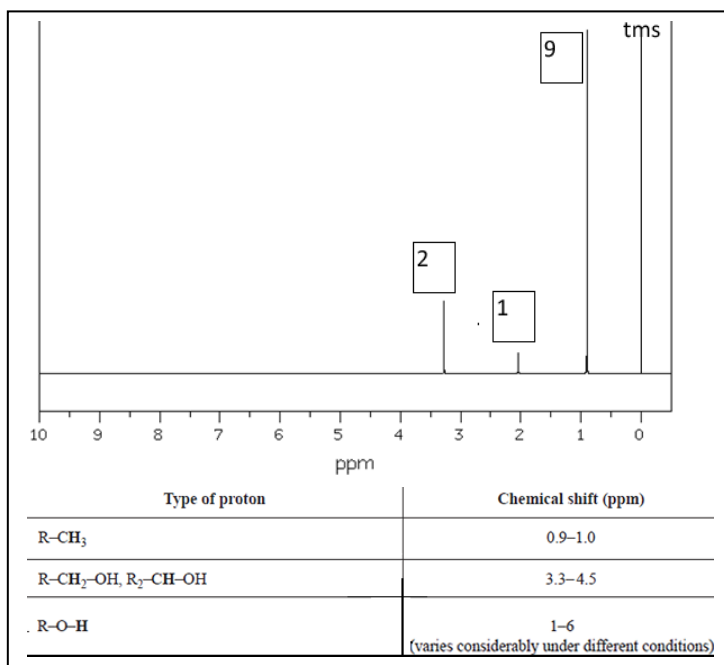
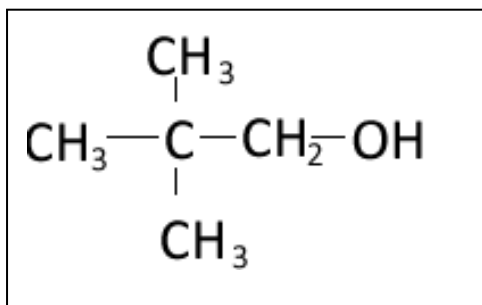


Friday Worksheet  
<sup>1</sup>H NMR spectroscopy 3

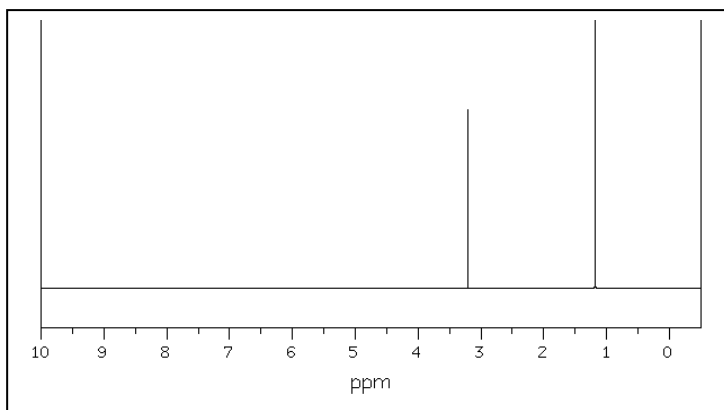
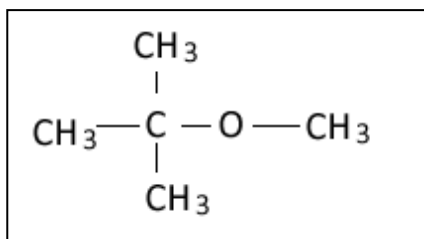
Name: .....

- 1) Consider the molecule whose structural formula is shown below.

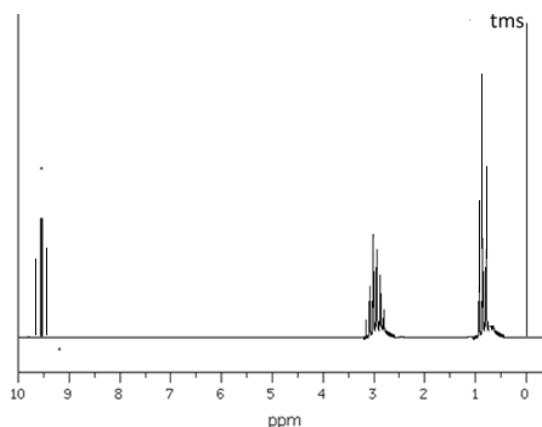


- a) Write the IUPAC name for the molecule. *2,2-dimethylpropan-1-ol*
- b) In the box, on the right, draw the <sup>1</sup>H NMR spectrum of this molecule. Note that the hydrogen on the OH group creates a signal at 2.0 ppm. *The data sheet should be used to determine the ppm of each non-equivalent group of hydrogens.*
- c) Indicate on the spectrum the relative area of each signal.
- d) How many signals are expected on the <sup>13</sup>C NMR spectrum? **3**

