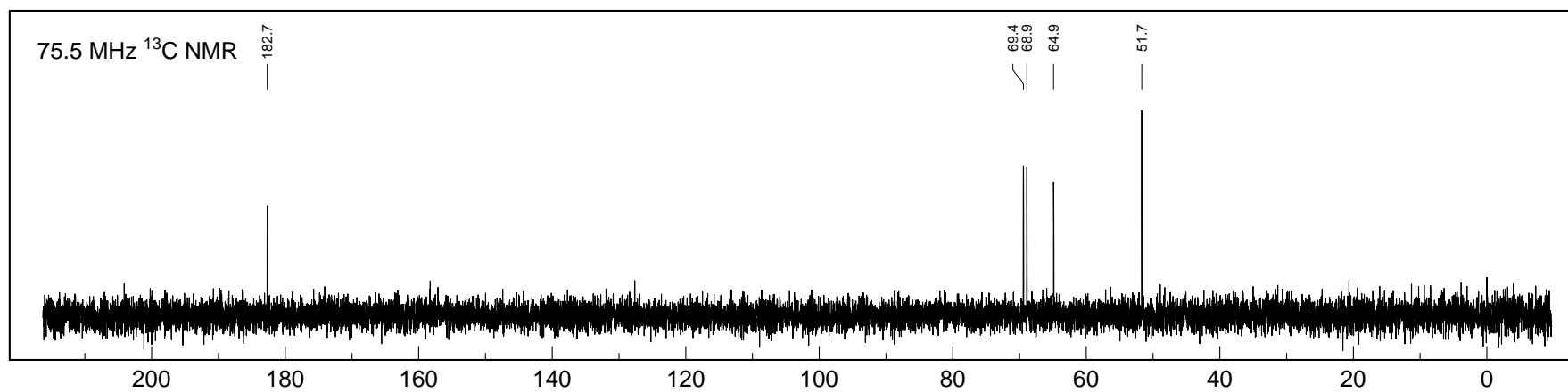
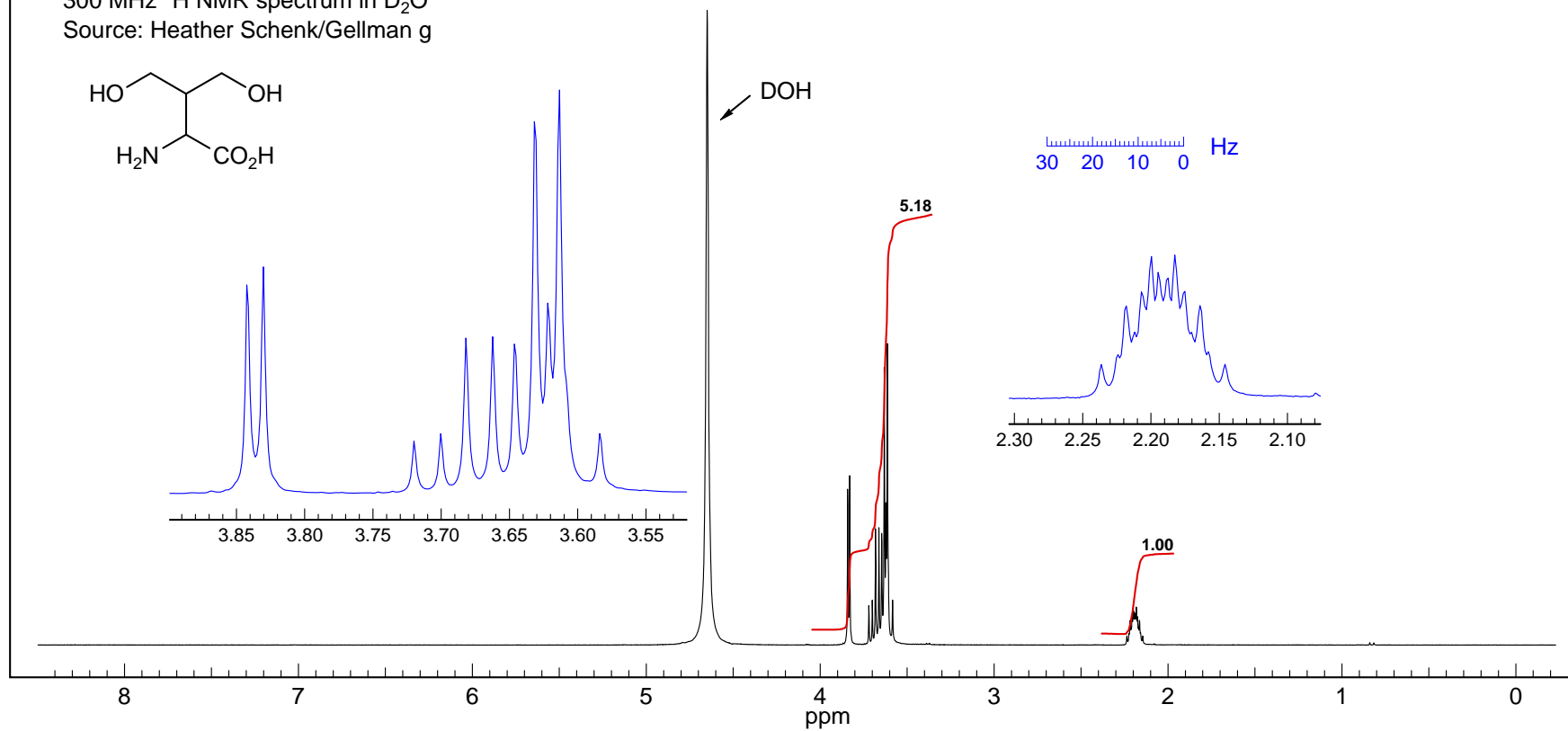
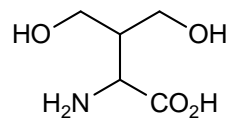


