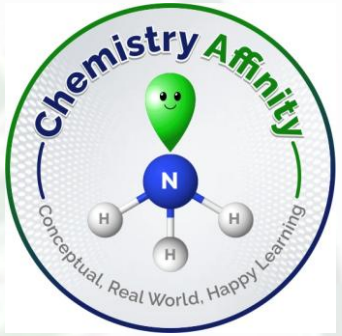
Check Your Learning



Carboxylic Acids

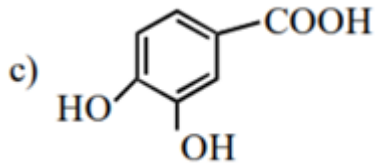
Designed by
Dr. Anuradha Mukherjee

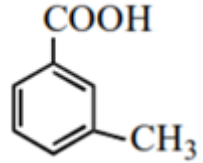
Chemistry Affinity
Conceptual, Real world and Happy Learning

Write down IUPAC nomenclature

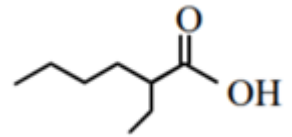
a) $CH_3CH_2CF_2CH_2COOH$

b) $CH_3 - CH_2 - \underset{\displaystyle OH}{\underset{|}{CH}} - COOH$

c) 

d) 

e) $CH_3 - \underset{\displaystyle NH_2}{\underset{|}{CH}} - COOH$

f) 

a) 3,3-difluoropentanoic acid

b) 2-hydroxybutanoic acid

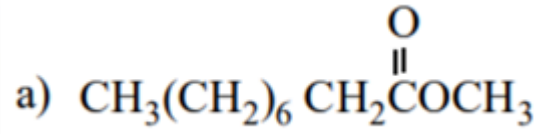
c) 3,4-dihydroxybenzoic acid

d) 3-methylbenzoic acid

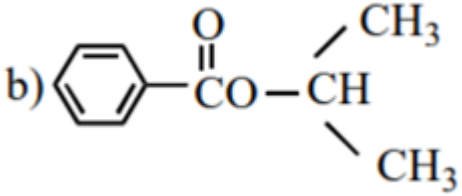
e) 2-aminopropanoic acid

f) 2-ethylhexanoic acid

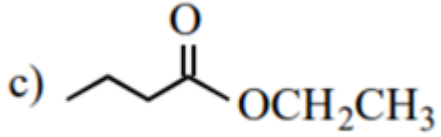
Write down IUPAC nomenclature

a) 

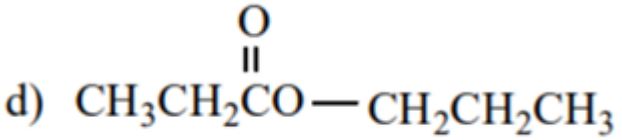
Methyl nonanoate

b) 

Isopropyl benzoate

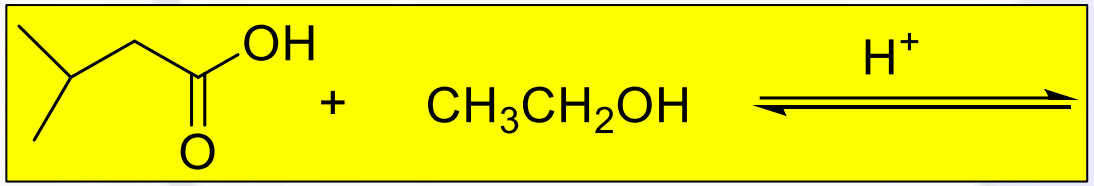
c) 

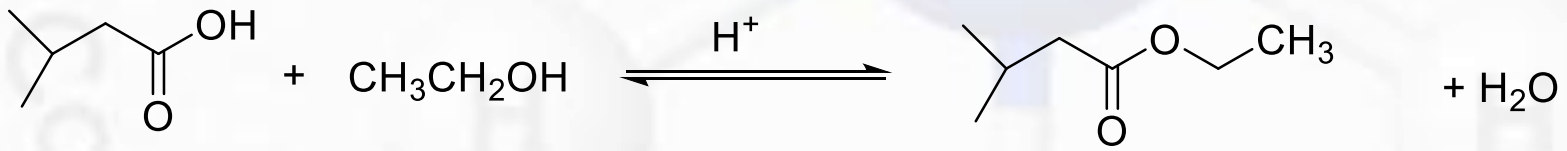
Ethyl butanoate

d) 

