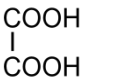
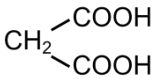
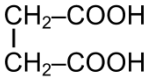
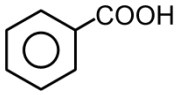
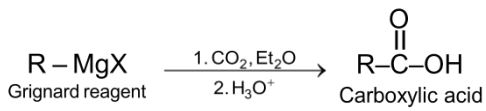
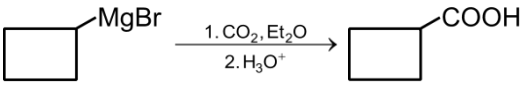
ABC-4 (Carboxylic acid & Carbonyl compounds)

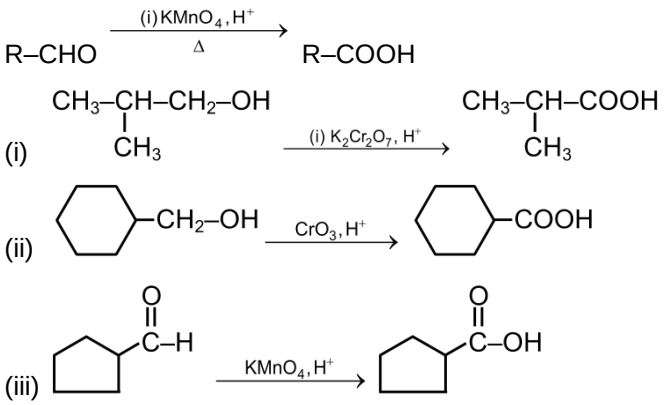
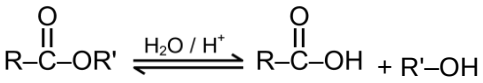
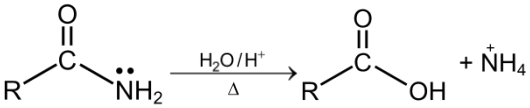
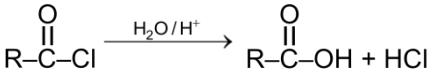
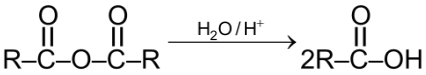
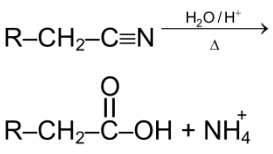
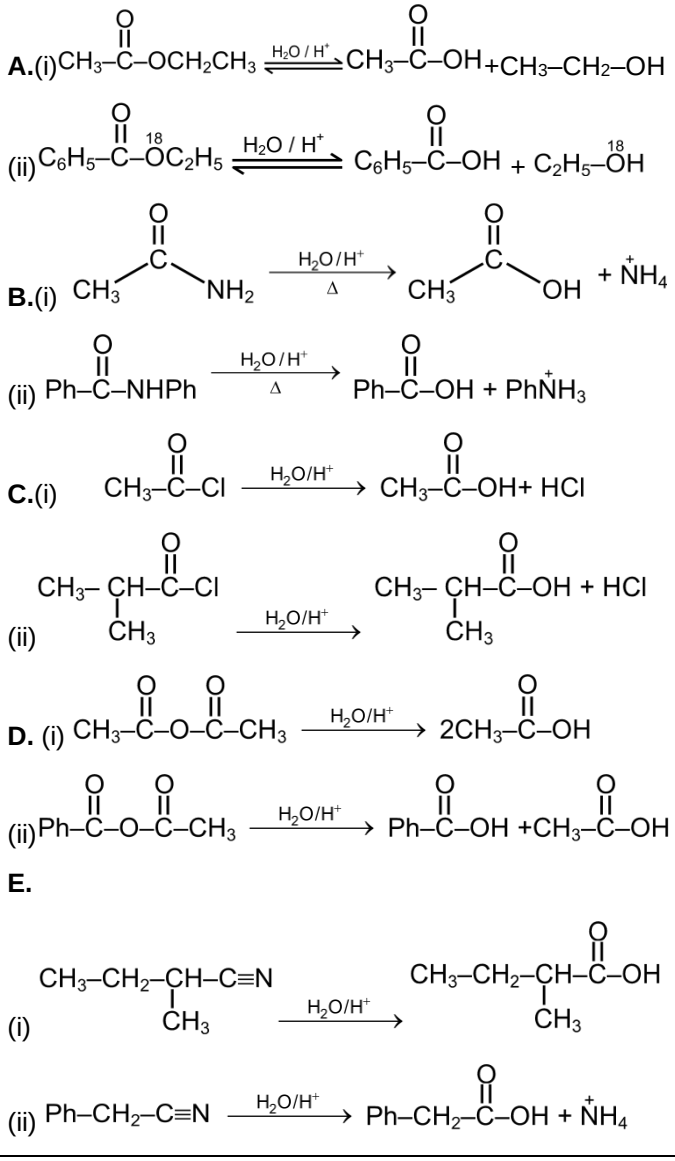
(A) CARBOXYLIC ACID

➢ Compounds containing the carboxyl group (–COOH) are distinctly acidic and called carboxylic acid.

