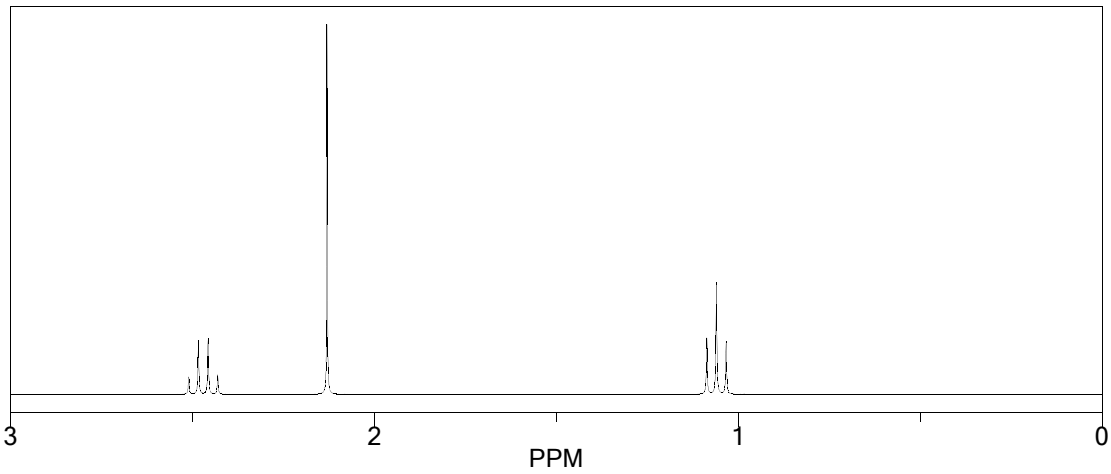
Marks 5

- An unknown compound **K** with the molecular formula C_4H_8O gives the following spectroscopic data.

  ^{1}H NMR: 1.06 ppm, triplet, integration = 3H
  2.13 ppm, singlet, integration = 3H
  2.47 ppm, quartet, integration = 2H



IR spectroscopy: stretch at 1715 cm^{-1}.

Use the information above to deduce the structure of compound **K**. Give reasoning for the structure chosen.

From the NMR:

- **the singlet at 2.13 ppm corresponds to 3H so is CH_3 group with no H on the neighbouring atom**
- **the triplet at 1.06 corresponds to 3H so is a CH_3 group with (n + 1) = 3 so n = 2 H atoms on the neighbouring atom**
- **the quartet at 2.47 ppm corresponds to 2H so is a CH_2 group with (n + 1) = 3 H on the neighbouring atom**
- **the triplet and the quartet together must therefore come from a CH_2CH_3 group.**

Absorbance in IR at 1715 cm^{-1} is typical of C=O group.

Molecular formula of C_4H_8O is sum of these three groups, so structure is: