SOME TYPICAL $^1$H CHEMICAL SHIFT VALUES:

1. Alkanes and alkyl groups:

   CH$_3$ – C $\delta$ 0.9 – 1.1 ppm
   C – CH$_2$ – C $\delta$ 1.3 ppm
   C – CH – C $\delta$ 1.4 ppm
   C – CH$_2$ – C = C $\delta$ 2.0 ppm
   CH$_3$ – C = C $\delta$ 1.7 ppm
   C – CH$_2$ – C = C $\delta$ 2.0 ppm
   CH$_3$ – C = C $\delta$ 1.8 ppm
   CH$_3$ – Ph $\delta$ 2.3 ppm
   CH$_3$ – C = O $\delta$ 2.1 ppm
   C – CH$_2$ – C = O $\delta$ 2.5 ppm
   CH$_3$ – C = C $\delta$ 1.7 ppm
   C – CH$_2$ – C = C $\delta$ 2.0 ppm
   CH$_3$ – C = C $\delta$ 1.8 ppm
   CH$_3$ – X $\delta$ 2.5 – 4 ppm
   (X = halogen)
   C – CH$_2$ – X $\delta$ 3 – 4 ppm
   (X = halogen)
   CH$_3$ – O $\delta$ 3 – 4 ppm
   C – CH$_2$ – O $\delta$ 3.5 – 4.5 ppm

2. Alkenes:

   C = C – H $\delta$ 4.5 – 6 ppm

3. Alkynes:

   C = C – H $\delta$ 2.5 ppm

4. Benzene and compounds containing benzene rings:

   Ph – H $\delta$ 7.15 ppm
   Various benzene ring H-atoms $\delta$ 7 – 8.5 ppm

5. Alcohols and Phenols:

   R – OH $\delta$ 2 – 5 ppm
   Ar – OH $\delta$ 4 – 7 ppm

6. Aldehydes:

   R – C = O $\delta$ 9 – 10 ppm

7. Carboxylic Acids:

   R – COOH $\delta$ 10 – 12 ppm

8. Amines:

   R – NH$_2$ $\delta$ 1.5 – 4 ppm
**SOME TYPICAL $^{13}$C CHEMICAL SHIFT VALUES:**

1. Alkanes and alkyl groups
   \( (sp^3\) hybridized C):\n   \[\begin{align*}
   &\text{C – C – C} & \delta & 0 – 30 \text{ ppm} \\
   &\text{C – C = C} & \delta & 20 – 40 \text{ ppm} \\
   &\text{C – C = O} & \delta & 20 – 40 \text{ ppm} \\
   &\text{C – C – X} & \delta & 20 – 40 \text{ ppm} \\
   &\text{(X = halogen)} \\
   &\text{C – C – O} & \delta & 50 – 75 \text{ ppm}
   \end{align*}\]

2. Alkynes (\(sp\)-hybridized C):
   \[\begin{align*}
   &\text{C = C} & \delta & 75 – 95 \text{ ppm}
   \end{align*}\]

3. Nitriles (\(sp\)-hybridized C):
   \[\begin{align*}
   &\text{N = C} & \delta & 100 – 120 \text{ ppm}
   \end{align*}\]

4. Alkenes (\(sp^2\) hybridized C):
   \[\begin{align*}
   &\text{C = C} & \delta & 100 – 150 \text{ ppm}
   \end{align*}\]

5. Benzene rings (\(sp^2\) hybridized C):
   \[\begin{align*}
   &\delta & 110 – 150 \text{ ppm}
   \end{align*}\]

6. Carboxylic Acids and Derivatives
   \( (sp^2\) hybridized C):
   \[\begin{align*}
   &\text{-COOH, -COOR,} \\
   &\text{-CONR}_2, -\text{COCl} & \delta & 155 – 180 \text{ ppm}
   \end{align*}\]

7. Aldehydes (\(sp^2\) hybridized C):
   \[\begin{align*}
   &\text{R – C = O} & \delta & 180 – 210 \text{ ppm} \\
   &\text{H}
   \end{align*}\]

8. Ketones (\(sp^2\) hybridized C):
   \[\begin{align*}
   &\text{R – C = O} & \delta & 190 – 220 \text{ ppm} \\
   &\text{R’}
   \end{align*}\]