Victor Meyer's method to distinguish alcohols :

In Victor Meyer's method, alcohol is first treated with P and I_2 to get iodoalkane , which is then treated with $AgNO_2$ (silver nitrate) to get nitroalkane. The nitroalkane thus obtained is treated with nitrous acid (a mixture of $NaNO_2$ and dil. HCl) and the resulting solution is finally made alkaline with KOH and the colour is observed. If the colour obtained is :

Red Colour = Primary alcohol

Blue Colour = Secondary alcohol

No colour = Tertiary alcohol.

Primary (1º) alcohol	Secondary (2º) alcohol	Tertiary(3º) alcohol
$R-CH_2-OH$	R_2CH-OH	R_3C-OH
$\downarrow P + I_2$	$\downarrow P + I_2$	$\downarrow P + I_2$
$R-CH_2-I$ (Iodoalkane)	R_2CH-I (Iodoalkane)	R_3C-I (Iodoalkane)
$\downarrow AgNO_2$	$\downarrow AgNO_2$	$\downarrow AgNO_2$
$R-CH_2-NO_2$ (Nitroalkane)	R_2CH-NO_2 (Nitroalkane)	R_3C-NO_2 (Nitroalkane)
$\downarrow HNO_2$ $(NaNO_2 + HCl)$	$\downarrow HNO_2$ $(NaNO_2 + HCl)$	$\downarrow HNO_2$ $(NaNO_2 + HCl)$
N-OH ‖ $R-CH-NO_2$ (nitrolic acid)	N=O | R_2C-NO_2 (pseudonitrol)	No Reaction
$\downarrow KOH$	$\downarrow KOH$	$\downarrow KOH$
Red colour	Blue colour	No colour (Colourless)

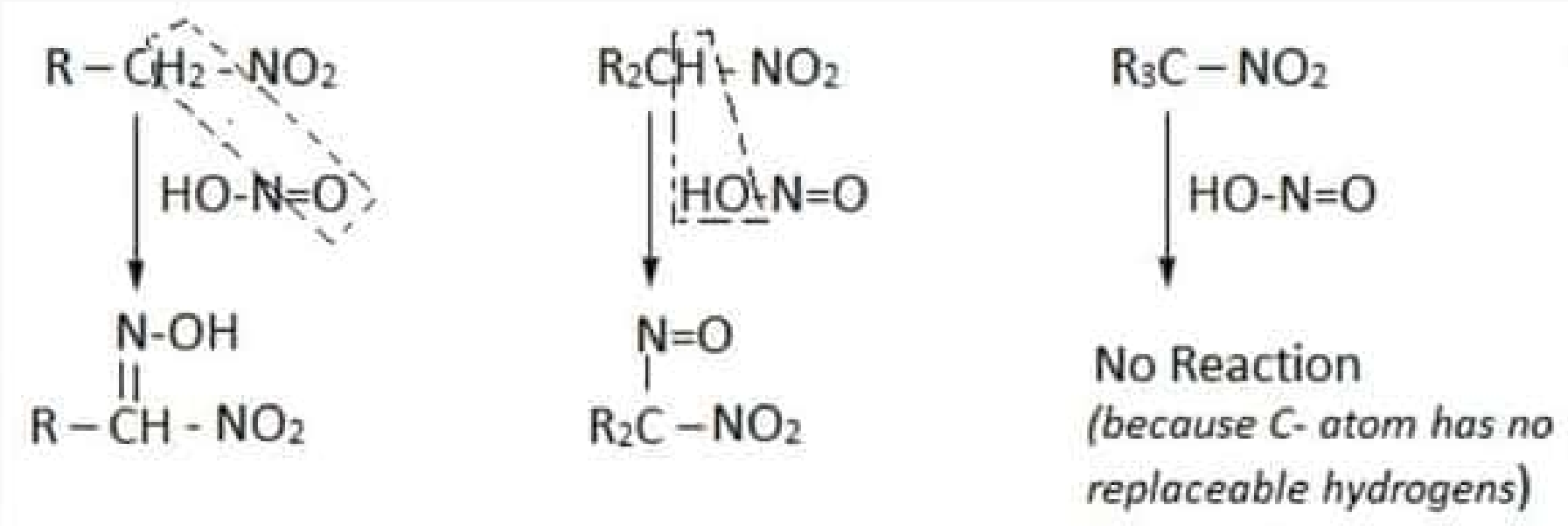
Victor- Meyer's method to distinguish alcohols

