

COURSE-III: ATOMIC & MOLECULAR PHYSICS

Block-1:

Rotation, vibration and rotation-vibration spectra of diatomic molecules, Electronic spectra: Born-Oppenheimer approximation, Progressions and sequences of vibrational bands: Intensity distribution, Franck-Condon principle

Block-2

The chemical bond, Ionic bonds, Covalent bonds, Atomic and molecular orbitals, electron dot structures, and the octet rule, Molecular geometry

Block-3:

Basic elements of laser, Einstein coefficients, Optical and electrical pumping, Excitation mechanism: Selected applications of laser

References:

1. White H. E, - Introduction to Atomic Spectra; McGraw-Hill book company, inc., USA, 1934.
2. Bransden B. H. and Joachain C J, - Physics of Atoms and Molecules; 2nd Edition, Pearson Publishing Company, New York, 2003.
3. Cagnac B. and Pabey J. C, -Modern Atomic Physics (Vol I); Halsted Press Book, New York, 1975. .
4. Banwell C. N. and McCash E. M, - Fundamentals of Molecular Spectroscopy; 4th edition, McGraw Higher Ed, New York, 2016.
5. Herzberg G, - Molecular Spectra and Molecular Structure: Spectra of Diatomic Molecules (Vol. 1); 2nd edition, Van Nostrand Company, New York, 1950.
6. Laud B. B, - Lasers and Non-linear Optics; 3rd edition, New Age International Publishers, New Delhi, 2011.
7. Thyagarajan K. and Ghatak A. K, - Lasers: Theory and Applications; 1st edition, Springer Publications, New York, 1981.
8. Hecht E and Ganesan A R, – Optics; 4th Edition, Pearson Publications, New York, 2003.
9. John Wilson and John Hawkes, - Optoelectronics; 3rd edition, Prentice Hall Europe, London, 1998

10. Mahan B.M and Meyers R J, - University Chemistry; 4th edition, Pearson, New York, 2009.