DPP - Daily Practice Problems

Chapter-wise Sheets

Date : ☐ **Start Time :** ☐ **End Time :** ☐

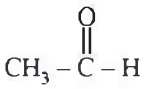
CHEMISTRY CC26

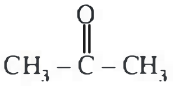
SYLLABUS : Aldehydes, Ketones and Carboxylic Acids

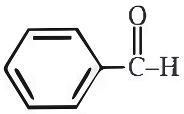
Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

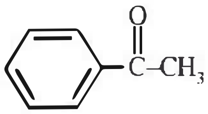
INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Which of the following compounds is most reactive towards nucleophilic addition reactions?

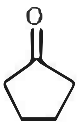
(a) 
$CH_3-\overset{\overset{\large O}{||}}{C}-H$

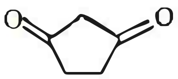
(b) 
$CH_3-\overset{\overset{\large O}{||}}{C}-CH_3$

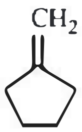
(c) 

(d) 

2. Arrange the following in order of decreasing acidity

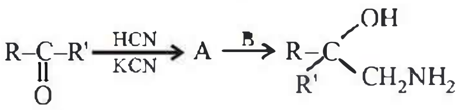
(A) 

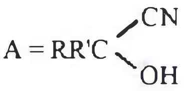
(B) 

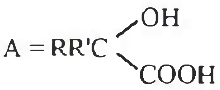
(C) 

(a) B > A > C
(b) C > B > A
(c) A > C > B
(d) A > B > C

3. A and B in the following reactions are



(a) 
$A = RR'C\begin{matrix}CN\\OH\end{matrix}$, $B = LiAlH_4$

(b) 
$A = RR'C\begin{matrix}OH\\COOH\end{matrix}$, $B = NH_3$

(c) 
$A = RR'C\begin{matrix}CN\\OH\end{matrix}$, $B = H_3O^{\oplus}$

(d) $A = RR'CH_2CN$, $B = NaOH$

4. Acetaldehyde reacts with

(a) Electrophiles only
(b) Nucleophiles only
(c) Free radicals only
(d) Both electrophiles and nucleophiles

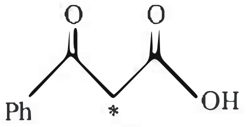
RESPONSE GRID	**1.** ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ

Space for Rough Work

5. $C_6H_5CH{=}CHCHO \xrightarrow{X} C_6H_5CH{=}CHCH_2OH$
In the above sequence X can be :
(a) H_2/Ni (b) $NaBH_4$
(c) $K_2Cr_2O_7/H^+$ (d) Both (a) and (b)

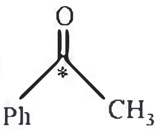
6. Which one of the following can be oxidised to the corresponding carbonyl compound?
(a) 2-hydroxy-propane
(b) Ortho-nitro-phenol
(c) Phenol
(d) 2-methyl-2 hydroxy-propane

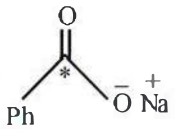
7. In the following reaction sequence, the correct structures of E, F and G are



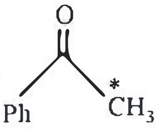
$\xrightarrow{\text{Heat}}[E]\xrightarrow[\text{NaOH}]{I_2}[F]+[G]$

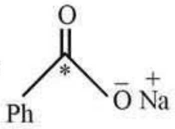
[* implies ^{13}C labelled carbon)

(a) E = 

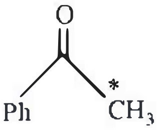
F = 

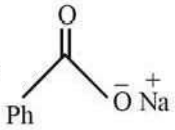
$G = CHI_3$

(b) E = 

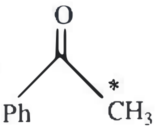
F = 

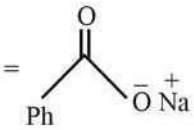
$G = CHI_3$

(c) E = 

F = 

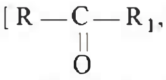
$G = \overset{*}{C}HI_3$

(d) E = 

F = 

$G = \overset{*}{C}H_3I$

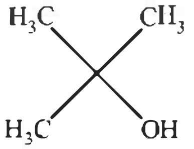
8. Ketones

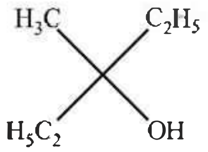

[$R-\underset{\underset{O}{\|}}{C}-R_1$, where $R = R_1$ = alkyl groups]

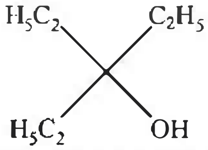
can be obtained in one step by
(a) oxidation of primary alcohols
(b) hydrolysis of esters
(c) oxidation of tertiary alcohols
(d) reaction of acid halides with alcohols

