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SET 1 – THERMODYNAMICS

1. Thermodynamics deals with –
    a) Rate of reaction
    b) Energy changes
    c) Product composition
    d) Mechanism of reaction

2. The word "Thermodynamics" is derived from Greek words meaning –
    a) Heat and motion
    b) Temperature and pressure
    c) Work and energy
    d) Force and motion

3. Which of the following is not a thermodynamic term?
    a) System
    b) Surroundings
    c) Universe
    d) Constant

4. The part of the universe under observation is called –
    a) System
    b) Surroundings
    c) Universe
    d) Boundary

5. The part of the universe outside the system is called –
    a) System
    b) Surroundings
    c) Boundary
    d) Reaction mixture

6. The combination of system and surroundings is called –
    a) Universe
    b) Atmosphere
    c) Boundary
    d) Medium

7. A system that can exchange both matter and energy with surroundings is –
    a) Open system
    b) Closed system
    c) Isolated system
    d) None

8. A system that can exchange only energy but not matter is –
    a) Open system

b) Closed system
c) Isolated system
d) None

9. A system that cannot exchange either energy or matter with surroundings is –
   a) Open
   b) Closed
   c) Isolated
   d) Homogeneous

10. The wall that separates system and surroundings is called –
    a) Boundary
    b) Layer
    c) Wall
    d) Surface

11. When ice melts in a glass of water, it represents –
    a) Open system
    b) Closed system
    c) Isolated system
    d) None

12. A closed thermos flask represents –
    a) Open system
    b) Closed system
    c) Isolated system
    d) Adiabatic system

13. A chemical reaction taking place in a sealed tube is –
    a) Open
    b) Closed
    c) Isolated
    d) None

14. A cup of hot tea left open on a table is –
    a) Closed system
    b) Open system
    c) Isolated system
    d) Adiabatic system

15. Which of the following represents a state function?
    a) Work
    b) Heat
    c) Pressure
    d) Path

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16. Which of the following is a path function?
    a) Enthalpy
    b) Internal energy
    c) Work
    d) Temperature

17. State functions depend on –
    a) Path
    b) Initial and final states only
    c) Time
    d) Pressure and volume changes

18. Work and heat are –
    a) State functions
    b) Path functions
    c) Both
    d) Neither

19. Internal energy is represented by –
    a) Q
    b) W
    c) U
    d) H

20. Change in internal energy is represented as –
    a) ΔU
    b) ΔE
    c) ΔH
    d) ΔQ

21. The SI unit of internal energy is –
    a) Joule
    b) Calorie
    c) Erg
    d) kJ/mol

22. First law of thermodynamics is based on –
    a) Conservation of mass
    b) Conservation of energy
    c) Law of definite proportion
    d) Law of gaseous volumes

23. The first law of thermodynamics states that –
    a) Energy can be created
    b) Energy can be destroyed
    c) Energy can neither be created nor destroyed

d) Energy is lost in reactions

24. Mathematical form of first law is –
    a) $\Delta U = Q + W$
    b) $\Delta U = Q - W$
    c) $\Delta U = W - Q$
    d) $\Delta U = Q \times W$

25. In an isochoric process, work done is –
    a) Maximum
    b) Minimum
    c) Zero
    d) Positive

26. In an adiabatic process, heat exchanged is –
    a) Maximum
    b) Zero
    c) Minimum
    d) Infinite

27. In an isothermal process, temperature –
    a) Increases
    b) Decreases
    c) Remains constant
    d) First increases then decreases

28. When system absorbs heat, Q is taken as –
    a) Positive
    b) Negative
    c) Zero
    d) Undefined

29. When system does work on surroundings, W is taken as –
    a) Positive
    b) Negative
    c) Zero
    d) Constant

30. For an exothermic process, heat is –
    a) Absorbed
    b) Released
    c) Constant
    d) Zero

31. For an endothermic process, heat is –
    a) Released
    b) Absorbed

c) Lost
d) None

32. ΔU > 0 means –
   a) Internal energy increases
   b) Internal energy decreases
   c) Internal energy remains same
   d) None

33. ΔU < 0 means –
   a) System loses energy
   b) System gains energy
   c) Both
   d) None

34. Work done by expansion of gas is –
   a) Positive
   b) Negative
   c) Zero
   d) Undefined

35. Work done on the system is –
   a) Positive
   b) Negative
   c) Zero
   d) Undefined

36. If a gas expands against a constant external pressure, work done is –
   a) W = PΔV
   b) W = –PΔV
   c) W = –ΔV/P
   d) W = ΔV/P

37. At constant volume, ΔU = –Q means –
   a) Heat absorbed
   b) Heat released
   c) No change
   d) None

38. For a cyclic process, ΔU is –
   a) Positive
   b) Negative
   c) Zero
   d) Constant

39. If ΔU = 0, then Q = –W represents –
   a) Isothermal process

b) Adiabatic process
c) Isochoric process
d) Cyclic process

40. Work done in reversible expansion is –
   a) More than irreversible
   b) Less than irreversible
   c) Same
   d) Zero

41. For irreversible expansion, work done is –
   a) Minimum
   b) Maximum
   c) Constant
   d) Zero

42. The unit of heat is –
   a) Joule
   b) Newton
   c) Pascal
   d) Ampere

43. Heat capacity (C) is defined as –
   a) $Q \times \Delta T$
   b) $Q / \Delta T$
   c) $\Delta T / Q$
   d) $\Delta Q / T$

44. Molar heat capacity is –
   a) Heat capacity per gram
   b) Heat capacity per mole
   c) Total heat
   d) None

45. At constant volume, heat capacity is denoted as –
   a) C_v
   b) C_p
   c) C_t
   d) C_x

46. At constant pressure, heat capacity is denoted as –
   a) C_v
   b) C_p
   c) C_t
   d) C_e

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47. Relation between Cp and Cv for an ideal gas is –
    a) Cp = Cv – R
    b) Cp = Cv + R
    c) Cp = R/Cv
    d) Cp = Cv × R

48. Enthalpy is denoted by –
    a) H
    b) Q
    c) W
    d) U

49. Relation between enthalpy and internal energy is –
    a) H = U + PV
    b) H = U – PV
    c) H = PV – U
    d) H = P/U

50. For an ideal gas, ΔH = ΔU + Δ(PV) simplifies to –
    a) ΔH = ΔU + ΔnRT
    b) ΔH = ΔU – ΔnRT
    c) ΔH = ΔU × ΔnRT
    d) ΔH = ΔU / ΔnRT

✅ **ANSWER KEY – SET 1**

1–b 2–a 3–d 4–a 5–b 6–a 7–a 8–b 9–c 10–a
11–b 12–c 13–b 14–b 15–c 16–c 17–b 18–b 19–c 20–a
21–a 22–b 23–c 24–b 25–c 26–b 27–c 28–a 29–b 30–b
31–b 32–a 33–a 34–b 35–a 36–b 37–b 38–c 39–d 40–a
41–a 42–a 43–b 44–b 45–a 46–b 47–b 48–a 49–a 50–a