ALDOL & SIMILAR NAME REACTIONS

(1) CANNIZARO REACTION

This reaction is given by aldehyde having no α - hydrogen in the presence of conc. NaOH/ Δ or KOH/ Δ .

$$H - C - H \xrightarrow{KOH} H - C - O^{\Theta}K^{+} + CH_{3}OH$$

Mechanism :

$$H-C-H \xrightarrow{HO^{\ominus}} H-C+H \xrightarrow{r.d.s.} CH_{3}-O^{\ominus} + H-C-O-H \longrightarrow CH_{3}OH + H-C-O^{\ominus}$$

In the presence of a very strong concentration of alkali, aldehyde first forms a doubly charged anion (I) from which a hydride anion is transferred to the second molecule of the aldehyde to form acid and an alkoxide ion. Subsequently, the alkoxide ion acquires a proton from the solvent.

$$HCH_{2}\overset{\Theta}{O} \xrightarrow{H_{2}O} HCH_{2}OH + \overset{\Theta}{O}H$$

Q.1 Which of following will not undergo Cannizaro reaction



Q.3	$ \begin{array}{c} \text{CHO} & \\ \downarrow & \\ \text{CHO} \end{array} \xrightarrow{\text{conc.NaOH}} (A) \xrightarrow{H^+} (B) \end{array} $		
	Product (B) is :		
	(A) $H_2C=CH-CO_2H$ (B) CH_2 C-O CH_2 CH_2	(C) $\begin{bmatrix} CH_2 - O - C \\ CH_2 - O - C \\ CH_2 - O - C \\ O \end{bmatrix}$ (D) $H_2C = C = O$	A D 0003
0.4	(i) HCHO <u>NaOD</u>	(ii) DCHO NaOD	AROUUS
	Δ	Δ	AR0004
Q.5	(i) Ph-CHO $\xrightarrow{\bigcirc}$ DOD	(ii) Ph-CHO $\xrightarrow{^{18}OH}$	
	Δ		AR0005
Q.6	(i) $Ph - CHO + HCHO \xrightarrow{KOH} \Delta$	(ii) $Ph - C - C - H \xrightarrow{KOH} \Delta$	
		ÖÖ	AR0006
Q.7	(i) MeCH ₂ – CHO $\frac{KOH}{\Delta}$	(ii) Me ₂ CH – CHO $\frac{\text{conc.KOH}}{\Delta}$	
			AR0007
Q.8	(i) Me–NO ₂ + HCHO \overrightarrow{KOH}	(ii) MeCHO–HCHO KOH	
	(excess)	(excess)	
0.0	Phecocup Aq. OH Conc. OH D	H^{+} . the compound (C) is t	AKUUUð
Q.9	PNCOCHBr ₂ \longrightarrow A \longrightarrow B \longrightarrow (A) PhCH(OH)CHO	(B) PhCH(OH)COOH	
	(C) PhCOOH	(D) None of these	
		(D) None of these	
O 10 Match the column :			
Q.10	Column I	Column II	
	Column - I	Column - II	
	(A) HCHO + NaOD (conc.)	(P) $DCOO^- + CDH_2OH$	
	(B) DCHO + NaOH (conc.)	(Q) $DCOO^- + CD_3OH$	

(R) $DCOO^- + CDH_2OD$

(S) $HCOO^- + CH_3OD$

(C) DCDO + NaOH (conc.)

(D) DCHO + NaOD (conc.)





Q.15 CHO _____ CONC. KOH

True about this reaction is / are

(A) Cannizaro name is associated with this reaction

- (B) It is a disproportion reaction
- (C) It is a bimolecular reaction in r.d.s.
- (D) All of these

Q.16
$$O_3 \rightarrow (A) \xrightarrow{\text{conc.KOH}} (B)$$

End product (B) of above reaction is :



AR0016

Q.17 The major product pair of the following reaction will be :



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Q.18 Reactant 'X' will be :

$$X \xrightarrow{H^{+}} Y \xrightarrow{O_{3}} Z_{1} + Z_{2} \xrightarrow{NaOH} + \xrightarrow{CH_{2}OH} + \xrightarrow{COO^{-}Na^{+}} + \xrightarrow{COO^{-$$

Q.19 An organic compound neither reacts with neutral ferric chloride solution nor with Fehling solution, It however, reacts with Grignard reagent and gives positive iodoform test. The compound is -

# [JEE-MAIN (APRIL)-2019]



#### AR0019

# (2) BENZIL-BENZILIC REARRANGEMENT OR BENZILIC ACID REARRANGEMENT

The base catalysed reaction of 1,2-diketones to a salt of -2- hydroxy carboxylic acid is known as Benzilic acid rearrangement, this reaction is mainly applicable when aryl group is present on both carbonyl carbons.



Mechanism :



#### (3) ALDOL CONDENSATION

The  $\alpha$ - hydrogen of carbonyl compounds are acidic due to the fact that the anion (enolate ion) is stabilized by resonance.



#### **Base catalysed Aldol**

In aqueous base, two acetaldehyde molecules react to form  $\beta$ -hydroxy aldehyde called aldol. The reaction is called Aldol condensation. The enolate ion is the intermediate in the aldol condensation of aldehyde and ketone. Acetaldehyde for instance, forms a dimeric product aldol in presence of a dilute base ( $\approx 10\%$  NaOH)



Mechanism :



Aldols are stable and may be isolated. They, however can be dehydrated easily by heating the basic reaction mixture or by a separate acid catalyzed reaction. Thus if the above reaction is heated the product is dehydrated to 2-butenal (crotonaldehyde).

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#### Acid cataysed Aldol

In acid catalysed aldol condensation enol form of carbonyl is the nucelophile in place of enolate. *Mechanism* :



Q.1 Write the product and mechanism for given reactions.

(I) 
$$CH_3 - CH_2 - C - H \xrightarrow{\text{Dil NaOH}} (A) \xrightarrow{\Delta} (B)$$
  
O  $AR0024$ 

(II) 
$$\longrightarrow$$
 O  $\xrightarrow{\text{Dil NaOH}}$  (C)

(III) 
$$C_6H_5 - CH_2 - CHO \xrightarrow{Dil NaOH} (D)$$

$$(IV) \longrightarrow O \xrightarrow{\text{Dil NaOH}} (E) \xrightarrow{\Delta} (F)$$
AR0027

(V) 
$$C_6H_5 - C_6 - CH_3 \xrightarrow{\text{Dil NaOH}} (G) \xrightarrow{\Delta} (H)$$

Q.2 Identify the intramolecular aldol product?

(I) 
$$CH_3 - C - CH_2 - CH_2 - C - CH_3 \xrightarrow{\text{Dil NaOH}} (A) \xrightarrow{\Delta} (B)$$

AR0029

**AR0028** 

**AR0025** 



AR0030

Q.3 Find out the total number of possible aldol products (including and excluding stereo products).

(I) 
$$C_6H_5 - CHO + CH_3 - CHO \xrightarrow{\text{NaOH/HOH}} 5^{\circ}C$$
  
AR0031

(II) 
$$CH_3 - CH = O + CH_3 - CH_2 - CH_3 -$$

Q.4 Identify the structure of substrate ?



