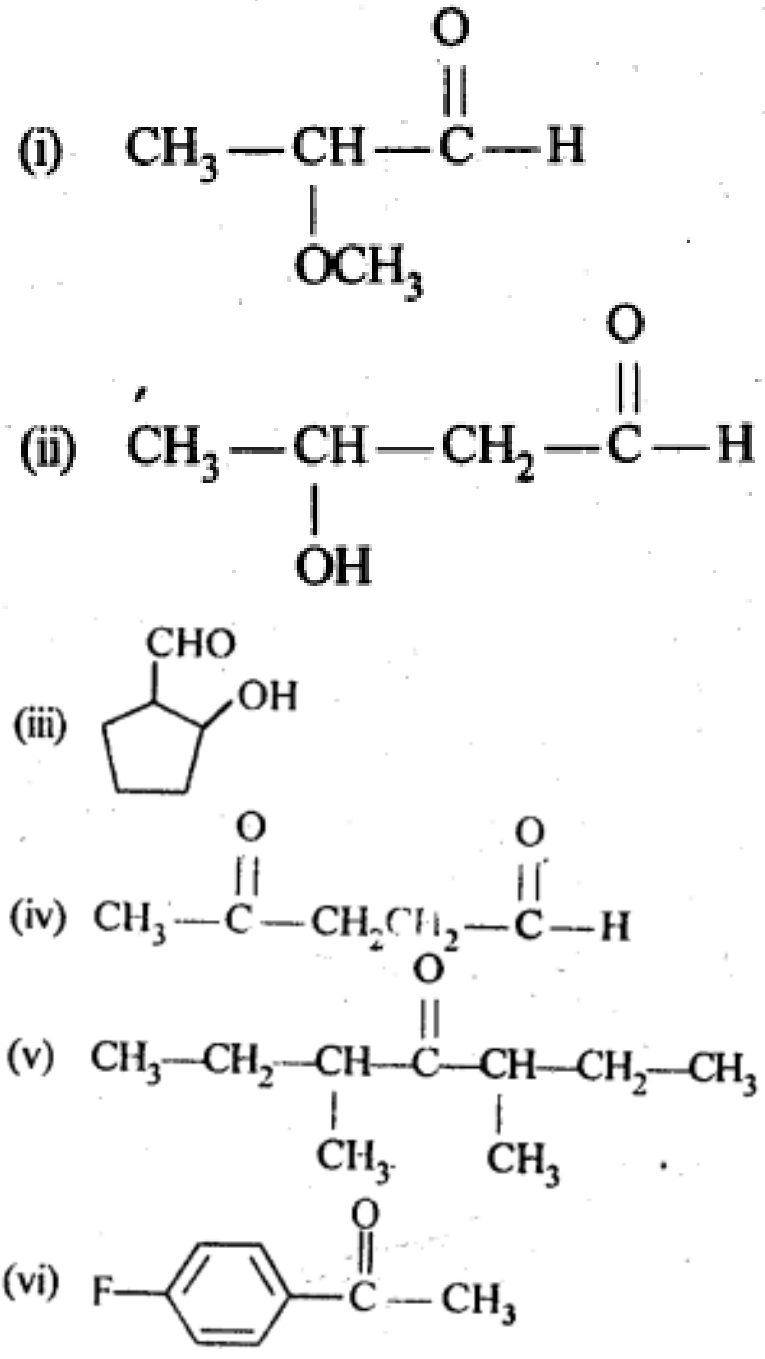
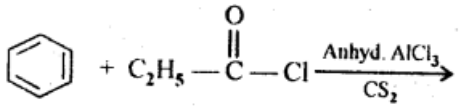
NCERT INTEXT QUESTION

12.1. Write the structures of the following compounds:
(i) α-Methoxypropionaldehyde
(ii) 3-Hydroxybutanal
(iii) 2-Hydroxycyclopentane carbaldehyde
(iv) 4-Oxopentanal
(v) Di-sec.butylketone
(vi) 4-fluoroaeetophenone
Ans:

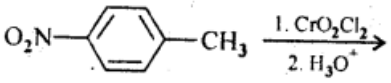


12.2. Write the structures of products of following reactions:

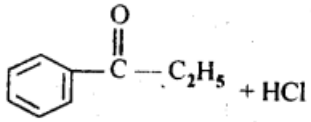
(i) 

(ii) $(C_6H_5CH_2)_2Cd + 2\,CH_3COCl \longrightarrow$

(iii) $H_3C-C\equiv C-H \xrightarrow{Hg^{2+},H_2SO_4}$

(iv) 

Ans:

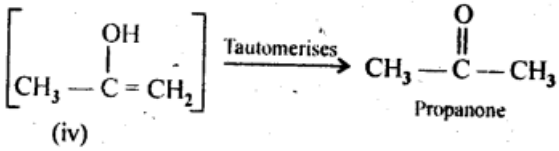
(i) 

Propiophenone

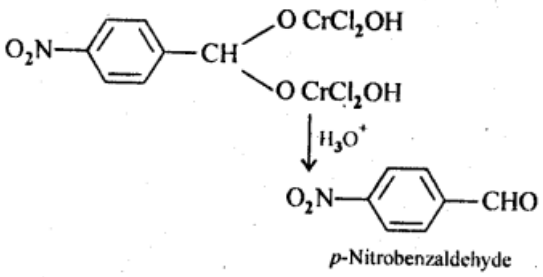
(ii) $2\,CH_3-\overset{O}{\overset{\|}{C}}-CH_2C_6H_5 + CdCl_2$

1 – Phenylpropanone

(iii)



(iv)



12.3. Arrange the following compounds in increasing order of their boiling points:

CH_3CHO, CH_3CH_2OH ,CH_3OCH_3, $CH_3CH_2CH_3$

Ans:

The order is: $CH_3CH_2CH_3 < CH_3OCH_3 < CH_3CHO < CH_3CH_2OH$

All these compounds have comparable molecular masses CH_3CH_2OH undergoes extensive intermolecular Il-bonding and thus its b.pt. is the highest. CH_3CHO is more pdlar than CH_3OCH_3 so that dipole-dipoie interactions in CH_3CHO are greater than in CH_3OCH_3. Thus, b.pt. of CH_3CHO > CH_3OCH_3. $CH_3CH_2CH_3$ has only weak van der waals forces between its molecules and hence has the lowest b.pt.

12.4. Arrange the following compounds in increasing order of their reactivity in nucleophilic addition reactions

(i) Ehtanal, propanal, propanone, butanone

(ii) Benzaldehyde, p-Tolualdehyde, p-Nitrobenzaldehyde, acetophenone.

Ans:

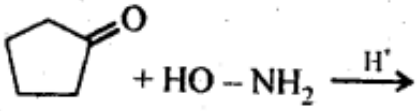
(i) Butanone < Propanone < Propanal < Ethanal .This is because as the no. of alkyl groups attached to carbonyl carbon increases, +I-effect increases. As a result, e^- density

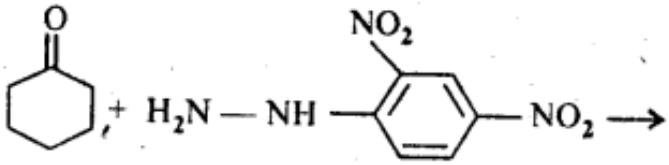
on C–atom of $-\overset{\overset{O}{\|}}{C}-$ group decreases and hence attack by Nu^- becomes slower and slower.

(ii) acetophenone < *p*–tolualdehyde < benzaldehyde < *p*–nitrobenzaldehyde

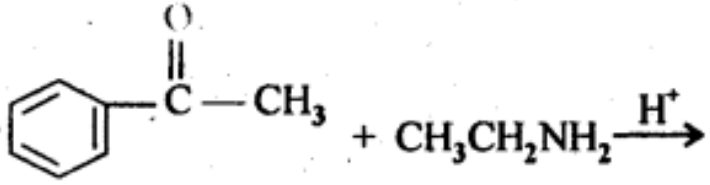
Acetophenone is ketone, rest all are aldehydes, hence it is the least reactive. In *p*–tolualdehyde, $-CH_3$ group at *p*–position increases e^- density on C–atom of $-\overset{\overset{O}{\|}}{C}-$ group thus making it less reactive than benzaldehyde. In *p*–nitrobenzaldehyde, $-NO_2$ groups with draw e^{-I}s by inductive and resonance effect thus rising e^- density on carbonyl C, thus making it more reactive than benzaldehyde.

