

Read chapter 19 first section

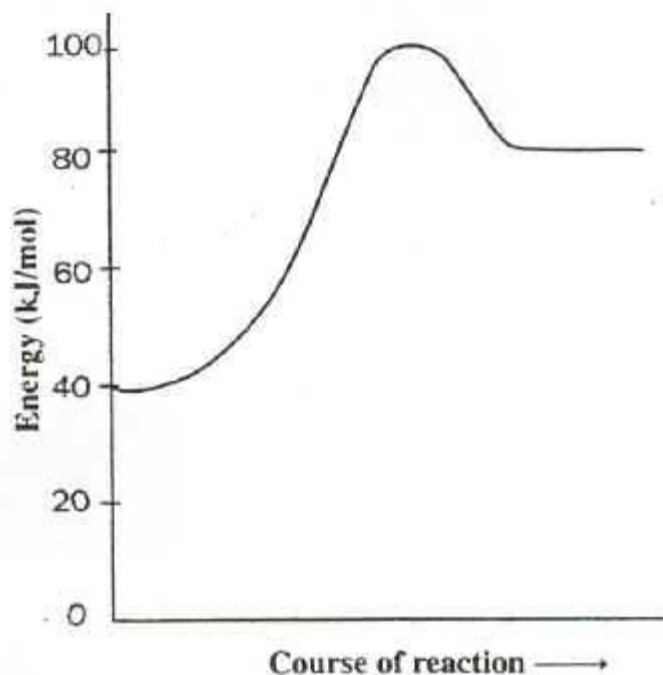
name: \_\_\_\_\_

1. What does collision theory of chemical reactions mean in your own words?
  2. What are the 4 factors that affect the rate of chemical reactions?  
At least 1 sentence per factor.
  3. Are most reactions one way chemical reactions or are they reversible? Explain.
  4. Write the balanced thermo-chemical reaction for the production of ammonia gas from the gases  $N_2$  &  $H_2$ . Draw in reversible reaction arrows. (look at Table I)
  5. Define and describe in your own words what dynamic equilibrium means.
- 

### Kinetics HW #2

Use the potential energy diagram here to answer the questions below.

1. What is the potential energy of the reactants in kJ/mol?
2. What is the potential energy of the products in kJ/mol?
3. Is the reaction exo or endothermic?
4. What is the  $\Delta H$  for this reaction? (do math)
5. For this diagram, would the energy of reaction be written with the products or with the reactants in a balanced chemical equation?
6. Would the  $\Delta H$  for the reaction change if a catalyst was added to this reaction?
7. What is the potential energy in kJ/mol of the activated complex?
8. What is the activation energy for this reaction?
9. Does the activation energy change if a catalyst is added to the system?



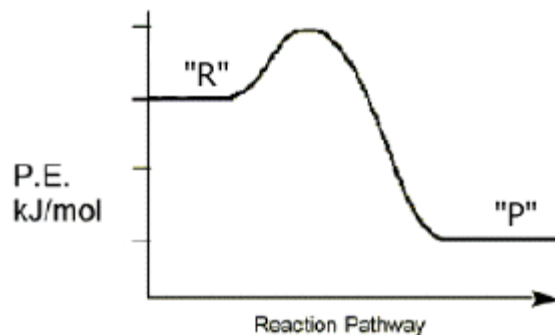
This is a LONG homework, put some good effort into it.

**Use TABLE I for reaction information.**

1. Draw the POTENTIAL ENERGY diagram for the formation of hydrogen iodide from the two gases hydrogen and iodine. Title your graph, label the axes, tell what the  $\Delta H$  is equal to. Label the curve "R" and "P" for reactants and products. Tell if this reaction and graph show ENDO or EXOthermic.
2. Do this same thing for the reaction of aluminum oxidizing into aluminum oxide.
3. Explain the difference between a catalyst & an inhibitor in a chemical reaction.

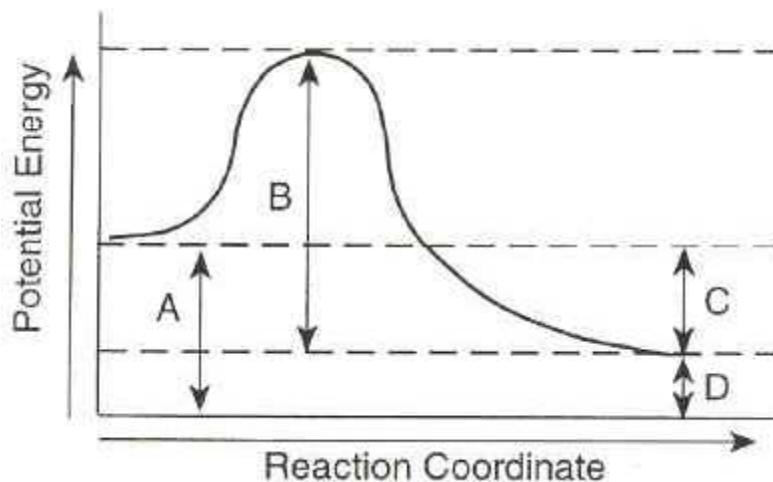
Name the 4 factors that affect the RATE OF CHEMICAL REACTIONS.

**Interpret this graph of a REVERSIBLE REACTION to answer the rest of the questions on this page. The graph shows aluminum and oxygen forming aluminum oxide exothermically in the forward direction. In reverse, it's the decomposition of aluminum oxide, endothermically.**



4. Is the forward reaction exo or endothermic?
5. Is the reverse reaction exo or endothermic?
6. What is the  $\Delta H$  for the forward reaction?
7. LABEL is the Activation energy of the forward reaction?
8. What is the  $\Delta H$  for the reverse reaction?
9. LABEL is the Activation energy for the reverse reaction?
10. Draw in a DOTTED LINE onto the graph to represent the curve with a catalyst added.
11. Does a catalyst favor the forward or the reverse reaction? Explain?
12. What would happen if you provided almost, but not quite the required activation energy to aluminum and oxygen above?

Kinetics HW #4 name: \_\_\_\_\_  
 USE LETTERS BELOW GRAPH FOR MEASUREMENTS



**A = 30 kJ/mol    B = 50 kJ/mol    C = 20 kJ/mol    D = 10 kJ/mol**

Use the diagram and labels to answer the questions.

1. What is the potential energy of the reactants? \_\_\_\_\_kJ/mol
2. What is the potential energy of the products? \_\_\_\_\_kJ/mol
3. What is the potential energy of the activated complex? \_\_\_\_\_kJ/mol
4. Is the  $\Delta H$  positive or negative? \_\_\_\_\_
5. What is the heat of reaction? \_\_\_\_\_kJ/mol (Look at Table I for definition)
6. How much energy is required to start this reaction? \_\_\_\_\_kJ/mol
7. What is this energy called (in question #6)? \_\_\_\_\_
8. Is this reaction endothermic or exothermic? \_\_\_\_\_
9. Could the reaction:  $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$   
 be represented by that diagram of this shaped diagram? \_\_\_\_\_