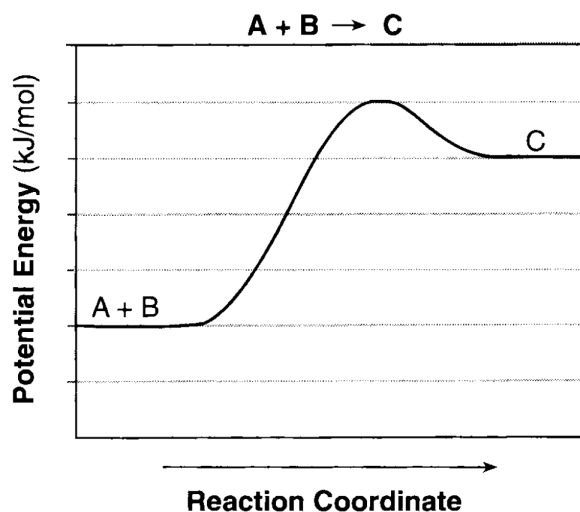
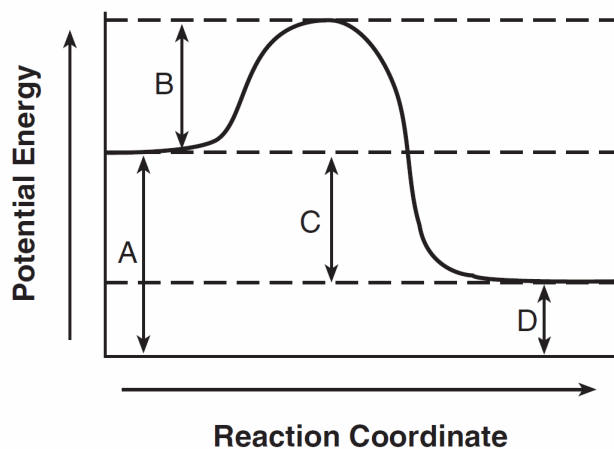


1. Given the equation and potential energy diagram representing a reaction:



If each interval on the axis labeled "Potential Energy (kJ/mol)" represents 10. kJ/mol, what is the heat of reaction?

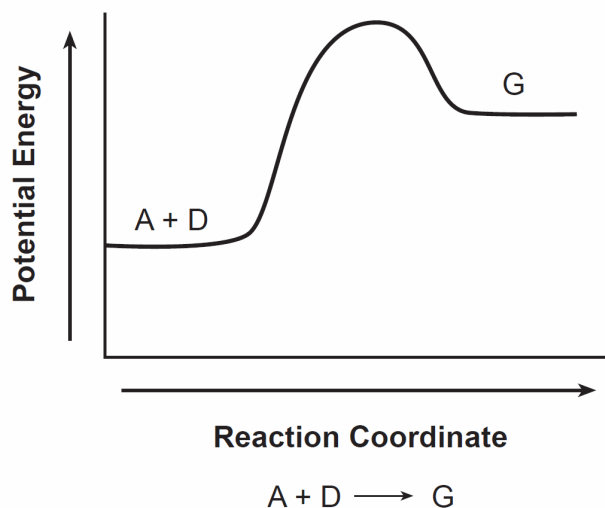
- A) +60. kJ/mol B) +20. kJ/mol
 C) +30. kJ/mol D) +40. kJ/mol
2. Given the potential energy diagram representing a reversible reaction:



The activation energy for the reverse reaction is represented by

- A) $A + B$ B) $B + C$
 C) $B + D$ D) $C + D$

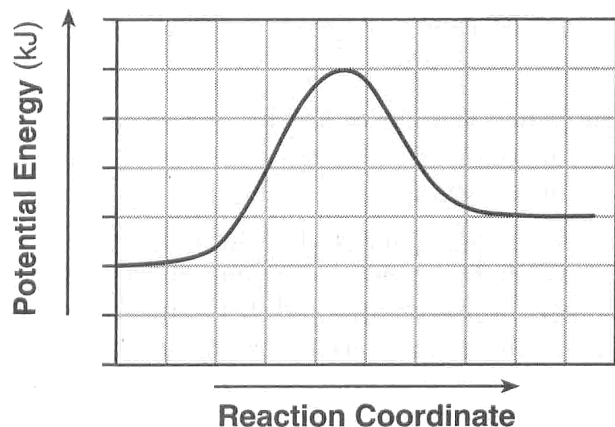
3. Given the potential energy diagram and equation representing the reaction between substances A and D :



