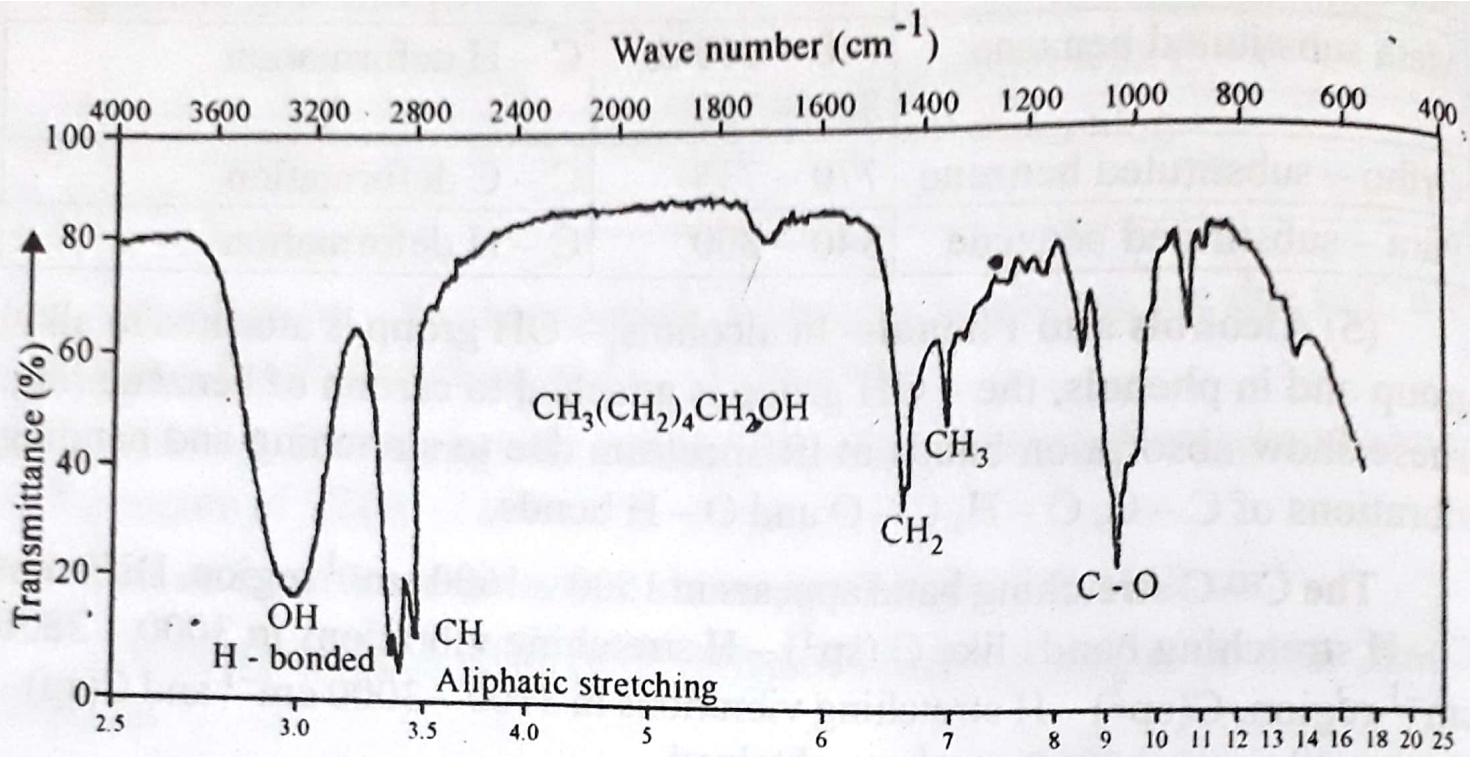


Fig 1.20 : Infrared spectrum of hexanol

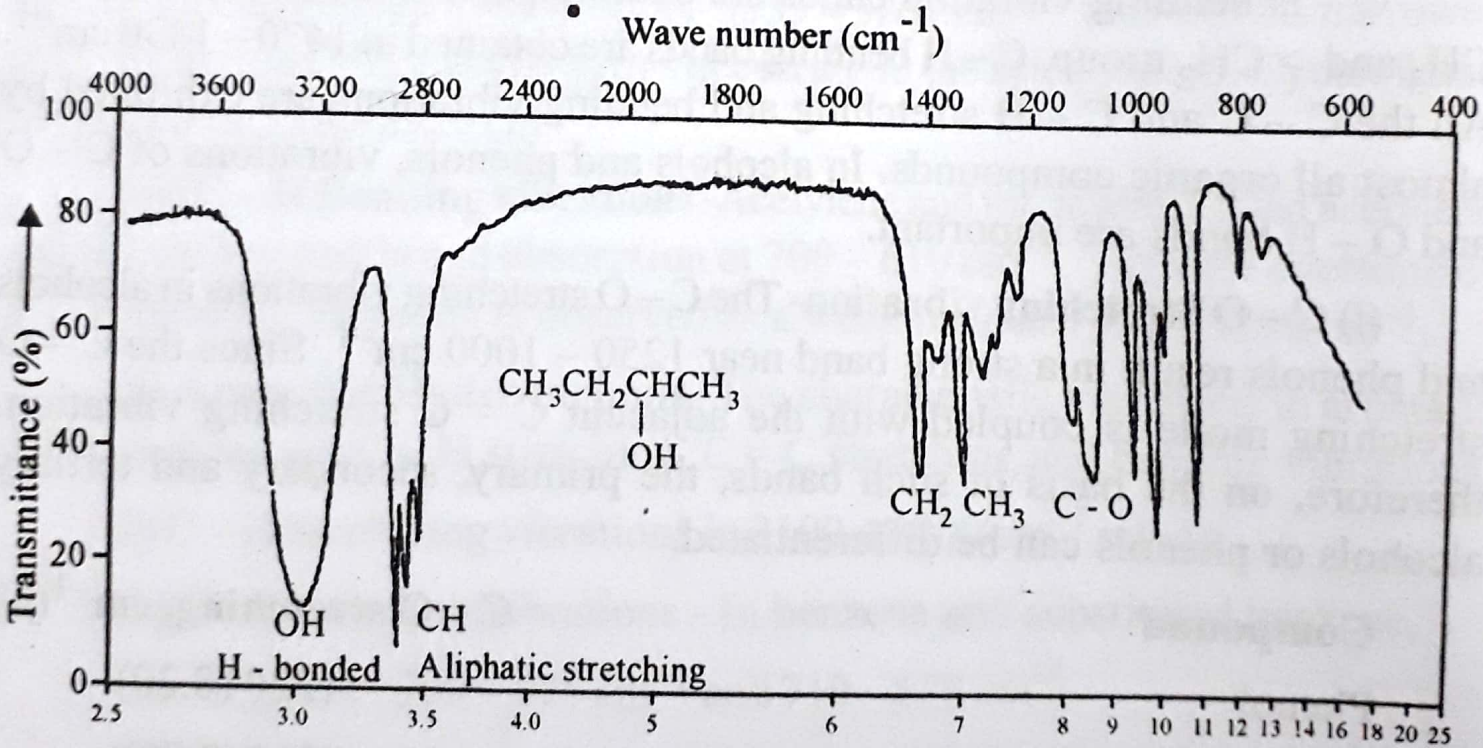


Fig 1.21 : Infrared spectrum of 2-butanol

