HOMEWORK ASSIGNMENT #5 ORGANIC CHEMISTRY I (20 pts)

**structure-property; free radical reactions of alkanes and ozone**

**(due Wed 3 October post mini-break)**

**Your name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ your name 1 pt**

* 1. **In the `zone’ (2 pts)**

The reactions of CFCs (chlorofluorocarbons) that occur in the upper stratosphere are below. Circle the two specific ones that are most directly responsible for interrupting the natural birth of ozone, O3.

a) Cl + Cl Cl2 b)CF3 + CF3  C2F6

any uv light <350 nm

c) ClO + O Cl +O2  d)F3C-Cl F3C + Cl

e) Cl + O3 ClO + O2

**5.2 Drawn and quartered… 3 pts**

sketch on the same plot below the reaction coordinate diagrams of Br and Cl with CH(CH3)3 , making sure to emphasize where they differ.

Energy

**CH(CH3)3 + Br or Cl**

**reaction progress**

**5.3. Activated Thinking ( 4 pts)**

sketch the activated complex you expect to form between F\* and methane vs that between I\* and methane. ( 4 pts total)

F\* + CH4 activated complex I \* + CH4 activated complex

*Homework #5 organic chemistry I Alfred State (continued)*

**5.4. Circle the carbon at which the most rapid chlorination is expected**

**in each of the two structures below ( 2 pts)**



**5.4) Productive thinking (4 pts)**

Photochemical chlorination of 2,2,4-trimethylpentane yields 4 different monochlorides. Draw them below

**5.6 All in the family chemistry (4 pts)**

Among the isomeric alkanes with the empiric formula C5H12, sketch the skeletal structure of the particular alkane that on photochemical chlorination produces :

a) single monochloride b) three isomeric monochlorides

c) four isomeric monochlorides d) two isomeric dichlorides