Answers	Marks	Examiner's tips
1 CH_3Br 94 and 96 $\therefore\ ^{79}Br$ and ^{81}Br $\therefore\ CH_2Br_2$ has 3 peaks *relative abundances:* 1 : 2 : 1 *m/z values:* 172 174 176	 **1** **1** **1** **1**	 Remember that some elements have isotopes, which means their mass numbers are different.
2 (a) *absorption X*: (O–H) (<u>alcohols</u>)	**1**	Penalise acid or missing 'alcohol'.
absorption Y: C=O	**1**	Allow carbonyl.
	3	Since the OH peak is an alcohol OH peak (which has a slightly higher wavenumber than an acid OH) you cannot have a carboxylic acid for the answer.
3 3 peaks m/z = 126, 128 and 130	**1** **2**	 You can have both Cl's as 35, both as 37, or one of each type in the compound.
4 (a) Cl has (two) isotopes or ^{35}Cl and ^{37}Cl	**1**	
(b) 106 **and** 108	**1**	
5 (a) *compound C*: pentan-2-one	**1**	You may not have met this name yet but you will meet it in the A2 units.
(b) (i) 1680 to 1750 (cm^{-1}) **(ii)** 3230 to 3550 (cm^{-1})	**1** **1**	 You must use the data sheet. You could also have 1000 to 1300 cm^{-1} as the answer here although the obvious answers would be the 3230 cm^{-1} peak for the O–H bond in an alcohol.
6 (a) C=O	**1**	You could also put 'carbonyl'.
(b) Cl has two isotopes	**1**	^{35}Cl and ^{37}Cl without the word isotope would score – but they must be the correct isotopes, i.e. 35 and 37.
7 in the region 1680–1750 cm^{-1}	**1**	
8 both spectra will show the same OH alcohol peak at 3230 to 3550 cm^{-1} since the two compounds are isomers of each other and have the same functional group fingerprint region will be different since the compounds are not exactly the same	**1** **1** **1**	

Nelson Thornes is responsible for the solution(s) given and they may not constitute the only possible solution(s).