Problem R-09O ($\text{C}_{10}\text{H}_7\text{NO}$). Shown below is the 250 MHz proton homonuclear shift correlated spectrum (H,H-COSY) of quinoline 8-carboxaldehyde. The aldehyde proton at $\delta$ 9.5 is not shown (C. G. Anklin, P. S. Pregosin Magn. Reson. Chem. 1985, 23, 672)

Assign the proton signals A through F to the protons H$^2$ to H$^7$.

$H^2 = \_\_\_\_$

$H^3 = \_\_\_\_$

$H^4 = \_\_\_\_$

$H^5 = \_\_\_\_$

$H^6 = \_\_\_\_$

$H^7 = \_\_\_\_$
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Asign the proton signals A through F to the protons $\text{H}^2$ to $\text{H}^7$.

$\text{H}^2 = \underline{\quad F \quad}$

H$^2$ can be assigned to F on the basis of chemical shift. It is correlated to A and D. A is a dd with two large couplings, so must be H$^3$, and thus D = H$^4$

$\text{H}^3 = \underline{\quad A \quad}$

$\text{H}^4 = \underline{\quad D \quad}$

H$^7$ can be assigned to E on the basis of chemical shift (ortho shift of CHO larger than para shift). It is correlated to C and B. B is a triplet (two large couplings), so must be H$^6$, and thus C = H$^5$

$\text{H}^5 = \underline{\quad C \quad}$

$\text{H}^6 = \underline{\quad B \quad}$

$\text{H}^7 = \underline{\quad E \quad}$