1. Draw all of the dibromo derivatives of 1-pentene.

*Note: R/S stereochemistry has not yet been considered*

2. Give IUPAC names for the following:
   - 6-bromo-2-octanone
   - (E)-6-mercapto-3-hexenal
   - 4-aminoheptanedioic acid
   - 3-chloro-2-methyl-2-cyclohexenol

3. Draw the structures of the following:
   - 3-bromo-2,5,5-trimethyl-2-cyclohexenone
   - (Z)-6-amino-4-oxo-2-hexenal
   - 2-mercapto-4-penten-1-ol
4. To draw the bonds clearly, we will consider each bond separately

**σ-system** (only bonding MO’s are shown)

- \( \text{sp}_x \)  
- \( \text{sp}_x\text{sp}_x \)  
- \( \text{sp}_x\text{sp}^2_{(xz)} \)

Two bonds: \( \text{sp}^2_{(xz)}\text{–s} \)

**π-system**

For the \( \rho_y \) orbitals, we need to consider the complete MO picture

- \( \rho_z\rho_z \)  

\( \Phi_1 \)
\( \Phi_2 \)
\( \Phi_3 \)