Propyl propanoate

Complete the following reactions and name the products

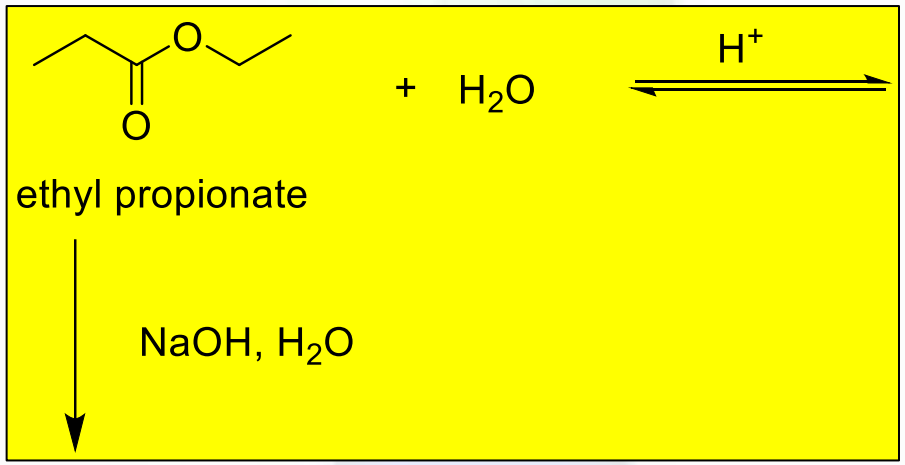


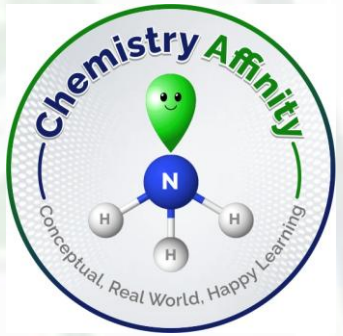


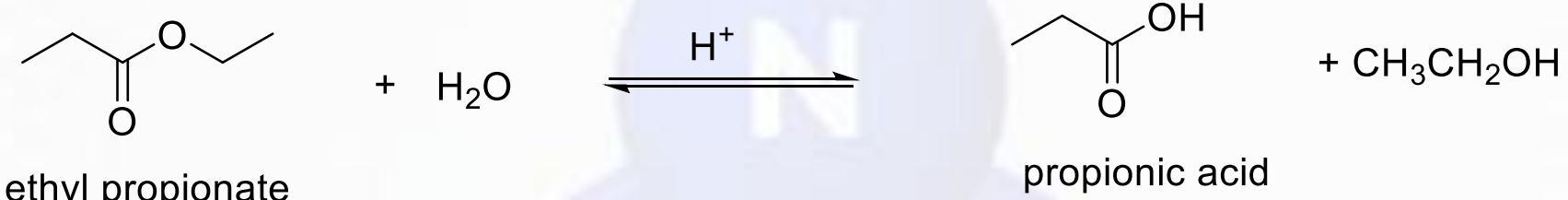
3-methylbutanoic acid

ethyl 3-methylbutanoate

Complete the following reactions and name the products

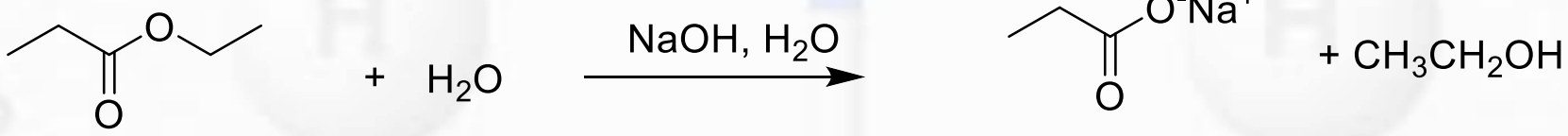






ethyl propionate

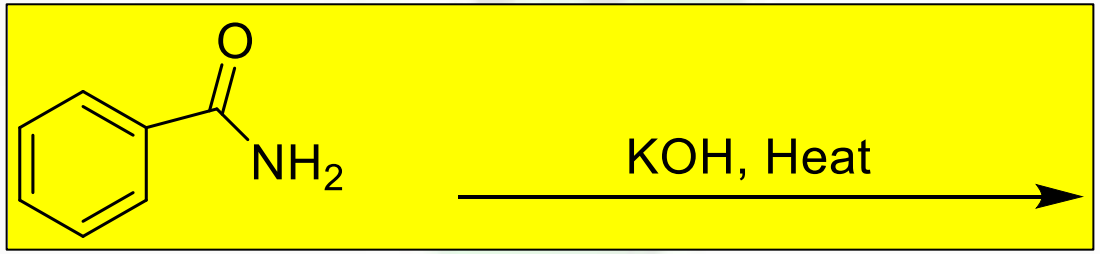
propionic acid

