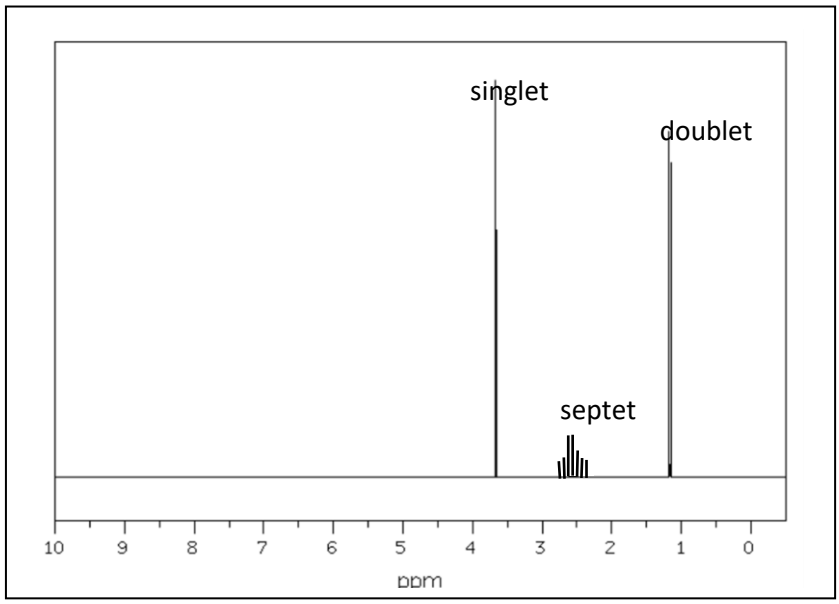
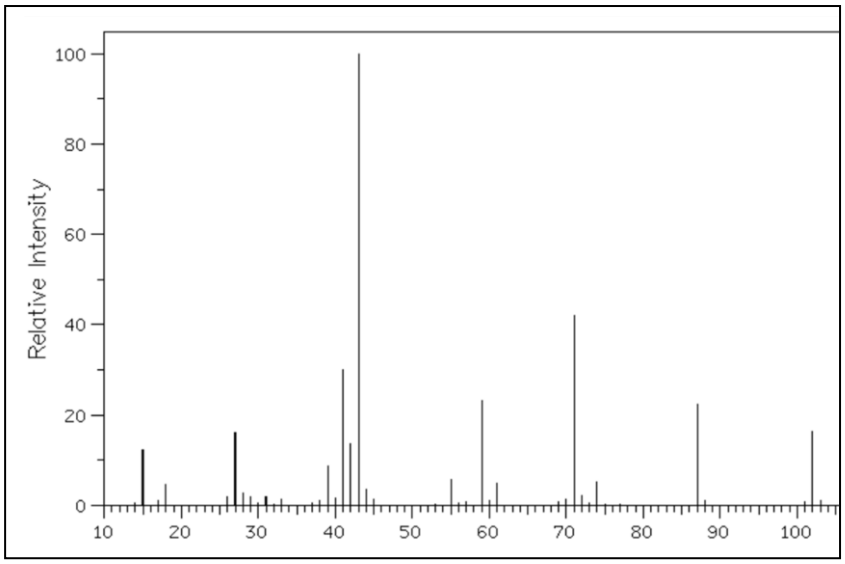
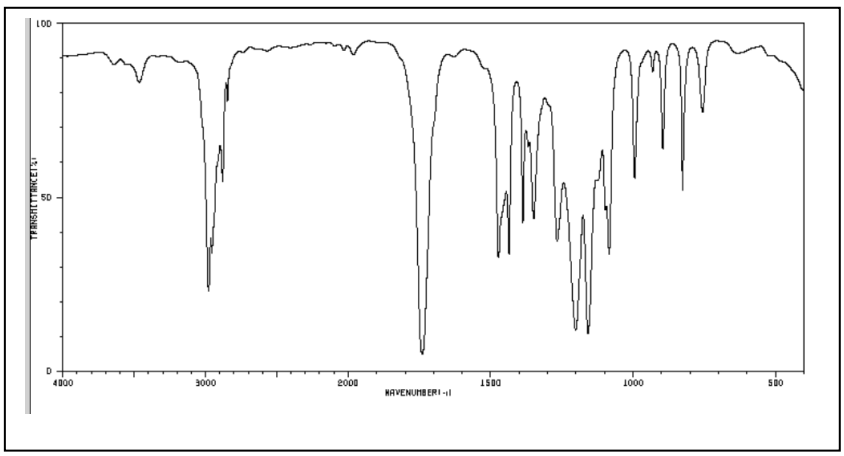
