\underset{\displaystyle OH}{\underset{|}{C}}HCOOH$

(B) $CH_2\underset{\displaystyle OH}{\underset{|}{C}}H_2COOH$

(C) $H_2C=CHCOOH$

(D) $ClCH_2CH_2COOH$

Q 6. How will you convert butan -2-one to propanoic acid ?

(A) Tollen's reagent

(B) Fehling's solution

(C) $NaOH/NaI/H^+$

(D) 20% acetic acid

Q 7. In the following reaction, $RCH_2COOH \xrightarrow{Br_2/P} X \xrightarrow{\text{Excess } NH_3} Y$ the major amounts of X and Y are

(A) $RCHBrCONH_2;\ RCH(NH_2)COOH$

(B) $RCHBrCOOH;\ RCH_2CONH_2$

(C) $RCH_2COBr;\ RCH_2COONH_4$

(D) $RCHBrCOOH;\ RCH(NH_2)COOH$

Q 8. Oxalic acid on treatment with conc. H_2SO_4 gives

(A) CO only (B) CO_2 only

(C) CO_2+H_2O (D) $H_2O+CO+CO_2$

Q 9. $CH_3CH_2CH_2CH_2CH_2COOH \rightarrow$

$CH_3CH_2CH_2CH_2\underset{\displaystyle NH_2}{\underset{|}{C}}H-COOH$

the reagents used in the conversion are

(A) (i) Red P, $Br_2/(ii)\,NH_3(\text{excess})$

(B) (i) $PBr_3/(ii)\,NH_3$

(C) (i) $PBr_3, NaCN/(ii)\,LiAlH_4$

(D) None of the above

Q 10. In the given reaction product 'X' is

$ClCH_2CH_2CH_2COOH \xrightarrow[\Delta]{\text{aq.KOH}}$ 'x'

(A) $\gamma-$ butyrolactone

(B) $\gamma-$ butyrolactum

(C) crotonic acid

(D) $\alpha-$ hydroxybutyric acid

Q 11. Identify A and B in the following reaction

$CH_3CH_3 \xleftarrow{B} CH_3COOH \xrightarrow{A} CH_3CH_2OH$

	A	**B**
(A)	$HI+$ Red P	$LiAlH_4$
(B)	Ni/Δ	$LiAlH_4$
(C)	$Pd-BaSO_4$	$Zn+HCl$

(D) $\overset{LiAlH_4}{\underset{HI+Red\ P}{}}$

Q 12. $CH_3COOH + CH_2 = C = O \rightarrow (X)$ (X) is most probably

(A) $(CH_3CO)_2O$ (B) $CH_3COOCH_2CH_3$

(C) $CH_3CH_2COOCH_3$ (D) $(COOH)_2$

Q 13. A compound undergoes the following sequence of reactions :

$$C_3H_5N \xrightarrow{\text{Hydrolysis}} \underset{(A)}{C_3H_6O_2} \xrightarrow{Cl_2/P} \underset{(B)}{C_3H_5O_2Cl} \xrightarrow{NH_3} \underset{(C)}{C_3H_7NO_2}$$

The compound (C) is

(A) 1- nitropropane

(B) 2-aminopropionic acid

(C) 2-nitropropane

(D) 2-hydroxypropanamide

Q 14. On vigorous oxidation by permanganate solution, $(CH_3)_2C = CH - CH_2CH_3$ gives:

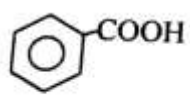
(A) $CH_3 - \underset{CH_3}{\overset{}{C}}(OH) - CH(OH) - CH_2CH_3$

(B) $(H_3C)_2CH - COOH + CH_3CH_2COOH$

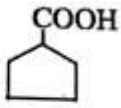
(C) $(H_3C)_2CH - OH + CH_3CH_2CH_2OH$

(D) $(H_3C)_2C = O + CH_3CH_2COOH$

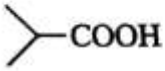
Q 15. Which of the following compound(s) will give HVZ reaction ?



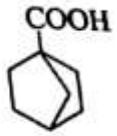
(I)



(II)



(III)



(IV)

(A) II only (B) III only

(C) Both (II) and (III) (D) All four

Q 16. Identify X and Y in the following sequence of reactions respectively :

$$CH_3CHO \xrightarrow{HNO_3} X \xrightarrow[\Delta]{P_4O_{10}} Y$$

(A) C_2H_5OH and C_2H_4

(B) CH_2COOH and $(CH_3CO)_2O$

(C) CH_3COOH and CH_3COOCH_3

(D) C_2H_5OH and CH_3COOH

Q 17. In the reaction

$$CH_3CH_2COONH_4 \xrightarrow{P_2O_5} (A) \xrightarrow{H^+/H_2O} (B)$$

(A) and (B) are

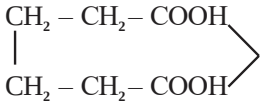
(A) $CH_3CH_2CONH_2, CH_3CH_2COO^-$

(B) $CH_3CH_2COONH_2, CH_3CH_2COOH$

(C) $CH_3CH_2CN, CH_3CH_2CH_2COO^-$

(D) CH_3CH_2CN, CH_3CH_2COOH

Q 18. Identify the product 'Y' in the following reaction sequence.



(A) Pentane (B) Cyclobutane

(C) Cyclopentane (D) Cyclopentanone

Answer Key

1. Acid & its Preparation

(1). B	(2). C	(3). D
(4). C	(5). D	(6). A
(7). B	(8). B	(9). A
(10). A	(11). D	(12). D
(13). B	(14). D	(15). A
(16). A	(17). C	(18). B

2. Preparation of Acid Derivatives

(1). B	(2). A	(3). A
(4). A	(5). A	(6). B
(7). B	(8). D	(9). B
(10). D	(11). A	(12). C
(13). A	(14). C	(15). C
(16). D		

3. Hundsdiecker Reaction, curtius Reaction, HVZ Reaction, Hoffmann bromamide reaction

(1). B	(2). C	(3). B
(4). A	(5). C	(6). C
(7). A	(8). D	(9). B
(10). C	(11). A	(12). C
(13). C	(14). D	(15). B

4. Tests of Acid & its derivatives

(1). C	(2). A	(3). B
(4). C	(5). C	(6). D
(7). D	(8). D	(9). A
(10). A	(11). D	(12). A
(13). B	(14). D	(15). D
(16). B	(17). D	(18). C