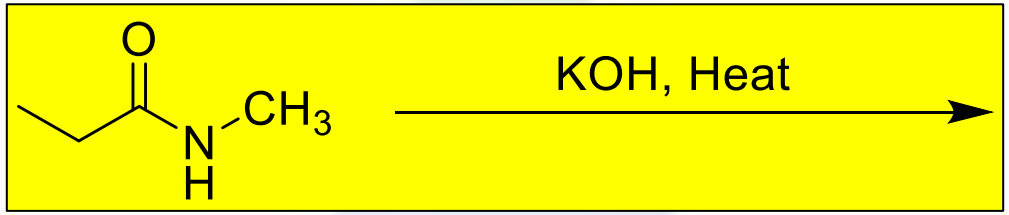


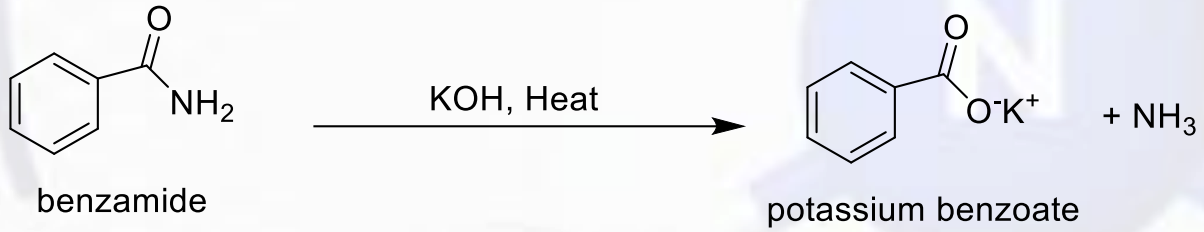
ethyl propionate

sodium propionate

Complete the following reactions and name the products

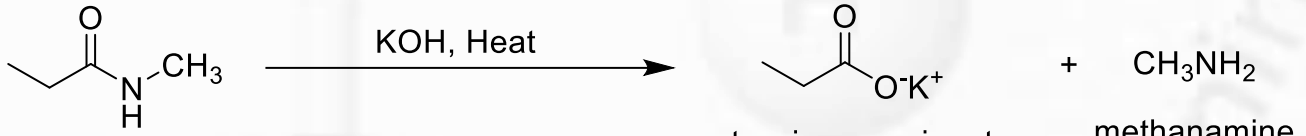






benzamide

potassium benzoate

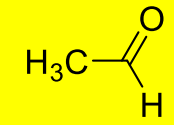
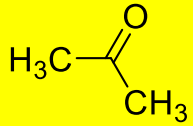
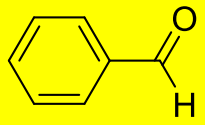
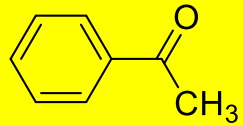


