CHE 112 - Homework - Ch 17c

OER 17.2 and 17.5 **Arrhenius Equation and Collision Theory** Score: _____/30

Name: _____ Date: _____

Show any required calculations on the back page or another sheet of paper

[8 pt] 1. What are 4 ways to speed up a reaction. Explain how each speeds up a reaction. Include a sketch where appropriate to illustrate your explainations

(a)

(b)

(c)

(d)

[2 pt] 2. Why don't all collisions between reactant molecules lead to a chemical equation (2 answers)?

[7 pt] 3. For the reaction ___H_2(g) + ___CO_2(g) $\longrightarrow$ ___H_2O(g) + ___CO(g), the Activation Energy is 248 kJ/mol and the overall change in energy is 41 kJ/mol. Sketch the potential energy profile for the reaction. Label the axis, the location of the Reactants, Products, and Transition state, along with the values of E_a and ΔE. Is the reaction exothermic or endothermic? Using a second color (or dotted line etc), draw what the potential energy profile would be for an enzyme catalyzed reaction

CHE 112 - Homework - Ch 17c

[5 pt] 4. Graph the following data for the reaction: _2_NO_2(g) $\longrightarrow$ _2_NO(g)+___O_2(g), and using the graph, calculate the Activation Energy for the reaction (in kJ/mol). Attach the graph to the back of your homework

Temp (℃)	330.	354	378	383
k ($M^{-1}s^{-1}$)	0.77	1.8	4.1	4.7

[3 pt] 5. A certain first-order reaction has a rate constant of $1.0 \times 10^{-3} s^{-1}$ at 25℃. If the reaction rate triples when the temperature is increased to 35℃, what is the activation energy (in kJ/mol)?

[5 pt] 6. Rate constants for the reaction ___NO_2(g) + ___CO(g) $\longrightarrow$ ___NO(g) + ___CO_2(g) are 1.30 $M^{-1}s^{-1}$ at 700. K and 23.0 $M^{-1}s^{-1}$ at 800. K.

6(a) What is the value of the Activation Energy in kJ/mol?

6(b) What is the rate constant at 750.K?