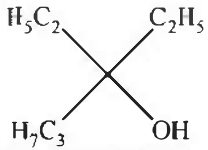
9. The compound that neither forms semicarbazone nor oxime is
(a) HCHO (b) CH_3COCH_2Cl
(c) CH_3CHO (d) $CH_3CONHCH_3$

10. Ethyl ester $\xrightarrow[\text{excess}]{CH_3MgBr}$ P . The product P will be

(a) 

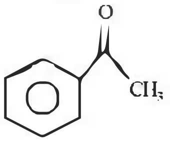
(b) 

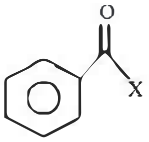
(c) 

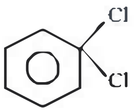
(d) 

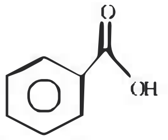
11. Which of the following compounds when heated with CO at 150°C and 500 atm pressure in presence of BF_3 forms ethyl propionate ?
(a) C_2H_5OH (b) CH_3OCH_3
(c) $C_2H_5\bullet C_2H_5$ (d) $CH_3OC_2H_5$

12. Benzaldehyde is obtained from Rosenmund's reduction of

(a) 

(b) 

(c) 

(d) 

13. Acetone oxime is obtained by reacting acetone with
(a) NH_3 (b) NH_2OH (c) NH_2Na (d) $NH_2.NH_2$

14. $2C_6H_5CHO \xrightarrow[H_2O]{OH^-} C_6H_5CH_2OH + C_6H_5COO^-$
Which of the following statements are correct regarding the above reduction of benzaldehyde to benzyl alcohol?
(i) One hydrogen is coming from H_2O as H^+ and another from C_6H_5CHO as H^-
(ii) One hydrogen is coming from H_2O as H^- and another from C_6H_5CHO as H^+
(iii) One hydrogen from H_2O and another from C_6H_5CHO, both in the form of H^-
(iv) The reduction is an example of disproportionation reaction
(a) (i), (ii) and (iii) (b) (i) and (iv)
(c) (ii), (iii) and (iv) (d) (iii) and (iv)

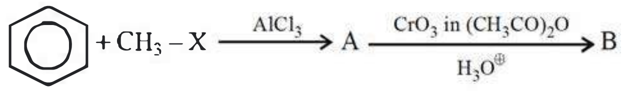
15. A carboxylic acid can best be converted into acid chloride by using
(a) PCl_5 (b) $SOCl_2$
(c) HCl (d) ClCOCOCl

16. Among the given compounds, the most susceptible to nucleophilic attack at the carbonyl group is
(a) MeCOCl (b) MeCHO
(c) MeCOOMe (d) MeCOOCOMe

RESPONSE GRID					
	5. ⓐⓑⓒⓓ	6. ⓐⓑⓒⓓ	7. ⓐⓑⓒⓓ	8. ⓐⓑⓒⓓ	9. ⓐⓑⓒⓓ
	10. ⓐⓑⓒⓓ	11. ⓐⓑⓒⓓ	12. ⓐⓑⓒⓓ	13. ⓐⓑⓒⓓ	14. ⓐⓑⓒⓓ
	15. ⓐⓑⓒⓓ	16. ⓐⓑⓒⓓ			

Space for Rough Work

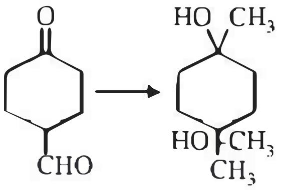
17. Find out B in the given reactions



(a) acetophenone
(b) benzaldehyde
(c) cyclohexyl carbaldehyde
(d) benzoic acid

18. Pinacolone is
(a) 2, 3-Dimethyl-2, 3-butanediol
(b) 3,3-Dimethyl-2-butanone
(c) 1-Phenyl-2-propanone
(d) 1, 1-Diphenyl-1, 2-ethandiol

19. The correct sequence of reagents for the following conversion will be :



(a) $[Ag(NH_3)_2]^+ OH^-$, H^+/CH_3OH, CH_3MgBr
(b) CH_3MgBr, H^+/CH_3OH, $[Ag(NH_3)_2]^+ OH^-$
(c) CH_3MgBr, $[Ag(NH_3)_2]^+ OH^-$, H^+/CH_3OH
(d) $[Ag(NH_3)_2]^+ OH^-$, CH_3MgBr, H^+/CH_3OH

20. Benzaldehyde reacts with ethanoic KCN to give
(a) $C_6H_5CHOHCN$ (b) $C_6H_5CHOHCOC_6H_5$
(c) $C_6H_5CHOHCOOH$ (d) $C_6H_5CHOHCHOHC_6H_5$

