

Principles of Thermodynamics

Thermodynamics · Practice Test · 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

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) $1 - (T_{\text{cold}}/T_{\text{hot}})$
- B) $1 - (T_{\text{hot}}/T_{\text{cold}})$
- C) $T_{\text{hot}} / T_{\text{cold}}$
- D) $(T_{\text{hot}} - T_{\text{cold}}) / T_{\text{cold}}$

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