$+ P + I_2 \quad + AgNO_2 +$

$HNO_2(NaNO_2 + HCl) + KOH$

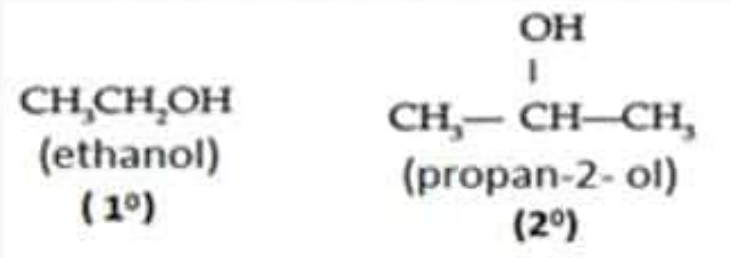
(Primary alcohol) *(Secondary alcohol)* *(Tertiary alcohol)*

Note : *All the steps are easy to remember. The reaction pattern for third step i.e. reaction of nitroalkane with HNO_2 (HONO) is as follows :*



Q. How would you distinguish ethanol and propan-2- ol using Victor Meyer's method?

→ Ethanol is a primary alcohol while propan-2-ol is a secondary alcohol.



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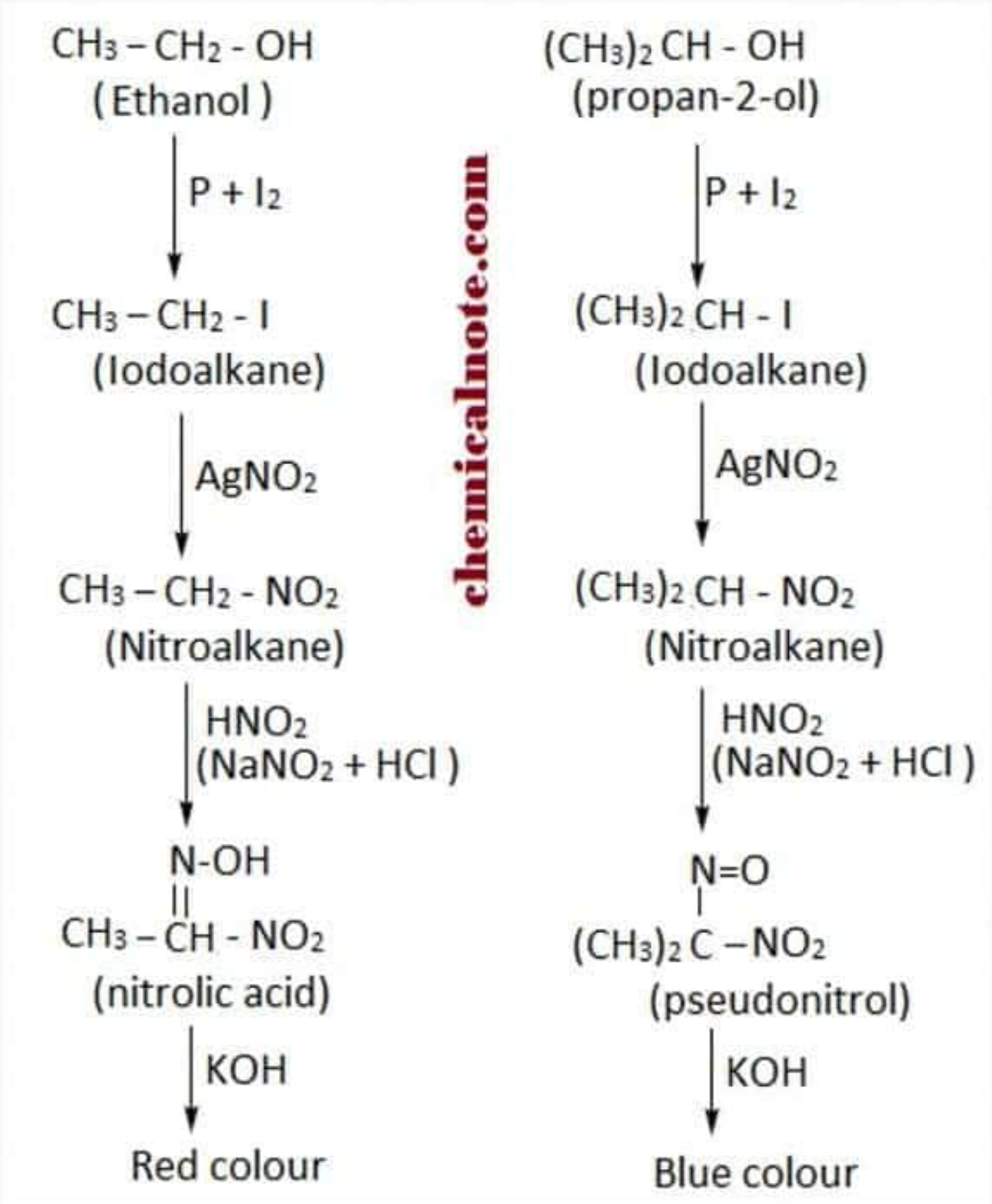
Red Colour = Primary alcohol