21. Which gives lactic acid on hydrolysis after reacting with HCN?
(a) HCHO (b) CH_3CHO
(c) C_6H_5CHO (d) CH_3COCH_3

22. Reduction of $>C = O$ to $>CH_2$ can be carried out with
(a) catalytic reduction
(b) Na/C_2H_5OH
(c) Wolff-Kishner reduction
(d) $LiAlH_4$

23. The end product B in the sequence of reactions

$R - X \xrightarrow{CN^-} A \xrightarrow{NaOH} B$ is

(a) an alkane
(b) a carboxylic acid
(c) sodium salt of carboxylic acid
(d) a ketone

24. Phenylmethyl ketone can be converted into ethylbenzene in one step by which of the following reagents?
(a) $LiAlH_4$ (b) Zn-Hg/HCl
(c) $NaBH_4$ (d) CH_3MgI

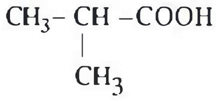
25. Conversion of acetaldehyde into ethyl acetate in presence of aluminium ethoxide is called
(a) Aldol condensation (b) Cope reaction
(c) Tischenko reaction (d) Benzoin condensation

26. Match the columns

	Column-I		Column-II
A.	Etard reaction	I.	Alcoholic KOH
B.	Hydroxylation	II.	Anhydrous $AlCl_3$
C.	Dehydrohalogenation	III.	Chromyl chloride
D.	Friedel-Crafts reaction	IV.	Dilute alkaline $KMnO_4$

(a) A – I; B – II; C – III; D – II
(b) A – IV; B – III; C – I; D – II
(c) A – III; B – IV; C – I; D – II
(d) A – II; B – I; C – IV; D – III

27. An organic compound A upon reacting with NH_3 gives B. On heating B gives C. C in presence of KOH reacts with Br_2 to given $CH_3CH_2NH_2$. A is :
(a) CH_3COOH (b) $CH_3CH_2CH_2COOH$
(c)



$CH_3-\underset{\underset{CH_3}{|}}{CH}-COOH$

(d) CH_3CH_2COOH

28. Which one of the following can be oxidised to the corresponding carbonyl compound?
(a) 2-hydroxypropane
(b) Ortho-nitrophenol
(c) Phenol
(d) 2-methyl-2 hydroxypropane

29. The reagent which can be used to distinguish acetophenone from benzophenone is
(a) 2,4- dinitrophenylhydrazine
(b) aqueous solution of $NaHSO_3$
(c) benedict reagent
(d) I_2 and Na_2CO_3

30. $R–CH_2–CH_2OH$ can be converted into RCH_2CH_2COOH. The correct sequence of reagents is
(a) PBr_3, KCN, H^+ (b) PBr_3, KCN, H_2
(c) KCN, H^+ (d) HCN, PBr_3, H^+

31. Sodium salt of an organic acid 'X' produces effervescence with conc. H_2SO_4. 'X' reacts with the acidified aqueous $CaCl_2$ solution to give a white precipitate which decolourises acidic solution of $KMnO_4$. 'X' is :
(a) C_6H_5COONa (b) HCOONa
(c) CH_3COONa (d) $Na_2C_2O_4$

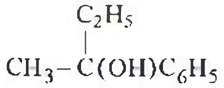
RESPONSE GRID	17. ⓐⓑⓒⓓ	18. ⓐⓑⓒⓓ	19. ⓐⓑⓒⓓ	20. ⓐⓑⓒⓓ	21. ⓐⓑⓒⓓ
	22. ⓐⓑⓒⓓ	23. ⓐⓑⓒⓓ	24. ⓐⓑⓒⓓ	25. ⓐⓑⓒⓓ	26. ⓐⓑⓒⓓ
	27. ⓐⓑⓒⓓ	28. ⓐⓑⓒⓓ	29. ⓐⓑⓒⓓ	30. ⓐⓑⓒⓓ	31. ⓐⓑⓒⓓ

Space for Rough Work

32. In a set of the given reactions, acetic acid yielded a product C.

$$CH_3COOH + PCl_5 \longrightarrow A \xrightarrow[\text{Anh.}AlCl_3]{C_6H_6} B \xrightarrow[\text{Ether}]{C_2H_5MgBr} C$$

Product C would be

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

(b) $CH_3CH(OH)C_2H_5$

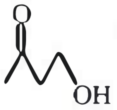
(c) $CH_3COC_6H_5$

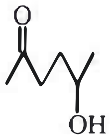
(d) $CH_3CH(OH)C_6H_5$

33. Which one of the following will most readily be dehydrated in acidic condition ?

(a) 

(b) 

(c) 

(d) 