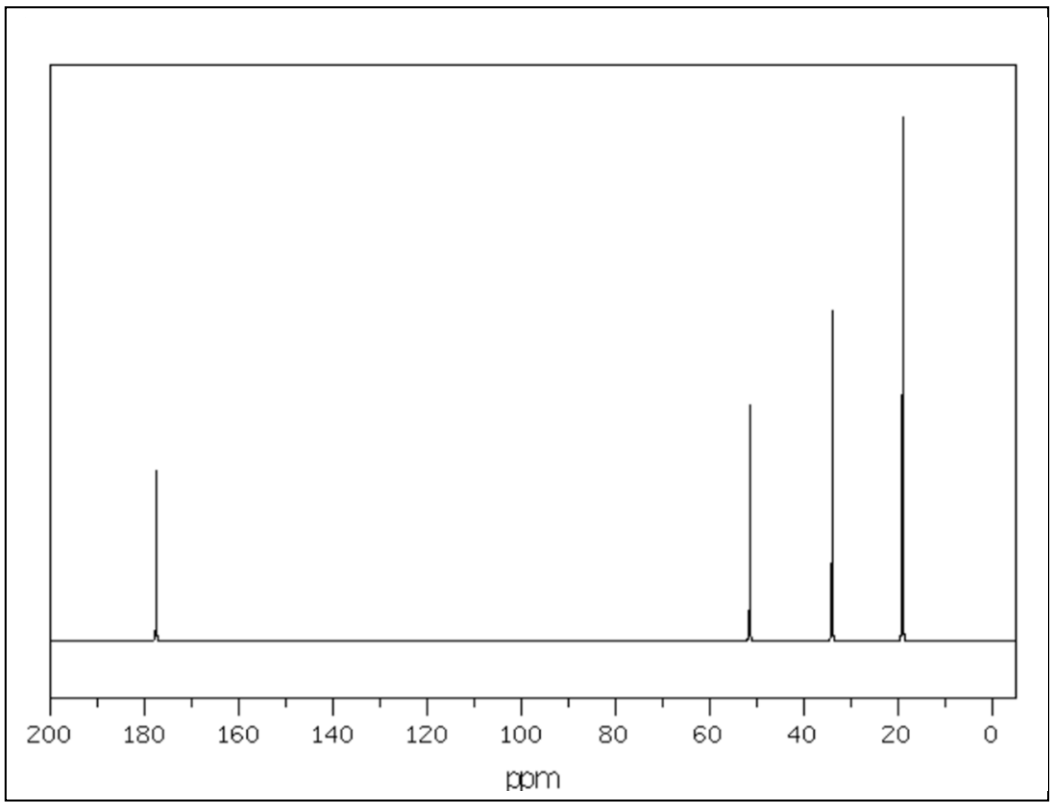
Revision – organic pathways , analytical (NMR, IR and MS), organic compound naming

