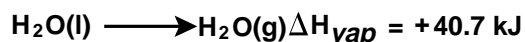


Name: _____

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- 1 Which of these increases when the sign of ΔS is negative?
- A Disorder
 - B Temperature
 - C Order
 - D Kinetic energy
- 2 When you eat a slice of pizza, the crust is often less hot than the toppings or sauce. This most likely occurs because the toppings and sauce have a greater —
- A molar enthalpy of formation
 - B specific heat
 - C heat of fusion
 - D mass
- 3 The equation shows the change in enthalpy when one mole of liquid water vaporizes into water vapor. This is called the molar heat of vaporization. Given this information, which of these is the proper value for the molar heat of condensation?



- A $\Delta H_{\text{cond}} = -40.7 \text{ kJ}$
 - B $\Delta H_{\text{cond}} = 0 \text{ kJ}$
 - C $\Delta H_{\text{cond}} = -571.6 \text{ kJ}$
 - D $\Delta H_{\text{cond}} = +571.6 \text{ kJ}$
- 4 Which of these is required for a reaction to be called exothermic?
- A The enthalpy of the reactants must be less than that of the products.
 - B The sign of the change in enthalpy for the reaction must be positive.
 - C The enthalpy of the products must be less than that of the reactants.
 - D Heat must flow from the surroundings into the system.
- 5 Leila is given a sealed flask of sugar water at room temperature. She places it over a Bunsen burner for a few minutes and notes condensation on the sides. Then she places the flask in an ice bath for ten minutes, and notices that ice crystals begin to form. Leila knows that the one statement that cannot be true is that —
- A the kinetic energy of the sugar water at the end of the experiment is less than at the beginning of the experiment
 - B the total energy in the sugar water at the end of the experiment is less than at the beginning of the experiment
 - C the entropy of the sugar water at the beginning of the experiment is greater than at the end of the experiment
 - D the total energy in the sugar water at the beginning of the experiment is greater than at the end of the experiment



Name: _____ **Date:** _____

- 6 Fusion, or melting, is an endothermic process because it —
- A requires heat to be transferred from system to surroundings and has a ΔH that is negative
 - B requires heat to be transferred from surroundings to system and has a ΔH that is positive
 - C involves a decrease in entropy
 - D involves a decrease in kinetic energy
- 7 Which of the following is NOT a variable in the Gibbs free energy equation, which determines reaction spontaneity?
- A Entropy
 - B Endothermy
 - C Temperature
 - D Enthalpy
- 8 Professor Bothwell determined from the wrapper the number of calories in a candy bar. He then burned the entire candy bar and measured the amount of heat released. His experiment was most likely designed to demonstrate —
- A the law of conservation of matter
 - B the law of disorder
 - C the law of conservation of energy
 - D the law of constant composition
- 9 Which of these would always be called a spontaneous reaction?
- A A reaction with a $-\Delta S$ and a $+\Delta H$
 - B A reaction with a $-\Delta H$ and a $-\Delta S$
 - C A reaction with a $+\Delta H$ and a $+\Delta S$
 - D A reaction with a $+\Delta S$ and a $-\Delta H$
- 10 Which of the following reactions is a spontaneous process at 25°C ?
- A $2\text{Fe}_2\text{O}_3(\text{s}) \rightarrow 4\text{Fe}(\text{s}) + 3\text{O}_2(\text{g}) \Delta H = 1625 \text{ kJ}$
 - B $\text{H}_2\text{O}(\text{l}) \rightarrow \text{H}_2\text{O}(\text{s}) \Delta H = -6.01 \text{ kJ}$
 - C $4\text{Fe}(\text{s}) + 3\text{O}_2(\text{g}) \rightarrow 2\text{Fe}_2\text{O}_3(\text{s}) \Delta H = -1625 \text{ kJ}$
 - D $\text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l}) \rightarrow \text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \Delta H = 891 \text{ kJ}$
- 11 The Gibb's free energy equation is $\Delta G_{\text{system}} = \Delta H_{\text{system}} - T\Delta S_{\text{system}}$. Which of the following combinations of factors must be true for a reaction to be nonspontaneous?
- A ΔG_{system} negative, $\Delta S_{\text{universe}}$ positive
 - B ΔG_{system} positive, $\Delta S_{\text{universe}}$ positive
 - C ΔG_{system} negative, $\Delta S_{\text{universe}}$ negative
 - D ΔG_{system} positive, $\Delta S_{\text{universe}}$ negative

