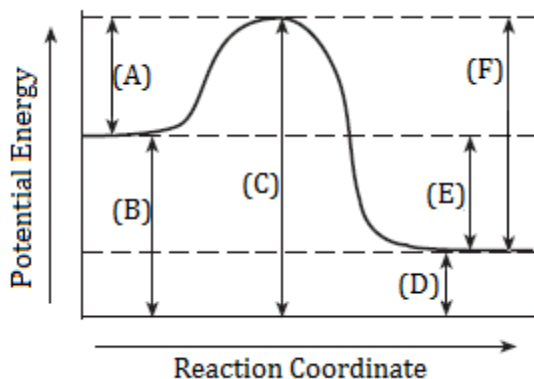


**Problem Set #15**

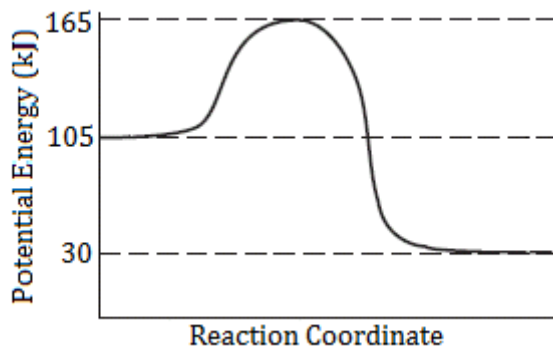
Name: \_\_\_\_\_

Part 1 - Use the following potential energy diagram to answer the questions.



1. Which of the letter(s) represents the heat of reaction ( $\Delta H$ ) for the forward reaction?
2. Which of the letter(s) represents the potential energy of the reactants for the reverse reaction?
3. Which of the letter(s) represents the  $E_a$  for the forward reaction?
4. Which of the letter(s) represents the potential energy of the activated complex?

5. Which of the letter(s) will change if a catalyst is added?



Part 2 - Use the following potential energy diagram to answer the questions.

6. What is the value for the  $\Delta H$  of the forward reaction?
7. What is the value for the activation energy for the forward reaction?
8. What is the value for the potential energy of the activated complex?
9. What is the value for the potential energy of the reactants for the forward reaction?

10. What is the value for the  $\Delta H$  of the reverse reaction?

11. What is the value for the potential energy of the reactants of the reverse reaction?

Part 3 - For each reaction given, identify whether the value for  $\Delta H$  would be positive or negative, whether the value for  $\Delta S$  would be positive or negative, and if the reaction would sometimes, always, or never be spontaneous.

Reaction	$\Delta H$	$\Delta S$	Spontaneous?
$\text{H}_2\text{O (s)} + \text{heat} \rightarrow \text{H}_2\text{O (l)}$			
$\text{HC}_2\text{H}_3\text{O}_2 \text{ (l)} \rightarrow \text{H}^+ \text{ (aq)} + \text{C}_2\text{H}_3\text{O}_2^- \text{ (aq)} + \text{heat}$			
$6 \text{ CO}_2 \text{ (g)} + 6 \text{ H}_2\text{O (g)} + \text{heat} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 \text{ (s)} + 6 \text{ O}_2 \text{ (g)}$			