34. Which of the following contain an aldehyde?

(a) Vanilla beans (b) Meadow sweet

(c) Cinnamon (d) All of these

35. Heating mixture of sodium benzoate and soda-lime gives

(a) benzene (b) methane

(c) sodium phenoxide (d) calcium benzoate

36. Observe the following structures and pick up the correct statement.

$>C=O$ I $\qquad >C=\overset{+}{O}H$ II

(a) Carbonyl carbon of I is more electrophilic than that of II

(b) Carbonyl carbon of I is less electrophilic than that of II

(c) Carbonyl carbon of both structures have equal electrophilic character

(d) It depends upon the complete structure of the compound

37. An enantiomerically pure acid is treated with a racemic mixture of an alcohol having one chiral carbon. The ester formed will be

(a) Optically active mixture (b) Pure enantiomer

(c) Meso compound (d) Racemic mixture

38. *m*-Chlorobenzaldehyde on reaction with conc. KOH at room temperature gives

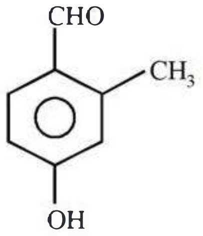
(a) potassium *m*-chlorobenzoate and *m*-hydroxybenzaldehyde

(b) *m*-hydroxybenzaldehyde and *m*-chlorobenzyl alcohol

(c) *m*-chlorobenzyl alcohol and *m*-hydroxybenzyl alcohol

(d) potassium *m*-chlorobenzoate and *m*-chlorobenzyl alcohol.

39. IUPAC name of following will be



(a) 4-formyl 3-methyl 1-hydroxy benzene

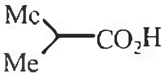
(b) 4-formyl 3-methyl phenol

(c) 4-hydroxy2-methyl benzaldehyde

(d) 4-hydroxy 2-methyl carbaldehyde

40. The correct order of increasing acid strength of the compounds

(A) CH_3CO_2H (B) $MeOCH_2CO_2H$

(C) CF_3CO_2H (D)  is

(a) D<A<B<C (b) A<D<B<C

(c) B<D<A<C (d) D<A<C<B

41. The increasing order of the rate of HCN addition to compound A – D is

(A) HCHO (B) CH_3COCH_3

(C) $PhCOCH_3$ (D) PhCOPh

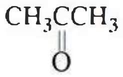
(a) D<C<B<A (b) C<D<B<A

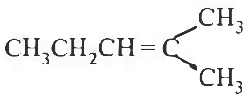
(c) A<B<C<D (d) D<B<C<A

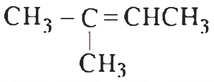
42. The carboxyl functional group (–COOH) is present in

(a) picric acid (b) barbituric acid

(c) ascorbic acid (d) aspirin

43. Which alkene on ozonolysis gives CH_3CH_2CHO and 
$CH_3\underset{\underset{O}{\|}}{C}CH_3$

(a)  (b) $CH_3CH_2CH=CHCH_2CH_3$

(c) $CH_3CH_2CH=CHCH_3$ (d) 
$CH_3-\underset{\underset{CH_3}{|}}{C}=CHCH_3$

44. Which one of the following is reduced with zinc and hydrochloric acid to give the corresponding hydrocarbon?

(a) Acetamide (b) Acetic acid

(c) Ethyl acetate (d) Butan-2-one

45. Acetal is produced by reacting an alcohol in the presence of dry HCl with

(a) acetaldehyde (b) ketone

(c) ether (d) carboxylic acid

RESPONSE GRID	32.ⓐⓑⓒⓓ	33.ⓐⓑⓒⓓ	34.ⓐⓑⓒⓓ	35.ⓐⓑⓒⓓ	36. ⓐⓑⓒⓓ
	37.ⓐⓑⓒⓓ	38.ⓐⓑⓒⓓ	39.ⓐⓑⓒⓓ	40.ⓐⓑⓒⓓ	41. ⓐⓑⓒⓓ
	42.ⓐⓑⓒⓓ	43.ⓐⓑⓒⓓ	44.ⓐⓑⓒⓓ	45.ⓐⓑⓒⓓ	

Space for Rough Work

DAILY PRACTICE PROBLEMS

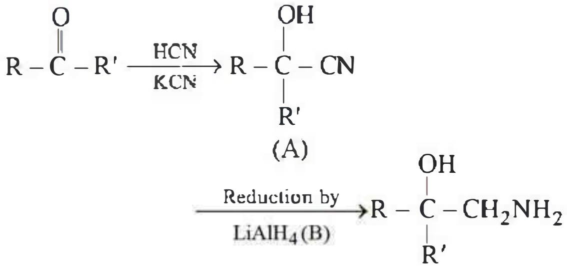
CHEMISTRY SOLUTIONS

DPP/CC26

1. **(a)** (B) followed by (A) then (C).