AR0033

AR0032

AR0034

AR0035

AR0036

Q.5 Complete reaction sequence :

(I) 
$$\underbrace{(i) O_3(1eq)}_{(ii) Zn / H_2O} (a) \underbrace{(i) OH}_{(ii) \Delta} (b)$$

Q.6 Complete the following reactions :



AR0038

AR0039



(II) (X)  $\xrightarrow{OH}^{\Theta}$ 



# Q.8 Consider following intramolecular aldol condensation reaction :



Q.9 Product 'Y' formed in the given reaction is :



AR0042

Q.10 Product 'D' is :

 $CH_{3} \xrightarrow{O} C \xrightarrow{H} A \xrightarrow{\Delta} B \xrightarrow{H_{2}/Pt} C \xrightarrow{CrO_{3}} D$ (A)  $CH_{3} - CH_{2} - CH = CH_{2}$ (B)  $CH_{3} - CH_{2} - CH_{2} - CHO$ (C)  $CH_{3} - CH_{2} - CH_{2} - COOH$ (D)  $CH_{2} = CH - CH = CH_{2}$ 



Q.15 The major product obtained in the following reaction is : [JEE-MAIN (JANUARY)-2019]



[JEE-MAIN (JANUARY)-2019]

Q.16 In the following reactions, products A and B are :



Q.17 The major product obtained in the following reaction is





AR0050

#### (4) HALOGENATION OF THE α-CARBON OF ALDEHYDES AND KETONES

<u>**I**</u><sup>st</sup><u>Acid-Catalyzed halogenation : -</u> When  $Br_2$ ,  $Cl_2$  and  $I_2$  is added to an acidic solution of an aldehyde or a ketone, a halogen replaces one of the  $\alpha$ -hydrogens of the carbonyl compound. Halogenation takes place through the slow formation of an enol followed by rapid reaction of the enol with the halogen.



Mechonism :

<u>**II**</u><sup>nd</sup><u>**Base-Catalyzed halogenation :** -</u> In the presence of excess base and excess halogen, a methyl ketone is converted first into a trihalo-substituted ketone and then into a carboxylic acid.

$$R \stackrel{O}{\longrightarrow} CH_{3} \stackrel{O}{\longrightarrow} R \stackrel{O}{\longrightarrow} R \stackrel{O}{\longrightarrow} C \stackrel{O}{\longrightarrow} + CHX_{3}$$
(Haloform)

Mechanism :



Q.1 Identify the compounds which can show iodoform test and complete the reaction ?



- Q.2 Complete the following given reaction :
  - (i)  $I_2 \xrightarrow{I_2} Product$

(ii) 
$$CH_3-C-C-OH \xrightarrow{I_2/\ddot{O}H} Product$$
  
(iii)  $\swarrow H \xrightarrow{I_2/\ddot{O}H} Product$   
 $OH$ 

Q.3 Select the compound which does not show haloform reaction is/are :

(A) 
$$CH_3-C$$
—O-Me (B)  $CH_3-C$  (C)  $C - CH_3$  (C)  $HO - O$  (D)  $I \rightarrow O$   
AR0055

Q.4 For the reaction

PhCH = CH<sub>2</sub> 
$$\xrightarrow{1. B_2H_6/THF}$$
 (X)  $\xrightarrow{PCC(CH_2Cl_2)}$  (Y)  $\xrightarrow{\Theta}$  (Z)  
(Z) is :

(A) Ph-CH=CH-CHO (B) Ph-C = C-CHO  
$$H_3$$

(C) 
$$Ph-CH_2 - CH = C - CHO$$
  
 $Ph$ 
(D)  $Ph-C = CH-CHO$   
 $CH_3$ 

**AR0056** 

**AR0054** 

Q.5 Two isomeric ketones, 3-pentanone and 2-pentanone can be distinguished by :
(A) I<sub>2</sub> / NaOH
(B) NaOH
(C) NaCN / HCl
(D) 2,4-DNP

**AR0057** 

Q.6 Which of the reagent is used to convert 2–Butanone into propanoic acid (A) NaOH, I<sub>2</sub>/H<sup>+</sup>
(B) Tollen's reagent
(C) Fehling solution
(D) NaOH, NaI/H<sup>+</sup>

**AR0058** 

## Paragraph for Q.07 to Q.09



- Q.7 Which one of the following reagent is best suitable for distinction between  $P_1$  and  $P_2$  -
  - (A) Braddy's reagent (2,4 DNP)
  - (B) NaHSO<sub>3</sub>
  - (C) NaHCO<sub>3</sub>
  - (D) NaOH /  $I_2$

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- Q.8 Select the correct statement among the following -
  - (A)  $P_1$  will show ald reaction &  $P_2$  will show cannizaro reaction
  - (B)  $P_1$  will show cannizaro reaction &  $P_2$  will show aldol reaction
  - (C) Both  $P_1 \& P_2$  will show cannizaro reaction
  - (D) Both  $P_1 \& P_2$  will show ald ol reaction
- Q.9  $P_2 \xrightarrow{\text{conc. NaOH}} \text{ products}$

Select incorrect statement for the above reaction -

- (A) It is a redox reaction
- (B) It is a disproportion reaction
- (C) Two products formed are alcohol & carboxylic acid
- (D) It is an intramolecular reaction

AR0061

**AR0062** 

**AR0060** 

Q.10 Which of the following will give yellow precipitate with NaOH /  $I_2$ 

(A) Ph-CH-Me (B) 
$$CI_3CHO$$
 (C)  $Me-C-C-OH$  (D)  $EtOH$   
OH O

Q.11 Ethylmethanoate 
$$\xrightarrow{(i)MeMgBr(2eq)}_{(ii)H_3O^+} \xrightarrow{W+X}_{organic product}$$

$$W \xrightarrow{CaOCl_2} CHCl_3 + Y$$

 $X \xrightarrow{CaOCl_2} CHCl_3 + Z$ 

 $Y + Z \xrightarrow{Dry} Organic product(s) + CaCO_3$ 

Which of the following organic product can be formed on dry distillation reaction

(I)  $CH_3 - CHO$ (II)  $CH_3 - CO - CH_3$ (III)  $CH_3 - CH = CH - CH_3$ (IV) HCHO(A) I and II only(B) II and III only(C) I, II and IV only(D) II and IV only

**AR0063** 

Q.12 Which of the following compounds(s) give a sweet smelling product having anesthetic use in presence of  $Cl_2$ , NaOH,  $\Delta$ .

(A) 
$$(B) CH_3 - CH - CH_3 (C) CH_3 - C - OH (D) Ph - C - CH_3$$
  
(A)  $(B) CH_3 - CH - CH_3 (C) CH_3 - C - OH (D) Ph - C - CH_3$   
(A)  $(B) CH_3 - CH - CH_3 (C) CH_3 - C - OH (D) Ph - C - CH_3$   
(A)  $(B) CH_3 - CH - CH_3 (C) CH_3 - C - OH (D) Ph - C - CH_3$ 

Q.13 Reaction in which product can show positive haloform test :-

(A) 
$$CH_{3}MgBr + PhCN \xrightarrow{H_{3}O^{\oplus}}$$
  
(B)  $CH_{3}-CH_{2}MgBr + Ph-COOEt \xrightarrow{H_{3}O^{\oplus}}$   
(C)  $CH_{3}MgBr + H-C-OMe \xrightarrow{NH_{4}Cl}$   
(D)  $CH_{3}MgBr + H-C-H \xrightarrow{NH_{4}Cl}$ 

AR0065

Q.14 In which reaction haloform is obtained as one product :-

- (A) Electrolysis of ethanolic aqueous solution of NaCl
- (B) Isopropanol with bleaching powder
- (C) Chlorination of methane in sun light
- (D) Chloral is treated with NaOH

AR0066

**AR0067** 

Q.15. Fructose and glucose can be distinguished by : [JEE-MAIN (APRIL)-2019]

- (1) Fehling's test
- (2) Barfoed's test
- (3) Benedict's test
- (4) Seliwanoff's test

#### (5) PERKIN CONDENSATION

## **Perkin Reaction :**

Condensation reaction between aromatic aldehyde and aliphatic acid anhydride having at least two alpha hydrogen in the presence of a base is known as **Perkin reaction**.