N-methylpropionamide

potassium propionate

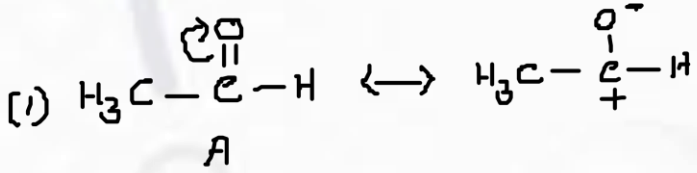
methanamine

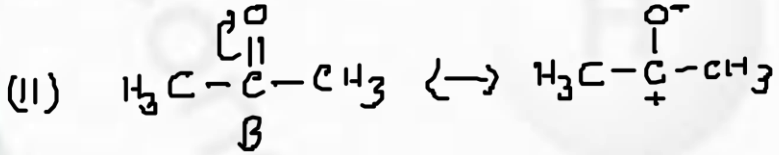
Which of the following compounds is most reactive towards nucleophilic addition?

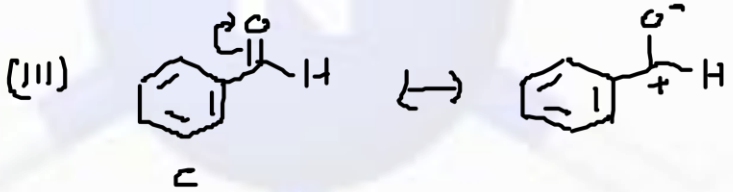
(i)  (ii)  (iii)  (iv) 

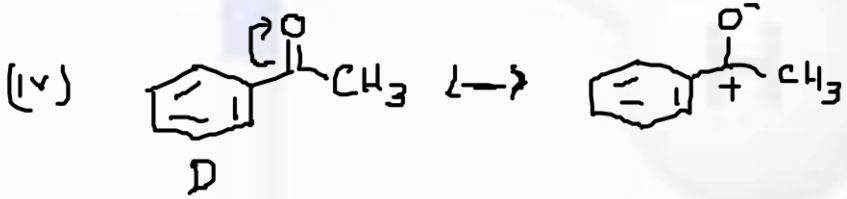
1. Most reactive towards nucleophilic addition means carbonyl carbon should have strong (+ve) charge

2. Strong (+ve) charge over the carbonyl carbon means charge should be less delocalized

(I) 

(II) 

(III) 

(IV) 

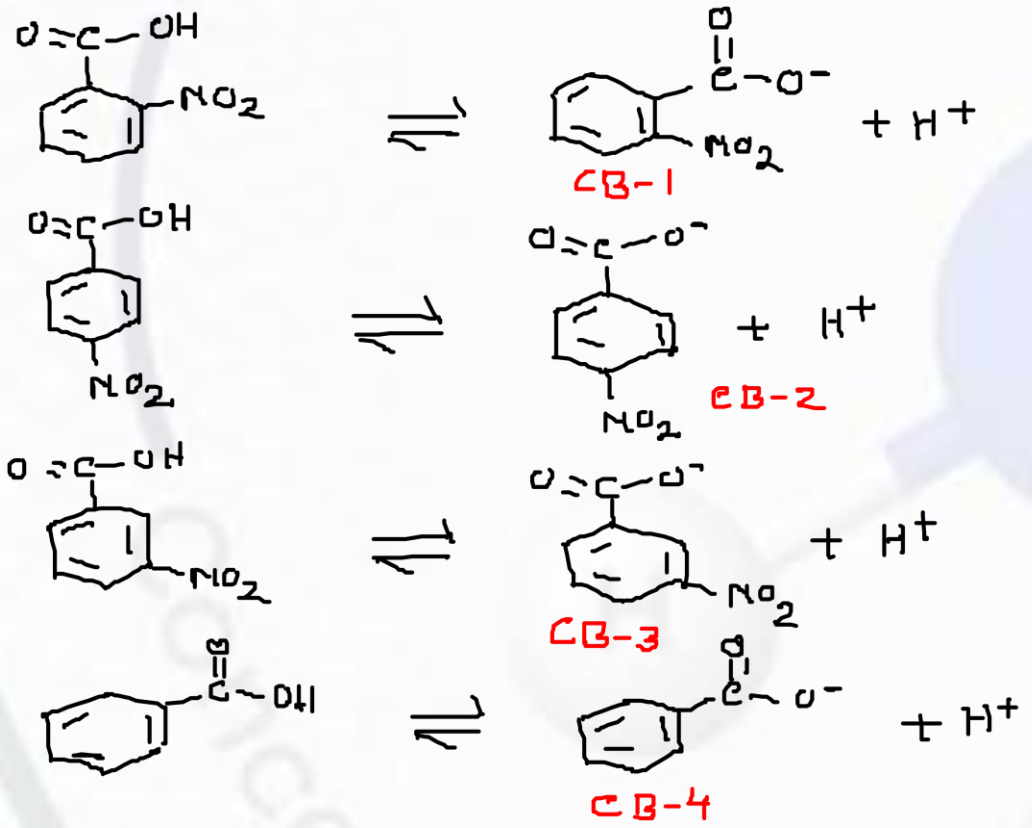
In compound D, + ve charge on carbonyl carbon is more delocalized due to resonance and +I effect

