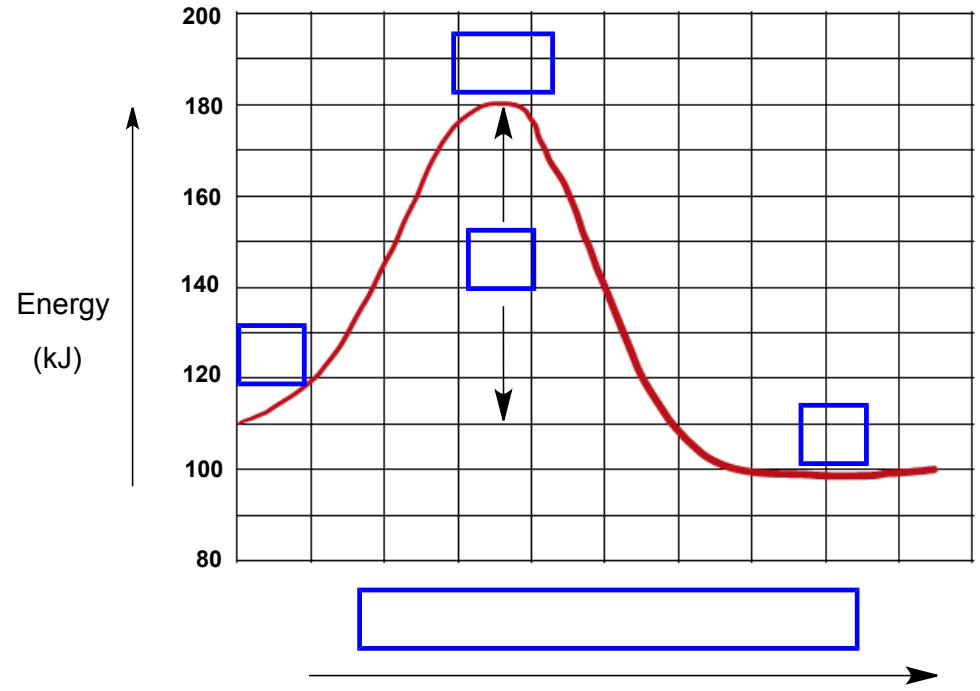
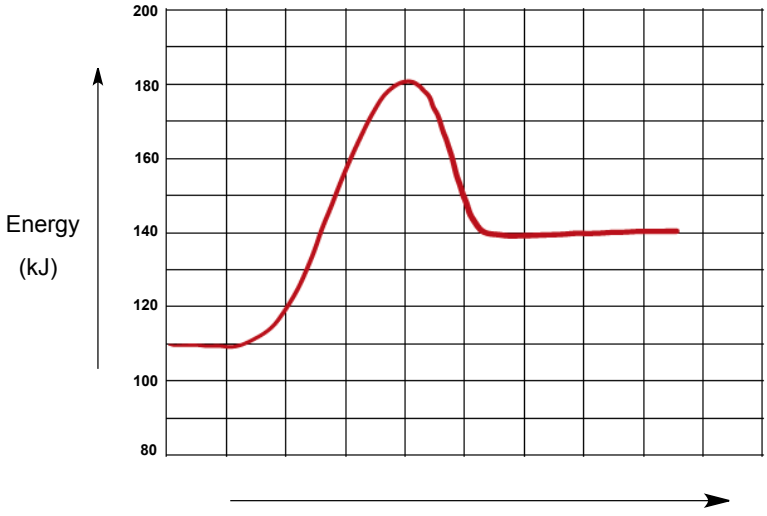
CONCEPT: ENERGY DIAGRAMS

- A curved plot on a graph that Illustrates the energies of reactants, products and *transition state* as a reaction occurs.
  - □ **Reactants (__):** Found _____ in the beginning. □ **Products (__):** Found _____ at the end.
  - □ **Transition State (__):** The _____ energy structure along a *reaction coordinate* between reactants and products.
    - Sometimes referred to as the _____ complex.
  - □ **Reaction Coordinate:** The progress of a reaction pathway that lies along the ____ axis.
  - □ **Activation Energy (Energy Barrier) (___):** The _____ energy required for a reaction to occur.



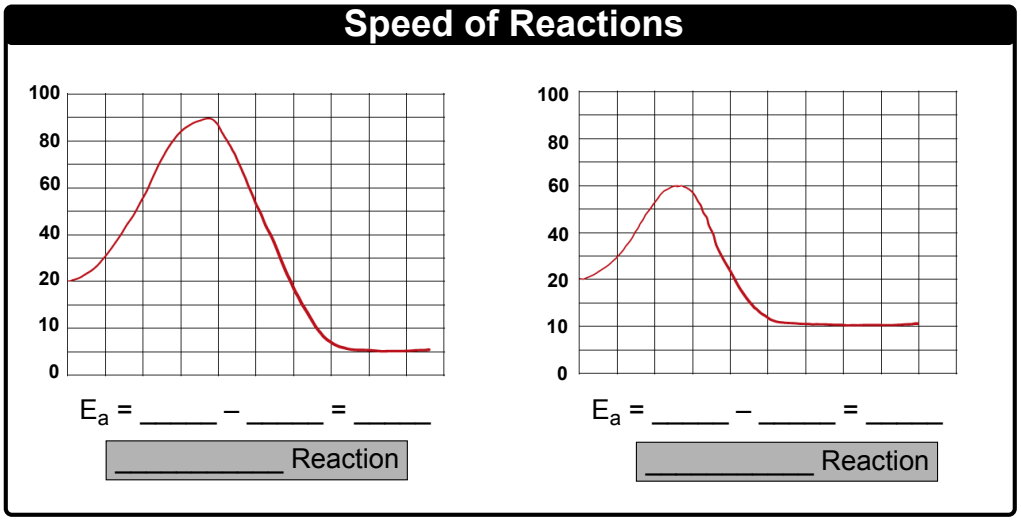
EXAMPLE: What is the energy value for the product within the following energy diagram?



CONCEPT: ENERGY DIAGRAMS

Speed of Reactions

- The speed of a chemical reaction is based on the _____ of the activation energy.
  - □ Activation Energy (E_a) = _____ – _____
  - □ The _____ the activation energy then fewer reactant molecules have enough energy to convert into products.
  - □ ___ E_a = slower the reaction.
  - □ ___ E_a = faster the reaction.



EXAMPLE: Which reaction will occur in the shortest amount of time?

a) **Reaction A** (E_a = 143 kJ) b) **Reaction B** (E_a = 80 kJ) c) **Reaction C** (E_a = 215 kJ)

Stability

- The difference in overall energy between the reactants and products can determine the _____ of a reaction.
  - □ Overall Energy (____) = _____ – _____
    - Enthalpy (____): when the overall energy is classified as _____ energy.