1. An organic molecule formed from the two reactants A and B, has the formula $C_5H_{10}O_2$. It's ^1H NMR, ^{13}C NMR, IR and MS are shown below. Using the information provided draw a structural formula for the molecule and give the IUPAC names for A and B.





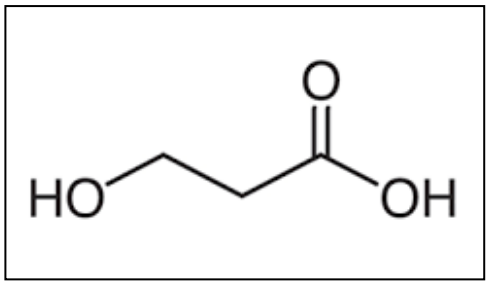




2. An amount of 0.010 mol of an unknown alkene is dissolved in an appropriate solvent and titrated against 1.00 M Br_2. An average titre of 20.02 mL was obtained.
    a. If the alkene contains 3 carbons identify the alkene write a balanced chemical equation, states not required, for the reaction between the alkene and Br_2.

    b. Give the IUPAC name for the compound formed in a. above.

3. Consider the compound shown on the right. It is the monomer of a polymerisation reaction.



   a. Name the compound.

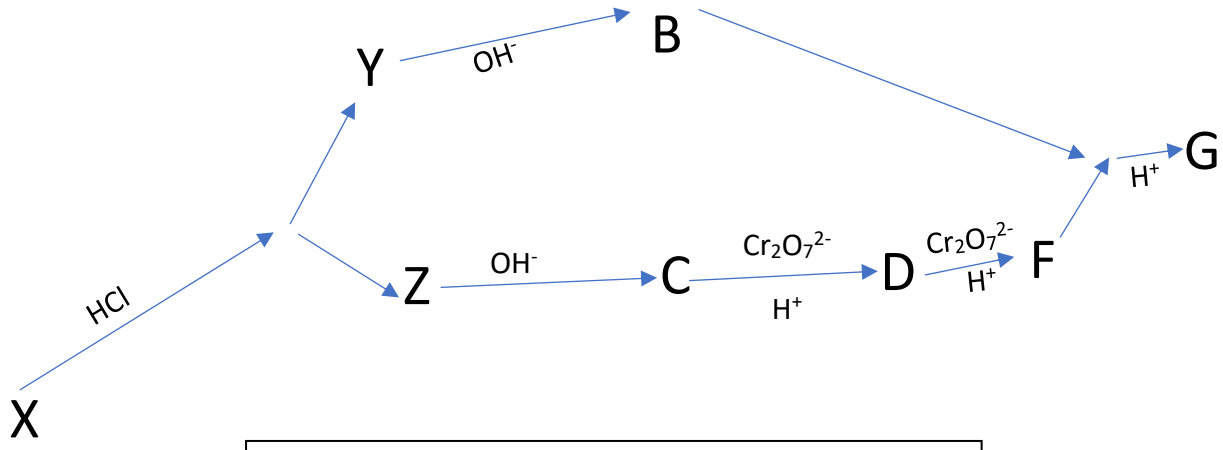
   b. Consider the polymerisation of four monomers.

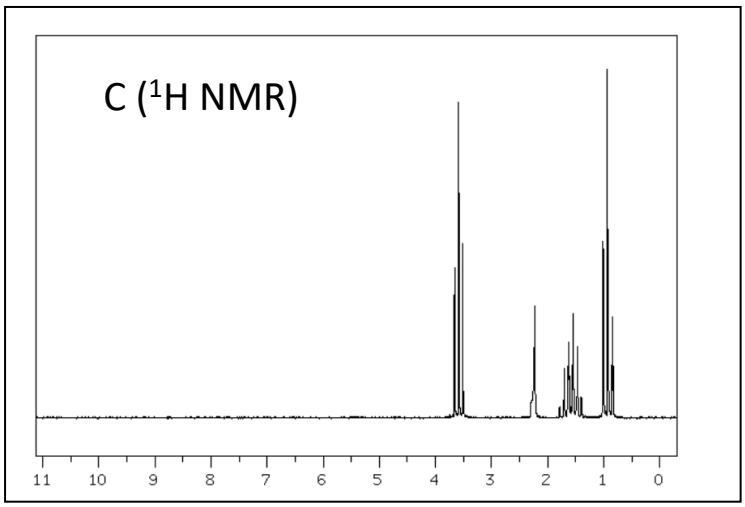
      i. Write a balanced chemical equation for the polymerisation. States not included.

      ii. Calculate the atom economy for this reaction.

      iii. If 36.0 grams of monomer is mixed in a reaction vessel to form 21.00 grams of polymer, calculate the percentage yield for the reaction.

4. Consider the reaction pathway shown below. The initial reaction between a straight carbon chain hydrocarbon (X) and HCl produces only two isomers.





a. Give the IUPAC names of the following:
   - X _____
   - Z _____
   - Y _____
   - F _____
   - B _____

b. Draw the structural formula of G in the box provided below.