In compound A, + ve charge on carbonyl carbon is more localized/intensified as it has only one methyl group, which exert +I effect

Therefore, compound A is most reactive to nucleophilic addition

Of the following, the strongest acid is:

1. o-$NO_2C_6H_4COOH$
2. p-$NO_2C_6H_4COOH$
3. m-$NO_2C_6H_4COOH$
4. PhCOOH



To finding out strongest acid we have to check most stable conjugate base

Most stable conjugate base means more forward reaction and more H+ ions form, thus acid become stronger

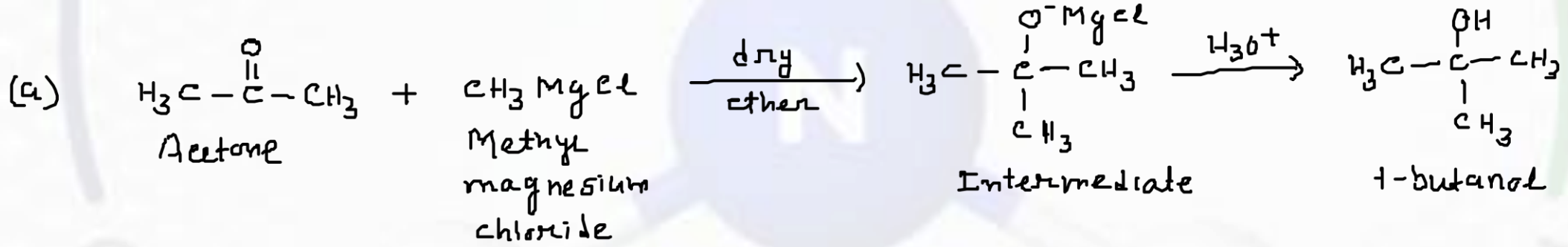
CB-2 is most stable because it has an EWG NO_2 at ortho position, which delocalize the negative charge over oxygen and gives stability to CB-1

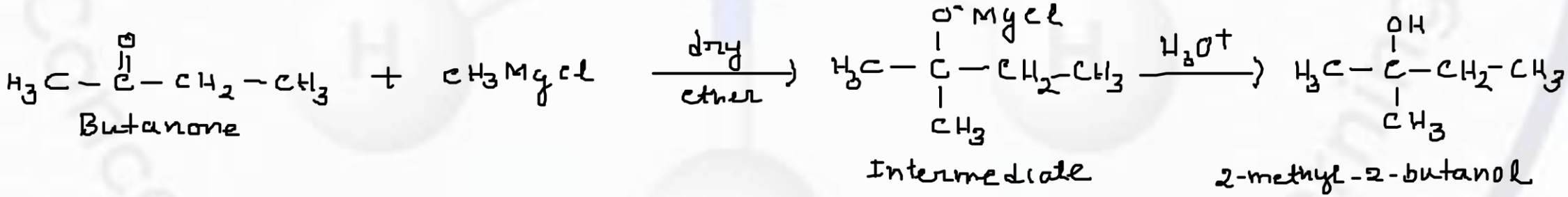
Therefore, o-nitro benzoic acid is strongest acid

