

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

NPTEL Video Course - Mechanical Engineering - NOC:Statistical Thermodynamics for Engineers

Subject Co-ordinator - Prof. Saptarshi Basu

Co-ordinating Institute - IISc - Bangalore

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

- Lecture 1 - Introduction to Statistical Thermodynamics
- Lecture 2 - Basic Probability Theory and Statistics
- Lecture 3 - Important Probability Distributions
- Lecture 4 - Combinatorial Analysis for Statistical Thermodynamics
- Lecture 5 - Basic Concepts
- Lecture 6 - Macrostates and Microstates
- Lecture 7 - Bose Einstein and Fermi Dirac Statistics
- Lecture 8 - Entropy and the equilibrium particle distribution
- Lecture 9 - Operator Theory - 1
- Lecture 10 - Stirling Approximation and Lagrange Multipliers
- Lecture 11 - Equilibrium particle distribution
- Lecture 12 - The Dilute Limit and Concept of Molecular Partition Function
- Lecture 13 - The Molecular Partition Function and its relationship with Classical Thermodynamics
- Lecture 14 - Historical Survey of Quantum Mechanics
- Lecture 15 - Operator Theory - 2
- Lecture 16 - Operator Theory - 3
- Lecture 17 - Bohr Model for the Spectrum of Atomic Hydrogen
- Lecture 18 - Heuristic Introduction to the Schrodinger Equation
- Lecture 19 - The postulates of Quantum Mechanics
- Lecture 20 - The Steady State Schrodinger Equation: Single Particle Analysis
- Lecture 21 - Coordinate System - 1
- Lecture 22 - Coordinate System - 2
- Lecture 23 - Coordinate System - 3
- Lecture 24 - The Steady State Schrodinger Equation: Multiparticle analysis
- Lecture 25 - The Particle in a Box
- Lecture 26 - The Uncertainty Principle
- Lecture 27 - The Pauli Exclusion and the Correspondence Principle
- Lecture 28 - Problem Solving - 1
- Lecture 29 - Problem Solving - 2

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- Lecture 30 - The Internal Motion for a two particle system
- Lecture 31 - The rotational and vibrational energy mode for a diatomic molecule
- Lecture 32 - Hermite polynomials as vibrational energy mode solution
- Lecture 33 - Equivalent two body model of atomic hydrogen
- Lecture 34 - The Electronic Energy Mode for Atomic Hydrogen
- Lecture 35 - Problem Solving - 3
- Lecture 36 - The four quantum numbers and multielectron systems
- Lecture 37 - Spectroscopic term symbols for multielectron atoms
- Lecture 38 - Electron energies for multielectron systems
- Lecture 39 - Combined energy modes for atoms and diatomic molecules
- Lecture 40 - Perturbation analysis of the Schrodinger Wave equation
- Lecture 41 - Selection rules
- Lecture 42 - The Rotational and vibrational spectroscopy
- Lecture 43 - Ro-vibrational spectroscopy (Simplex model)
- Lecture 44 - Rotation vibration coupling (Complex model)
- Lecture 45 - Ro-vibrational spectroscopy (Complex model)
- Lecture 46 - Ro-vibronic spectroscopy
- Lecture 47 - Working with Spectroscopic Schemes, Notations and Term Symbols
- Lecture 48 - From Particles to assembly - I
- Lecture 49 - From Particles to assembly - II
- Lecture 50 - Connecting Quantum Mechanics to Classical Mechanics
- Lecture 51 - The Equipartition principle and ideal gas
- Lecture 52 - Thermodynamic properties of ideal monoatomic and diatomic gas
- Lecture 53 - The zero of energy (rotational and vibrational)
- Lecture 54 - Specific heats, Internal energy through Vibrational and Ro-vibrational energy modes
- Lecture 55 - The Ro-vibrational partition function and Introduction to intersction of Radiation and Matter
- Lecture 56 - Absorption and Emission of Radiation
- Lecture 57 - The Rabi frequency and Beer's Law
- Lecture 58 - Insights into radiative spectral transitions
- Lecture 59 - Theory of Absorption Spectroscopy