

## Thermodynamics – MCQs

### 1. Thermodynamics deals with:

- A) Rate of chemical reactions
- B) Energy changes in chemical and physical processes
- C) Types of molecules in a reaction
- D) Mechanism of a reaction

### 2. The first law of thermodynamics is also known as:

- A) Law of conservation of mass
- B) Law of conservation of momentum
- C) Law of conservation of energy
- D) Law of conservation of entropy

### 3. In thermodynamics, the internal energy is denoted by:

- A) Q
- B) H
- C) E or U
- D) W

### 4. The SI unit of heat and work is:

- A) Calorie
- B) Joule
- C) Erg
- D) Watt

### 5. Which of the following is a state function?

- A) Heat (q)
- B) Work (w)
- C) Enthalpy (H)
- D) Path followed

### 6. In an isothermal process, the change in internal energy is:

- A) Maximum
- B) Minimum
- C) Zero
- D) Negative

### 7. A process in which no heat is exchanged with surroundings is called:

- A) Isothermal
- B) Adiabatic
- C) Isobaric
- D) Isochoric

### 8. Which of the following expresses the first law of thermodynamics correctly?

- A)  $\Delta U = q - w$
- B)  $\Delta U = q + w$
- C)  $\Delta U = -q + w$
- D)  $\Delta U = -q - w$

**9. Work done by the system is considered:**

- A) Positive
- B) Negative
- C) Zero
- D) Infinite

**10. Enthalpy is defined as:**

- A)  $H = E - PV$
- B)  $H = E + PV$
- C)  $H = q - w$
- D)  $H = T\Delta S$

**11. In an endothermic reaction:**

- A) Heat is released
- B) Heat is absorbed
- C) Temperature decreases
- D)  $\Delta H < 0$

**12. A spontaneous process occurs with:**

- A) Increase in enthalpy
- B) Decrease in entropy
- C) Increase in Gibbs free energy
- D) Decrease in Gibbs free energy

**13. Which of the following is *not* a thermodynamic process?**

- A) Isothermal
- B) Isochoric
- C) Isotonic
- D) Adiabatic

**14. Which of the following quantities is not a state function?**

- A) Internal energy
- B) Enthalpy
- C) Work
- D) Entropy

**15. What does  $\Delta H = 0$  indicate in a reaction?**

- A) Reaction is exothermic
- B) Reaction is endothermic
- C) No heat is exchanged
- D) No temperature change

**16. The entropy of a perfect crystal at absolute zero is:**

- A) Infinite
- B) Zero
- C) Negative
- D) One

**17. The second law of thermodynamics is related to:**

- A) Work
- B) Energy
- C) Entropy
- D) Heat capacity

**18. A process where pressure remains constant is called:**

- A) Isothermal
- B) Isobaric
- C) Isochoric
- D) Adiabatic

**19. The Gibbs free energy change ( $\Delta G$ ) is given by:**

- A)  $\Delta G = \Delta H - T\Delta S$
- B)  $\Delta G = \Delta H + T\Delta S$
- C)  $\Delta G = \Delta H \times \Delta S$
- D)  $\Delta G = \Delta H / T\Delta S$

**20. Which condition must be satisfied for a reaction to be spontaneous at constant T and P?**

- A)  $\Delta G = 0$
- B)  $\Delta G > 0$
- C)  $\Delta G < 0$
- D)  $\Delta H < 0$

**Answer Key**

- 1. B
- 2. C
- 3. C
- 4. B
- 5. C
- 6. C
- 7. B
- 8. B
- 9. B
- 10. B
- 11. B
- 12. D
- 13. C
- 14. C
- 15. C
- 16. B
- 17. C
- 18. B
- 19. A
- 20. C