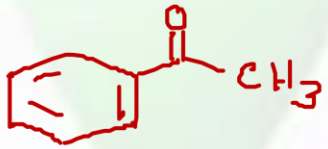
What happens when (a) propanone and butanone are treated with methyl magnesium chloride and then hydrolyzed respectively

(b) Benzene is treated with CH_3COCl in presence of anhy $AlCl_3$

(c) Sodium benzoate is heated with soda lime

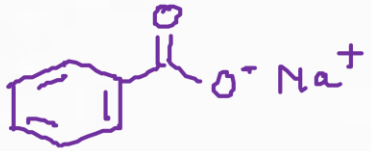




(b)  Anhy $AlCl_3$ / CH_3COCl 

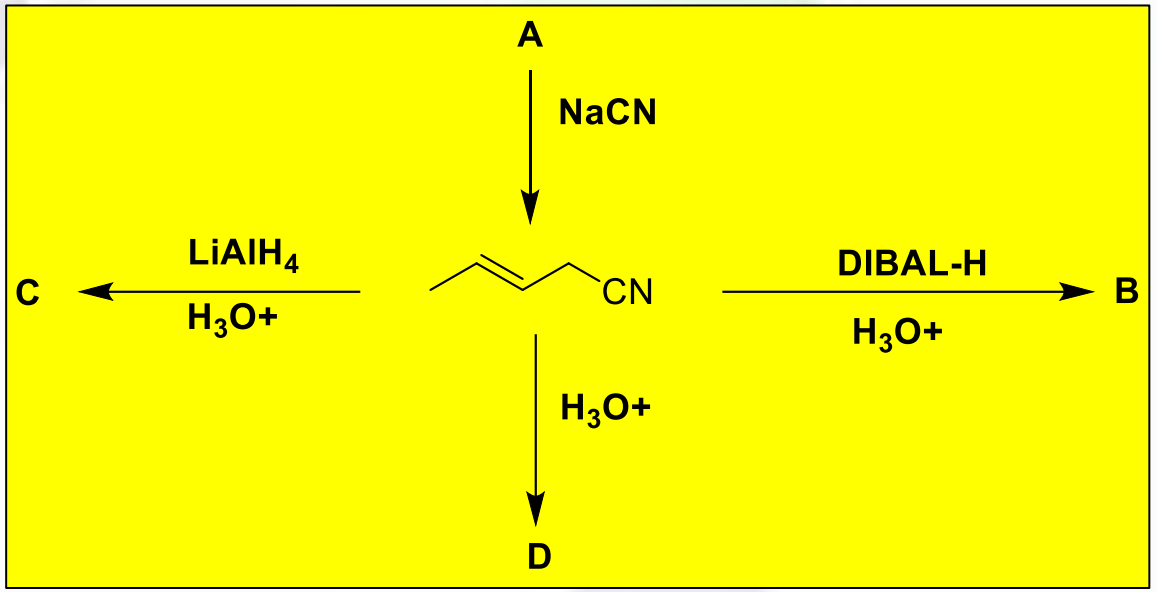
Benzene — Acetophenone

