Principles of Thermodynamics

Thermodynamics · Answer Key · 10 Questions

1. Which law of thermodynamics states that the entropy of a perfect crystal at absolute zero is exactly zero?

A) First Law
B) Second Law
C) Third Law
D) Zeroth Law

2. In an adiabatic process, which of the following variables remains constant?

A) Temperature
B) Pressure
C) Heat transfer
D) Internal energy

3. Which thermodynamic property is defined as the total heat content of a system?

A) Entropy
B) Enthalpy
C) Gibbs free energy
D) Internal energy

4. What is the unit of entropy in the International System of Units (SI)?

A) Joules per Kelvin
B) Watts per meter-Kelvin
C) Joules per kilogram
D) Pascal-seconds

5. The Zeroth Law of Thermodynamics provides the physical basis for the measurement of which property?

A) Volume
B) Pressure
C) Temperature
D) Density

6. According to the Second Law of Thermodynamics, what happens to the total entropy of an isolated system during a spontaneous process?

A) It remains constant
B) It decreases
C) It increases
D) It fluctuates randomly

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7. Which thermodynamic potential is minimized at equilibrium for a system at constant temperature and pressure?

A) Helmholtz free energy
B) Internal energy
C) Enthalpy
D) Gibbs free energy

8. What is the theoretical maximum efficiency of a heat engine operating between two temperatures T_hot and T_cold?

A) 1 - (T_cold/T_hot)
B) 1 - (T_hot/T_cold)
C) T_hot / T_cold
D) (T_hot - T_cold) / T_cold

9. Which phase transition describes the direct transformation of a substance from a solid to a gas?

A) Condensation
B) Sublimation
C) Deposition
D) Evaporation

10. Which state function is independent of the path taken to reach a particular state?

A) Work
B) Heat
C) Internal energy
D) Power

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