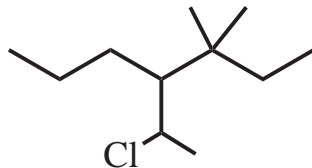


Chemistry 125 Third Examination
November 13, 2002

Name _____

1. (2 minutes) Give the systematic (IUPAC) name for the following molecule.

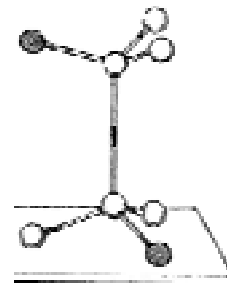
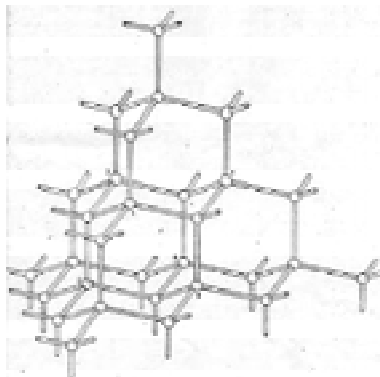
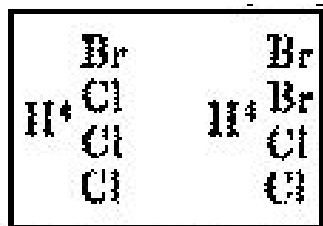
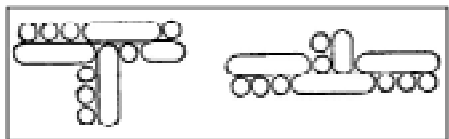


2. (5 minutes) Consider **1-chloro-3,3-dimethylbutane**.

- A) Use **Newman projections** to show two conformational isomers generated by rotation about the C(1)-C(2) bond of this molecule. Use an appropriate abbreviation for the alkyl radical substituent on C(2).
- B) Name these two conformational isomers.
- C) The energy difference between these isomers is 1.67 kcal/mole (according to Chem3D). What is their equilibrium ratio at room temperature?

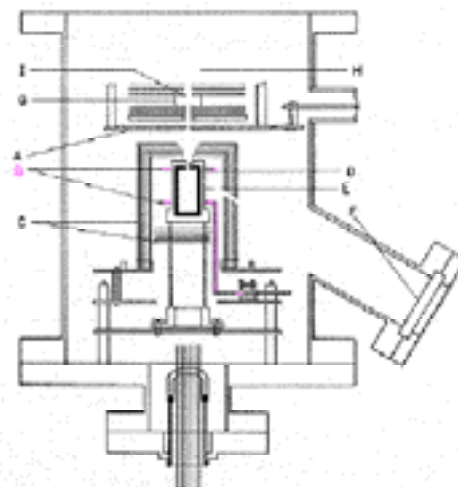
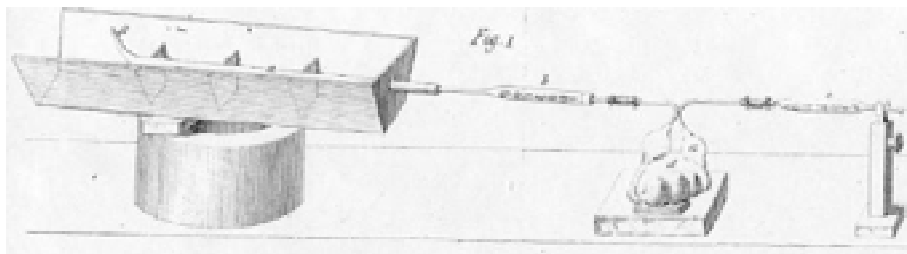
3. (5 min) **Name** three plausible choices for the “zero” reference point of a scale of energy for organic compounds. For each choice give a **reason** that would make it plausible.

4. (17.5 min) Tell what **experimental fact(s)** each of the following chemical formulae/models was meant to rationalize. Be as **specific** as possible



5. (5 minutes) List the types of contribution to strain energy that are considered by a molecular mechanics program like Chem3D. If the furthest right model in Question 4 had precisely the conformation suggested by the formula, which two contributions should dominate its strain energy,

6. (7.5 min) Explain what **ONE** of these two pieces of apparatus is used to measure, and how it works. **Choose ONE only.**



7. (8 minutes) One could easily imagine the existence of the following three isomers of “dichloroprismane”. Suggest a set of chemical transformations the results of which might allow you to identify which is which of these isomers if they came in unlabelled bottles. [All edges of the prism are of equal length.]

