NPTEL Video Course - Chemistry and Biochemistry - NOC:Thermodynamics: Classical to Statistical

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Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Cocepts of heat and work; First Law of Thermodynamics
Lecture 2 - Concepts of enthalpy and heat capacity
Lecture 3 - Introduction to entropy
Lecture 4 - Calculation of entropy for various processes
Lecture 5 - Gibbs and Helmholtz free energy
Lecture 6 - Introduction to chemical potential
Lecture 7 - Clapeyron equation and phase transition; concept of fugacity
Lecture 8 - Calculation of fugacity; free energy of mixing
Lecture 9 - Partial molar quantities; excess thermodynamic quantities
Lecture 10 - Concept of activity and activity coefficients; Debye-Huckel limiting law
Lecture 11 - Phase Diagram of one component systems
Lecture 12 - Phase Diagram of two component systems
Lecture 13 - Phase Diagram of three component system; one dimensional random walk
Lecture 14 - Macroscopic and microscopic states; Boltzmann distribution; Canonical partition function
Lecture 15 - Calculation of different thermodynamical quantities using canonical partition function
Lecture 16 - Introduction to molecular partition function
Lecture 17 - Translational, electronic and nuclear partition function
Lecture 18 - Rotational partition function
Lecture 19 - Vibrational partitition function; Introduction to grand canonical ensemble
Lecture 20 - Grand canonical distribution; Introduction to microcanonical ensemble
Lecture 21 - Problems on classical thermodynamics - 1
Lecture 22 - Problems on classical thermodynamics - 2
Lecture 23 - Problems on statistical thermodynamics - 1
Lecture 24 - Problems on statistical thermodynamics - 2
Lecture 25 - Problems on statistical thermodynamics - 3
Lecture 26 - Fermi-Dirac and Bose-Einstein statistics
Lecture 27 - Ideal Fermi gas
Lecture 28 - Ideal Bose gas;Introduction to Bose-Einstein condensation
Lecture 29 - Bose-Einstein condensations

Lecture 30 - Nuclear spin statistics; Ortho- and para-hydrogens
Lecture 31 - Specific Heats of solids
Lecture 32 - Problems on statistical thermodynamics - 4
Lecture 33 - Advance problems - 1
Lecture 34 - Advance Problems - 2
Lecture 35 - Advance Problems - 3
Lecture 36 - Advance Problems - 4
Lecture 37 - Advance Problems - 5