Blue Colour = Secondary alcohol

Hence, ethanol and propan-2-ol can be distinguished by observing colour in Victor-Meyer's method as ethanol gives red colour while propan-2-ol gives blue colour .

Hence, ethanol and propan-2-ol can be distinguished by observing colour in Victor-Meyer's method as ethanol gives red colour while propan-2-ol gives blue colour .



9) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{N}}}}-CH_3$ Trimethyl amine N,N,N dimethyl amino methane

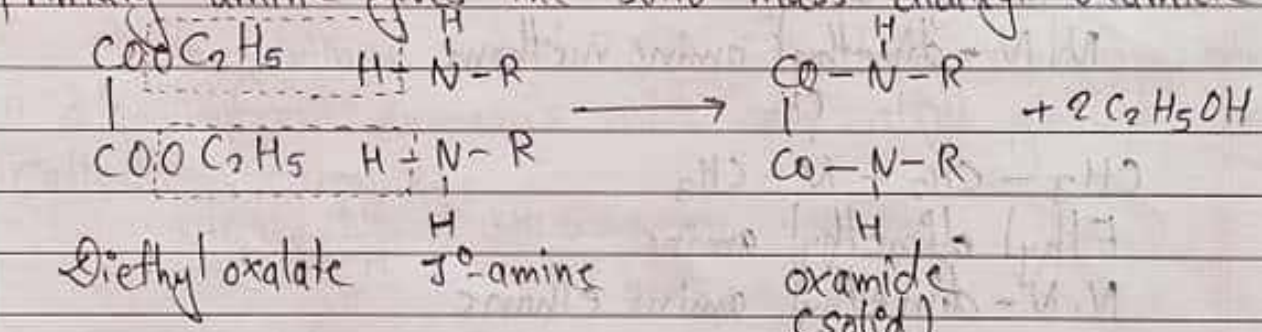
WTMP

Separation of primary (1°), secondary (2°) & Tertiary (3°) by Hoffmann's method.

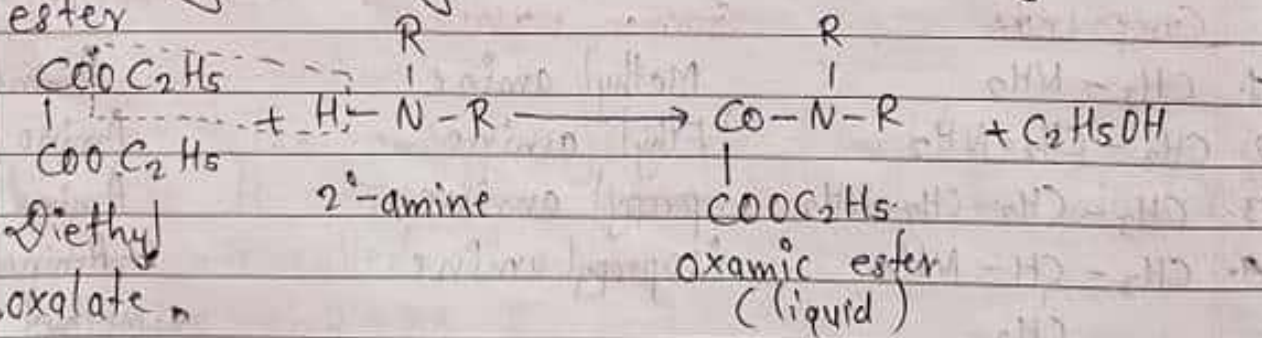
The mixture of 1°, 2° & 3°- amines is separated by Hoffmann's method with the help of following steps.