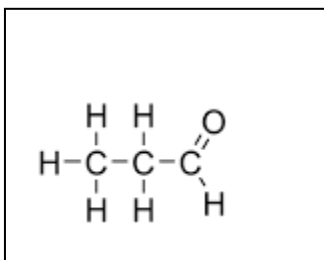
- 2) A compound has the molecular formula C<sub>5</sub>H<sub>12</sub>O. Its <sup>1</sup>H NMR spectrum is shown below. If the <sup>13</sup>C NMR spectrum shows only three signals draw the structural formula of this compound in the box below.



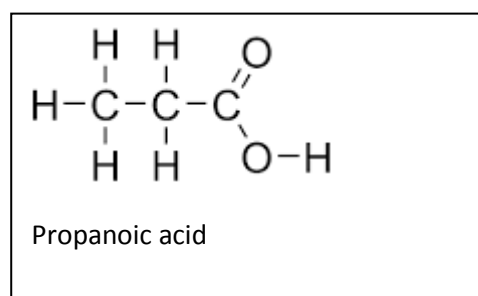
- 3) On the right is the  $^1\text{H}$ NMR spectrum of an organic compound (X) with the molecular formula  $\text{C}_3\text{H}_6\text{O}$ . Three signals are visible, with two triplets at 9.5 and 0.8 ppm. A multiple peak signal at 3.0 ppm is also seen.



- a) Draw the structural formula in the box below.



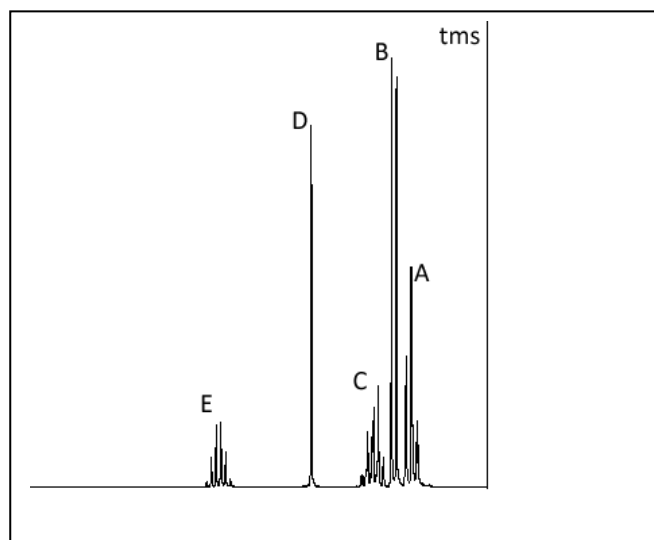
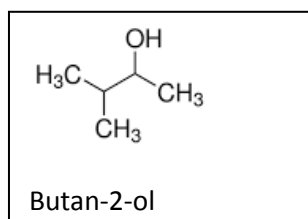
- b) Name and draw the structural formula of the compound formed when compound "X" is oxidised in the presence of acidified  $\text{Cr}_2\text{O}_7^{2-}$  solution.



- c) Another compound (Y) was analysed using  $^1\text{H}$ NMR and its spectrum is shown below. The spectrum shows 5 signals and are labelled.

- Signal A is a triplet  
Signal B is a doublet  
Signal C is a pentet  
Signal D is a singlet  
Signal E is a sextet

- a) Name and draw the structural formula of compound Y if its molecular formula is  $\text{C}_4\text{H}_{10}\text{O}$ .



- b) Draw the structural formula of the compound formed when compound "Y" is oxidised in the presence of acidified  $\text{Cr}_2\text{O}_7^{2-}$  solution.
- c) To what group of compounds does this product belong? *Ketones.*
- d) What is the functional group of this class of compounds?
- e) To what group of compounds does "Y" belong?  
*secondary alcohol*