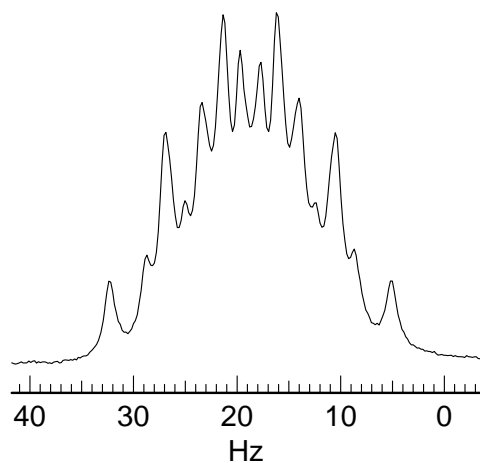
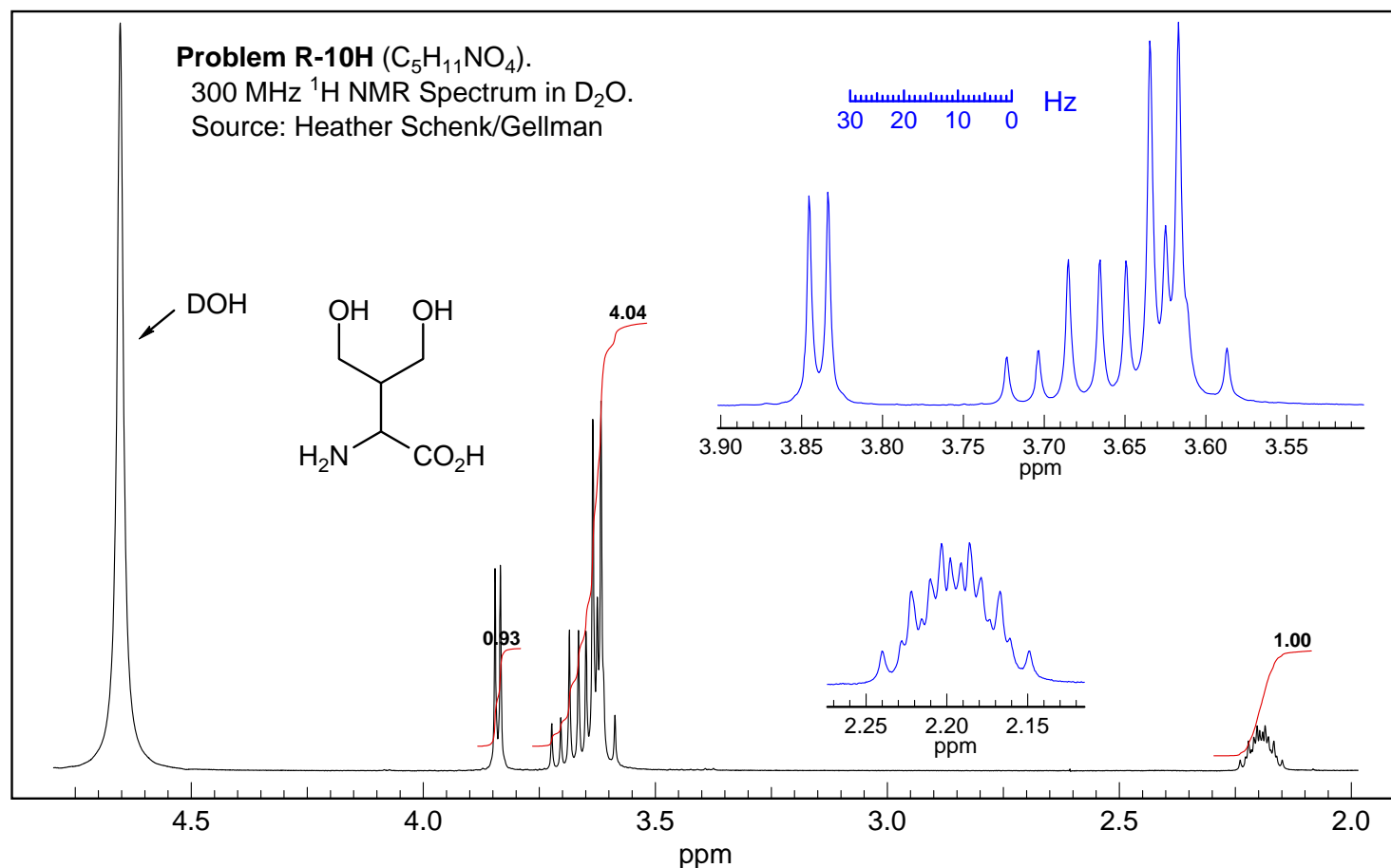
**Problem R-10H** ( $C_5H_{11}NO_4$ )

