Friday Worksheet **Name: …….**
Analytical chemistry revision 2

1) A hydrocarbon was analysed and found to contain the following percentage composition by mass, 85.7% carbon and 14.3% hydrogen.

a) If the molar mass of this compound is 56.0 g/mol calculate its formula mass

Step 1 Find the empirical formula

=> 85.7/12 carbon : 14.3/1 hydrogen

=> 7.14 : 14.3

=> 1 : 2

=> CH_2

Step 2 Find the value of the relationship formula mass / empirical mass = 56 / 14 =4

Step 3 Calculate the molecular formula

=> CH_2 X 4 = C_4H_8

b) To what homologous series does this molecule belong?

Alkenes

c) Write the semi-structural formulae of two possible isomers of this compound.

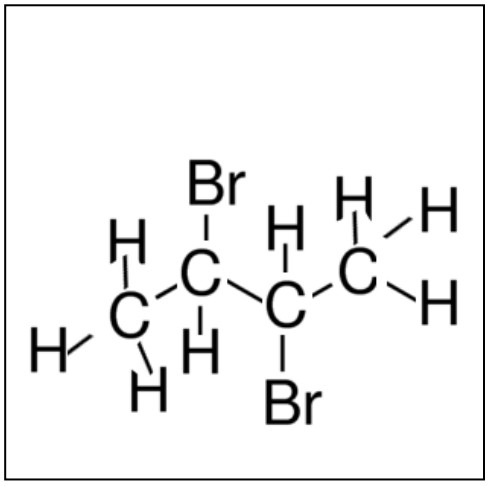
$CH_2CHCH_2CH_3$ and $CH_3CHCHCH_3$

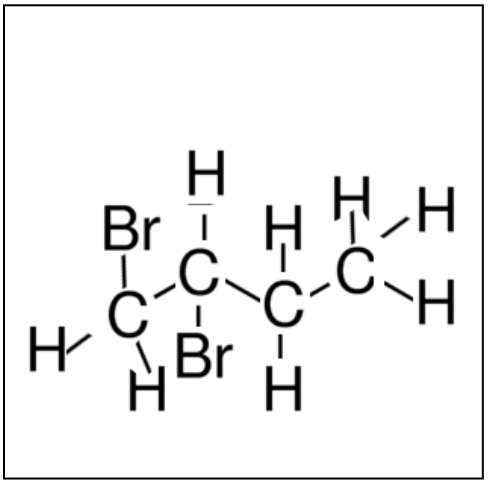
b) The compound reacts with Br_2.

i. What are the names of two possible products of this reaction?

2,3-dibromobutane, 1,2-dibromobutane

ii. Draw their structural formulae





iii. What type of reaction is this? Addition reaction

Below is the ^{1}HNMR spectrum of a compound with the same molecular formula as the products.

i. Draw the structural formula of this compound

See below

ii. Explain why this could not be a product of the reaction between the hydrocarbon and the Br_2

The compound is eitherbut-1ene ($CH_2CHCH_2CH_3$) or but-2-ene ($CH_3CHCHCH_3$) the products formed should be 2,3-dibromobutane or 1,2-dibromobutane. This compound is 1,3-dibromobutane.