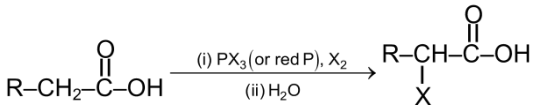
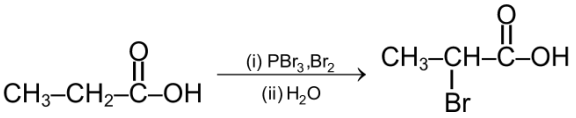
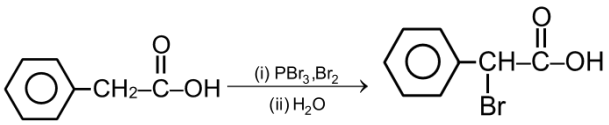
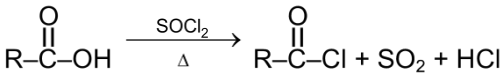
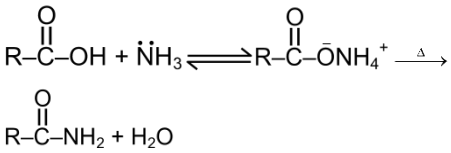
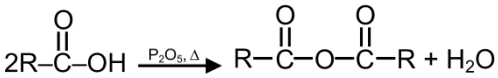
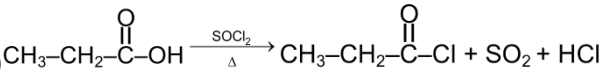
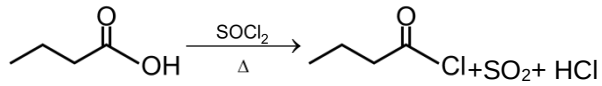
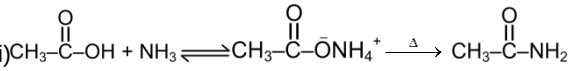
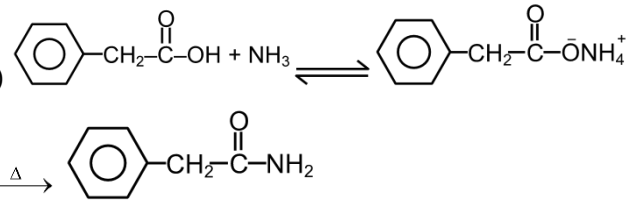
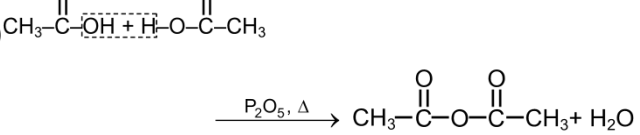
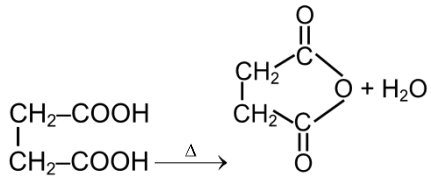
Compound	Common name	IUPAC name	Occurrence
HCOOH	Formic acid	Methanoic acid	Ants, bees & other stinging insects.
CH_3COOH	Acetic acid	Ethanoic acid	Grapes, Vinegar & pickle
$CH_3–CH_2–COOH$	Propionic acid	Propanoic acid	Animal fats, vegetables fats (coconut oil.)
$CH_3–(CH_2)_2–COOH$	Butyric acid	Butanoic acid	Rancid butter
	Oxalic acid	Ethanedioic acid	Kidney stone [$Ca(C_2O_4)$], Cabbage
	Malonic acid	Propanedioic acid	Plants (Leaves of lucerne)
	Succinic acid	Butanedioic acid	Amber, Lignite and many plants
	Benzoic acid	Benzene carboxylic acid	Cranberries, fruit juice, soft drink, plum

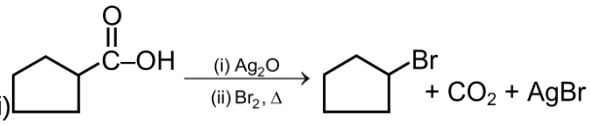
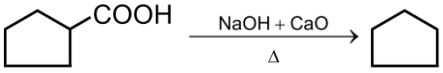
Preparation of carboxylic acid (3-Methods)

1	**By Grignard reagents :**  R → alkyl or aryl (i) Carbon dioxide is a carbonyl compound and it is an electrophile. (ii) X is (Cl, Br, I) (iii) Alkyl magnesium halide [R–MgX] is called Grignard reagent.	(i) $CH_3–CH_2–MgCl \xrightarrow[2.H_3O^+]{1.CO_2, Et_2O} CH_3–CH_2–\overset{O}{\overset{\|}{C}}–OH$ (ii) 
2	**By Oxidation of primary alcohol & aldehydes:**	$R–CH_2–OH \xrightarrow[\Delta]{(i)KMnO_4, \overset{\ominus}{O}H} R–COOH$

	(i) Primary alcohol and aldehydes are readily oxidized to carboxylic acids with common oxidizing agents such as potassium permanganate ($KMnO_4$) in neutral, acidic or alkaline medium or potassium dichromate ($K_2Cr_2O_7$) and chromium trioxide (CrO_3) in acidic medium. (ii) Number of carbon atom in carbon chain remains same during oxidation.	
3	**By Hydrolysis of acid derivatives:** **A. Hydrolysis of ester:**  **B. Hydrolysis of amides:**  Amides undergo hydrolysis when they are heated with aqueous acid. **C. Hydrolysis of acid chloride:**  Acid chloride reacts with water to form carboxylic acid. **D. Hydrolysis of acid anhydride:**  **E. Hydrolysis of nitriles:** 	

Chemical reactions of carboxylic acid [5-Reactions]

1	**Hell-Volhard-Zelinski reaction (HVZ reaction):** (i) In this reaction a carboxylic acid is treated with PX_3 and X_2, then halogenation at the α-carbon occurs. (ii) X is (Cl, Br). 	**Examples** (i)  (ii) 
2	**Preparation of acid derivatives:** **A. Reaction with $SOCl_2$**  **B. Reaction with NH_3**  Carboxylic acid reacts with aqueous ammonia to form ammonium salts and after heating produce an amide. **C. Reaction with RCOOH:**  P_2O_5 is a dehydrating agent (removal of H_2O). **D. Reaction with R–OH**	**A.** (i)  (ii)  **B.** (i)  (ii)  **C.** (i)  (ii)  **D.**

	$R-\overset{O}{\overset{\|}{C}}-OH \underset{}{\overset{R'OH,\ H^+}{\rightleftharpoons}} R-\overset{O}{\overset{\|}{C}}-OR' + H_2O$ Carboxylic acid reacts with excess alcohol in the presence of an acid catalyst produce ester. This reaction is called fisher esterification reaction.	(i) $CH_3-\underset{CH_3}{\underset{\|}{CH}}-CH_2-\overset{O}{\overset{\|}{C}}-OH + C_2H_5OH \overset{H^+}{\rightleftharpoons} CH_3-\underset{CH_3}{\underset{\|}{CH}}-CH_2-\overset{O}{\overset{\|}{C}}-OC_2H_5 + H_2O$ (ii) $Ph-\overset{O}{\overset{\|}{C}}-OH + CH_3OH \overset{H^+}{\rightleftharpoons} Ph-\overset{O}{\overset{\|}{C}}-OCH_3 + H_2O$
3	**Hunsdiecker reaction:** (i) A carboxylic acid can be decarboxylated if a heavy metal salt of the carboxylic acid is heated with bromine. (ii) The product is an alkyl halide with one less carbon than the starting carboxylic acid. (iii) The heavy metal can be silver ion or mercuric ion. $R\text{-}COOH \xrightarrow[(ii)\ Br_2,\ \Delta]{(i)\ Ag_2O} R\text{-}Br + CO_2 + AgBr$(Precipitate)	(i) $CH_3-CH_2-CH_2-\overset{O}{\overset{\|}{C}}-OH \xrightarrow[(ii)\ Br_2,\ \Delta]{(i)\ Ag_2O} CH_3-CH_2-CH_2-Br + CO_2 + AgBr$ (ii) $Ph-CH_2-CH_2-\overset{O}{\overset{\|}{C}}-OH \xrightarrow[(ii)\ Br_2,\ \Delta]{(i)\ Ag_2O} Ph-CH_2-CH_2-Br + CO_2 + AgBr$ (iii) 
4	**Sodalime decarboxylation:** $R-\overset{O}{\overset{\|}{C}}-OH \xrightarrow[\Delta]{NaOH + CaO} R-H + CO_2$ (i) **Sodalime:** NaOH + CaO (ii) Decarboxylation simply means removal of CO_2.	(i) $CH_3-CH_2-\overset{O}{\overset{\|}{C}}-OH \xrightarrow[\Delta]{NaOH + CaO} CH_3 - CH_3 + CO_2$ (ii)  (iii) $Ph - CH_2 - COOH \xrightarrow[\Delta]{NaOH + CaO} Ph - CH_3 + CO_2$
5	**Kolbe's electrolysis:** $2RCOOK + 2HOH \xrightarrow{Electrolysis} R-R + 2CO_2 + H_2 + 2KOH$ If n is the number of carbon atoms in the salt of carboxylic acid, the alkane formed has 2(n–1) carbon atoms.	(i) $2CH_3-COOK + 2H_2O \xrightarrow{Electrolysis} CH_3-CH_3 + 2CO_2 + H_2 + 2KOH$ (ii) $\underset{CH_2-COOK}{\underset{\|}{CH_2-COOK}} + 2H_2O \xrightarrow{Electrolysis} \underset{CH_2}{\overset{\|}{CH_2}} + 2CO_2 + H_2 + 2KOH$ (iii) $2CH_3-CH_2-COOK + 2H_2O \xrightarrow{Electrolysis} CH_3-CH_2-CH_2-CH_3 + 2CO_2 + H_2 + 2KOH$

