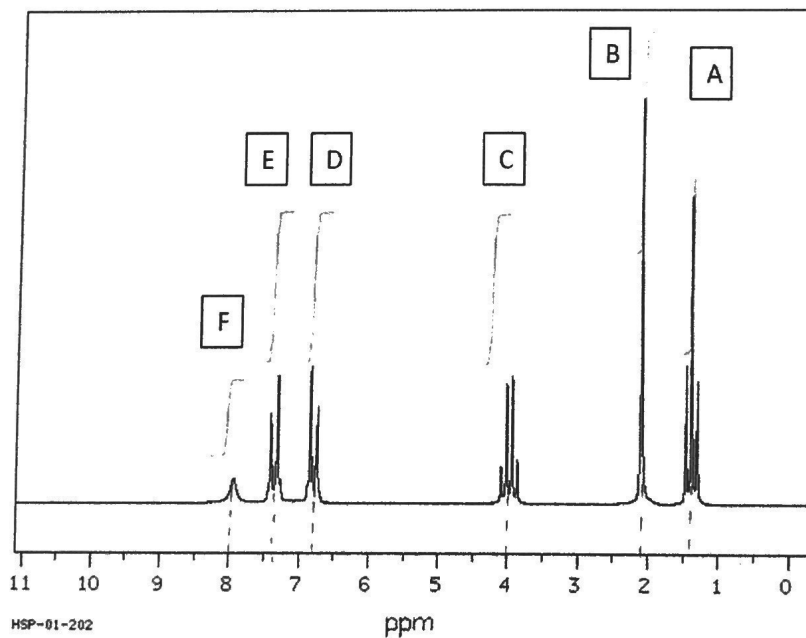
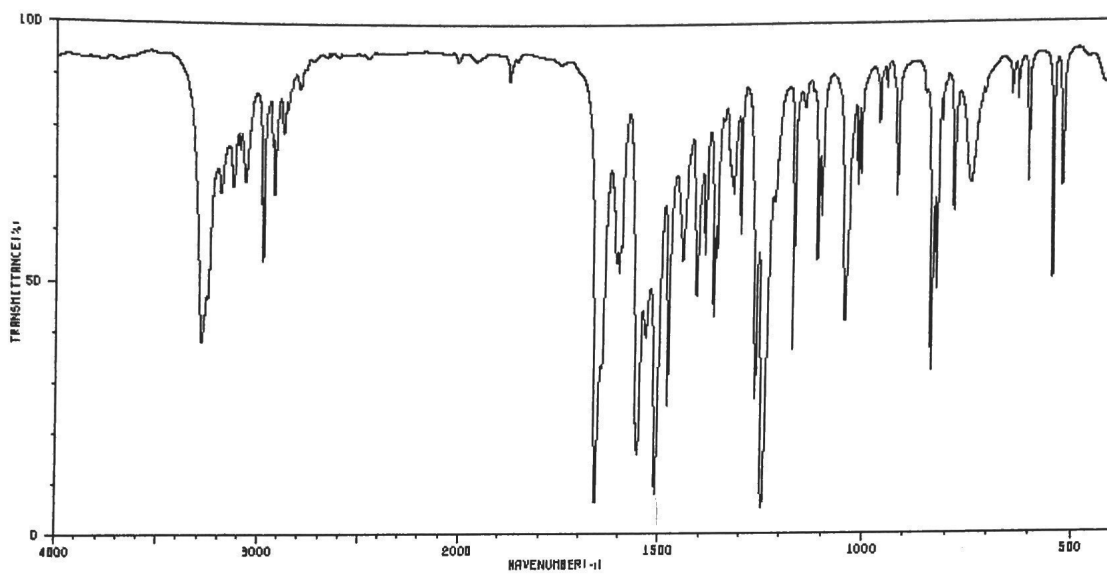


3. The IR and the ^1H NMR spectra of an unknown with a molecular formula of $\text{C}_{10}\text{H}_{13}\text{NO}_2$ are shown below. The questions that follow will guide you in the determination of its structure. (16 points in total)

a- Determine the degree of unsaturation. *Show your calculation.* (2 points)

b- Analyze **three significant bands** in the IR spectra below that conclude on the existing functions in the molecule. (3 points)



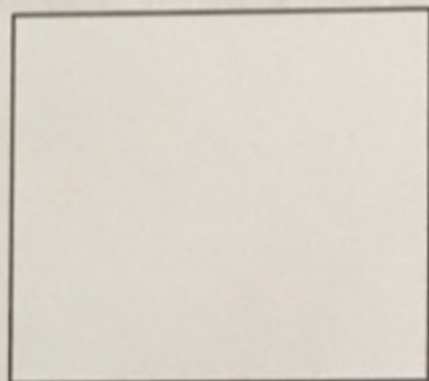
HSP-01-202

c- Fill in the table with all ^1H NMR characteristics for each signal and write down pertinent comments/ideas. (6 points)

Signal	δ (ppm)	Integration	Multiplicity	Comments/ideas
A				
B				
C				
D				
E				
F				

d- Identify the possible fragments then draw the final structure of the unknown in this box below. (5 points)

PS : all fragments should add up to give the same number of atoms in the molecular formula.



Final Structure