

1 Ideal Gas

$$PV = NkT \quad (1)$$

Know the Equipartition Theorem, and understand the microscopic picture.

2 Equipartition Theorem

$$U_{therm} = N \frac{f}{2} kT$$

Be able to find the degrees of freedom f for a system.

3 1st Law of Thermodynamics

$$\Delta U = Q + W$$

$$W = \int p dV$$

Understand how heat, work, and ΔU are associated with different cyclic processes.
Know what **adiabatic** and **isothermal** mean.

4 Heat Capacity

$$C = \frac{Q}{\Delta T} \quad C_v = \frac{\delta U}{\delta T} \quad C_p = \frac{\delta H}{\delta T}$$

Be able to derive C_v and C_p . H is enthalpy.

5 Heat Conduction

Understand the microscopic picture.

6 Diffusion

Understand the microscopic picture.

7 Multiplicities

- List microstates for the 2-state paramagnet, the Einstein solid, and the ideal gas.
- Be able to derive Ω , Ω_{tot}
- Be able to apply the Stirling approximation
- Be able to solve for peak width and number of microstates

8 Entropy

$$S = k \ln \Omega$$

$\Delta S?$

9 2nd Law of Thermodynamics

Understand the concept and importance.

10 Example Problems