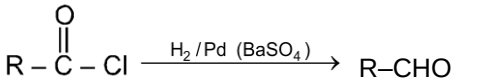
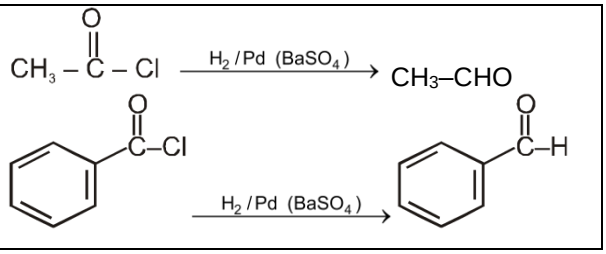
Lab test of carboxylic acid [3-Tests]

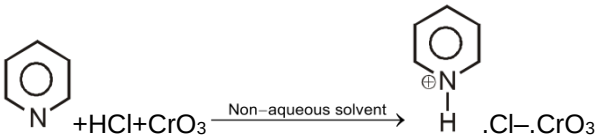
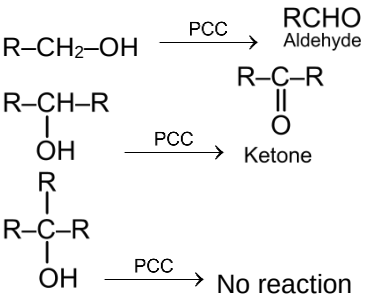
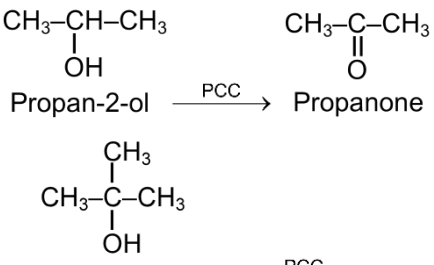
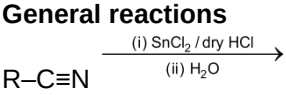
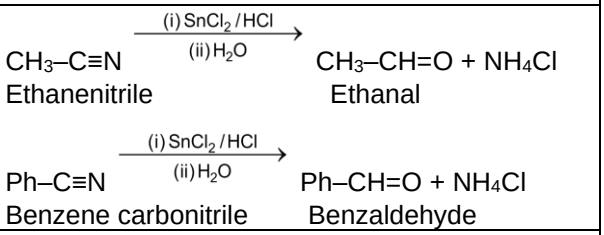
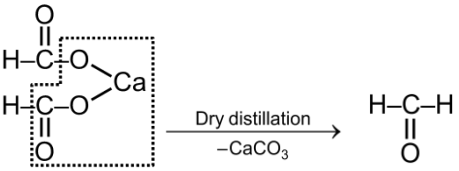
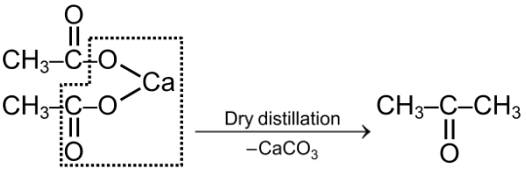
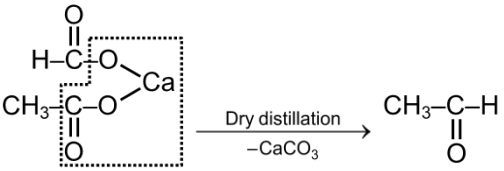
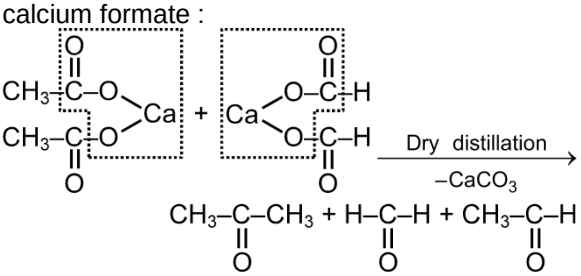
1	**Sodium bicarbonate ($NaHCO_3$) test :** All carboxylic acids & sulphonic acids give. $R-COOH + NaHCO_3 \longrightarrow R-COONa + H_2CO_3$	(i) $Ph-COOH + NaHCO_3 \rightarrow PhCOONa + H_2CO_3$ $\hookrightarrow H_2O + CO_2\uparrow$

	$\rightarrow H_2O + CO_2\uparrow$ $R–SO_3H + NaHCO_3 \longrightarrow R–SO_3Na + H_2CO_3$ $\rightarrow H_2O + CO_2\uparrow$ **Exception :** Picric acid gives $NaHCO_3$ test. Note : Phenol does not give $NaHCO_3$ test.	(ii)$CH_3–SO_3H + NaHCO_3 \rightarrow CH_3SO_3Na + H_2CO_3$ $\rightarrow H_2O + CO_2\uparrow$
2	**Litmus test:** Acid converts blue litmus into red litmus.	
3	**Esterification of acid:** When carboxylic acid reacts with alcohol then ester forms, which are sweet (fruity) smelling liquids.	$RCOOH + R' OH \underset{}{\overset{H^+}{\rightleftharpoons}} RCOOR' + H_2O$ (sweet smelling liquid)

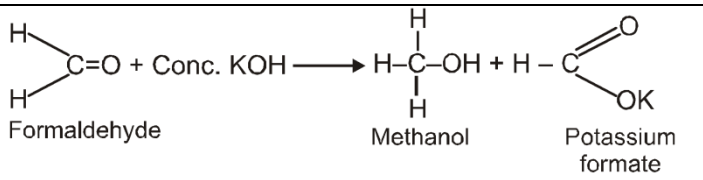
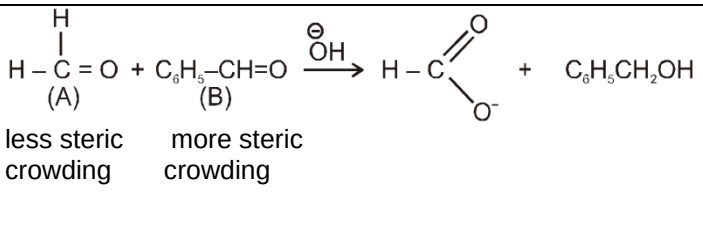
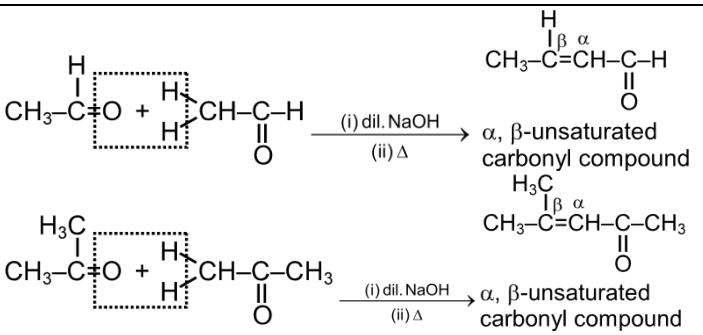
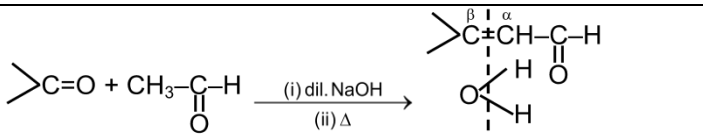
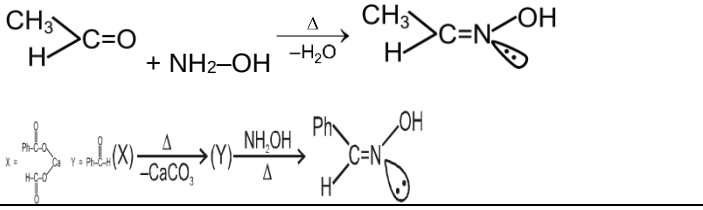
(B) CARBONYL COMPOUNDS

Preparation of carbonyl compounds (4-Methods)

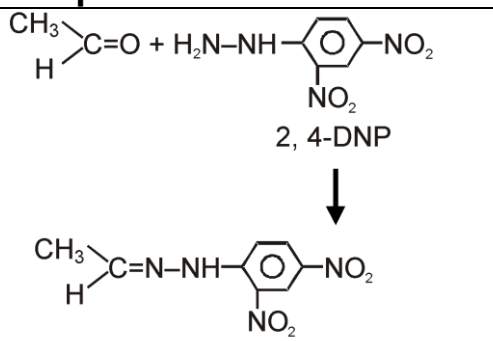
1.	**By reduction of acid halide** **Reagents** Rosenmund catalyst : [H_2/Pd ($BaSO_4$, quinoline)] **General Reactions** 	

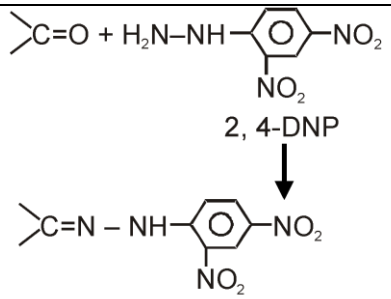
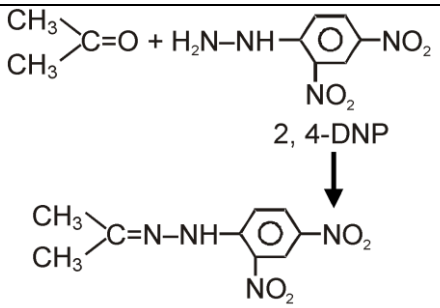
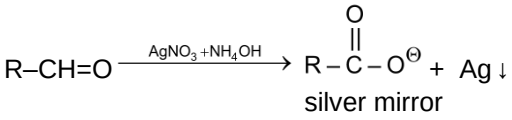
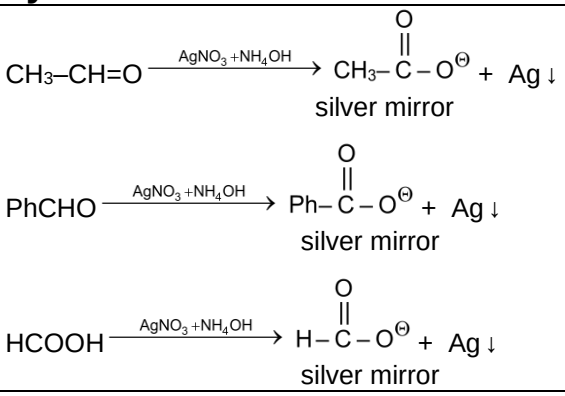
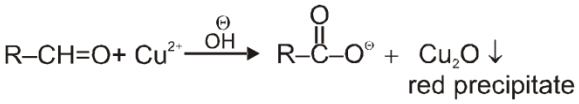
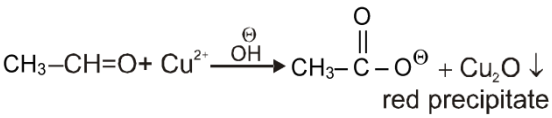
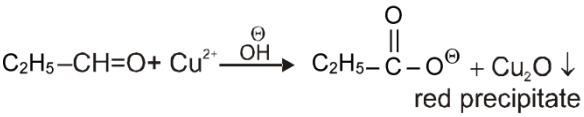
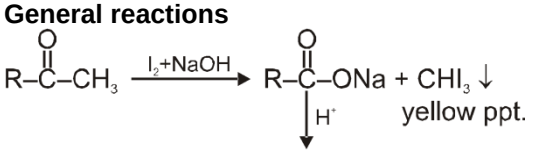
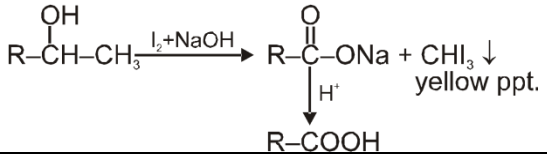
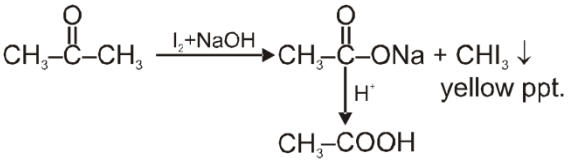
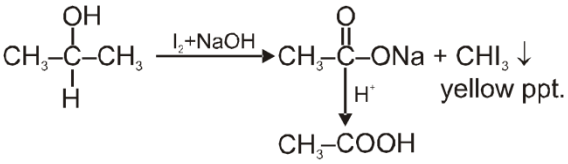
2.	**By oxidation of alcohol using PCC:** **Reagents** PCC* = (Pyridinium Chloro Chromate) in CH_2Cl_2  **General reactions** 	CH_3CH_2OH (Ethanol) $\xrightarrow{PCC}$ CH_3CHO (Acetaldehyde)  **Note :** 3º alcohols don't oxidize by most of the oxidizing agents
3.	**By Stephen's reduction of cyanide :** **Reagents :** (i) $SnCl_2$/dry HCl (ii) H_2O **General reactions** 	
4.	**Dry distillation of calcium salt of fatty acids :** (a) By dry distillation of calcium formate :  (b) By dry distillation of calcium acetate : 	(c) By dry distillation of calcium acetate formate:  (d) By dry distillation of calcium acetate and calcium formate : 

Chemical reactions of carbonyl compounds (3-Reactions)

1.	**Cannizzaro reaction:**	
	Simple Cannizzaro reaction Aldehydes which do not have an α-hydrogen atom, undergo self oxidation and reduction (disproportionation) reaction on treatment with concentrated alkali.	
	Crossed Cannizzaro reaction On using two types of carbonyl compounds not having α-hydrogen atom, acid salt will be corresponding to that aldehyde or ketone which is less sterically crowded and another will give alcohol.	
2.	**Aldol condensation (or aldol reaction):** Aldehydes and ketones with atleast one α-hydrogen undergo a reaction in the presence of dilute alkali as catalyst.	
	Prediction of reactant	
3.	**Reaction with NH_2OH**	

Test for carbonyl compounds

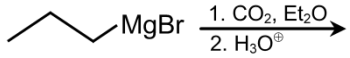
1.	**2,4-DNP¼2,4-Dinitrophenyl hydrazine-½Test :** Carbonyl compouds (all aldehydes and ketones) give yellow–orange precipitate with 2,4-DNP. It is also knwon as **Brady's reagent**. **General Reactions**	

	 2, 4-DNP (yellow–orange precipitate of Hydrazone)	 2, 4-DNP (yellow–orange precipitate of Hydrazone)
	Test for Aldehydes	
1.	**Tollen's reagent [$AgNO_3$ + NH_4OH or $\{Ag(NH_3)_2\}^+OH^-$] :** Tollen's Reagent gives silver mirror or Black precipitate with aldehydes. **General reactions**  silver mirror **Note :** HCOOH also gives this test.	 silver mirror silver mirror silver mirror
2.	**Fehling or Benedict test (Cu^{2+} in basic medium) %** Aliphatic aldehyde gives red precipitate of Cu_2O with Fehling/Benedict solution. Cu^{2+} reduced into $Cu^{1+}$and aldehyde oxidised into acid salt. **General reactions**  red precipitate *** Aromatic aldehydes do not give this test.** * Schiff reagent is also use for lab test of aliphatic aldehydes only.	 red precipitate  red precipitate
	Iodoform Test	
	Reagents : I_2 + NaOH or NaOI (Where R = H, alkyl, aryl group) Acetaldehyde, all methyl ketones & ethyl alcohol give Iodoform test. **General reactions**  yellow ppt. (Acid of 1 carbon less)  yellow ppt.	 yellow ppt.  yellow ppt.

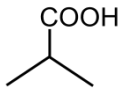
Exercise

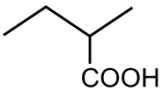
ONLY ONE OPTION CORRECT TYPE

PART-A (Carboxylic acids)

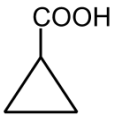
1. 

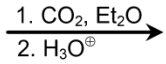
Product is –

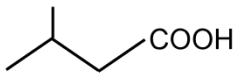
(A) 

(B) 

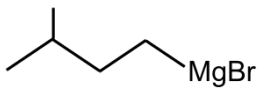
(C) 

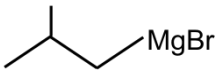
(D) 

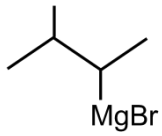
2. A 

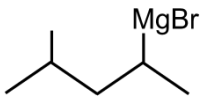


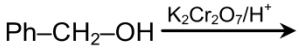
A is :

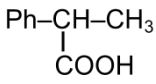
(A) 

(B) 

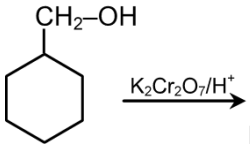
(C) 

(D) 

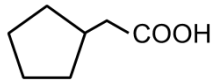
3. 

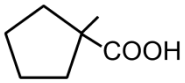
Product is -


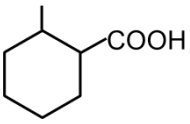
(A) $Ph–CH_2–COOH$ (B) (C) Ph–COOH (D) 

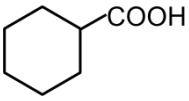
4. 

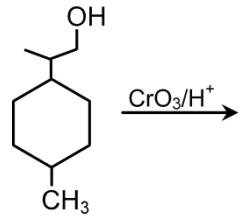
Find product is –

(A) 

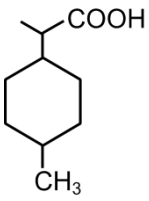
(B) 

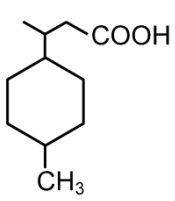
(C) 

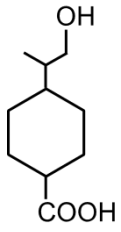
(D) 

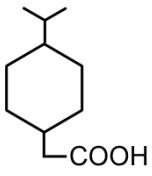
5. 

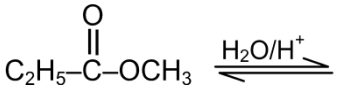
Product is –

(A) 

(B) 

(C) 

(D) 

6. 

Product is -

(A) CH_3COOH, C_2H_5OH (B) CH_3COOH, $C_2H_5–COOH$

(C) C_2H_5–*COOH*, *CH*$_3$*OH* (D) CH_3OH, C_2H_5–OH

7. $CH_3–\overset{\overset{O}{\|}}{C}–NH–Ph \xrightarrow[\Delta]{H_2O/H^+} A + B$

A and B are -

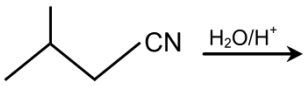
(A) $Ph–NH–\overset{\overset{O}{\|}}{C}–H + CH_3–COOH$ (B) $CH_3–\overset{\overset{O}{\|}}{C}–NH_2 + Ph–OH$

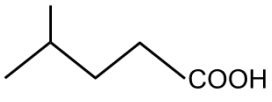
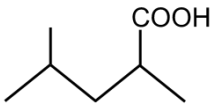
(C) $CH_3–\overset{\overset{O}{\|}}{C}–NH_2 + Ph–COOH$ (D) $CH_3–\overset{\overset{O}{\|}}{C}–OH + Ph–\overset{+}{N}H_3$

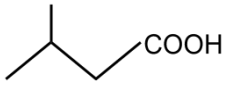
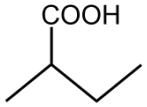
8. $C_2H_5–\overset{\overset{O}{\|}}{C}–O–\overset{\overset{O}{\|}}{C}–Ph \xrightarrow{H_2O/H^+} A + B$

Ratio of A and B is –

(A) 1 : 2 (B) 2 : 1 (C) 1 : 1 (D) 2 : 3

9.  Product is –

(A)  (B) 

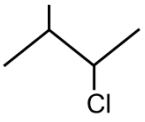
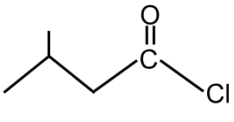
(C)  (D) 

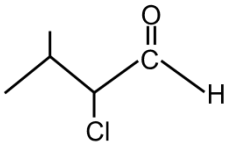
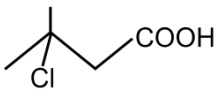
10. $CH_3CH_2CH_2COOH \xrightarrow{Red\ P + Br_2} CH_3–CH_2–\underset{\underset{Br}{|}}{CH}–COOH$

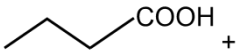
This reaction is called -

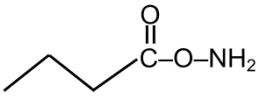
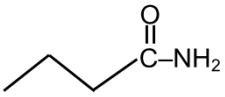
(A) cannizzaro reaction (B) Aldol reaction (C) HVZ reaction (D) Reimer Tiemann reaction

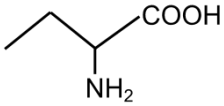
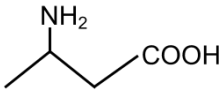
11.  Product is –

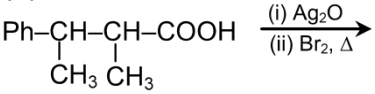
(A)  (B) 

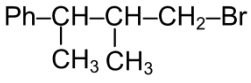
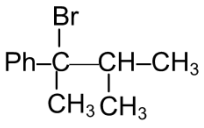
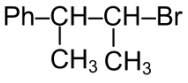
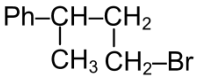
(C)  (D) 

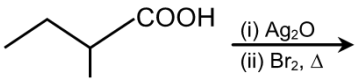
12.  Product is-

(A)  (B) 

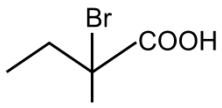
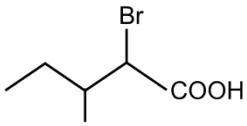
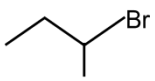
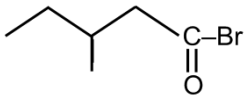
(C)  (D) 

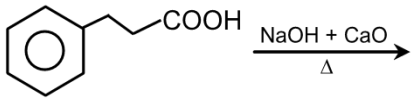
13.  Product is-

(A)  (B)  (C)  (D) 

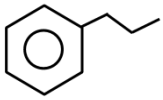
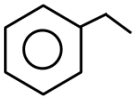
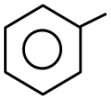
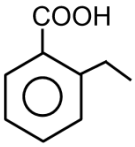
14. 

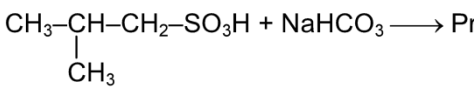
Product is-

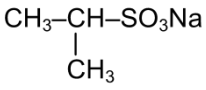
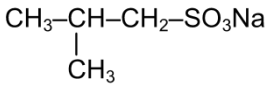
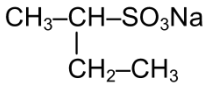
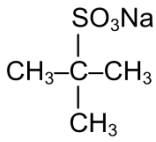
(A)  (B)  (C)  (D) 

15. 

Product is-

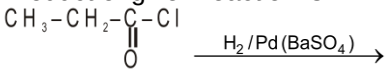
(A)  (B)  (C)  (D) 

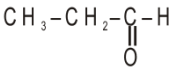
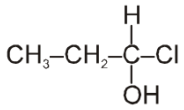
16. 

(A)  (B)  (C)  (D) 

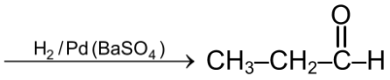
PART-B (Carbonyl compounds)

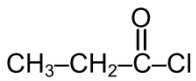
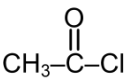
17. Product of given reaction is

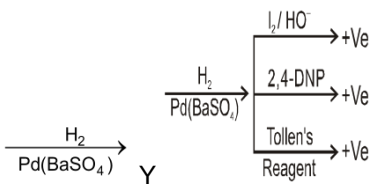


(A) $CH_3–CH_2–CH_2–OH$ (B)  (C)  (D) None of these

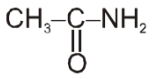
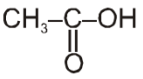
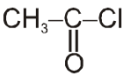
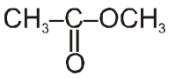
18. Predict the reactant

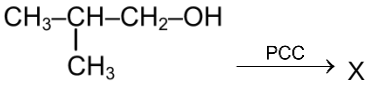
Reactant 

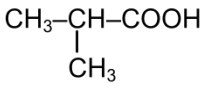
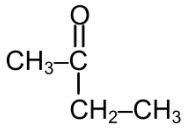
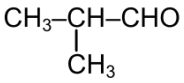
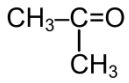
(A) $CH_3–CH_2–CH_2OH$ (B)  (C) $CH_3–CH_2–CH_2–Cl$ (D) 

19. 

