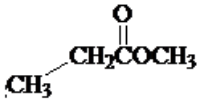
Friday Worksheet **Name: …….**
IR spectroscopy

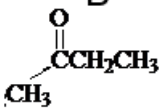
1) Consider the following statements.
   i. Valence electrons in metal atoms absorb energy and are excited to higher energy levels.
   ii. Valence electrons in metal atoms release energy as they return from high energy levels to low energy levels.
   iii. Nucleons absorb radio waves and are excited to higher energy spin states.
   iv. Bonds present in a molecule stretch or bend by absorbing energy of specific wavelength.
   v. The energy absorbed depends on the mass of the atoms forming a bond.
   a) Which of the statements above relate to IR spectroscopy ?
   b) Which of the statements above relate to NMR spectroscopy ?

2) How can IR spectroscopy be used to distinguish between compounds "A" and "B" shown on the right?

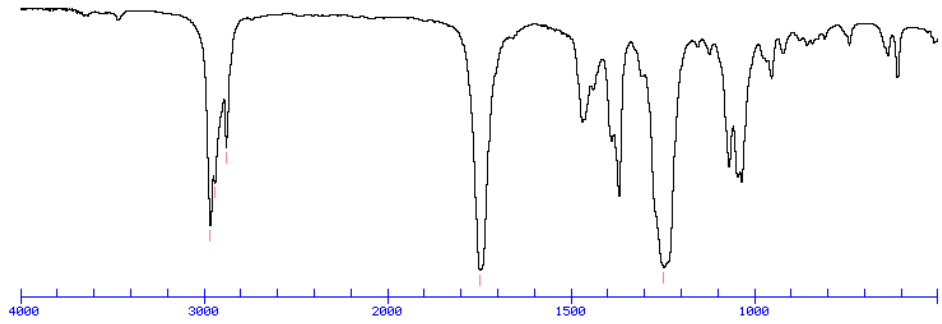
A

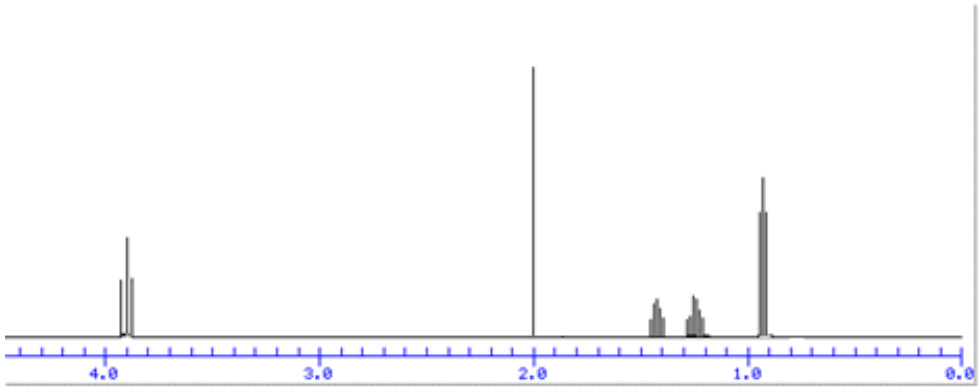


B



3) A compound has the molecular formula $C_6H_{12}O_2$. Its IR and ^{1}HNMR spectra are shown below.

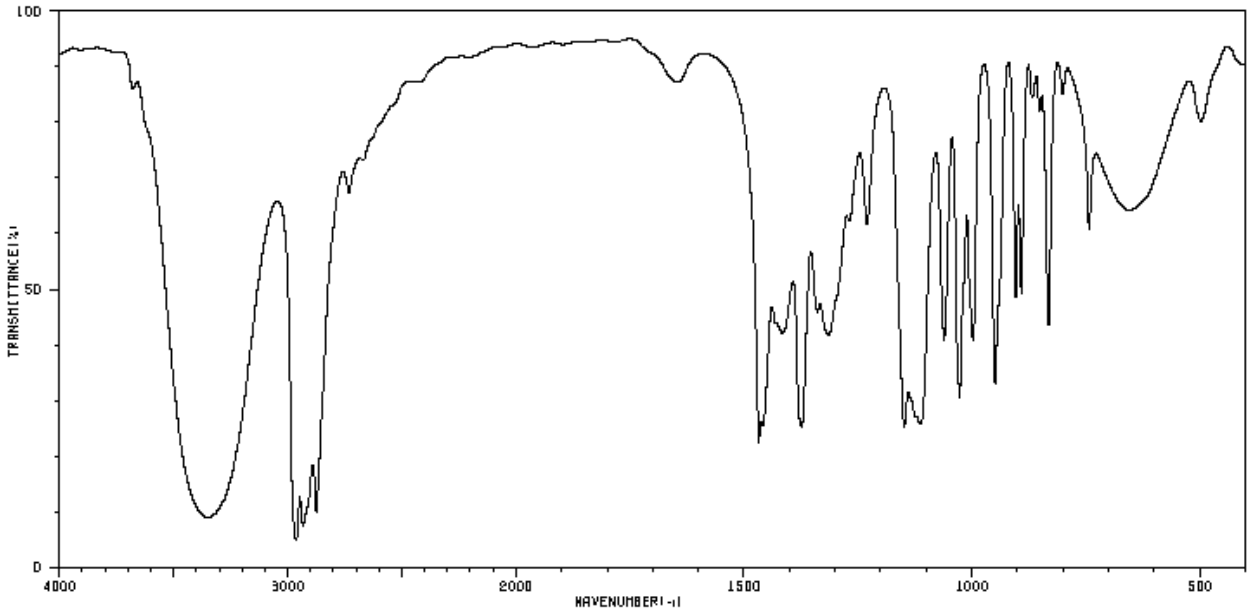




a) Identify the bonds present in the molecule?

b) Give a possible structural formula for the compound

4) Below is the IR spectrum of an organic molecule.



A scientist suspects that it belongs to either of three molecules

i) $CH_3CHOHCH_2CH_2CH_3$

ii) $CH_3CHCHCH_2CH_2OH$

iii) $CH_3CH_2CH_2CH_2COOH$

Which molecule is likely to form the IR spectrum above? Discuss with reference to the IR spectrum.