12.5. Predict the products of the following reactions:

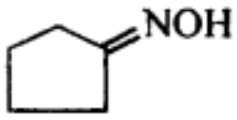
(i) 

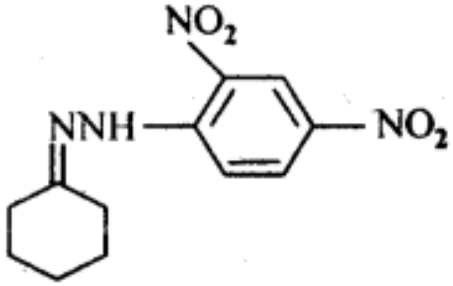
(ii) 

(iii) $R-CH=CH-CHO + NH_2-\overset{\overset{O}{\|}}{C}-NH-NH_2 \xrightarrow{H^+}$

(iv) 

Ans:

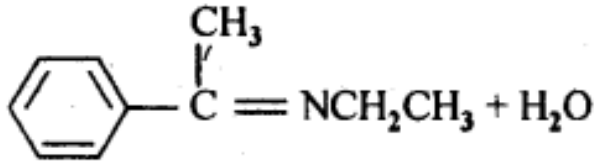
(i) 

(ii) 

(iii) $R—CH=CH—CH=\boxed{O+H_2}NNHCONH_2$

$$\downarrow$$

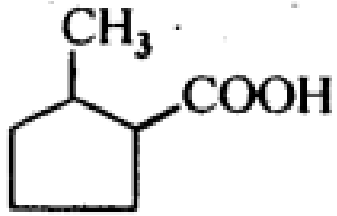
$R—CH=CH—CH=NNHCONH_2+H_2O$

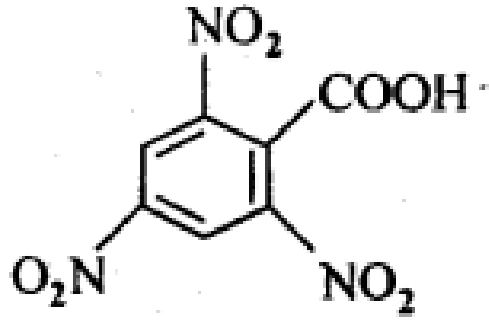
(iv) 

12.6. Give the IUPAC names of the following compounds:

(i) $PhCH_2CH_2COOH$

(ii) $(CH_3)_2$ C=CHCOOH

(iii) 

(iv) 

Ans:

(i) 3 - Phenylpropanoic acid

(ii) 3 - Methylbut-2-enoic acid

(iii) 2-Methylcyclohexanecarboxylic acid

(iv) 2,4,6 - Trinitrobenzoic acid

12.7. Show how each of the following compounds can be converted into benzoic acid.

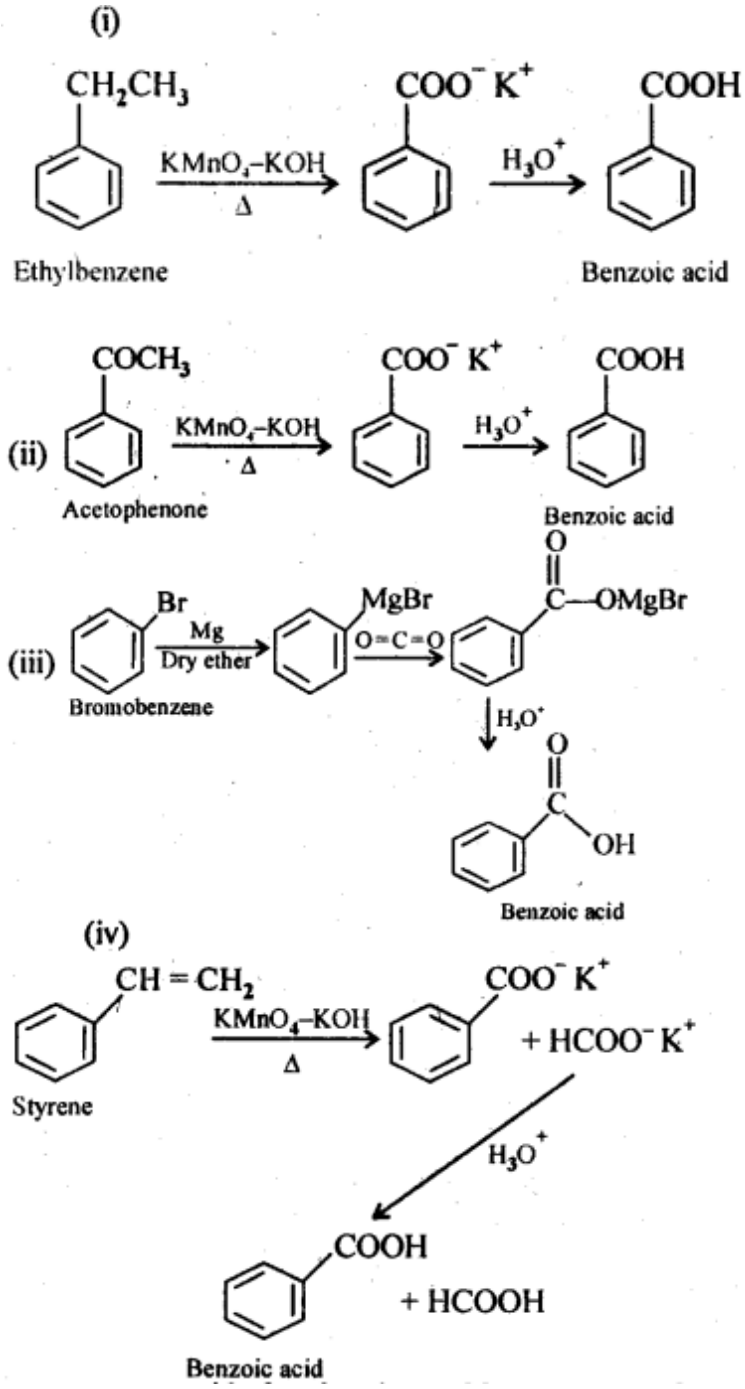
(i) Ethylbenzene

(ii) Acetophenone

(iii) Bromobenzene

(iv) Phenylethene (styrene)

Ans:



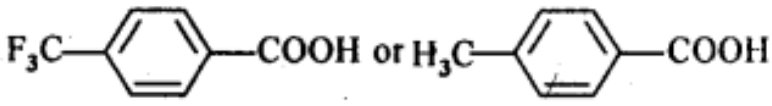
12.8. Which acid of each pair would you expect to be stronger?

(i) CH_3CO_2H or FCH_2CO_2H

(ii) FCH_2CO_2H or $ClCH_2CO_2H$

(iii) $FCH_2CH2CH_2CO_2H$ or $CH_3CH(F)CH_2CO_2H$

(iv)



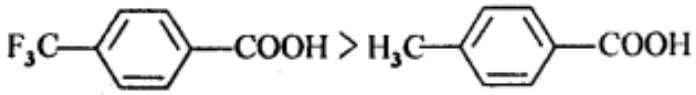
Ans:

(i) $FCH_2COOH > CH_3COOH$
(lesser e^- density in O–H bond and greater stability of FCH_2COO^- over CH_3COO^- ion.)

(ii) $FCH_2CO_2H > ClCH_2CO_2H$
(due to stronger – I effect of F over Cl)

(iii) $CH_3CH(F)CH_2CO_2H >$
$FCH_2CH_2CH_2COOH$
(because I-effect decreases with distance)

(iv)



($F_3C-C_6H_4-COO^-$ ion is more stable due to delocalisation of charge whereas $CH_3-C_6H_4-COO^-$ ion is less stable due to increased intensity of –ve charge.

********** END **********