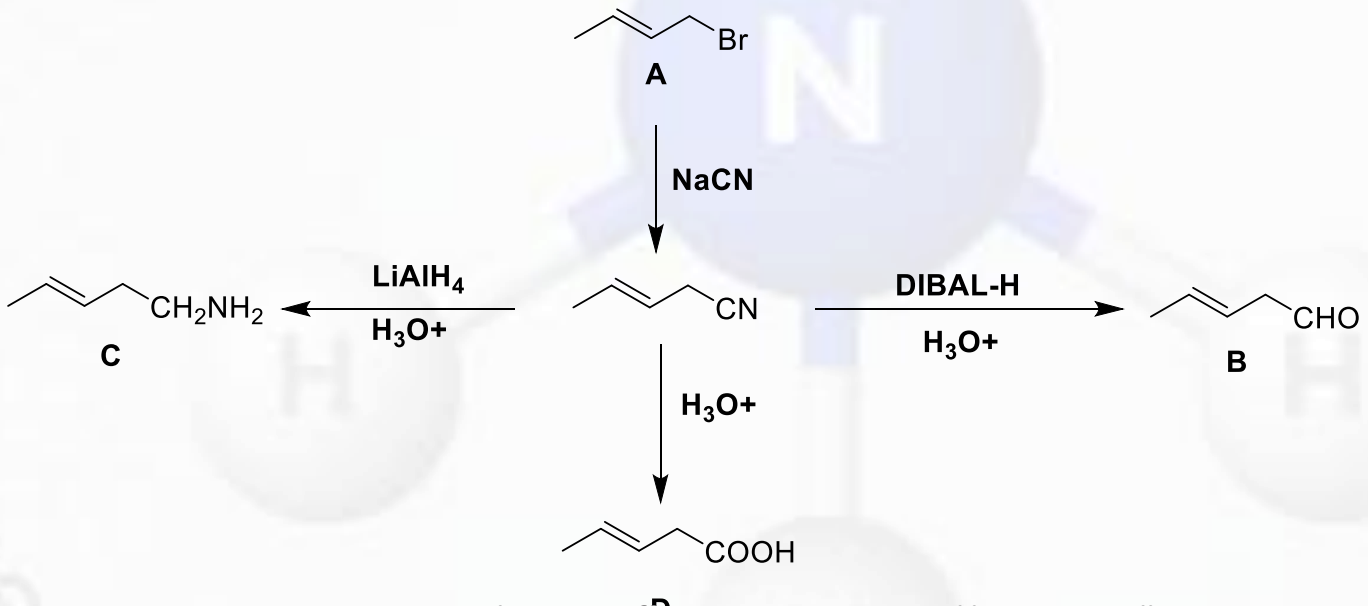
Friedel Craft's Acylation

(c)  $NaOH, CaO$ / heat  + Na_2CO_3

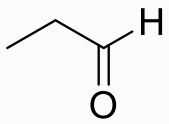
Sodium benzoate — benzene

Decarboxylation Reaction

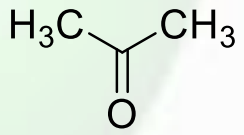

A
NaCN
LiAlH4
H3O+
C
CN
DIBAL-H
H3O+
B
H3O+
D


Br
A
NaCN
LiAlH4
H3O+
CH2NH2
C
CN
DIBAL-H
H3O+
CHO
B
H3O+
COOH
D

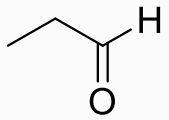
How can you distinguish between propanal and propanone?



