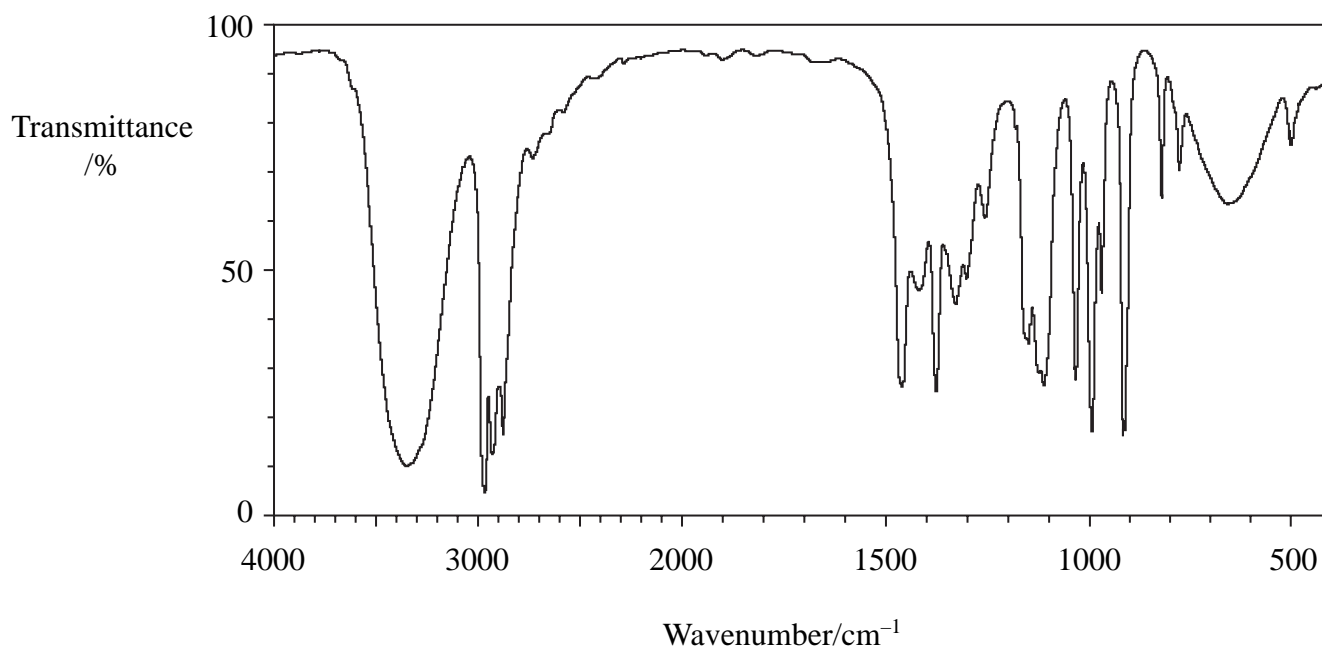


1 This question is about compounds **X**, $C_4H_{10}O$, and **Y**, C_4H_8O .

(a) Compound **X**, $C_4H_{10}O$, can be oxidized to compound **Y**, C_4H_8O . The infrared spectrum of **X** is given below.

Infrared Spectrum of X

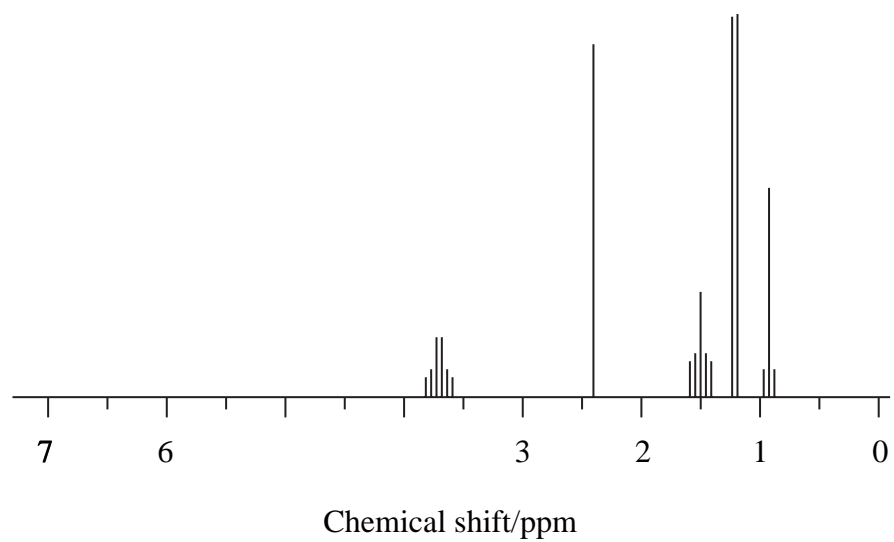


What can be deduced about the structures of **X** and **Y** using all this information and the data booklet? Justify your answer.

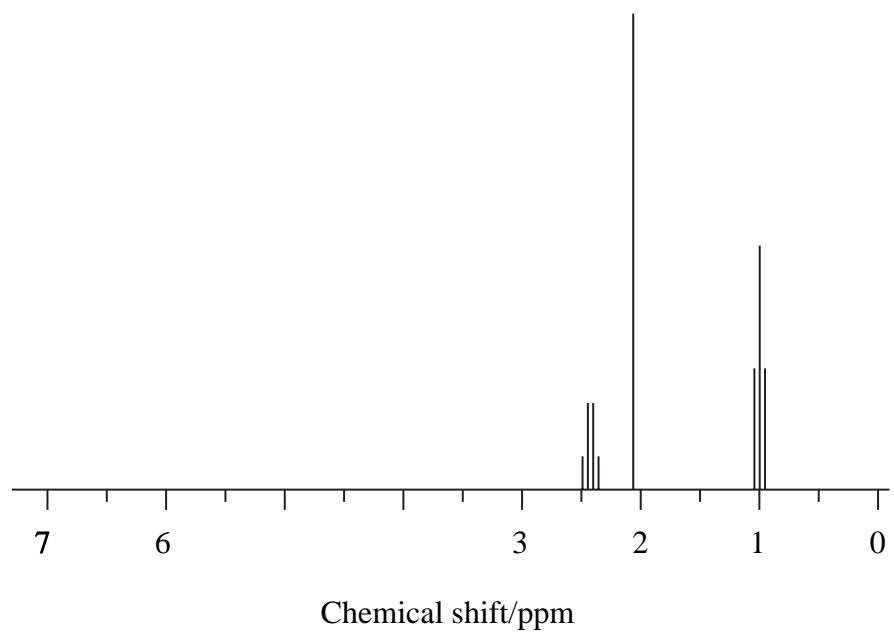
(4)

(b) Below are the nmr spectra of **X** and **Y**.

nmr spectrum of X



nmr spectrum of Y



*Use these nmr spectra and your answer to (a) to deduce the structural formulae of **X** and **Y**. Justify your answer and explain why **both** nmr spectra are consistent with these structures.

(6)

(Total for Question = 10 marks)