In this reaction, the anion of an acid anhydride adds to an aromatic aldehyde to produce an  $\beta$  aryl  $\alpha$ , $\beta$ , unsaturated acid. In order to prevent side reactions, the base that is used to make the anion of the anhydride is usually the sodium salt of the acid corresponding to the anhydride.

$$Ph - C - H + CH_3 - C - O - C - CH_3 \xrightarrow{CH_3 - C - ONa} Ph - CH = CH - C - OH + CH_3 - COOH$$

Mechanism :



4. In the perkin reaction which one of the following intermediates gives compound (I)

$$C_{6}H_{5} - CH = CH - \frac{O}{C} - O - C - CH_{3}$$
(A) 
$$O_{6}H_{5} - CH - CH_{2} - C - O - C - CH_{3}$$
(B) 
$$C_{6}H_{5} - CH - CH_{2} - C - O - C - CH_{3}$$
(B) 
$$C_{6}H_{5} - CH - CH_{2} - C - O - C - CH_{3}$$
(C) 
$$C_{6}H_{5} - CH - CH_{2} - C - O - C - CH_{3}$$
(D) 
$$C_{6}H_{5} - CH - CH_{3} -$$

#### Paragraph for Q.no. 5-6



Compound 'A' on treatment with conc. NaOH followed by acidification can give :
(A) Ph - CH<sub>2</sub> - COOH
(B) Ph - OH
(C) Ph - COOH
(D) Ph - CH<sub>2</sub> - OH

6. In the above reaction the reagent "X" can be :

(A) 
$$\begin{bmatrix} Br & 0 \\ I & I \\ CH_2 - C - OEt \end{bmatrix}$$
 (B)  $CH_2$  (

(C) 
$$\begin{bmatrix} 0 & 0 \\ H_3 - C - 0 - C - CH_3 \end{bmatrix}$$
 (D)  $\begin{bmatrix} 0 & 0 \\ H_3 - CH - C - 0 - C - CH - CH_3 \end{bmatrix}$ 

AR0073

AR0072

# (6) CLAISEN CONDENSATION

Esters undergo  $S_NAE$  Reaction. when attacked by a Nu<sup>-</sup> generated by the interaction of a base (usually base related to the Alkoxy anion of ester) with one of the molecule of ester and this Nuattacks on another molecule. The reaction over all is considered as condensation of ester known as claisen ester condensation.

$$2\text{Me} - \text{C} - OR \xrightarrow{(i) \text{ RONa}} \text{Me} - \text{C} - CH_2 - C - OR$$

$$(\beta \text{-keto ester})$$

Mechanism :

$$CH_{3} - C - OR \xrightarrow{RO Na}{\rightarrow} OC CH_{2} - COOR \xrightarrow{Me=C-OR (rds)}{} Me - C - CH_{2} - COOR$$

$$Me - C - CH_{2} - COOR$$

$$Me - C = CH - COOR \longleftrightarrow Me - C - CH = C - OR$$

$$Me - C - CH_{2} - COOR$$

$$Me - C - CH_{2} - COOR$$

Some times, when two ester group are p;resent within the molecule then the condensation occurs intramolecular then cyclization caused thus is known as Dieckmann cyclization or Dieckmann's condensation.

Q.1 MeCOOEt 
$$\xrightarrow{(1) \text{ EtOK}}$$
 A

Q.2 EtCOOMe 
$$\xrightarrow{(i) \text{ MeOK}}$$
 B

Q.3 MeCOOMe + EtCOOMe 
$$\xrightarrow{(i) \text{ MeOK}} C$$

**AR0076** 

**AR0074** 

**AR0075** 

Q.4 
$$C_6H_5COOC_2H_5 + CH_3COOC_2H_5 \xrightarrow{(i) C_2H_5ONa} D + D'$$
  
Ethyl benzoate

Ethyl benzoate

Q.5 
$$\begin{bmatrix} \text{COOC}_2\text{H}_5 \\ \text{COOC}_2\text{H}_5 \end{bmatrix}$$
 + C<sub>6</sub>H<sub>5</sub>CH<sub>2</sub>COOC<sub>2</sub>H<sub>5</sub>  $\xrightarrow{\text{(i) C}_2\text{H}_5\text{ONa}}$  [Cross Product]  
(ii) Acidification E [Cross Product] **AR0078**

Q.7 
$$C_2H_5-N$$
  $CH_2CH_2COOEt$   $(i) C_2H_5ONa$   $G \xrightarrow{H_3O} H$  (Piperidone derivative)

AR0080

# (7) Beayer villiger oxidation

Reaction involve the oxidation of ketone to aster by treatment with per acid such as per acetic acid, MCPBA, per trifloroacetic acid etc.

- It is a redox reaction
- Cyclic ketones are converted to lectone with ring expention.

$$R \xrightarrow{O} R \xrightarrow{RCO_{3}H} R \xrightarrow{O} R \xrightarrow{O} C \xrightarrow{O} R' + R \xrightarrow{COOH} R$$

Mechanism

$$R - C - R' \xrightarrow{H \cup O - C - R} R - C - R' + R - C - O - O$$

**Note :** In above reaction for shifting of groups migratory apptitude is applicable Migratory order for above reaction

 $-\!H>3^o\!>\!2^o\!>\!-\!Ph>1^o\!>\!-\!Me$ 



# ANSWER-KEY (1) CANNIZARO REACTION

Q.1 Ans. (D)

As Cl<sub>3</sub>C–CHO given chloroform

Q.2 Ans. (C)

In crom cannizzaro reaction move reactive carbonyl compound is oxidised & less in reduced.

Q.3 Ans. (B)

Intramoecular cannizzaro followed by heating effect

- Q.4 Ans. (i)  $CH_3OD + HCOONa$
- Q.5 Ans. (i) PhCH<sub>2</sub>OD + PhCOONa
- Q.6 Ans. (i) Ph–CH<sub>2</sub>OH + HCOOK

(ii)  $Ph - CH_2OH + PhCOONa$ (ii) Ph - CH - C - OK

(ii) DCH<sub>2</sub>OD + DCOONa



OH

HO



(ii) Me<sub>2</sub>CH – CH<sub>2</sub>OH + Me<sub>2</sub>CHCOOK

Q.9 Ans. (B)

Q.8 Ans. (i)



Q.10 Ans. (A) $\rightarrow$ S ; (B) $\rightarrow$ P ; (C) $\rightarrow$ Q ; (D) $\rightarrow$ R Q.11 Ans. (A)



-OH

 $NO_2 + CH_3OH + HCOOK$ 

Q.12 Ans. (D)



Q.15 Ans. (A)



option A is correct.

Q.16 Ans. (B)



# Q.17 Ans. (B)

Cron cannizaro reaction

Q.18 Ans. (A)

$$\begin{array}{cccc} & & & & \\ & H \\ X: Ph-CH-CH-Ph & Y: Ph-C=CH-Ph & Z_1: Ph-C-Me \\ & & H \\ CH_3 & OH & O \end{array} \qquad \begin{array}{c} Z_2: Ph-CH=O \\ H \\ OH \end{array}$$

Q.19 Ans. (1)



#### (2) BENZIL-BENZILIC REARRANGEMENT OR BENZILIC ACID REARRANGEMENT



# (3) ALDOL CONDENSATION

Q.1 Ans.