300 MHz  $^1H$  NMR spectrum in  $D_2O$

Source: Heather Schenk/Gellman g

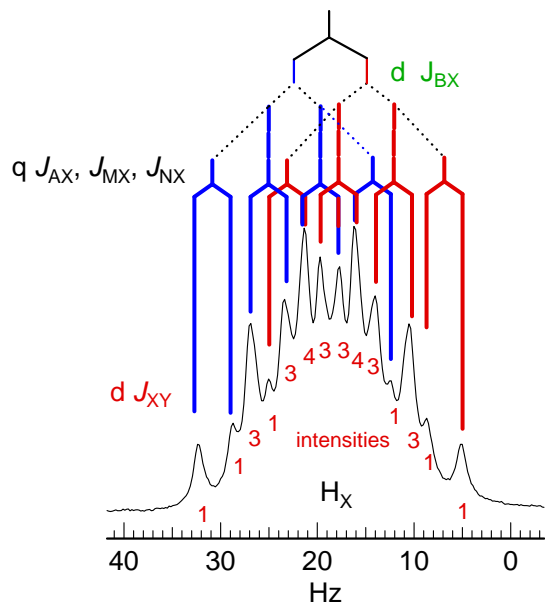


**Problem R-10H** ( $C_5H_{11}NO_4$ ). A graduate student thought she had prepared the compound below, but was worried about the NMR spectrum (taken in  $D_2O$ ), which seemed more than a little odd. Does the NMR spectrum fit the structure? Analyze and assign each of the multiplets. In particular, provide an explanation for the appearance of the key multiplet  $\delta$  3.5-3.8.



To show you understand the spectrum, draw a coupling tree for the multiplet at  $\delta$  2.2 (start with an intensity assignment).

5



Expect this proton (X) to be coupled as follows:

Thus  $d_{qd}, J = 7.5, 5.5, 3.5$