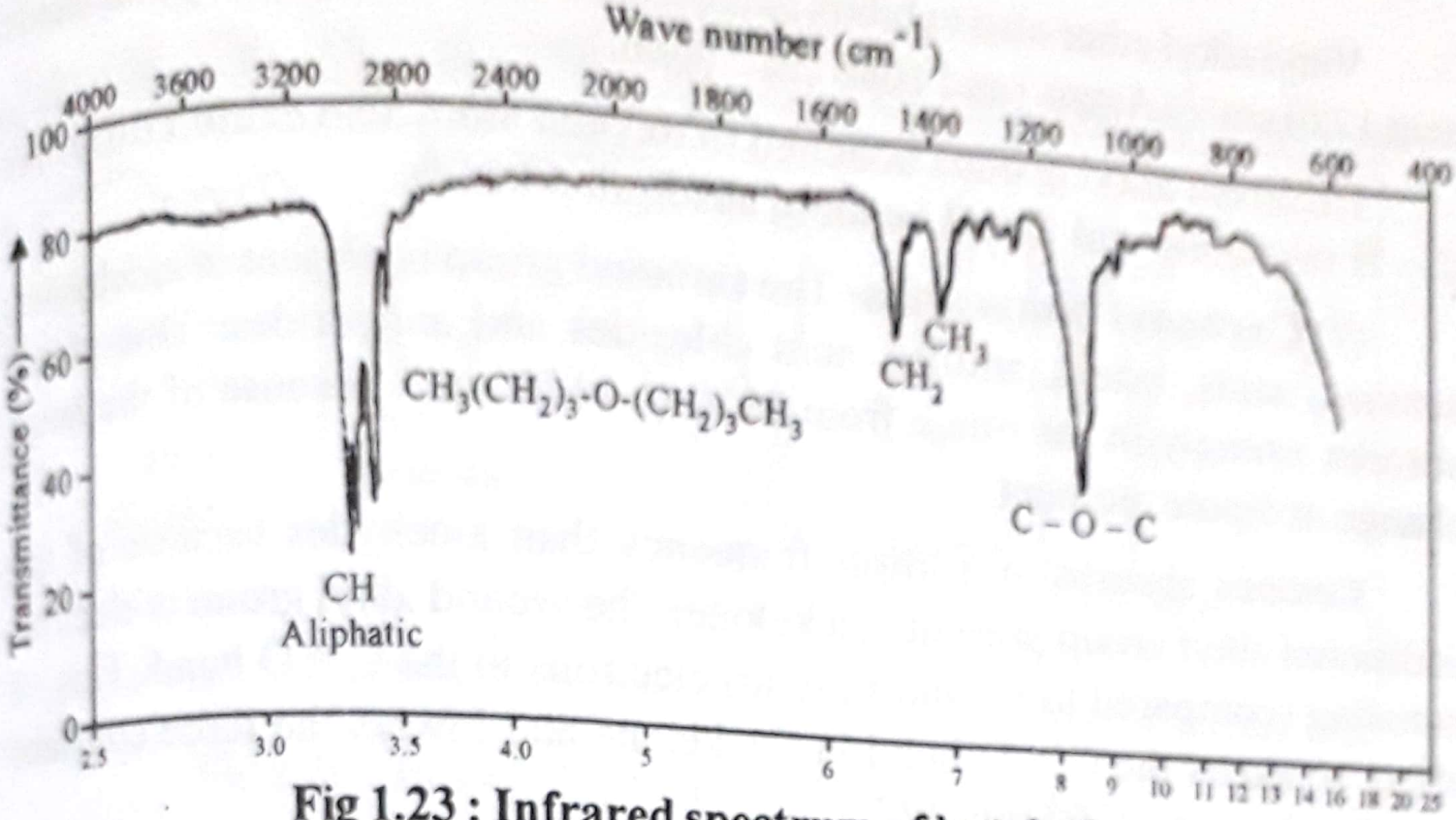


Fig 1.23 : Infrared spectrum of butyl ether

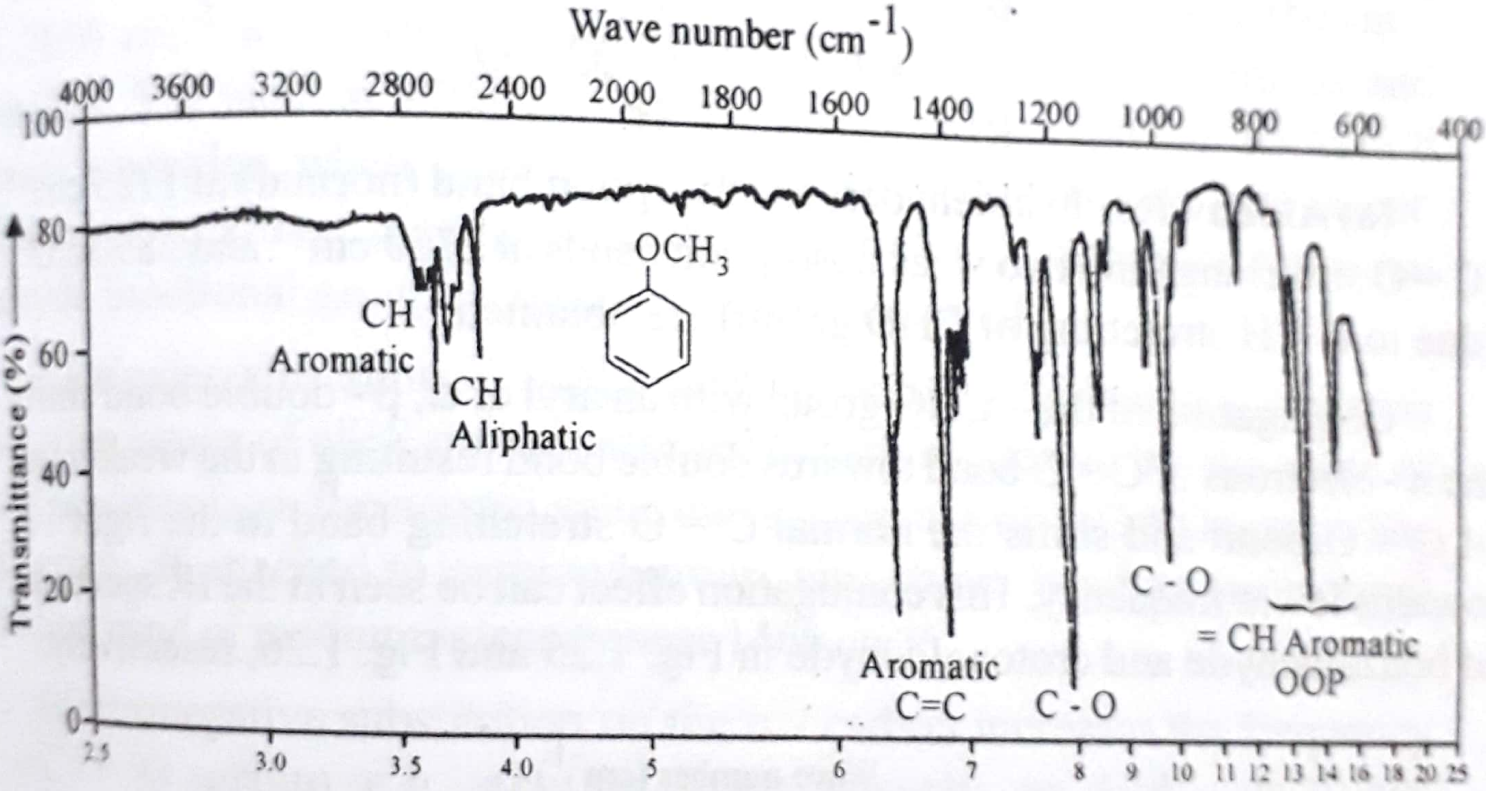


