Name _____ Date _____ Period _____

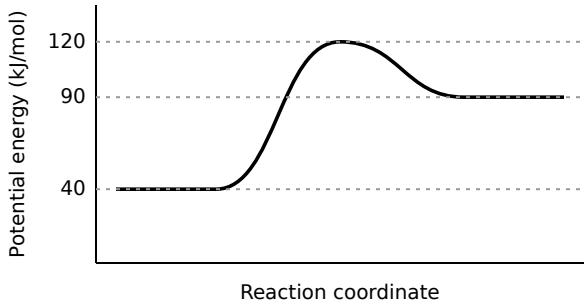
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5.6 Reaction Energy Profile

AP Chemistry

Measure E_a from the reactants to the transition state. ΔH = energy of products − energy of reactants. Include units.

1. Use the energy profile to answer the questions.



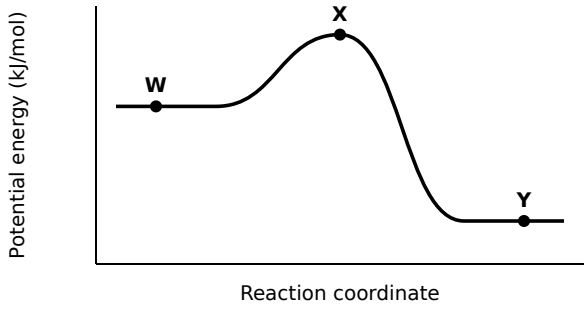
(a) Find E_a for the forward reaction.

(b) Find ΔH.

(c) Is the reaction exothermic or endothermic? Explain.

(d) Find E_a for the reverse reaction.

2. Points W, X, and Y are marked on the energy profile below.



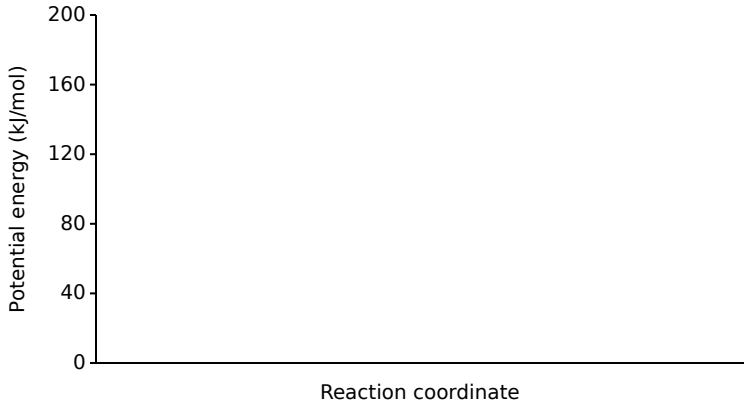
(a) Which point is the transition state? Describe the bonds at that point.

(b) Is the reaction exothermic or endothermic?

(c) Can the species at the transition state be isolated in a bottle? Explain.

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3. On the axes below, sketch the energy profile for an elementary reaction with reactants at 100 kJ/mol, E_a = 60 kJ/mol, and $\Delta H = -80$ kJ/mol. Label the reactants, the transition state, the products, E_a, and ΔH.



4. An elementary reaction has $\Delta H = -45$ kJ/mol and E_a = 75 kJ/mol for the forward reaction. Calculate E_a for the reverse reaction.

5. The Arrhenius equation is $k = A \exp(-E_a/RT)$. No calculation is needed.

(a) What happens to k when the temperature increases?

(b) At the same temperature, reaction 1 has E_a = 35 kJ/mol and reaction 2 has E_a = 85 kJ/mol. Which has the larger k? Explain using collisions.

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