CH-314 Structural Analysis
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Jigsaw 2E

1. [Hore Section 2.2] How many distinct chemical shifts would you expect to find in the ^{1}H spectra of the three isomers of dibromobenzene? *See also: Jigsaws 2A.1, 2B.3 2C.2, and 2D.1.*

2. [Hore Section 2.3] For each of the following sets, rank the options from highest to lowest ^{1}H chemical shift. Assume the diamagnetic contribution is the dominant contribution. For each answer, explain why.

    a. CH_4, CH_3Cl, CH_2Cl_2, and $CHCl_3$.

    b. The ortho, meta, and para protons in styrene.

    c. The protons in $CH_2BrCH_2CH_3$.

3. * [Hore Section 2.1, Week 2 Slide 25, and Keeler Section 4.2] The B_0 field induces precession of magnetization around the z-axis at the Larmor frequency, $\omega_0 = -\gamma B_0$. Here we neglect the effect of relaxation.

    a. Starting with the magnetization along the **z**-axis, what is the direction of the magnetization of a ^{13}C site after one second in a 9.4 T magnetic field? The gyromagnetic ratio for ^{13}C is 1.071×10^{7} rad·s^{-1}T^{-1}.

    b. Starting with the magnetization along the **x**-axis, what is the direction of the magnetization of a ^{13}C site after one second in a 9.4 T magnetic field?