NPTEL Video Course - Chemistry and Biochemistry - NOC:Symmetry and Group Theory (2021)

Subject Co-ordinator - Prof. Jeetender Chugh

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Course Contents
Lecture 2 - Symmetry and Parity Operator
Lecture 3 - Symmetry Elements and Operations - Part 1
Lecture 4 - Symmetry Elements and Operations - Part 2
Lecture 5 - Planes and Reflections
Lecture 6 - Tutorial - 1
Lecture 7 - Coordinate System and Inversion Center
Lecture 8 - Improper axis and improper rotation
Lecture 9 - Solved Examples of Symmetry Elements and Operations
Lecture 10 - Product of Symmetry Operations
Lecture 11 - Tutorial - 2
Lecture 12 - Symmetry Point Groups - Part 1
Lecture 13 - Symmetry Point Groups - Part 2
Lecture 14 - Symmetry Point Groups - Part 3
Lecture 15 - Dipole Moment and Optical Acitivity
Lecture 16 - Tutorial - 3
Lecture 17 - Point Group Definition and Examples
Lecture 18 - Sub-Group and Classes
Lecture 19 - Matrix Representation of Symmetry Operations
Lecture 20 - Matrix Representation of Point Group
Lecture 21 - Tutorial - 4
Lecture 22 - Matrix Representation of Point Group
Lecture 23 - Reducible and Irreducible Representations
Lecture 24 - Great Orthogonality Theorem
Lecture 25 - Properties of Great Orthogonality Theorem
Lecture 26 - Tutorial - 5
Lecture 27 - Irreducible Representation using GOT
Lecture 28 - Reducible to Irreducible Representation using GoT
Lecture 29 - Character Table and Mulliken Symbols

Lecture 30 - How to write a complete character table
Lecture 31 - Tutorial - 6
Lecture 32 - Representations of a cyclic group
Lecture 33 - Group Theory and Quantum Mechanics
Lecture 34 - 1) Degenerate Eigen Functions 2) Direct Product
Lecture 35 - Direct Product
Lecture 36 - Tutorial - 7
Lecture 37 - Direct Product Applications - Part 1
Lecture 38 - Direct Product Applications - Part 2
Lecture 39 - Symmetry Adapted Linear Combinations - Part 1
Lecture 40 - Symmetry Adapted Linear Combinations - Part 2
Lecture 41 - Tutorial - 8
Lecture 42 - Incomplete Projection Operator
Lecture 43 - SALC using Projection Operator
Lecture 44 - Symmetry and Chemical Bonding
Lecture 45 - Valence Bond Theory
Lecture 46 - Tutorial - 9
Lecture 47 - Molecular Orbital Theory
Lecture 48 - Localised MO Theory
Lecture 49 - Delocalized MO Theory - Part 1
Lecture 50 - Delocalized MO Theory - Part 2
Lecture 51 - Ascent and Descent in Symmetry - Part 1
Lecture 52 - Ascent and Descent in Symmetry - Part 2
Lecture 53 - Crystal Field Theory - Part 1
Lecture 54 - Crystal Field Theory - Part 2
Lecture 55 - Jahn-Teller Distortion - Part 1
Lecture 56 - Jahn-Teller Distortion - Part 2
Lecture 57 - Introduction to Spectroscopy - Part 1
Lecture 58 - Introduction to Spectroscopy - Part 2
Lecture 59 - Vibrational Spectroscopy
Lecture 60 - 1) Raman Spectroscopy and 2) Atomic Motions
Lecture 61 - Symmetry of Normal Modes of Vibration
Lecture 62 - Visualizing Molecular Vibrations using Internal Coordinates
Lecture 63 - Spectral Transition Probabilities - Part 1
Lecture 64 - Spectral Transition Probabilities - Part 2