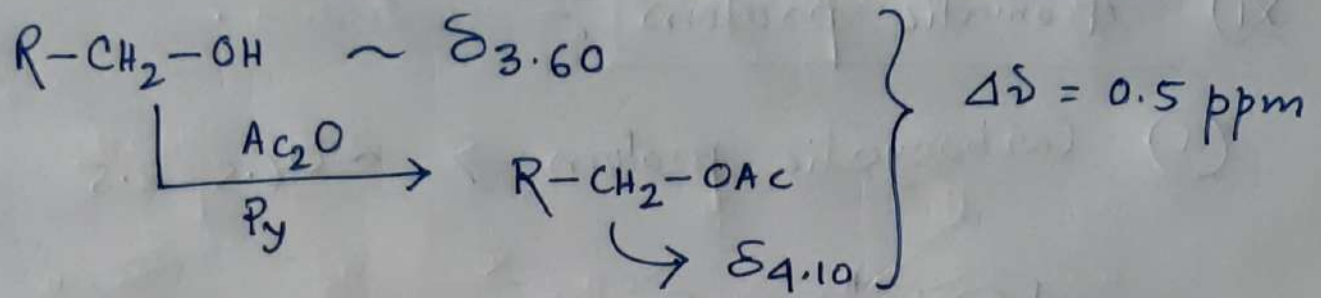
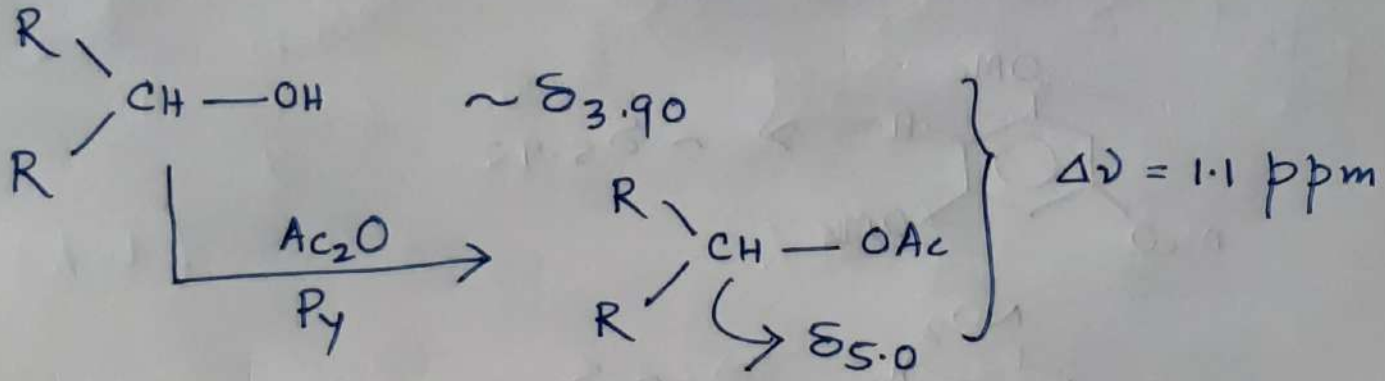
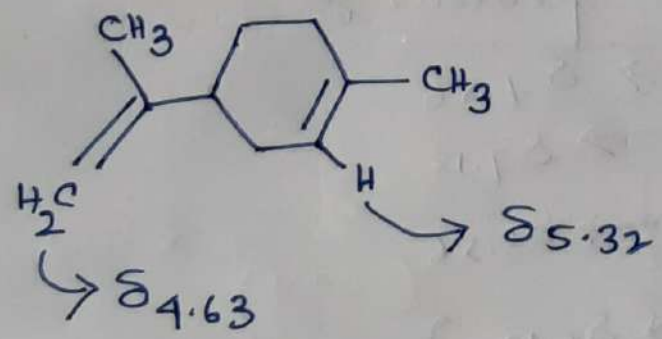
vii) $-CH_2$ & $-CH$ attached to $-OH$ & $-OAc$:-





