GLY 4310   Name_____
Homework Exercise 4

EQUILIBRIUM CONSTANT

The equilibrium constant for a reaction can be roughly formulated as follows:

$$K = e^{-\frac{E}{RT}}$$ **(1)**

where E = energy barrier (calories/mole)

        R = gas constant = 1.987 cal/° mole

        T = temperature (Kelvin)

                °C + 273.15 = Kelvin

        e = natural logarithm base

1.   Suppose a reaction takes place at a constant temperature of 0°C. Calculate K for the
        following values of E.

          E, cal/mol   K

            5.0   _____

            50.   _____

           500.   _____

          5000.   _____

         50000.   _____

Assume all values of E are good to two significant figures.

2.   Suppose a reaction takes place with a constant energy barrier of 1000 cal/mol. Calculate K
        for the following temperatures.

                T, °C   K

                300   _____

                400   _____

                500   _____

                600   _____

                700   _____

                800   _____

        Assume T and E values are good to three significant figures.

3.   Prepare a plot of K vs. T for the temperature range 300 to 800°C. This may be done on a
        computer, but the plot must be printed out and handed in.

4.   For a constant energy barrier of 1000 cal/mol calculate the temperature in °C at which the
        amount of products should equal the amount of reactants
        (i.e. when K = 0.500). This answer should be calculated to three significant figures. (HINT:
        Take the natural log of both sides of the above equation).

                T = _____ °C