Fig 1.24 : Infrared spectrum of anisole

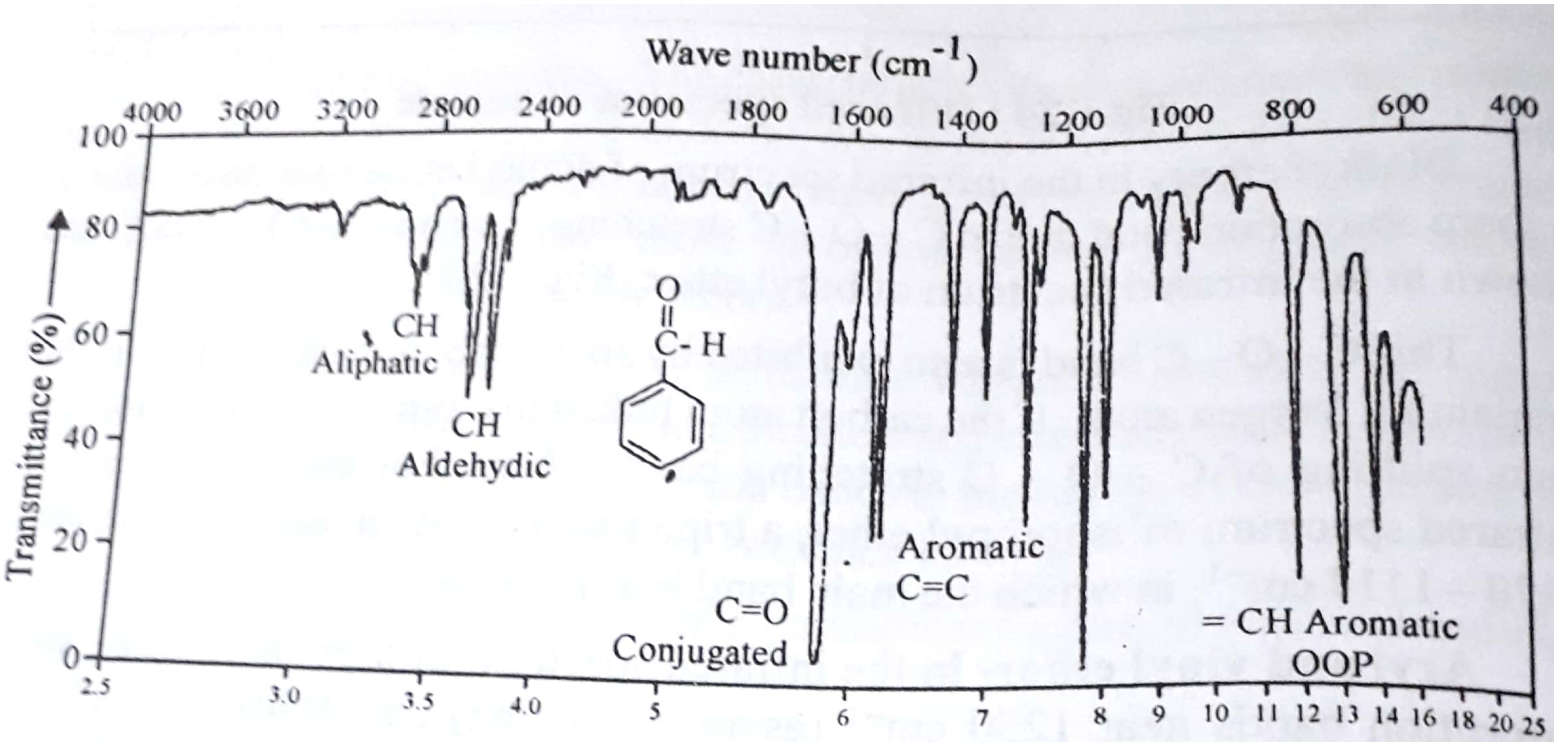


Fig 1.25 : Infrared spectrum of benzaldehyde

