1. Draw an energy diagram for a reaction in which the transition state resembles the products. (2 points).

2. Indicate any chiral centers in the following molecule and label them as R or S. (4 points)

3. (Problem 4-48) Hydrogen peroxide (HO-OH) is often used as an initiator in the radical chlorination of hydrocarbons because the O-O bond is fairly weak with a bond dissociation energy of 51 Kcal/mol. Provide a step by step mechanism for hydrogen peroxide induced chlorination of methane. Note: you do not have to show termination steps. (4 points)