According to Table I , substance G could be

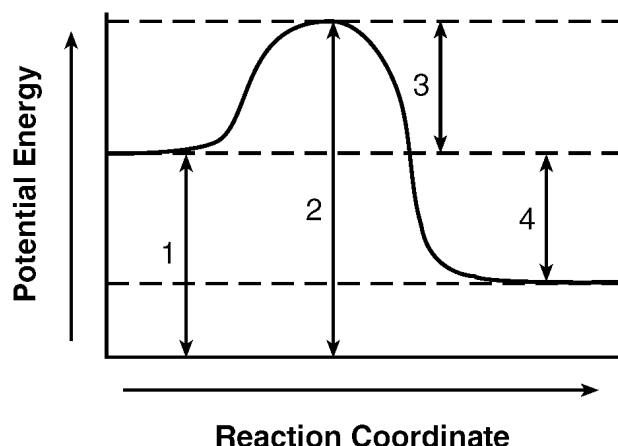
- A) $\text{HI}(\text{g})$ B) $\text{H}_2\text{O}(\text{g})$
 C) $\text{CO}_2(\text{g})$ D) $\text{C}_2\text{H}_6(\text{g})$
4. In a chemical reaction, the difference between the potential energy of the products and the potential energy of the reactants is equal to the
- A) activation energy
 B) entropy of the system
 C) heat of fusion
 D) heat of reaction
5. Changes in activation energy during a chemical reaction are represented by a
- A) cooling curve
 B) heating curve
 C) ionization energy diagram
 D) potential energy diagram

6. The potential energy diagram for a chemical reaction is shown below.



Each interval on the axis labeled "Potential Energy (kJ)" represents 40 kilojoules. What is the heat of reaction?

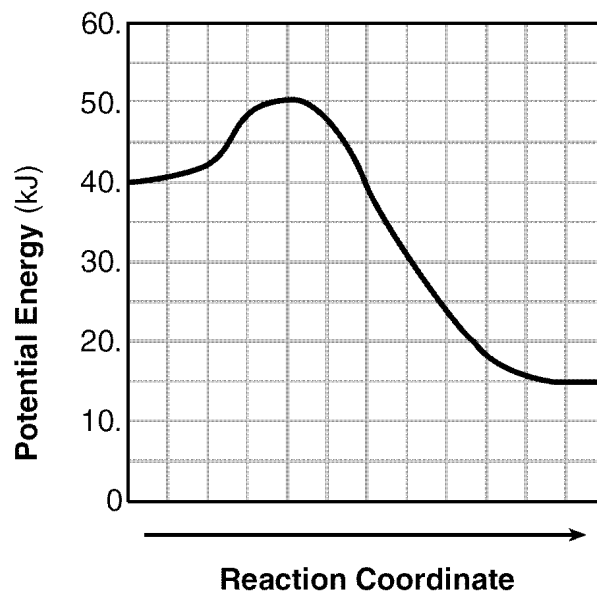
- A) -120kJ B) -40kJ
 C) $+40\text{kJ}$ D) $+160\text{kJ}$
7. Given the potential energy diagram for a reaction:



Which interval on this diagram represents the difference between the potential energy of the products and the potential energy of the reactants?

- A) 1 B) 2 C) 3 D) 4

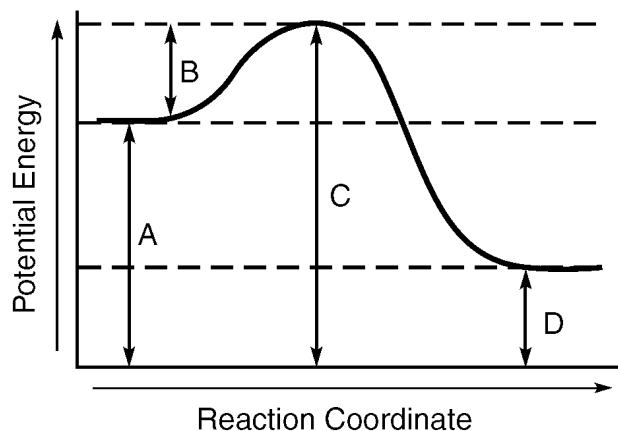
8. Given the potential energy diagram for a chemical reaction:



Which statement correctly describes the energy changes that occur in the forward reaction?

- A) The activation energy is 10. kJ and the reaction is endothermic.
 B) The activation energy is 10. kJ and the reaction is exothermic.
 C) The activation energy is 50. kJ and the reaction is endothermic.
 D) The activation energy is 50. kJ and the reaction is exothermic.
9. In a chemical reaction, the difference between the potential energy of the products and the potential energy of the reactants is defined as the
- A) activation energy
 B) ionization energy
 C) heat of reaction
 D) heat of vaporization
10. Which information about a chemical reaction is provided by a potential energy diagram?
- A) the oxidation states of the reactants and products
 B) the average kinetic energy of the reactants and products
 C) the change in solubility of the reacting substances
 D) the energy released or absorbed during the reaction

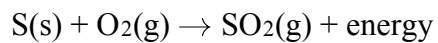
11. The potential energy diagram below represents a reaction.