2. **(a)** (C) contains the most reactive methylene group followed by (A) then (B).

3. **(a)**



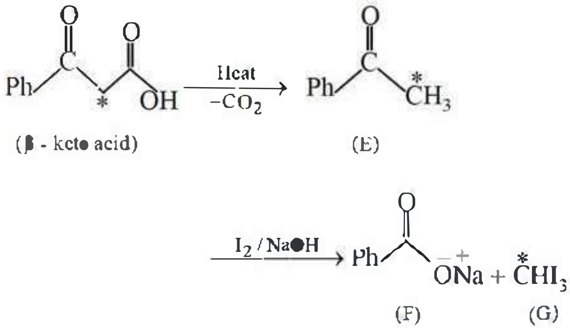
$$R-\overset{\overset{O}{\|}}{C}-R' \xrightarrow[KCN]{HCN} \underset{(A)}{R-\overset{\overset{OH}{|}}{\underset{\underset{R'}{|}}{C}}-CN} \xrightarrow[LiAlH_4(B)]{\text{Reduction by}} R-\overset{\overset{OH}{|}}{\underset{\underset{R'}{|}}{C}}-CH_2NH_2$$

4. **(b)** Acetaldehyde reacts only with nucleophiles. Since the mobile p electrons of carbon–oxygen double bond are strongly pulled towards oxygen, carbonyl carbon is electron-deficient and carbonyl oxygen is electron-rich. The electron deficient (acidic) carbonyl carbon is most susceptible to attack by electron rich nucleophilic reagents, that is, by base. Hence the typical reaction of aldehydes and ketones is nucleophilic addition.

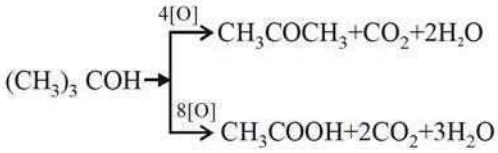
5. **(b)** $NaBH_4$ selectively reduces the aldehyde group to alcohol without affecting double bond in a organic compound. So, X is $NaBH_4$.

6. **(a)**

7. **(c)**



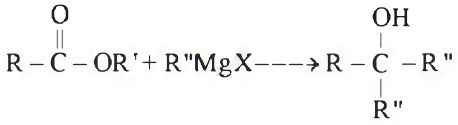
8. **(c)** By oxidation of tertiary alcohol with stronger oxidising agents, ketones may be formed along with carboxylic acid.



$$(CH_3)_3\,COH \xrightarrow{4[O]} CH_3COCH_3 + CO_2 + 2H_2O$$
$$(CH_3)_3\,COH \xrightarrow{8[O]} CH_3COOH + 2CO_2 + 3H_2O$$

9. **(d)**

10. **(a)** Recall that, esters react with excess of Grignard reagents to form 3° alcohols having at least two identical alkyl groups corresponding to Grignard reagent.



$$R-\overset{\overset{O}{\|}}{C}-OR' + R''MgX \dashrightarrow R-\overset{\overset{OH}{|}}{\underset{\underset{R''}{|}}{C}}-R''$$

Since here Grignard reagent is CH_3MgBr, the 3° alcohol should have at least two methyl groups

Thus, the choice with at least two methyl groups at the carbon linked with –OH group will be the correct choice. Hence (a) is the correct choice.

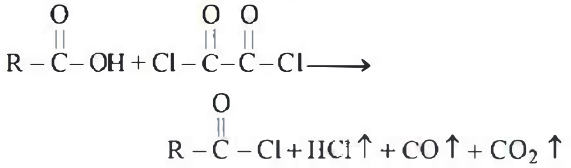
11. **(c)** Reaction of diethyl ether ($C_2H_5-O-C_2H_5$) with carbon monoxide produces ethyl propionate.

$$C_2H_5-O-C_2H_5 + CO \xrightarrow[500\,atm]{BF_3,\,150°C} \underset{\text{ethyl propionate}}{C_2H_5COOC_2H_5}$$

12. **(b)** 13. **(b)**

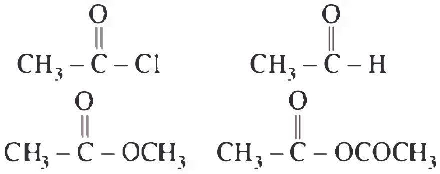
14. **(b)** The hydrogen atom that is added to the carbonyl carbon of the aldehyde in the reduction is derived directly from the other aldehyde molecule as a hydride ion. The second hydrogen that is added to the negatively charged oxygen is coming from the solvent (consult mechanism of Cannizzaro reaction). Oxidation of one molecule of the compound at the expense of other molecule of the same compound is known as disproportionation.