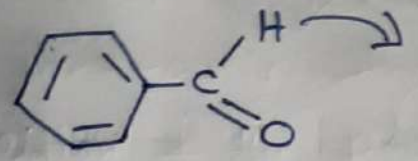
viii) Olefinic protons :- $\delta_{4.6-6.4}$



In case of extended Conjugation in olefins the olefinic proton signals merge with those of aromatic protons.

ix) Acetylinic protons :- $\sim\delta_{2.5-3.0}$

X) Aldehydic protons :- ~$\delta_{10.0}$

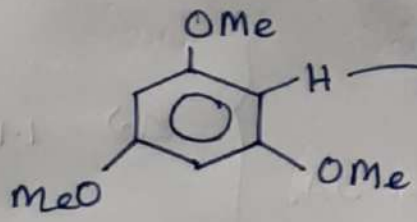


→ ~$\delta_{9.86}$

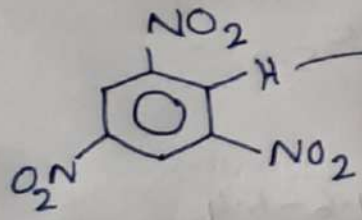
xi) Aromatic protons :-

(a) Carbocyclic protons → ~$\delta_{6.5-8.5}$

→ $\delta_{7.26}$

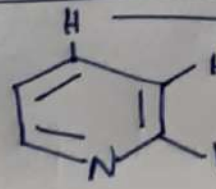


→ ~$\delta_{5.95}$

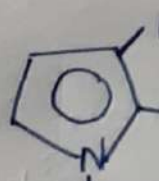


→ ~$\delta_{9.97}$

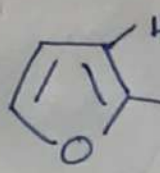
(b) Heterocyclic protons :-



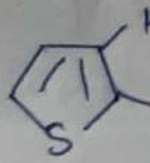
H → $\delta_{7.56}$
H → $\delta_{7.18}$
H → $\delta_{8.56}$



H → $\delta_{6.12}$
H → 6.52
} $\Delta\nu$ = 0.40 ppm
H → ~$\delta_{7.53}$



H → $\delta_{6.29}$
H → $\delta_{7.34}$
} $\Delta\nu$ = 1.05 ppm

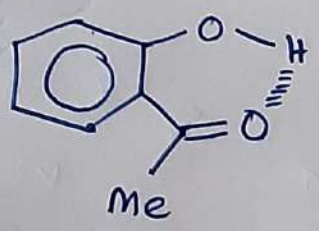


H → ~$\delta_{7.12}$
H → $\delta_{7.22}$

Phenols :- ~δ 6.0 - 7.7 in moderate Concentration

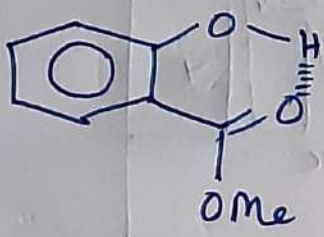
Shifts upfield on dilution ~ 4-5

In some ortho substituted phenols capable of strong intramolecular H-bond, the phenolic hydroxyl proton signals are shifted downfield. (~δ 10.52 - 12.5)

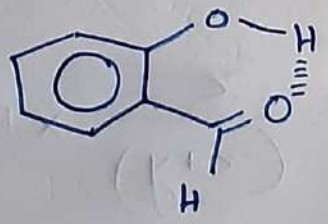


→ δ 12.5

(unchanged on dilution)



