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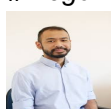
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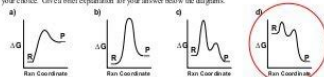


so many fake sites. this is the first one which worked! Many thanks

CHEM 1202 - Homework # 3
Chemical Kinetics
Due: Tuesday, 5:59:29, 2004 (1 PM)

ANSWER KEY

1. (5 pts) Which of the following energy diagrams best represents the slowest spontaneous reaction? Circle your choice. Give a brief explanation for your answer below the diagrams.

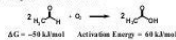


The spontaneous reaction will be the one that has products lower in energy than the reactants (c or d). The slowest reaction will have the highest activation energy barrier. Start in the smallest energy difference between the reactant energies and the top of the activation barrier. (That narrows it down to d.)

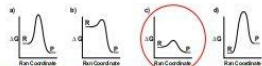
2. (5 pts) Explain in your own words why chemical reactions almost always go faster as increases the temperature.

The higher the temperature the faster molecules are vibrating and moving. Both features are important for chemical reactions. Faster translational motion means that molecules, especially those in the liquid or gas phase, will collide more frequently and with more force. This increases the probability that they will react, particularly with regards to bimolecular reactions (those involving the collision of two molecules). At higher temperatures also have more vibrating of bonds and bending of angles. This increased internal vibrational motion makes it more likely for unimolecular reactions that involve the breaking of a chemical bond to occur. All of that makes it easier for two molecules to react, which almost always involves the breaking and making of chemical bonds between atoms.

3. (5 pts) Consider the following reaction and information:



Circle the energy curve shown below (R = reactants, P = products) that best represents the reaction described above?



The -50 kJ/mol tells you that the reaction is spontaneous and goes downward (to the right). The 49 kJ/mol activation energy is the barrier in magnitude from ΔG° , so that tells you that the height of the activation barrier should be similar to the amount of energy difference between the reactants and products. For (a) the activation energy is a bit bigger (factor of 2 or 3) than ΔG° . For (b) the activation energy is quite similar to ΔG° by a factor of 2 (or 3) (has the activation energy a little larger than ΔG° and that has the disadvantage in the problem).

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