1. (9) Complete the following equations, showing the stereochemistry of the product when appropriate:

\[ \text{CH}_3\text{C}≡\text{C}-\text{C}_2\text{H}_5 + \text{Br}_2 \text{ (1 equivalent)} \]

\[ \text{CH}_3\text{C}≡\text{CH} \quad \xrightarrow{\text{H}_2\text{O}, \text{H}_2\text{SO}_4} \quad \xrightarrow{\text{HgSO}_4 \text{ (cat.)}} \]

\[ \text{O} \quad \xrightarrow{\text{light}} \quad \text{CH}_2\text{Cl}_2 \]

2. (10) Give the reagents on the arrows that can be used to convert the reactant to the indicated product in high yield:

\[ \text{CH}_3\text{C}≡\text{CH} \quad \xrightarrow{\quad} \quad \xrightarrow{\quad} \quad \xrightarrow{\quad} \quad \text{CH}_3\text{C}≡\text{C}-\text{CH}_3 \]

\[ \text{CH}_3\text{CHBrCHBrCH}_3 \quad \xrightarrow{\quad} \quad \xrightarrow{\quad} \quad \text{H}_5\text{C} \quad \xrightarrow{\quad} \quad \text{C}_2\text{H}_5 \]

3. (4) Give either the IUPAC name or the correct structure for each of the following compounds:

\[ \text{methylene chloride} \]

4. (2) Which one of the following species is the most stable radical?

\[ \text{CH}_3\cdot \quad \text{CH}_3\text{CH}_2\cdot \quad \text{\[\text{cyclic} \]} \cdot \quad \text{\[\text{cyclic} \]} \cdot \quad \text{\[\text{cyclic} \]} \cdot \]