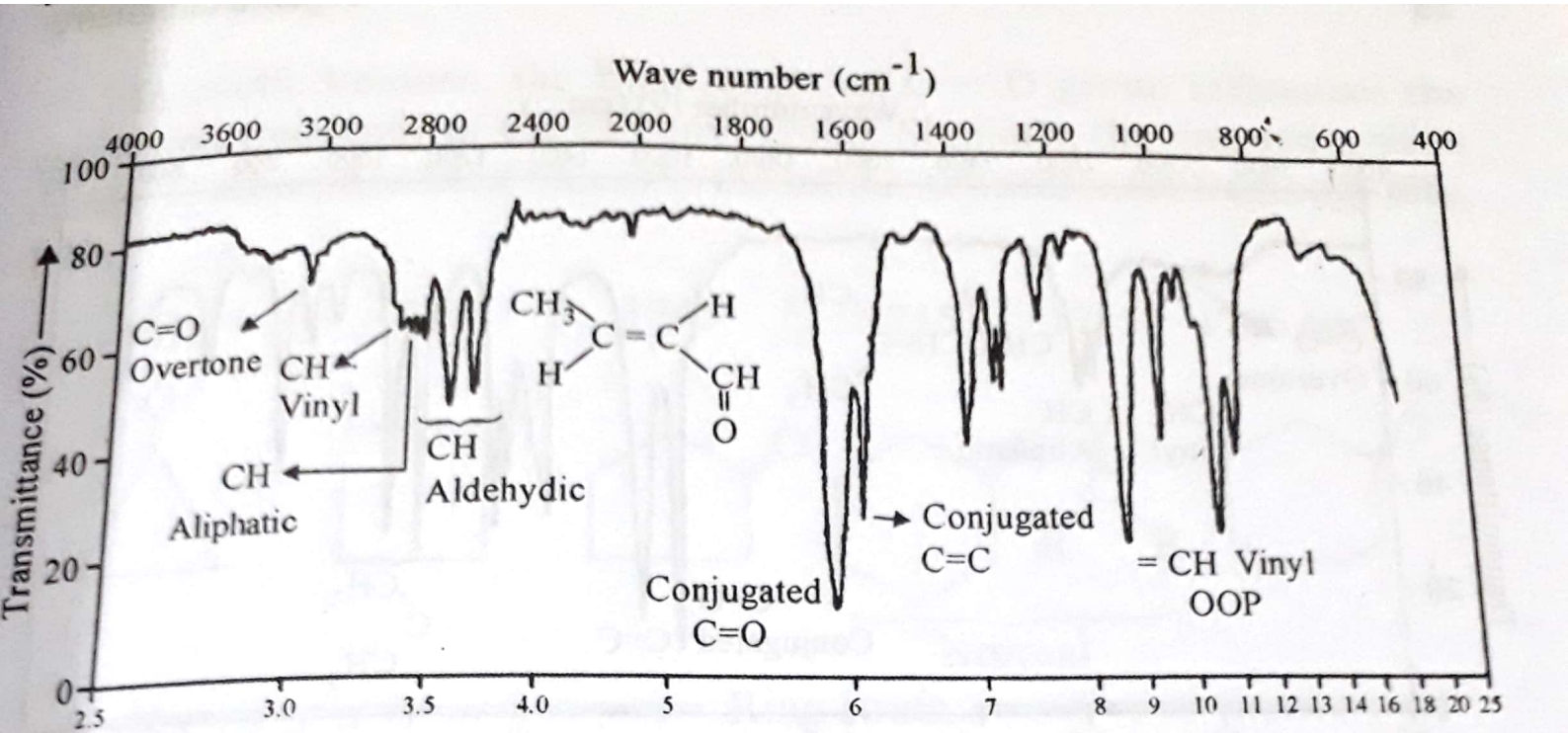


Fig 1.26 : Infrared spectrum of crotonaldehyde

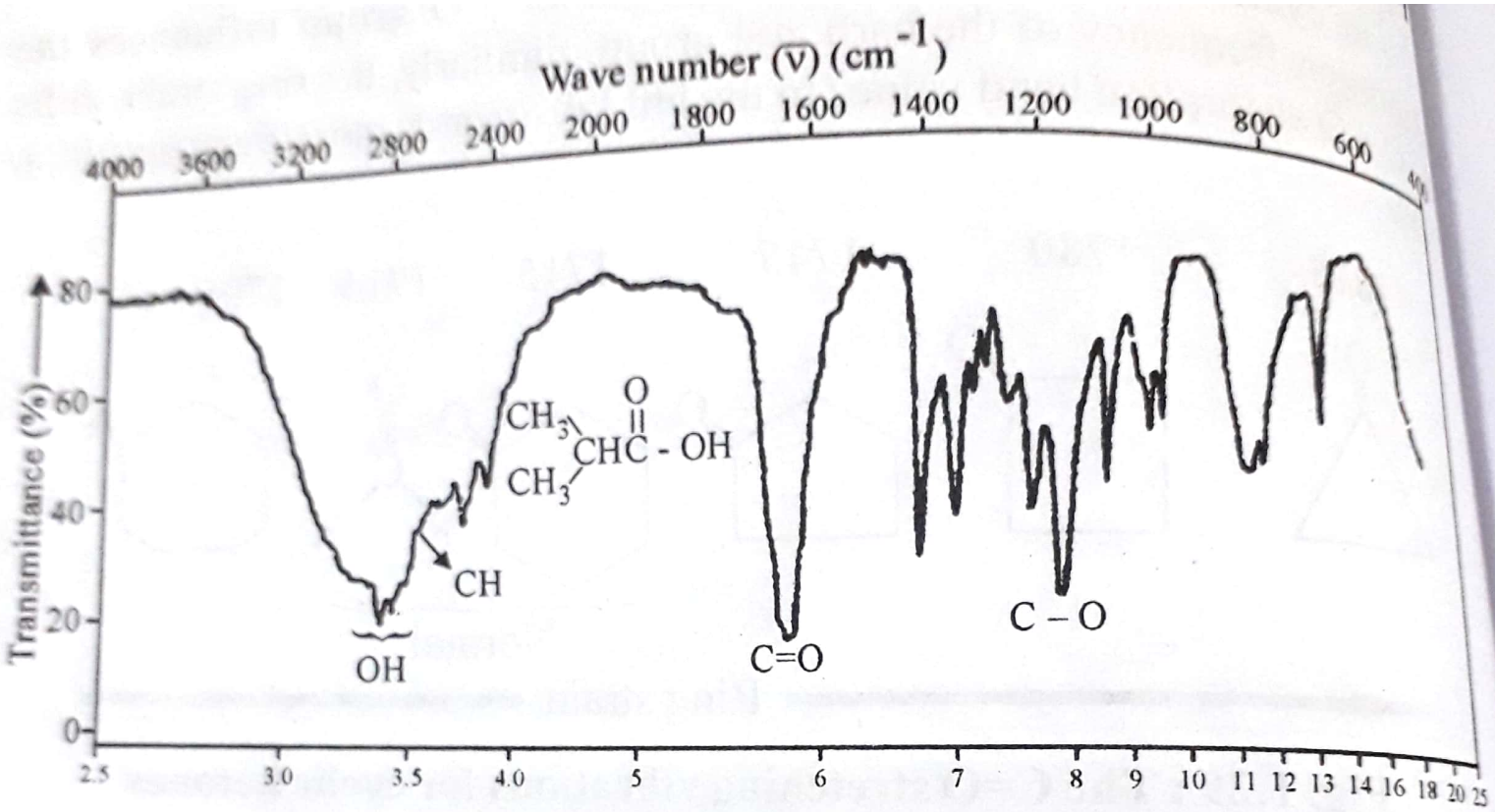


Fig 1.30 : Infrared spectrum of isobutyric acid