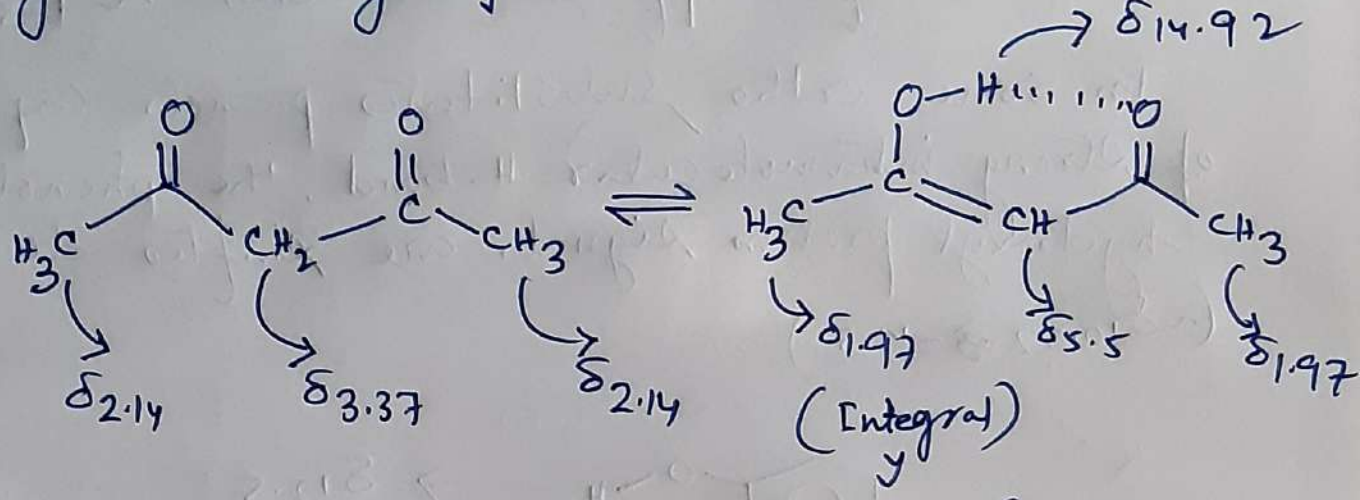
→ δ 10.56

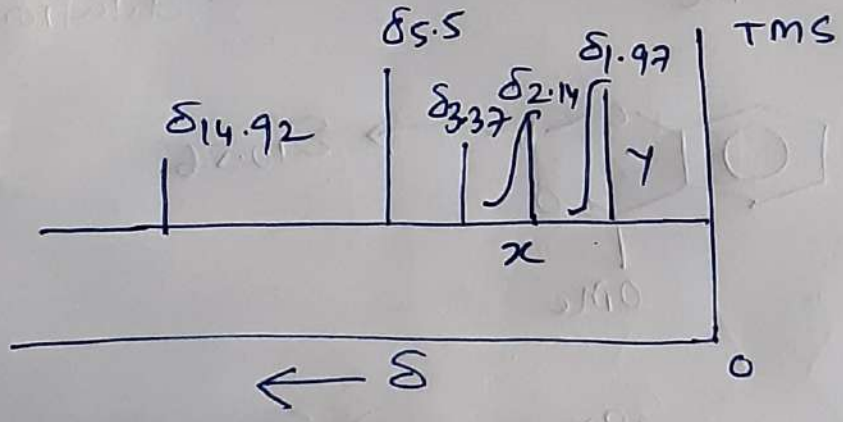


→ δ 10.95

Enols :-

Enols owe their existance to strong intramolecular H-bonding. The enolic hydrogen appears as a very down field position & the position of the signals remains unchanged on change of concentration.





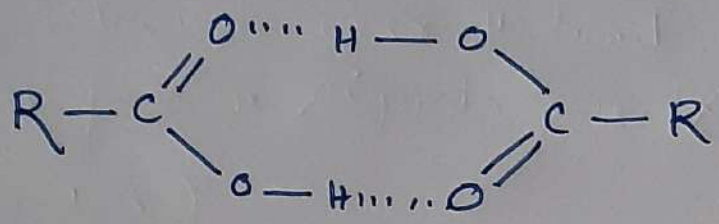
$$\% \text{ of Keto form} = \frac{x}{(x+y)} \times 100$$

$$\% \text{ of enol form} = \left(\frac{y}{x+y}\right) \times 100$$

From this method we can determine the keto-enol Content of a Compound exhibiting keto-enol tautomerism.

Carboxylic acid :- $\sim\delta_{10.5-12.0}$

$Ph-CH_2-COOH \rightarrow \sim\delta_{11.95}$



Amines :-

$-NH_2$

Aliphatic	Aromatic
$\sim\delta_{0.3-2.2}$	$\sim\delta_{2.6-4.7}$

Amides :- $(-CONH_2)$

Aliphatic → $\sim 5.0-8.5$