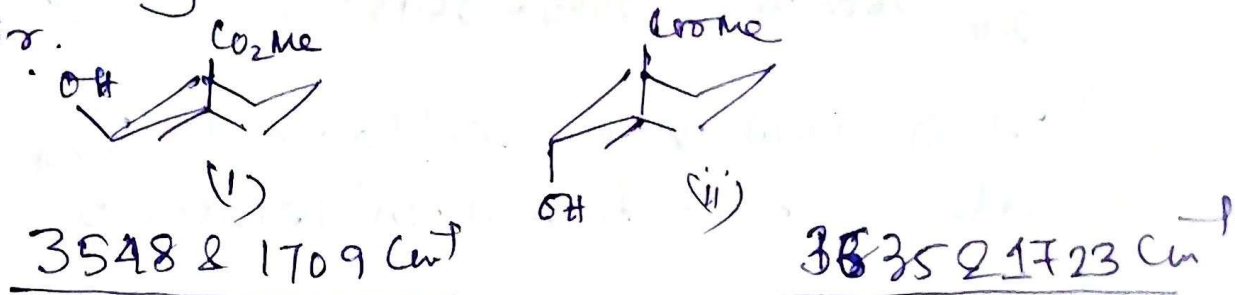
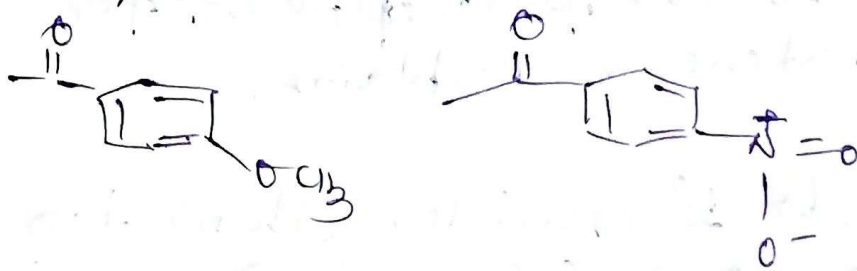


Problems on IR Spectroscopy

Q.1. Comment on the indicated O-H & C=O stretching vibrations for the stereoisomeric pair.



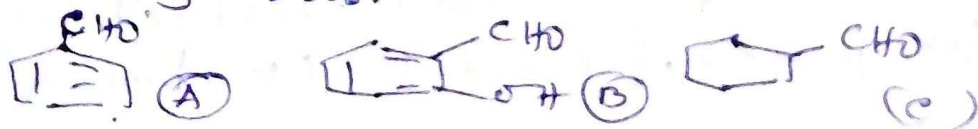
Q.2. Which one show low C=O stretching frequency?



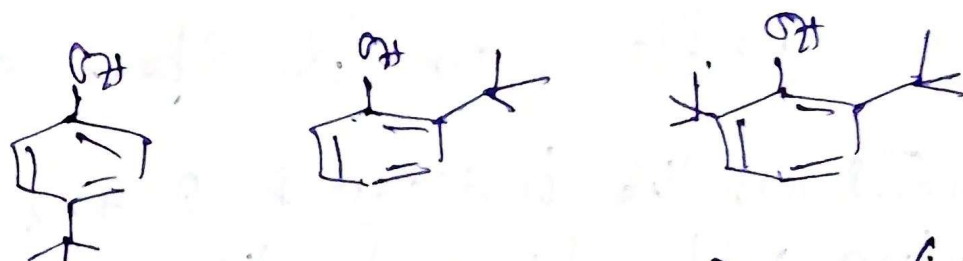
Q.3. Ester of ortho chlorobenzoic acid show two C=O stretching frequencies why?

Q.4. 2-hydroxy-3-nitroacetophenone shows two carbonyl stretching frequencies at 1692 cm⁻¹ & 1658 cm⁻¹ - Explain

Q.5. Arrange the following C=O absorptions frequency of the following compounds in decreasing order.



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$$\bar{\nu}_{\text{O-H}} = (3608 \text{ cm}^{-1}) \quad (3605 \text{ \& } 3643 \text{ cm}^{-1}) \quad (3643 \text{ cm}^{-1})$$

How will you explain the $\bar{\nu}_{\text{O-H}}$ of the above mentioned molecules?

8.7. The C=C stretching vibration of 2-methylpropene appears at 1640 cm^{-1} in IR, whereas no such peak appears for 2,3-dimethyl-2-butene - Explain.

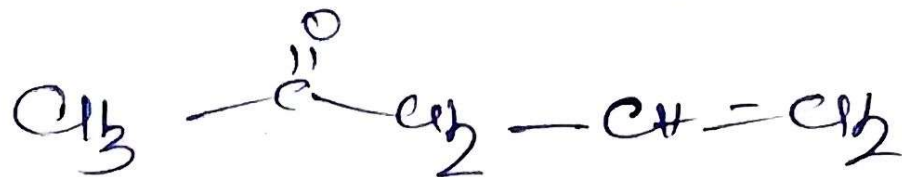
8.8. Why do 1° amides show two N-H bands while 2° amides show ~~one~~ only one in their IR spectra - Explain.

8.9. The frequency of O-H stretching in phenols can be lowered by 40-100 cm^{-1} when the spectrum is recorded in benzene solution compared to CCl_4 solution - Why?

8.10. A 1:1:1 mixture of CH_3I , CH_3Br & CH_3Cl shows three IR peaks at 732 cm^{-1} , 611 cm^{-1} & 533 cm^{-1} respectively. Assign the peaks for each compound.

Q11

Ampl acetate
~~Acetate~~ gives ~~following peaks~~
 IR signals at - 3080, 1745, 1650 and ¹²⁴⁰
 931 cm⁻¹. Identify the peaks.



Q12. $\text{C}_2\text{H}_5\text{OH}$ shows C-O stretch at 1034 cm⁻¹
~~at 1034 cm⁻¹~~ whereas EtOH shows C-O
 stretching band at 1053 cm⁻¹.

Q-13 The IR spectrum of ethyl acetate
 shows absorptions ~~at~~ at 1748 cm⁻¹
 1720 cm⁻¹ and 1650 cm⁻¹. Explain.