

1. Which law of thermodynamics is primarily concerned with the conservation of energy in reacting systems?

- a) First Law
- b) Second Law
- c) Third Law
- d) Zeroth Law

Answer: a) First Law

Explanation: The First Law of Thermodynamics, also known as the Law of Energy Conservation, states that energy cannot be created or destroyed in a chemical reaction, but it can change forms. It is essential in analyzing the energy changes in reacting systems.

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2. What is the purpose of using steam tables and Mollier charts in reactive systems?

- a) To determine the adiabatic flame temperature
- b) To analyze the enthalpy of formation
- c) To calculate the entropy change
- d) To predict reaction kinetics

Answer: a) To determine the adiabatic flame temperature

Explanation: Steam tables and Mollier charts are tools used to find thermodynamic properties like enthalpy, entropy, and temperature, crucial for determining the adiabatic flame

temperature in reactive systems.

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3. Enthalpy of formation is best defined as:

- a) The heat required to form one mole of a compound from its elements in their standard states at a specified temperature
- b) The heat released when one mole of a compound reacts completely with oxygen
- c) The difference in enthalpy between reactants and products in a reaction
- d) The change in internal energy of a system at constant pressure

Answer: a) The heat required to form one mole of a compound from its elements in their standard states at a specified temperature

Explanation: Enthalpy of formation refers to the heat change accompanying the formation of one mole of a substance from its constituent elements in their standard states.

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4. The theoretical combustion process is characterized by:

- a) Complete combustion with no heat loss
- b) Incomplete combustion with excess oxygen
- c) Ideal conditions without any restrictions
- d) Combustion at non-standard temperature and pressure

Answer: a) Complete combustion with no heat loss

Explanation: Theoretical combustion processes assume perfect conditions, where combustion occurs completely without any heat loss to the surroundings.

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5. Adiabatic flame temperature refers to:

- a) The maximum temperature achieved during a combustion process under adiabatic conditions
- b) The temperature at which combustion ceases due to lack of oxygen
- c) The temperature of the surroundings during a combustion process
- d) The temperature reached when the reaction is at equilibrium

Answer: a) The maximum temperature achieved during a combustion process under adiabatic conditions

Explanation: Adiabatic flame temperature is the maximum temperature attained in a combustion process assuming no heat exchange with the surroundings.

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6. The Third Law of Thermodynamics deals primarily with:

- a) Absolute zero and the behavior of entropy

- b) Conservation of energy in a closed system
- c) The relationship between pressure, volume, and temperature
- d) Chemical equilibrium in reactive systems

Answer: a) Absolute zero and the behavior of entropy

Explanation: The Third Law of Thermodynamics focuses on the behavior of entropy as temperature approaches absolute zero, providing insights into the stability of systems at extremely low temperatures.

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7. In a first law analysis of reacting systems, which of the following statements is true?

- a) The total energy of the system remains constant
- b) Energy can be created or destroyed during the reaction
- c) Only kinetic energy changes during the reaction
- d) Internal energy of the system decreases

Answer: a) The total energy of the system remains constant

Explanation: According to the First Law of Thermodynamics, energy cannot be created or destroyed, only converted from one form to another. Thus, the total energy of the system remains constant in a first law analysis of reacting systems.

8. Which parameter is not typically found in steam tables and Mollier charts?

- a) Enthalpy
- b) Entropy
- c) Internal Energy
- d) Gibb's Free Energy

Answer: d) Gibb's Free Energy

Explanation: Steam tables and Mollier charts primarily provide data on properties like enthalpy, entropy, and internal energy, but Gibbs Free Energy is not typically included.

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9. The enthalpy of reaction is defined as:

- a) The heat absorbed or released during a chemical reaction
- b) The change in temperature of the reactants
- c) The change in pressure of the system
- d) The change in volume of the products

Answer: a) The heat absorbed or released during a chemical reaction

Explanation: Enthalpy of reaction refers to the heat change accompanying a chemical

reaction, whether it is absorbed or released.

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10. The purpose of using enthalpy of formation in thermodynamics is to:

- a) Predict the heat capacity of a substance
- b) Calculate the work done by the system
- c) Determine the stability of compounds
- d) Measure the rate of a reaction

Answer: c) Determine the stability of compounds

Explanation: Enthalpy of formation provides insight into the stability of compounds by measuring the heat change associated with their formation from their constituent elements.

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