1. (2) Draw as a Fischer projection any molecule that possesses four chirality centers but overall is achiral.

2. (4) (a) Draw and give an IUPAC systematic name for any terminal alkyne.

   (b) Draw and give an IUPAC systematic name for any unsymmetrical internal alkyne.

3. (2) Cyclopentene is a known stable compound, while cyclopentyne is very unstable. Speculate why this is so.
4. (6) Draw the major product for each of the following reactions, being sure to indicate any relevant stereochemistry where important:

\[ \text{H}_3\text{C} \quad \text{C} \quad \text{C} \quad \text{H} \quad \text{H} \quad \text{CH}_3 \quad \text{Br}_2 \quad \text{CH}_2\text{Cl}_2 \]

\[ \text{H}_3\text{C} \quad \text{C} \quad \text{C} \quad \text{H} \quad \text{H} \quad \text{CH}_3 \quad \text{Br}_2 \quad \text{H}_2\text{O} \]

5. (8) Draw the major product or best starting material for each of the following reactions. Indicate any stereochemistry where important.

\[ 1 \text{ H}_3\text{C} \quad \text{C} \quad \text{C} \quad \text{CH}_3 \quad \frac{1 \text{ Br}_2}{\text{CH}_2\text{Cl}_2} \]

\[ \text{H}_2\text{O} \quad \text{H}^+\text{(cat.)} \]

\[ \text{O} \]
6. (2) Are any of the reactions in problem 5 stereoselective? If so, which ones?