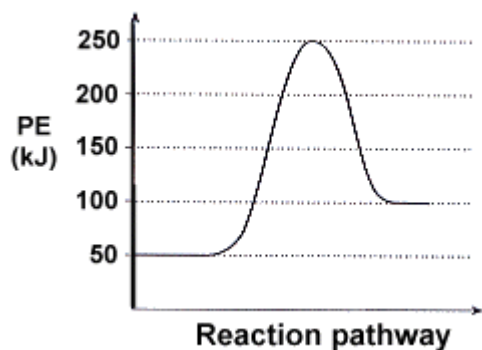


Practice Questions: Factors Influencing Reaction Rate - Activation Energy – WS #3

1. Answer the following questions based on the potential energy diagram shown here:

- Does the graph represent an endothermic or exothermic reaction?
- Label the position of the reactants, products, and activated complex.
- Determine the heat of reaction, ΔH , (enthalpy change) for this reaction.
- Determine the activation energy, E_a for this reaction.
- How much energy is released or absorbed during the reaction?
- How much energy is required for this reaction to occur?

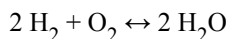


2. Sketch a potential energy curve that is represented by the following values of ΔH and E_a . You may make up appropriate values for the y-axis (potential energy).

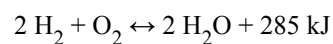
$$\Delta H = -100 \text{ kJ and } E_a = 20 \text{ kJ}$$

Is this an endothermic or exothermic reaction?

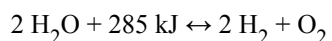
3. In the next unit we will be discussing reactions that are reversible, and can go in either the forward or reverse directions. For example, hydrogen gas and oxygen gas react to form water, but water can also be broken down into hydrogen and oxygen gas. We typically write a reaction that can be reversed this way, using the double arrow symbol (or \leftrightarrow):



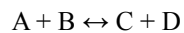
This reaction is exothermic in the forward direction:



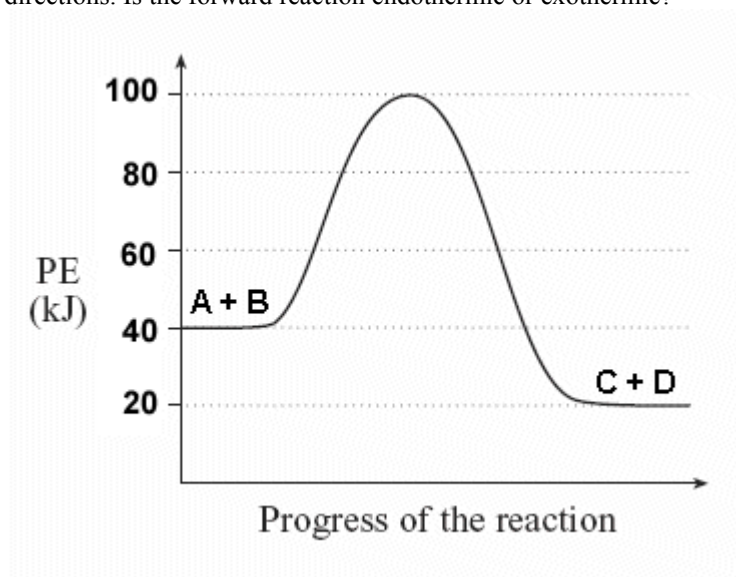
but endothermic in the reverse direction:



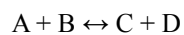
Consider a general reversible reaction such as:



Given the following potential energy diagram for this reaction, determine ΔH and E_a for both the forward and reverse directions. Is the forward reaction endothermic or exothermic?



4. Sketch a potential energy diagram for a general reaction



Given that $\Delta H_{\text{reverse}} = -10 \text{ kJ}$ and $E_{a \text{ forward}} = +40 \text{ kJ}$