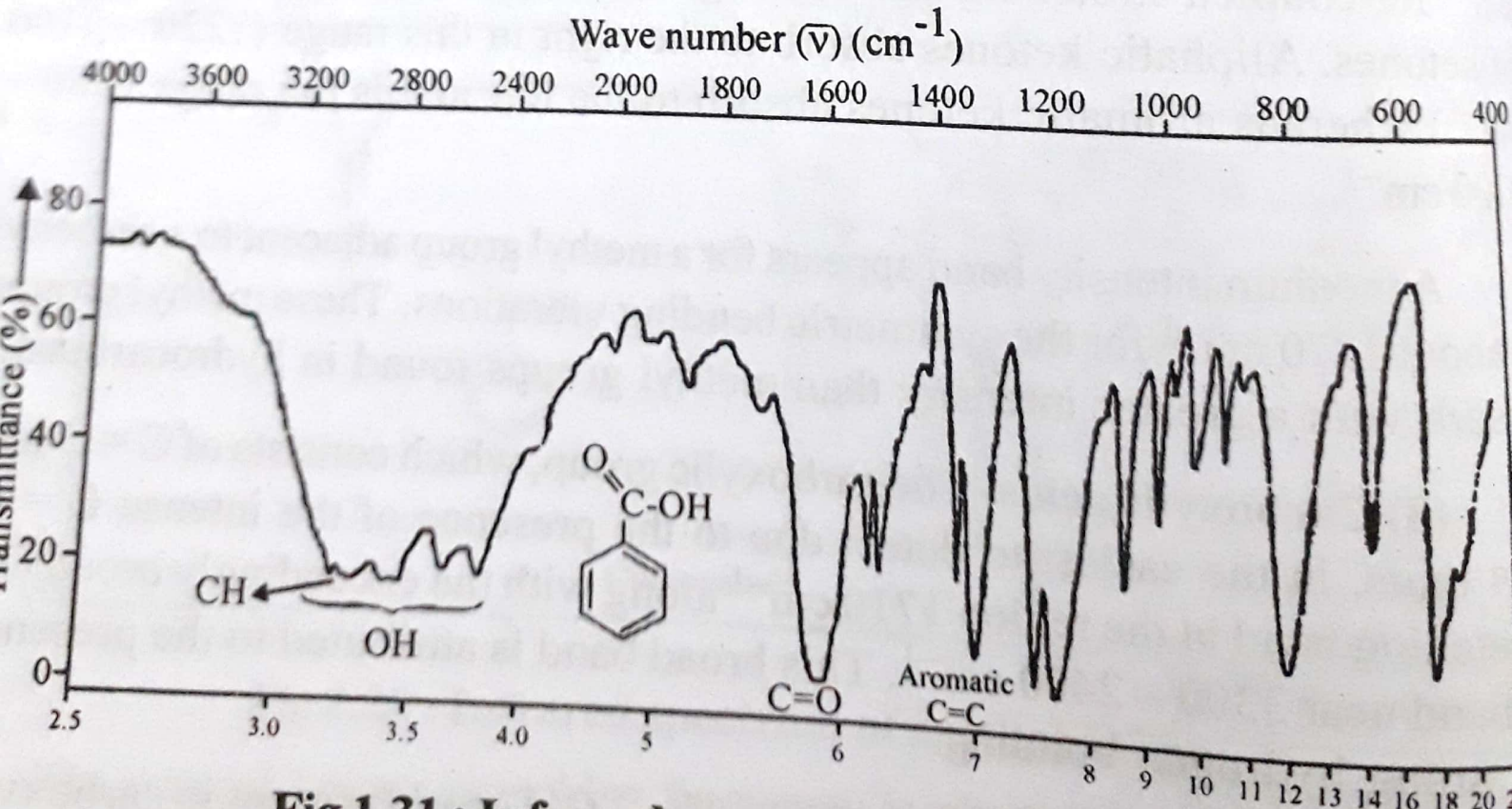


Fig 1.31 : Infrared spectrum of ben

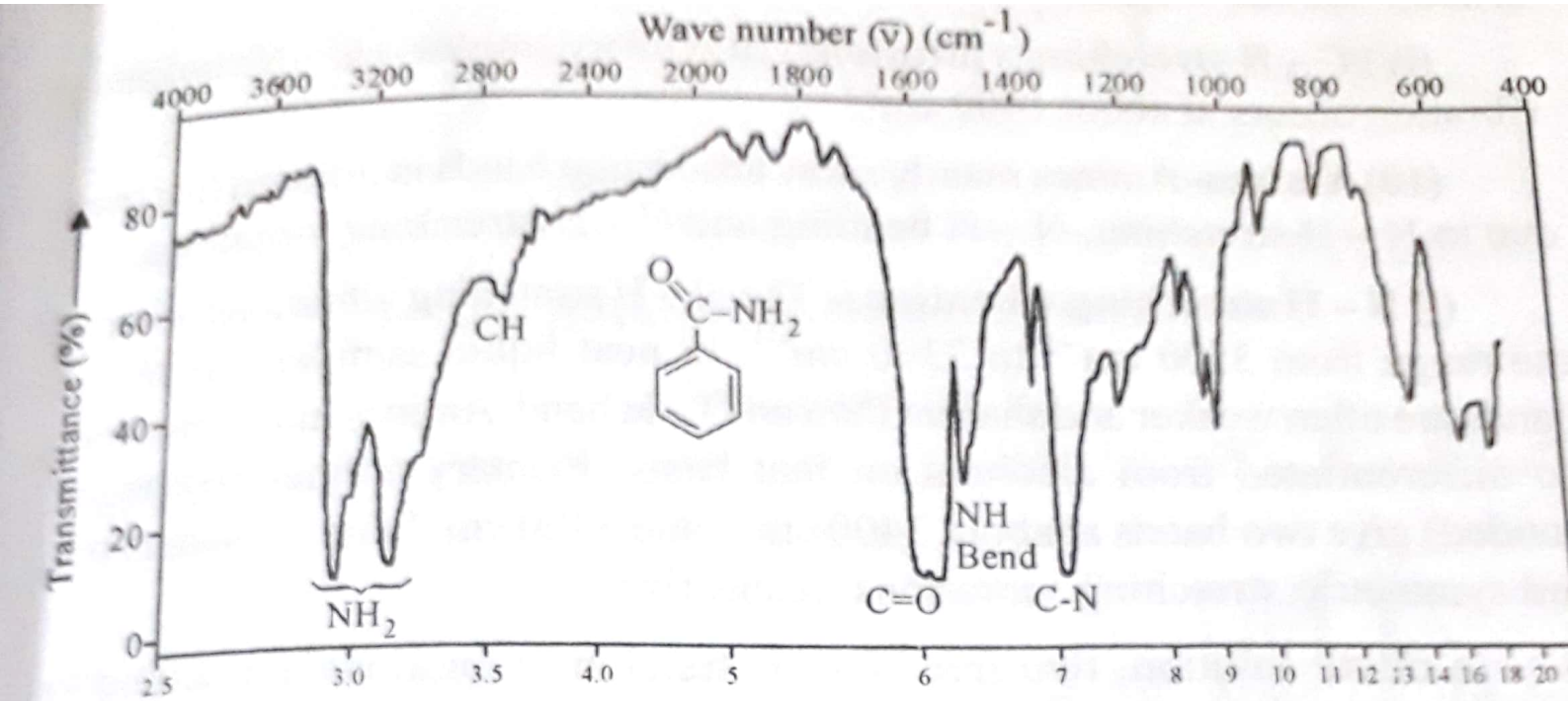