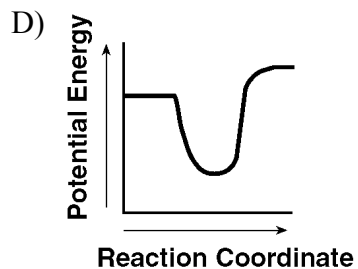
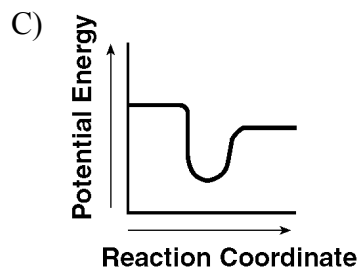
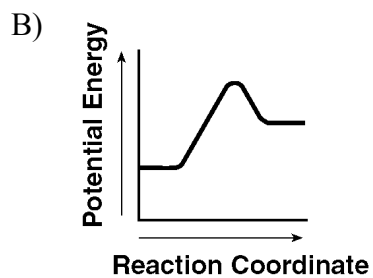
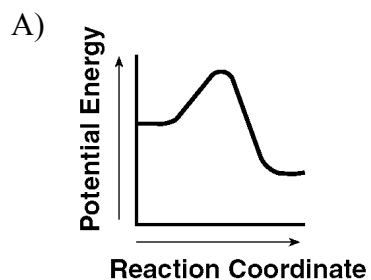
Which arrow represents the activation energy of the forward reaction?

- A) *A* B) *B* C) *C* D) *D*

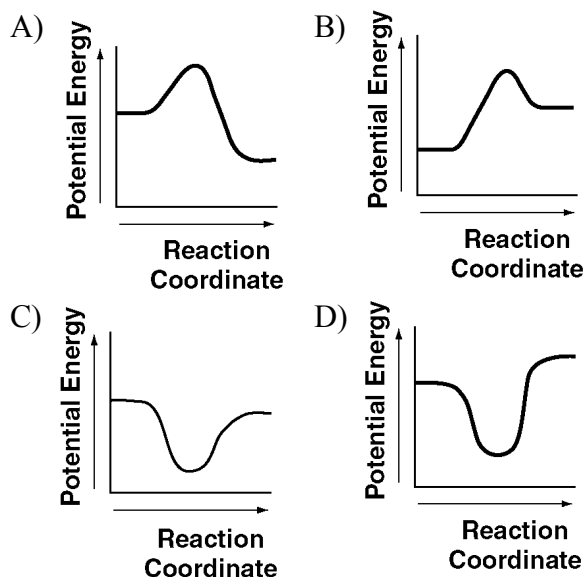
12. Given the reaction:



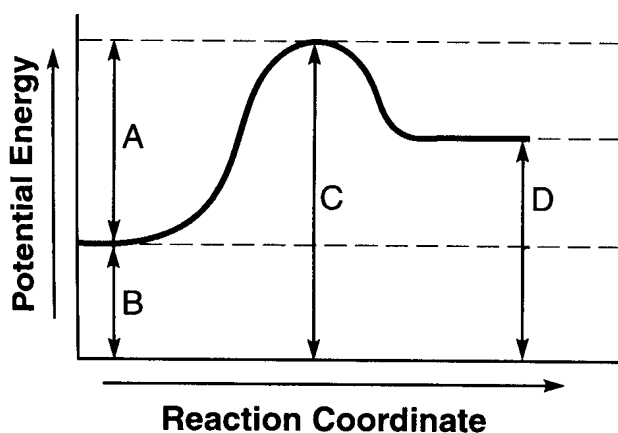
Which diagram best represents the potential energy changes for this reaction?



13. According to Table I, which potential energy diagram best represents the reaction that forms $\text{H}_2\text{O}(\ell)$ from its elements?



