

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Physics - NOC:Thermal Physics

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Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Foundation of kinetic theory of gasses
- Lecture 2 - Maxwell's law for speed distribution of gas molecules
- Lecture 3 - Average speeds in an ideal gas assembly
- Lecture 4 - Principle of equipartition of energy
- Lecture 5 - Maxwell's law for energy distribution of gas molecules
- Lecture 6 - The mean free path of a gas assembly
- Lecture 7 - Expression for mean free path
- Lecture 8 - Experimental determination of mean free path
- Lecture 9 - Pressure and molecular flux from mean free path
- Lecture 10 - Problems on mean free path
- Lecture 11 - Transport in fluids: introduction
- Lecture 12 - Viscosity: transport of momentum
- Lecture 13 - Thermal conductivity: transport of thermal energy
- Lecture 14 - Diffusion coefficient: transport of mass
- Lecture 15 - Molecular effusion: theory and applications
- Lecture 16 - Brownian motion: concept, features, theory of fluctuation
- Lecture 17 - Brownian motion: mean square displacement and vertical distribution of particles
- Lecture 18 - Perrin's experiment on Brownian motion - Part 1
- Lecture 19 - Perrin's experiment on Brownian motion - Part 2
- Lecture 20 - Problems on Brownian motion, Rotational brownian motion
- Lecture 21 - Specific heat of solids: Dulong-Petit law and Einstein theory
- Lecture 22 - Limitation of Einstein theory of specific heat
- Lecture 23 - Debye theory of specific heat
- Lecture 24 - Behavior of real gasses
- Lecture 25 - Van der Waals equation of state
- Lecture 26 - Critical parameters from Van der Waal's equation
- Lecture 27 - Determination of Van der Waals' constants and Boyle temperature
- Lecture 28 - Other equations of state
- Lecture 29 - Measurement of temperature: Celsius scale, ideal gas scale, absolute zero

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## NPTTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - The platinum resistance thermometer
- Lecture 31 - Basic concepts of classical thermodynamics
- Lecture 32 - Basic concepts of classical thermodynamics (Continued...)
- Lecture 33 - First law of thermodynamics
- Lecture 34 - General description of work done and specific heat
- Lecture 35 - General discussion on Heat conduction and elastic properties
- Lecture 36 - Cyclic processes
- Lecture 37 - The reversible heat engine: Carnot cycle
- Lecture 38 - Refrigerator and Carnot Theorem
- Lecture 39 - 2nd law and Clausius theorem
- Lecture 40 - Concept of Entropy and mathematical form of 2nd law
- Lecture 41 - The entropy principle
- Lecture 42 - Efficiency of a cycle from T-S diagram
- Lecture 43 - The Otto cycle
- Lecture 44 - The Diesel cycle
- Lecture 45 - Entropy and available energy
- Lecture 46 - Thermodynamic relations
- Lecture 47 - Application of thermodynamic relation
- Lecture 48 - The free energy functions
- Lecture 49 - Condition for thermodynamic equilibri
- Lecture 50 - Thermodynamics of chemical reaction
- Lecture 51 - Equilibrium between phases: The Clapeyron equation
- Lecture 52 - 1st order phase transition along liquid-vapor equilibrium
- Lecture 53 - Phase diagram and triple point
- Lecture 54 - The 2nd latent heat equation
- Lecture 55 - Gibbs phase rule and basics of second order phase transition
- Lecture 56 - Basic concepts of radiation
- Lecture 57 - Diffused radiation and Kirchhoff's law
- Lecture 58 - Cavity radiation as a thermodynamic system: Stefan-Boltzmann law
- Lecture 59 - Thermodynamics of cavity radiation
- Lecture 60 - 3rd law of thermodynamics