15. **(d)** Use of $SOCl_2$ and ClCOCOCl forms gaseous by-products which can be easily removed, giving better yield of RCOCl. Further, oxalyl chloride is particularly easy to use because any excess of it can be easily evaporated due to its low b.p. (62°C)



$$R-\overset{\overset{O}{\|}}{C}-OH + Cl-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-Cl \longrightarrow R-\overset{\overset{O}{\|}}{C}-Cl + HCl\uparrow + CO\uparrow + CO_2\uparrow$$

16. **(a)** More the magnitude of positive charge on the carbonyl carbon, higher will be its reactivity toward nucleophilic attack.

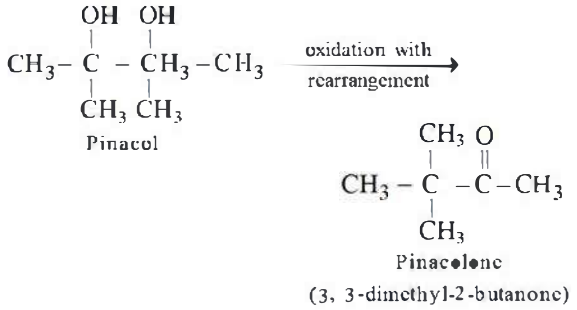


$$CH_3-\overset{\overset{O}{\|}}{C}-Cl \qquad CH_3-\overset{\overset{O}{\|}}{C}-H$$
$$CH_3-\overset{\overset{O}{\|}}{C}-OCH_3 \qquad CH_3-\overset{\overset{O}{\|}}{C}-OCOCH_3$$

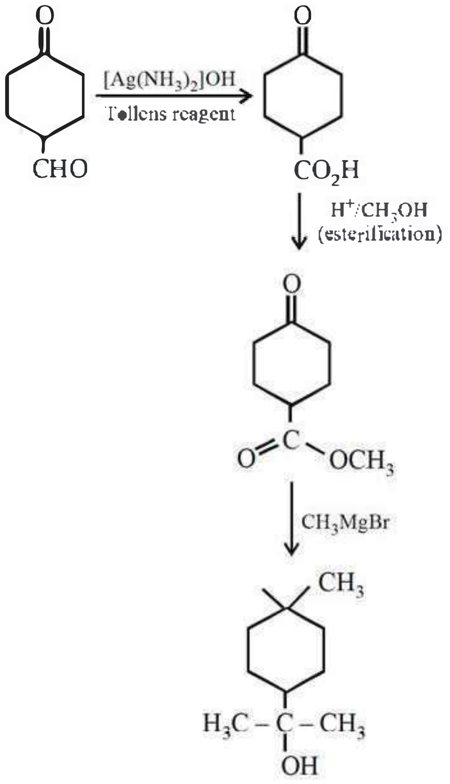
Chlorine being more electron-withdrawing than oxygen develops more positive charge on carbonyl carbon.

17. **(b)**

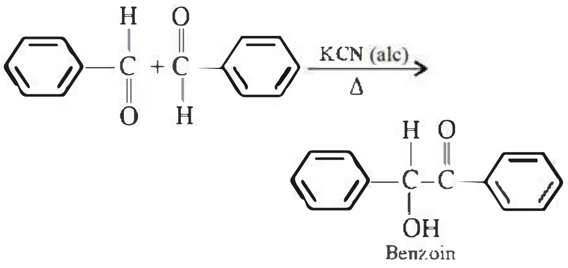
18. (b) Pinacolone is oxidation product of pinacol.


$$CH_3-\overset{OH}{\underset{CH_3}{C}}-\overset{OH}{\underset{CH_3}{CH_3}}-CH_3 \xrightarrow[\text{rearrangement}]{\text{oxidation with}} CH_3-\overset{CH_3}{\underset{CH_3}{C}}-\overset{O}{\overset{\|}{C}}-CH_3$$

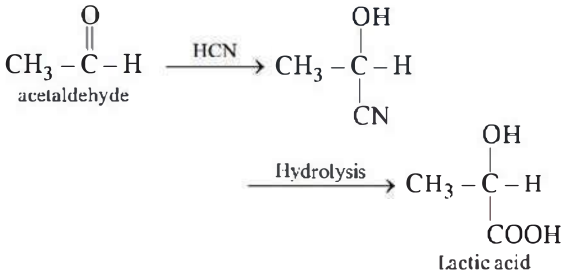
19. (a)



20. (b) When benzaldehyde is refluxed with aqueous alcoholic potassium cyanide, two molecules of benzaldehyde condense together to form benzoin



21. (b)