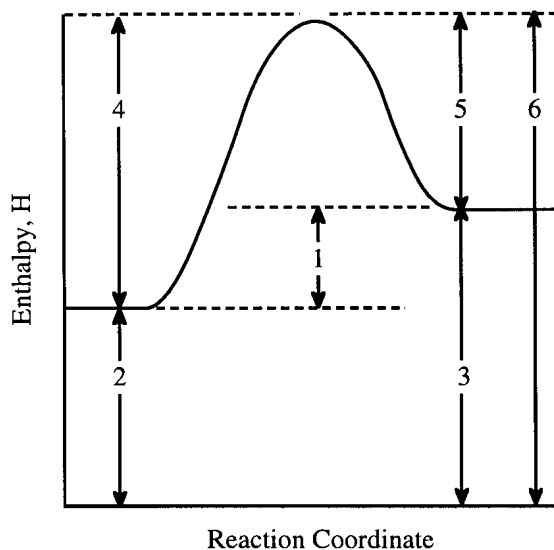
14. Given the potential energy diagram of a chemical reaction:



Which arrow represents the potential energy of the reactants?

- A) A B) B C) C D) D

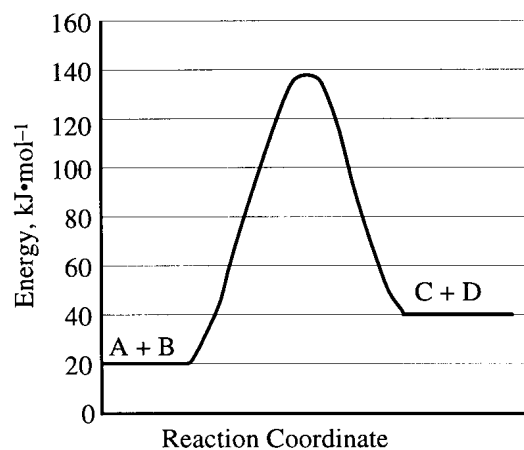
15. Base your answer to the following question on the diagram shown below.



Which represents the activation energy for the forward reaction?

- A) 1 B) 2 C) 3 D) 4 E) 6

Base your answers to questions 16 and 17 on the diagram below. The reaction $\text{A} + \text{B} \rightarrow \text{C} + \text{D}$ follows the energy path shown below.



16. What is the activation energy for the *forward* reaction?

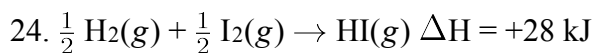
- A) 20.0 $\text{kJ}\cdot\text{mol}^{-1}$ B) 40.0 $\text{kJ}\cdot\text{mol}^{-1}$
 C) 100. $\text{kJ}\cdot\text{mol}^{-1}$ D) 120. $\text{kJ}\cdot\text{mol}^{-1}$
 E) 140. $\text{kJ}\cdot\text{mol}^{-1}$

17. What is the activation energy for the *reverse* reaction?

- A) 20.0 $\text{kJ}\cdot\text{mol}^{-1}$ B) 40.0 $\text{kJ}\cdot\text{mol}^{-1}$
 C) 100. $\text{kJ}\cdot\text{mol}^{-1}$ D) 120. $\text{kJ}\cdot\text{mol}^{-1}$
 E) 140. $\text{kJ}\cdot\text{mol}^{-1}$

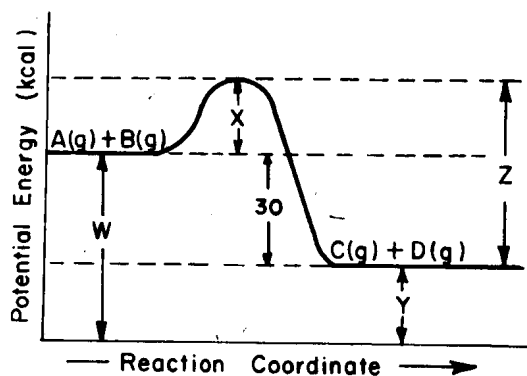
23. A catalyst increases the rate of a chemical reaction by

- A) increasing the kinetic energy
- B) decreasing the heat of reaction
- C) changing the concentration of the reactants
- D) providing an alternate reaction mechanism
- E) decreasing kinetic energy



The activation energy for the formation of HI, which is shown above, is 167 kJ. The activation energy for the decomposition of HI is

- A) 28 kJ
- B) 139 kJ
- C) 167 kJ
- D) 195 kJ
- E) 210 kJ



25. According to the above reaction mechanism, the distanced marked "Z" represents

- A) the activation energy for $A(\text{g}) + B(\text{g}) \leftrightarrow C(\text{g}) + D(\text{g})$
- B) the heat of reaction for $A(\text{g}) + B(\text{g}) \leftrightarrow C(\text{g}) + D(\text{g})$
- C) the activation energy for $C(\text{g}) + D(\text{g}) \leftrightarrow A(\text{g}) + B(\text{g})$
- D) the heat of reaction for $C(\text{g}) + D(\text{g}) \leftrightarrow A(\text{g}) + B(\text{g})$
- E) none of these