1. Determine the structure of a compound with an exact mass of 191.1310. IR, EIMS, 500 MHz $^1$H NMR and 125 MHz $^{13}$C data are provided. The compound exhibits broad peaks in the upfield region of the $^1$H NMR spectrum at room temperature that become sharp at -20 °C. Show your analysis of the data that are relevant to determining the structure. If stereoisomers are possible, you are not expected to determine the stereochemistry of the compound.
500 MHz 1H NMR at 298 K
$500 \text{ mm}^2$, 14 Nm/K at 253 K
2. Determine the structure of a compound with an exact mass of 165.1154. IR, EIMS, 500 MHz $^1$H NMR and 125 MHz $^{13}$C data are provided. Show your analysis of the data that are relevant to determining the structure. If stereoisomers are possible, you are not expected to determine the stereochemistry of the compound.
13C spectrum with 1H decoupling
CDCl3 125 MHz
3. Determine the structure of a compound with an exact mass of 206.1307. IR, EIMS, 500 MHz $^1$H NMR and 125 MHz $^{13}$C data are provided. Show your analysis of the data that are relevant to determining the structure. If stereoisomers are possible, you are not expected to determine the stereochemistry of the compound.
1H spectrum
CDCl3 500 MHz
13C spectrum with 1H decoupling
CDCl$_3$ 125 MHz
$^{13}C$ spectrum with $1H$ decoupling

CDCl$_3$ 125 MHz