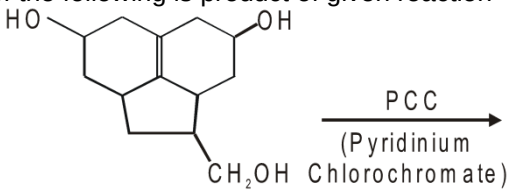
X is :

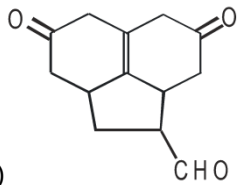
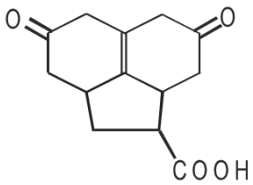
(A)  (B)  (C)  (D) 

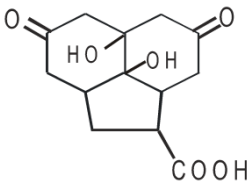
20. 

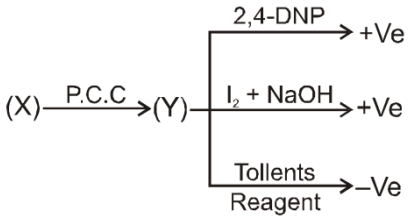
(A)  (B)  (C)  (D) 

21. Which of the following is product of given reaction

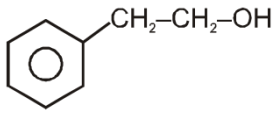
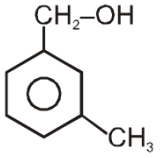


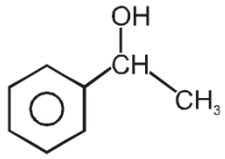
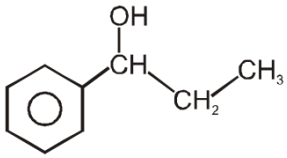
(A)  (B) 

(C)  (D) None of these

22. 

X is :

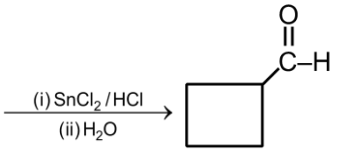
(A)  (B) 

(C)  (D) 

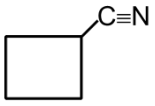
23. $CH_3–C\equiv N \xrightarrow[(ii)\,H_2O]{(i)\,SnCl_2/HCl} X + NH_4Cl$

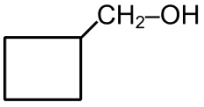
Identify 'X' :

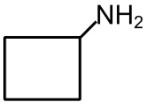
(A) $CH_3–CH=O$ (B) $CH_3–CH_2–CH=O$ (C) CH_3CH_2OH (D) $CH_3CH(OH)CH_3$

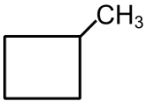
24. R 

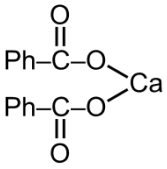
Identify 'R' :

(A) 

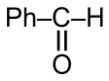
(B) 

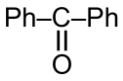
(C) 

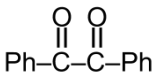
(D) 

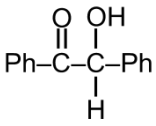
25. 

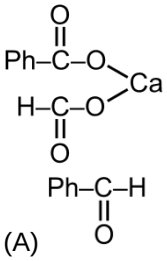
Product

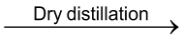
(A) 

(B) 

(C) 

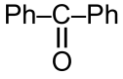
(D) 

26. 

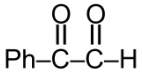


Product

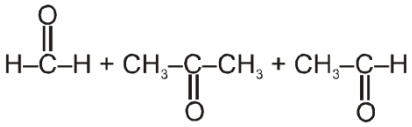
(A)

(B) 

(C) 

(D) 

27. Ca-Salt of Carboxylic acid 



X and Y

(A) $(H–COO)_2Ca + (CH_3–COO)_2 Ca$ (B) $(HCOO)_2Ca + (CH_3–CH_2–COO)_2Ca$

(C) $(CH_3COO)_2Ca + (CH_3CH_2–COO)_2Ca$ (D) None of these

28. Benzaldehyde, when heated with conc. KOH solution, gives

(A) $C_6H_5CH_2OH$ only (B) C_6H_5COOH only

(C) C_6H_5COOK only (D) a mixture of C_6H_5COOK and $C_6H_5CH_2OH$

29. The Cannizzaro's reaction is not given by :

(A) C_6H_5CHO (B) HCHO (C) CH_3CHO (D) $(CH_3)_3C–CHO$

30. In the reaction, $(CH_3)_3CCHO + HCHO \xrightarrow[\text{heat}]{NaOH}$ A + B

the products (A) and (B) are respectively :

(A) $(CH_3)_3CCH_2OH$ and $HCOO^- Na^+$. (B) $(CH_3)_3CCOONa$ and CH_3OH.

(C) $(CH_3)_3CCH_2OH$ and CH_3OH. (D) $(CH_3)_3COONa$ and $HCOO^- Na^+$.

31. $(X) \xrightarrow[+\,HCl]{SnCl_2} \xrightarrow{HO^{\ominus}} C_6H_5COO^{\ominus} + C_6H_5CH_2-OH$

(A) $C_6H_5-\overset{\overset{O}{\|}}{C}-Cl$ (B) $C_6H_5-\overset{\overset{O}{\|}}{C}-NH_2$ (C) $C_6H_5-\overset{\overset{O}{\|}}{C}-OH$ (D) $C_6H_5-C\equiv N$

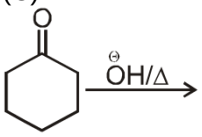
32. Which of the products is formed when acetone is reacted with dil. NaOH solution after heating?