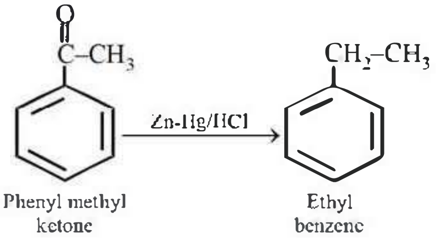

$$\underset{\text{acetaldehyde}}{CH_3-\overset{O}{\overset{\|}{C}}-H} \xrightarrow{HCN} CH_3-\overset{OH}{\underset{CN}{C}}-H \xrightarrow{\text{Hydrolysis}} \underset{\text{Lactic acid}}{CH_3-\overset{OH}{\underset{COOH}{C}}-H}$$

22. (c) Catalytic reduction, Na/C_2H_5OH and $LiAlH_4$ reduce $\rangle C=O$ group to $\rangle CHOH$ and not $\rangle CH_2$.

23. (c) $RX \xrightarrow{CN^-} \underset{(A)}{RCN} \xrightarrow[H_2O]{NaOH} \underset{(B)}{RCOO^-Na^+}$

The conversion of an alkyl halide into nitrile followed by hydrolysis (alkaline or acidic), provides a method for preparing carboxylic acid containing one carbon atom more than the starting alkyl halide.

24. (b)



This reaction is known as Clemmensen's reduction.

25. (c) Aldehydes having α-H atom, when treated with aluminium ethoxide (in place of NaOH or KOH), undergo Cannizzaro type of reaction with a difference that the product isolated is an ester rather than salt of acid or alcohol. Such reaction in called Tischenko reaction.

$$\underset{\text{Acetaldehyde}}{2CH_3CHO} \xrightarrow{Al(OC_2H_5)_3}$$

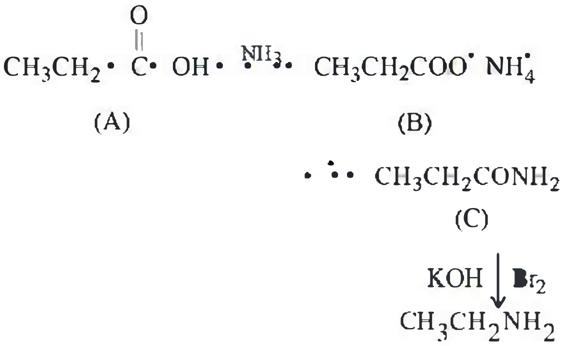
$$[CH_3COOH + CH_3CH_2OH] \rightarrow \underset{\text{Ethyl acetate}}{CH_3COOC_2H_5}$$

26. (c)

27. (d) $A \xrightarrow[(I)]{NH_3} B \xrightarrow[II]{\Delta} C \xrightarrow[KOH,(III)]{Br_2} CH_3CH_2NH_2$

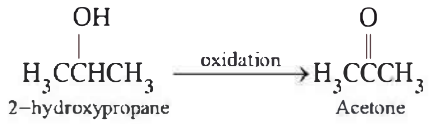
Reaction (III) is a Hoffmann bromamide reaction. Now formation of $CH_3CH_2NH_2$ is possible only from a compound $CH_3CH_2CONH_2$(C) which can be obtained from the compound $CH_3CH_2COO^-NH_4^+$ (B).

Thus (A) should be CH_3CH_2COOH


$$\underset{(A)}{CH_3CH_2\cdot\overset{O}{\overset{\|}{C}}\cdot OH} \cdot \overset{NH_3}{\cdot\cdot} \underset{(B)}{CH_3CH_2COO^{\cdot}NH_4^{\cdot}}$$

$$\therefore \underset{(C)}{CH_3CH_2CONH_2} \xrightarrow[KOH]{Br_2} CH_3CH_2NH_2$$

28. (a) Carbonyl compounds (aldehydes and ketones) are obtained by the oxidation of 1° and 2° alcohols respectively. Among the given options, only (a) is 2° alcohol hence it can be oxidized to ketone.



$$H_3C\overset{OH}{C}HCH_3 \xrightarrow{\text{oxidation}} H_3C\overset{O}{\overset{\|}{C}}CH_3$$

29. (d) I_2 and Na_2CO_3 react with acetophenone ($C_6H_5COCH_3$) to give yellow ppt. of CHI_3 but benzophenone ($C_6H_5COC_6H_5$) does not and hence can be used to distinguish between them.