Fig 1.32 : Infrared spectrum of benzamide (solid phase)

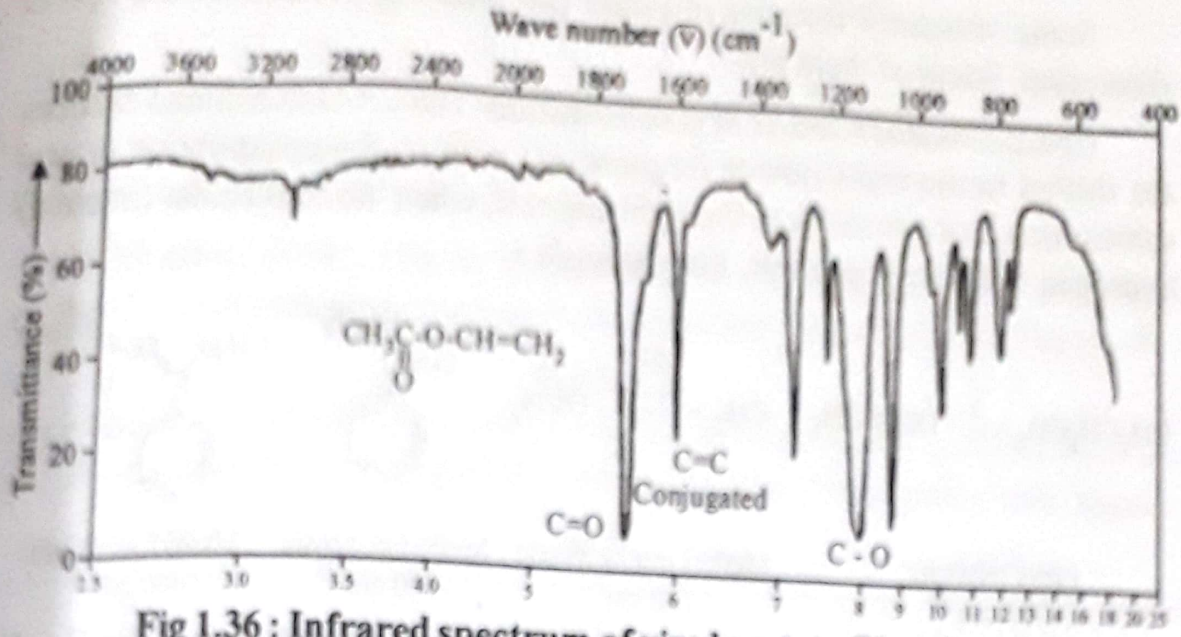


Fig 1.36 : Infrared spectrum of vinyl acetate (Neat liquid)

