1. (12 points) Write the correct IUPAC name for each of the following:
   a. \[ \begin{array}{c}
   \text{H} \\
   \text{C} \\
   \text{N} \\
   \text{H}
   \end{array} \] 
   5,5-dimethylhexanamine
   c. \[ \begin{array}{c}
   \text{C} \\
   \text{C} \\
   \text{O}
   \end{array} \] 
   (1R)-3-cyclohexenol
   b. \[ \begin{array}{c}
   \text{C} \\
   \text{C} \\
   \text{C} \\
   \text{C} \\
   \text{C}
   \end{array} \] 
   4-methylpentanal
   d. \[ \begin{array}{c}
   \text{C} \\
   \text{C} \\
   \text{C} \\
   \text{C} \\
   \text{C}
   \end{array} \] 
   ethyl (4S)-(2E)-4-hydroxy-2-pentenoate

2. (12 points) Draw the structure corresponding to the name given. Please show all stereochemistry clearly.
   a. (3R,6R)-(4E)-6-methyl-4-octen-3-ol
   b. (3S)-2,3-dimethylheptane
   c. 1,1-dimethylpropyl butanoate
   d. (3R)-3-methylcyclopentanone

3. (6 points) For each pair, indicate whether they are diastereomers, enantiomers or the same.
   - \[ \begin{array}{c}
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{Br}
   \end{array} \] enantiomers
   - \[ \begin{array}{c}
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H}
   \end{array} \] same