30. (a) $RCH_2CH_2OH \xrightarrow{PBr_2} RCH_2CH_2Br$

$\xrightarrow{KCN} RCH_2CH_2CN \xrightarrow{H^+} RCH_2CH_2COOH$

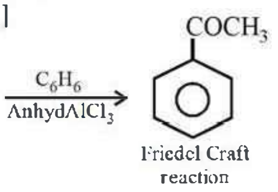
31. (d) $\underset{'x'}{Na_2C_2O_4} + \underset{(conc.)}{H_2SO_4} \rightarrow Na_2SO_4 + CO\uparrow + CO_2\uparrow + H_2O$

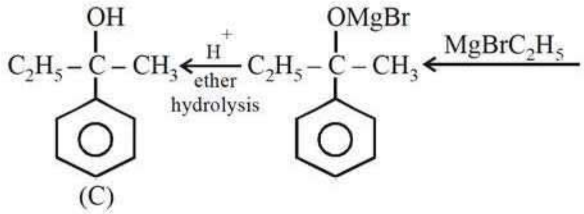
$\underset{'x'}{Na_2C_2O_4} + CaCl_2 \rightarrow \underset{(white\ ppt.)}{CaC_2O_4\downarrow} + 2NaCl$

$5CaC_2O_4\downarrow + \underset{(purple)}{2KMnO_4} + 8H_2SO_4 \rightarrow$

$K_2SO_4 + 5CaSO_4 + \underset{(colourless)}{2MnSO_4} + 10CO_2 + 8H_2O$

32. (a) $CH_3COOH + PCl_5 \longrightarrow \underset{[A]}{CH_3COCl}$





(C)

33. (a) Compound (a) undergoes dehydration easily as the product obtained is conjugated and thus more stable.

34. (d) Vanillin -vanilla beans

Salicylaldehyde - meadow sweet

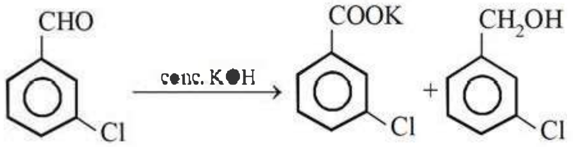
Cinnamaldehyde -from cinnamon.

35. (a)

36. (b) In structure II, presence of positive charge on oxygen causes the displacement of π electrons toward oxygen, making carbon more electron deficient than that in unprotonated carbonyl group.

37. (a) The optically active acid will react with *d* and *l* forms of alcohol present in the racemic mixture at different rates to form two diastereomers in unequal amounts leading to optical activity of the product.

38. (d) *m*-Chlorobenzaldehyde does not contains α-H atom. It is an example of Cannizzaro reaction



39. (c)

40. (a) The correct order of increasing acid strength

$CF_3COOH > MeOCH_2COOH > CH_3COOH > (Me)_2CHCOOH$

Electron withdrawing groups increase the acid strength and electron donating groups decrease the acid strength.

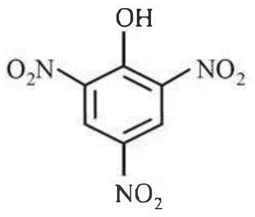
41. (a) Addition of HCN to carbonyl compounds is nucleophilic addition reaction. The order of reactivity of carbonyl compounds is

Aldehydes (smaller to higher), ketones (smaller to higher), Then

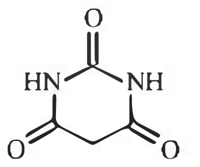
$HCHO > CH_3COCH_3 > Ph.COCH_3 > PhCOPh$

The lower reactivity of ketones is due to presence of two alkyl group which shows +I effect. The reactivity of ketones decreases as the size of alkyl group increases.

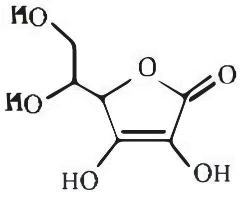
42. (d)



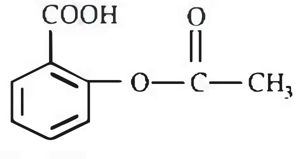
(Picric acid)



(Barbituric acid)

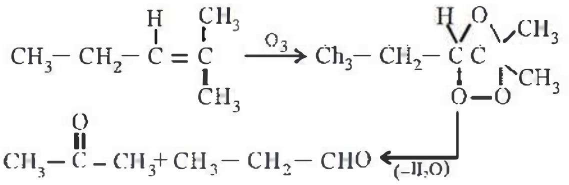


(Ascorbic acid)

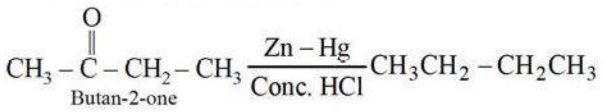


(Aspirin)

43. (a)



44. (d) It is Clemmensen's reduction



$$\underset{\text{Butan-2-one}}{CH_3 - \overset{O}{\overset{\|}{C}} - CH_2 - CH_3} \xrightarrow[\text{Conc. HCl}]{Zn-Hg} CH_3CH_2 - CH_2CH_3$$

45. (a)