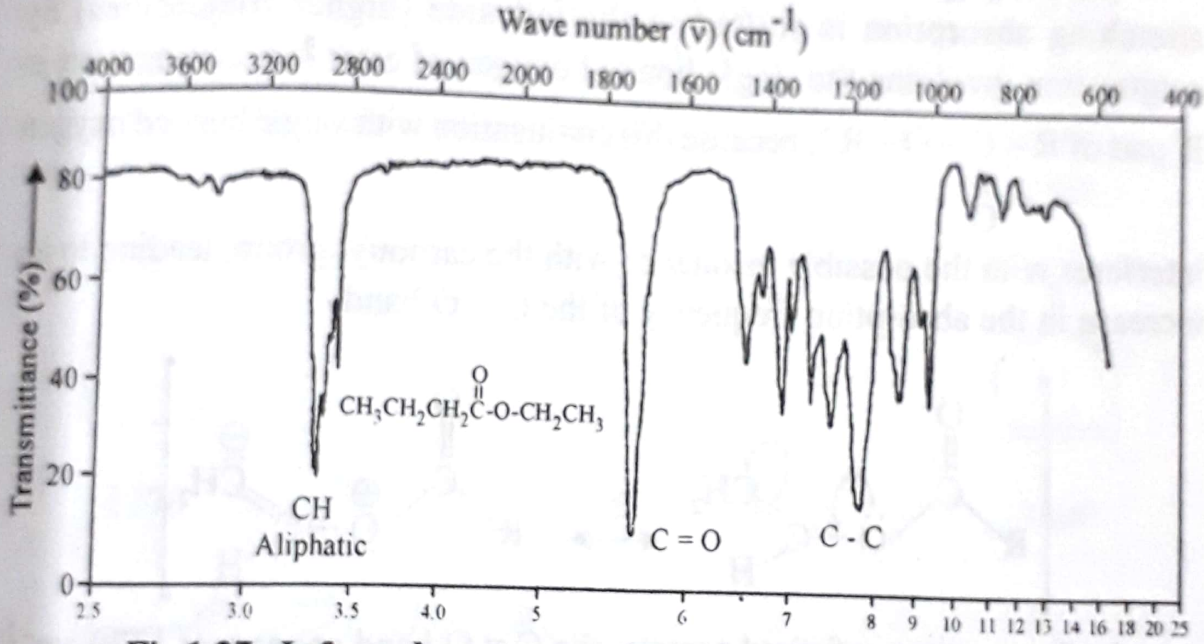


Fig 1.37 : Infrared spectrum of ethyl butyrate (Neat liquid)

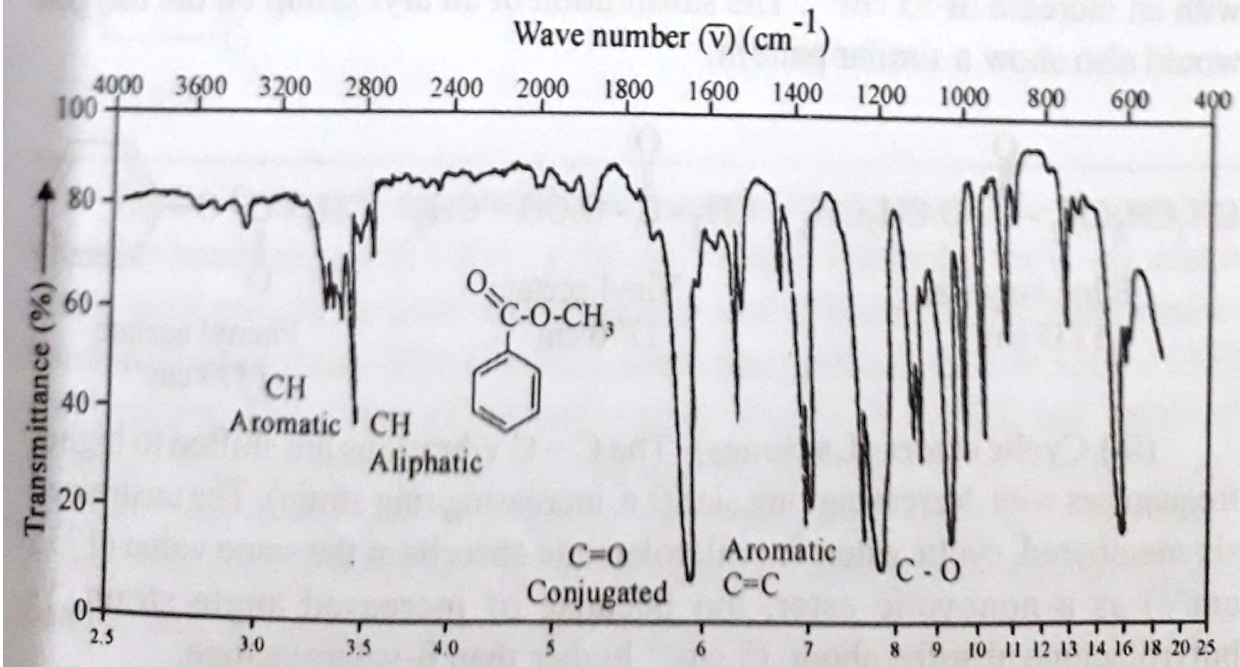
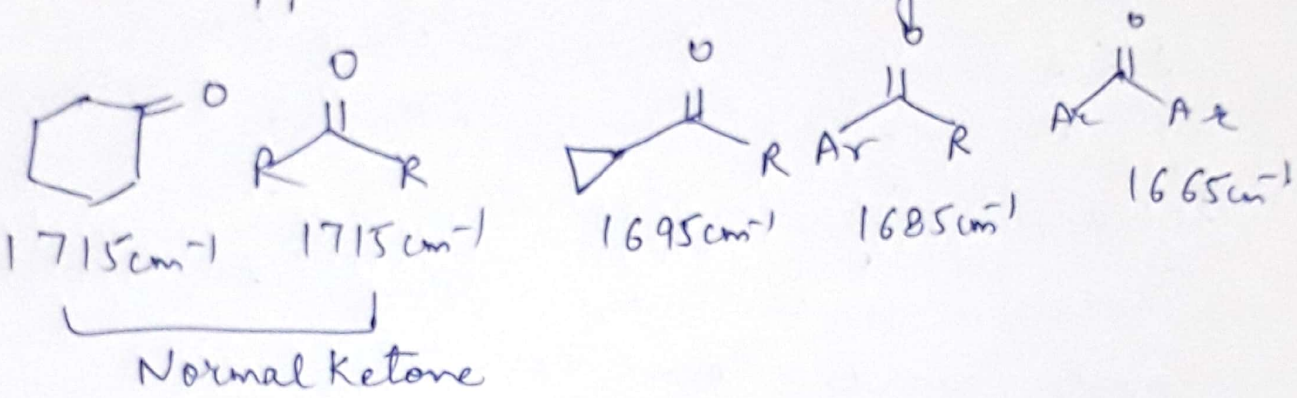