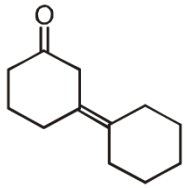
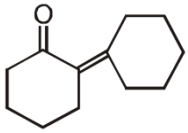
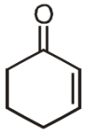
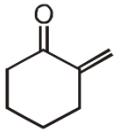
(A) $CH_3-\overset{\overset{O}{\|}}{C}-CH=\overset{CH_3}{\overset{|}{C}}-CH_3$

(B) $CH_3-\overset{\overset{O}{\|}}{C}-\underset{CH_3}{\overset{|}{CH}}-\underset{OH}{\overset{|}{CH}}-CH_3$

(C) $CH_3-\overset{\overset{O}{\|}}{C}-CH_2-\underset{CH_3}{\overset{|}{C}}=CH_2$

(D) $CH_3-\underset{CH_3}{\overset{OH}{\overset{|}{C}}}-\underset{CH_3}{\overset{OH}{\overset{|}{C}}}-CH_3$

33.  Product is :

(A)  (B)  (C)  (D) 

34. Reactant $\xrightarrow[(ii)\,\Delta]{(i)\,dil.\,NaOH} CH_3-CH=CH-\overset{\overset{O}{\|}}{C}-H$

Reactant is :

(A) CH_3-CH_3 (B) $H-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-H$ (C) $CH_3-\overset{\overset{O}{\|}}{C}-CH_3$ (D) $CH_3-\overset{\overset{O}{\|}}{C}-H$

35. $(X) \xrightarrow[+\,HCl]{SnCl_2} \xrightarrow[(ii)\,\Delta]{(i)\,HO^{\ominus}} \overset{CH_3}{\overset{|}{H}}\!\!>\!C=CH-\overset{\overset{O}{\|}}{C}-H$

(A) $H-C\equiv N$ (B) $CH_3-C\equiv N$ (C) CH_3-CH_2-CN (D) CH_3-COCl

36. The structure of the compound when acetaldehyde reacts with NH_2-OH is

(A) $CH_3CH = NCONHNH_2$ (B) $CH_3CH = NNHCONH_2$

(C) $CH_3CH = NOH$ (D) $CH_3CH = NNH_2$

37. (X) + (Y) $\xrightarrow[-H_2O]{\Delta}$ $\overset{CH_3}{\overset{|}{H}}\!\!>\!C=N-OH$

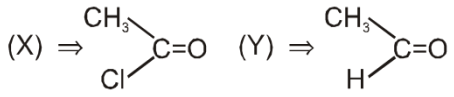
idenitfy (X) and (Y)

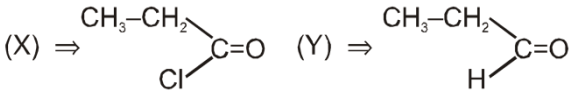
(A) X ⇒ $\overset{CH_3}{\overset{|}{H}}\!\!>\!C=O$; y = $NH_2CONHNH_2$ (B) X ⇒ $\overset{CH_3}{\overset{|}{H}}\!\!>\!C=O$; y = NH_2-NH_2

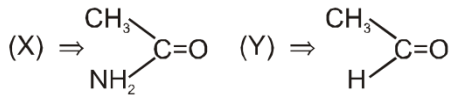
(C) X ⇒ $\overset{CH_3}{\overset{|}{H}}\!\!>\!C=O$; y = NH_2-OH (D) X ⇒ $\overset{CH_3}{\overset{|}{H}}\!\!>\!C=O$; y = $NH_2-NH-Ph$

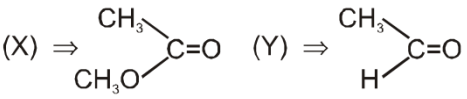
38. $(X) \xrightarrow[H_2]{Pd + BaSO_4} (Y) \xrightarrow[\Delta]{H_2N-OH}$ $\overset{CH_3}{\overset{|}{H}}\!\!>\!C=N-OH$

Identify (X) and (Y).

(A) 

(B) 

(C) 

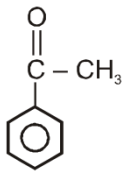
(D) 

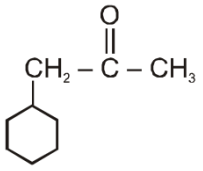
39. Benzaldehyde and acetone can be distinguished by
(A) Mulliken Baker test (B) Fehling solution
(C) Iodoform test (D) Ninhydrin test

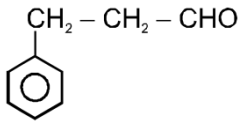
40. Acetaldehyde and benzaldehyde can be distinguished by
(A) Tollen's test (B) Fehling solution
(C) $FeCl_3$ test (D) $NaHCO_3$ test

41. Propanal and propanone can not be distinguished by
(A) Iodoform test (B) Fehling solution
(C) Tollen's test (D) 2,4- DNP test

42. Which of the following compound will not react with I_2 /OH^-.

(A) 

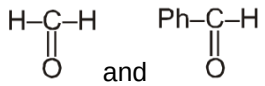
(B) 

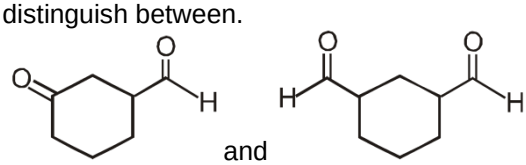
(C) 

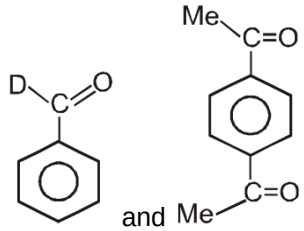
(D) $CH_3 - CHO$

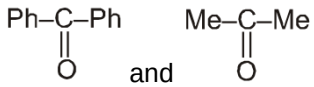
43. 2-Pentanone can be distinguished from 3- Pentanone by which reagent ?
(A) 2, 4- Dinitrophenyl hydrazine (B) Tollen's reagent
(C) I_2 and dilute NaOH (D) Fehling solution

44. Tollen's reagent ($AgNO_3 + NH_4OH$) can be used to distinguish between.

(A)  and

(B)  and

(C)  and

(D)  and

Answers

1.	(C)	**2.**	(B)	**3.**	(C)	**4.**	(D)	**5.**	(A)
6.	(C)	**7.**	(D)	**8.**	(C)	**9.**	(C)	**10.**	(C)
11.	(B)	**12.**	(B)	**13.**	(C)	**14.**	(C)	**15.**	(B)
16.	(B)	**17.**	(B)	**18.**	(B)	**19.**	(C)	**20.**	(C)
21.	(A)	**22.**	(C)	**23.**	(A)	**24.**	(A)	**25.**	(B)
26.	(A)	**27.**	(A)	**28.**	(D)	**29.**	(C)	**30.**	(A)
31.	(D)	**32.**	(A)	**33.**	(B)	**34.**	(D)	**35.**	(B)
36.	(C)	**37.**	(C)	**38.**	(A)	**39.**	(C)	**40.**	(B)
41.	(D)	**42.**	(C)	**43.**	(C)	**44.**	(C)		