JENPAS UG 2025 Thermodynamics Solved Questions for Physics Preparation PDF

Here are some important Thermodynamics solved questions that will help you ace your Physics preparation for the JENPAS UG 2025 exam:

Question 1: Two non-reacting gases, A and B, are mixed. What is the total pressure?

Answer: Total pressure = partial pressure A + partial pressure B. (Dalton's Law of Partial Pressures)

Explanation: Dalton's Law states that the total pressure equals the sum of partial pressures.

Question 2: How much energy is required to vaporise 10 g of water at 100°C? (L_V =2260 J/g)

Answer: Energy = Q = mL=10×2260 = 22600 J.

Explanation: Calculate using mass and latent heat. (Latent Heat Calculation)

Question 3: Which process (isothermal or adiabatic) causes quicker cooling when a gas expands?

Answer: Adiabatic expansion causes quicker cooling.

Explanation: In an adiabatic process, no heat is exchanged, and the temperature falls rapidly. (Isothermal vs Adiabatic)

Question 4: What factors does the internal energy of an ideal gas depend on?

Answer: Only temperature, not pressure or volume.

Explanation: Internal energy U of an ideal gas is a function of temperature. (Internal Energy for Ideal Gas)

Question 5: What is the work done in an isochoric process?

Answer: Zero, because volume doesn't change (ΔV=0).

Explanation: Work done = W = PΔV = 0 for isochoric. (Characteristics of Isochoric Process)

Question 6: Work done by a gas expanding from 2 L to 5 L at a constant pressure of 1 atm.

Answer: $W = P(V_2 - V_1)$
$=1\times(5-2) = 3$ L atm ≈ 3×101.3 = 303.9 J.

Explanation: Convert L atm to joules (1 L atm = 101.3 J). (PV Diagram Work)

Question 7: Mixing 100 g ice at 0°C with 200 g water at 50°C (c = 4.2 J/g°C, L = 334 J/g). Final temperature?

Answer: Heat to melt ice: 100×334 = 33400 J

Heat available from water cooling to 0°C: 200×4.2×50 = 42000 J

Since 42000>33400, all ice melts; remaining energy increases the temperature of 300 g of water:

Excess heat = 42000−33400 = 8600 J
ΔT = 8600/(300×4.2) ≈ 6.8 C

Final temperature: approximately 6.8°C

Explanation: Apply calorimetry: heat exchange and mixing methods. (Calorimetry Problem)

Question 8: Can heat flow from a cold to a hot body spontaneously?

Answer: No, as per the second law, heat flows from hot to cold bodies spontaneously.

Explanation: The Second Law governs the natural direction of heat transfer. (Second Law: Direction of Heat Flow)

Question 9: Calculate the entropy change for melting 50 g of ice at 0°C. L=334 J/g.

Answer: ΔS = Q/T = mL/273

= 50×334/273 ≈ 61.2 J/K.

Explanation: Entropy change during phase transition. (Entropy Change)

Question 10: 200 g of water at 25°C absorbs 4200 J. Find its rise in temperature.

Answer: $Q = mc\Delta T \Rightarrow \Delta T = Q/(mc)$
$= 4200/(0.2\times4200) = 5°C$.

Explanation: Simple calorimetry formula application. (Specific Heat Calculation)