Fig 1.38 : Infrared spectrum of methyl benzoate

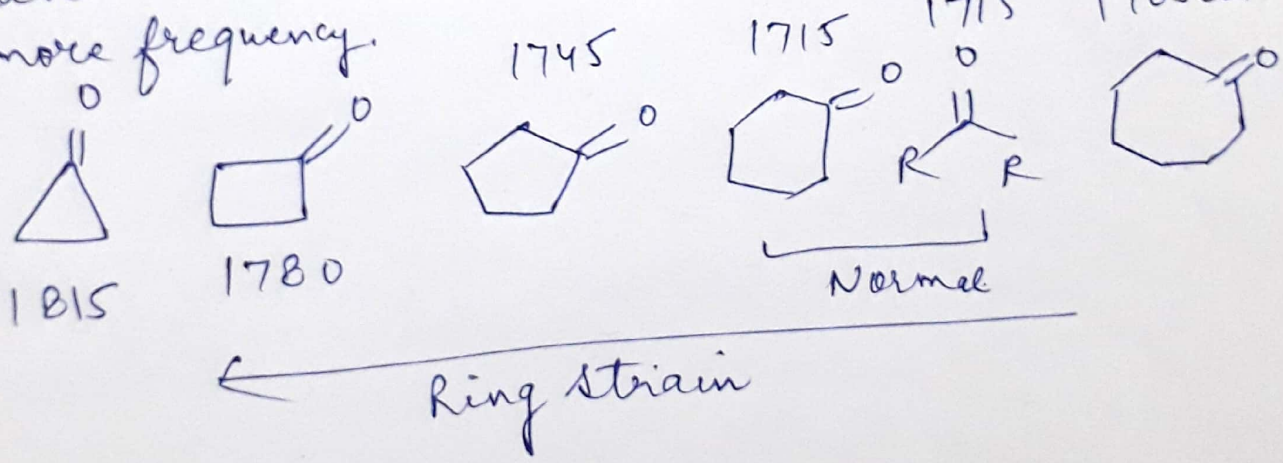
→ Normal ketone stretching frequency is observed at 1715 cm^{-1}.

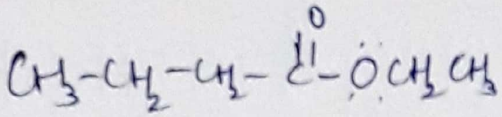
→ Overtones from >C=O bond appear at twice the frequency of C=O absorption in the range 3500 - 3350 cm^{-1}. These small bands should not be confused with O-H absorption (more intense) which appear in the same range.



In cyclic ketones, bond angle of C=O gp influences the absorption frequency of >C=O gp.

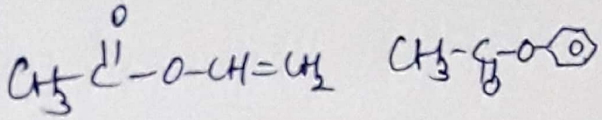
Similarly, ring strain shifts C=O absorption band values to the left i.e. towards more frequency.





Ethyl butyrate

1735 cm^{-1}

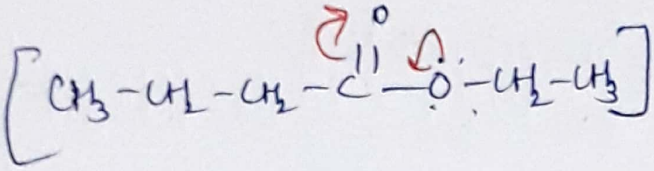


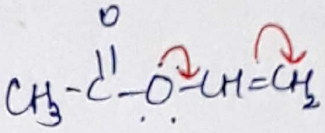
Vinyl acetate

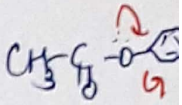
1770 cm^{-1}

Phenyl acetate

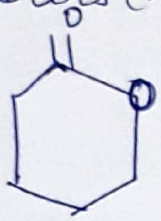
1779 cm^{-1}





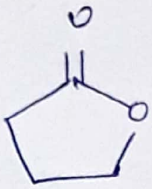


Cyclic esters (Lactones):-



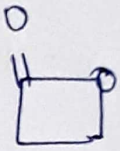
δ-Valerolactone

1735 cm^{-1}



γ-Butyrolactone

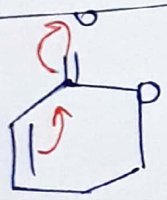
1770 cm^{-1}



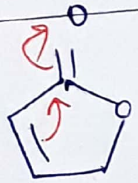
1820 cm^{-1}

angle strain →

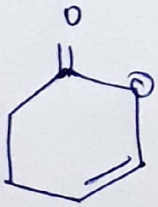
(α, β-unsaturation)



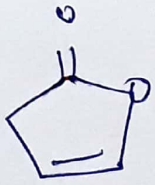
1720 cm^{-1}



1750 cm^{-1}



1760 cm^{-1}



1800 cm^{-1}

Finger Print Region :-

4000 – 1500 cm^{-1} Functional gp region

1500 — 600 cm^{-1} Finger Print region

→ Region below 1500 cm^{-1} is rich in many absorptions (intense or weak), which are caused by bending vibrations & those resulting from stretching vibrations of C–C, C–O & C–N bonds. c/a Finger Print region

* Two compounds can't show same absorption bands in the region below 1500cm^{-1}.

→ Some molecules containing same functional group show similar absorption above 1500cm^{-1} but their spectra are different in finger print region.

① Region 1500 – 1350 cm^{-1} = appearance of doublet near 1380(m) & 1365(s)cm^{-1} shows the presence of 3° butyl gp in the compound.

Out of strong bands for NO_2 compd, one appears near 1350cm^{-1}.

② 1350 – 1000 cm^{-1} - All compds (alcohols, esters, ethers, lactones, acid anhydride) show strong bands in this region due to C–O stretching.

Esters exhibit two strong bands b'n 1380–1050cm^{-1}.

1° alcohols absorb near 1350 – 1260 cm^{-1}.

Appearance of bands b'n 1150 - 1070 cm^{-1} due to C–O str. in C–O–C gp is characteristic of ethers.

iii) Below 1000 cm^{-1} →

H–C=C–H deformation at ~700 cm^{-1} & 970–960 cm^{-1} distinguishes b'n cis & trans alkenes.

→ Higher value (H atoms are trans)

In aromatic Ring :-

a) Strong band 770–730 cm^{-1} shows mono sub.

b) O- & P- disub. comps show one band each.

c) Meta sub. comps are recognized by two medium bands in region 850–710 cm^{-1}.