1. Is the following molecule chiral or achiral? Justify your answer. (2 points).

![Molecule](image)

2. The relationship between the two bromides in the structure above is: (1 point)
   a) cis & geminal   b) trans & geminal   c) trans & vinylic   d) trans & vicinal

3. Label all chiral centers in the structure below as R or S. State the relationship between them, and indicate whether they could be separated by crystallization or distillation. (Problem5-22b) (4 points)

![Structures](image)

4. Translate the following perspective structure to a Fischer projection. (3 points)

![Perspective Structure](image)