(II)  $CH_3 - C - CH_3$ Q.4 **Ans.** (I) Q.5 Ans. (i) (a)  $\bigcirc C - H \\ CH_2 - CH_2 - CH_2 - C - H \\ \blacksquare$  (b)  $\bigcirc$ ∕ <sup>−</sup>С – Н О (ii)  $\bigcirc$   $-C_6H_5$  $H_{3}C \xrightarrow{H} Y = CH_{3} - C - H$ Q.6 Ans. (i) X =  $\begin{array}{c} O \\ II \\ CH_2 - CH_2 - C - CH_3 \end{array} \qquad (iii) \quad X = CH_3 - C \end{array}$  $-CH_2 - CH_2 - CH_2 - CHO$ (ii)  $X = CH_2 - C$ Q.7 Ans. (C) Intramolecular aldol condensation the 1,4-additon and finally clemmesion reduction. Q.8 Ans. (D) Q.9 Ans. (B) Ozonolysis followed by intramolecular aldol. Q.10 Ans. (C) (A) CH<sub>3</sub>-CH-Cl<sub>2</sub>CHO (B) CH<sub>3</sub>CH=CH–CH=O ĠН (C) CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>OH (D) CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>COOH Q.11 Ans. (A) Q.12 Ans. (A) Q.13 Ans. (A) P:/ Q : Me–CH=O R : Me-CH=Ch-CH=O Q.14 Ans. (1) Sol. Aldehyde reacts at a faster rate than keton during aldol and stericall less hindered anion will be

a better nucleophile so sefl aldol at  $CH_3 - C - H$  will be the major product. Q.15 Ans. (4)





# (4) HALOGENATION OF THE $\alpha$ -CARBON OF ALDEHYDES AND KETONES Q.1 Ans. (1, 2, 5, 7, 8, 9, 11) Q.2 Ans. (i) CH<sub>3</sub>-COO<sup>-</sup> + CHI<sub>3</sub>; (ii) $^{\circ}O_{-C-C-O^{-}} + CHI_3$ ; (iii) $^{\circ}COO^{-} + CHI_3$ Q.3 Ans. (A,B,C)

Q.4 Ans. (C)

- Q.5 Ans. (A)
- Q.6 Ans. (A)

$$C-C-C-C \xrightarrow{\text{NaOH}} CHI_3 + CH_3CH_2COONa \xrightarrow{H^{\oplus}} CH_3CH_2COOH$$

Q.7 Ans. (B)



NO,

- (A) Both ketone & aldehyde react with braddy's reagent  $H_2N$ —NH— $O_2$  2, 4 dinitrophenyl hydrazine.
- (B) With NaHSO<sub>3</sub> only aldehyde give crystalline bisulphite adduct whereas hindered ketone is unable react.
- (C) NaHCO<sub>3</sub> will not react any of them.
- (D) Both  $P_1 \& P_2$  are unable to form idoform with NaOH/I<sub>2</sub>
- Q.8 Ans. (A)

For aldol  $\alpha$ H should be present i.e.  $H \rightarrow \alpha$ Hydrogen H  $P_1$  where as  $P_2$  Ph-C = H will give

cannizaro's as there is no.  $\alpha H$  in  $P_2$ .

Q.9 Ans. (D)

$$\begin{array}{c} O \\ H \\ Ph-C-H \\ \hline \begin{array}{c} conc.NaOH \\ H^{+} \end{array} \end{array} \xrightarrow{O} Ph-C-OH + Ph-CH_2-OH$$

The above reaction is intermolecular redox reaction. In which desprotionation is taking place as a result of which 2 different products are formed from singlet reactant.

- Q.10 Ans. (A,B,C,D)
- Q.11 Ans. (C)

$$H-C-OEt \xrightarrow{(i) 2MeMgBr} MeCH-OH + EtOH$$

$$(ii) H_{3}O^{+} \xrightarrow{(ii) 2MeMgBr} CHCl_{3} + (MeCOO)_{2}Cl + CHCl_{3}$$

$$CHCl_{3} + (MeCOO)_{2}Cl + CHCl_{3}$$

$$Me-C-H + Me-C-Me + H-C-H$$

Q.12 Ans. (A,B,D)



Q.13 Ans. (A,B,C,D)

#### Q.14 Ans. (A,B,C,D)

Q.15. Ans. (4)

Sol. Seliwanoff's test is used to distinguished aldose and ketose group.

#### (5) PERKIN CONDENSATION