1) The mixture of 1°, 2° and 3°- amines are treated with diethyl oxalate

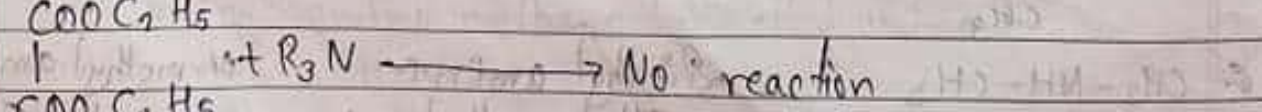
a) Primary amine gives the solid mass dialkyl oxamide



b) Secondary amine gives the liquid mass dialkyl oxamic ester



c) Tertiary amine does not react with diethyl oxalate due to absence of replaceable H-atom.

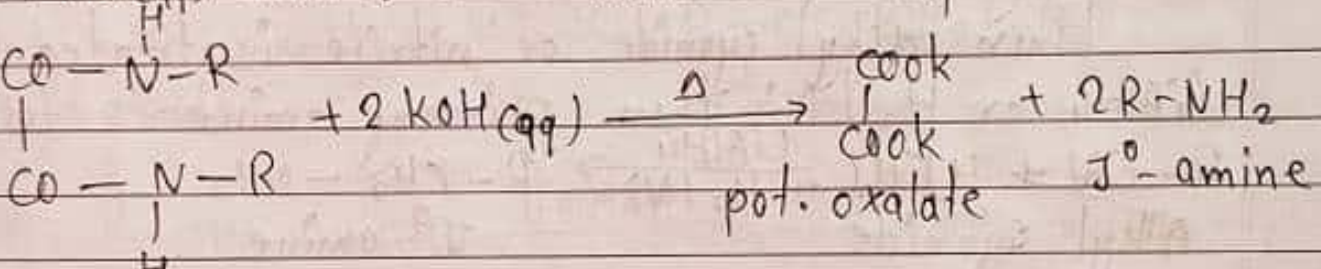


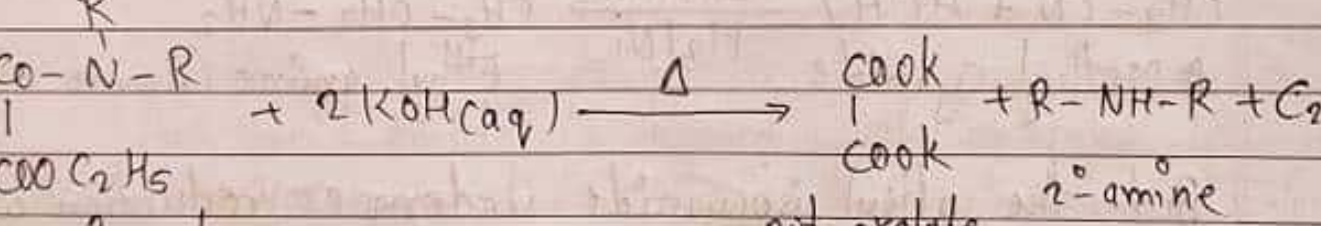
The unreacted 3°-amine is separated by fractional

distillation. It is because 3°-amine has low boiling point than other in the mixture.

2) The mixture contains the solid mass (oxamide) and liquid mass (oxamic ester) where the alcohol is also separated by fractional distillation. The mixture is separated by filtration into separate vessels.

3) The solid and liquid mass are separately heated with KOH(aq) or NaOH(aq) then 1° & 2°-amines are separated.

(a) 

(b) 

The ethanol impurity is separated by fractional distillation.

General methods for the preparation of amines:-

1) From haloalkanes:

When haloalkane is heated with alcoholic ammonia at 100°C then the mixture of 1°, 2°, 3° & 4°-amines are formed.