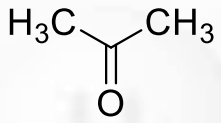
propionaldehyde



propan-2-one

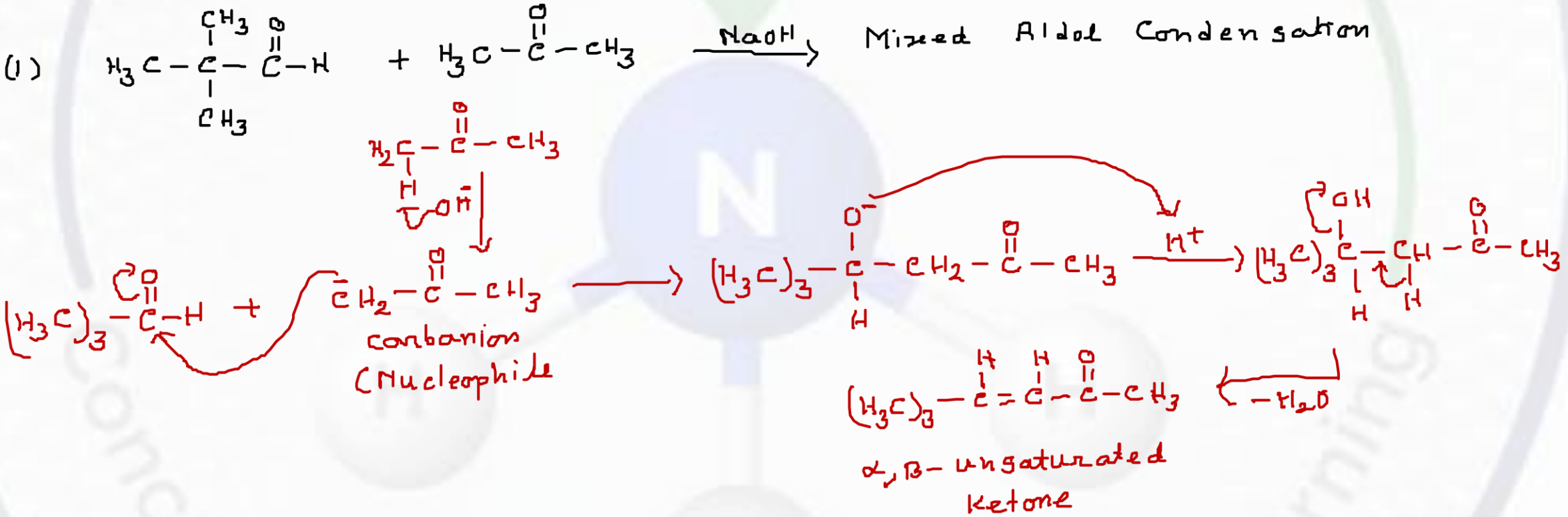


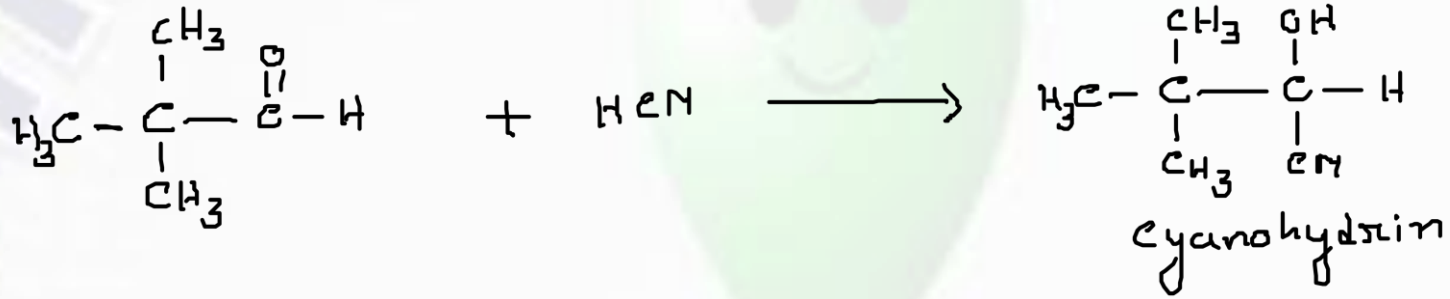
propionaldehyde



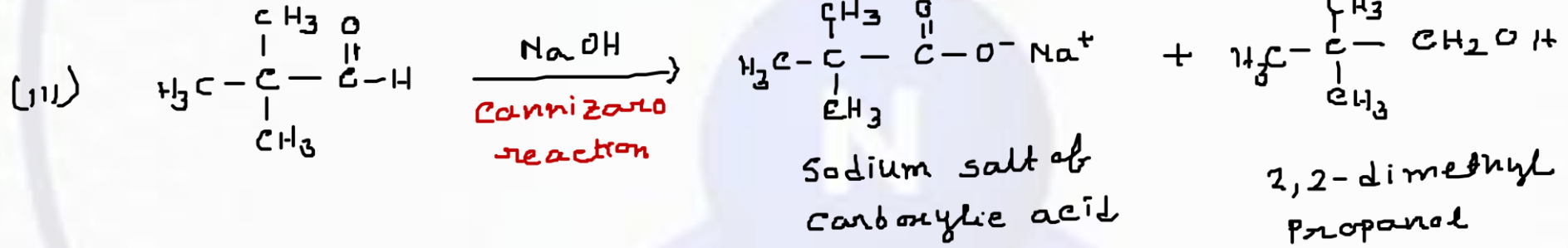
propan-2-one

Write the products formed when $(CH_3)_3C\text{-}CHO$ reacts with the following reagents
(i) CH_3COCH_3 in presence of dilute NaOH
(ii) HCN, (iii) Conc NaOH



(ii) 

cyanohydrin

(iii) 

Sodium salt of carboxylic acid

2,2-dimethyl propanol

Practice Makes Perfect