

SARDAR PATEL UNIVERSITY
Programme: MSC (Integrated Biotechnology)
Semester: II
Syllabus with effect from: December 2010

Paper Code: PS02CIGB01	Total Credits: 3
Title Of Paper: Physics - II	

Unit	Description in detail	Weightage (%)
1	<p>ELECTRICITY AND MAGNETISM</p> <p>Introduction- Electric charge, Coulomb's law, Continuous charge distribution, Electric field- Electric field lines, Introduction to electric potential, Work done in moving a charge, Energy of a point charge distribution, Energy of a continuous charge distribution, Magnetic interactions and magnetic poles, Magnetic force of moving charge, Magnetic force on current carrying wire, Hall effect, Magnetic fields in material media-Three types of magnetic substances, Magnetization M, The equation $B = \mu_0 M + \mu_0 H$, Hysteresis, The B-H curve.</p>	
2	<p>ELASTICITY AND SOUND</p> <p>Introduction, Load, Stress and Strain, Hooke's law, Ductility, Brittleness and Plasticity (Definition only), Elastic behaviour of solid in general, Factors affecting elasticity, Three types of elasticity, Young's modulus, Relation connecting elastic constants, Poisson's ratio, Velocity of longitudinal waves in a gaseous medium, Calculation of velocity of sound in air, Effect of pressure, temperature and humidity on the speed of sound, Velocity of sound in metal rod, Intensity of sound, Measurement of intensity, Resonance, Sound absorbing materials, Ultrasonic waves, Production, Detection, Properties, Wavelength & Applications of Ultrasonic waves.</p>	
3	<p>TRANSMISSION OF HEAT</p> <p>Introduction- Heat, Specific Heat, Coefficient of thermal conductivity, Rectilinear flow of heat along a bar, Searle's method, Lee and Charlton's method for bad conductors, Spherical Shell method (radial flow of heat), Cylindrical flow of heat, Application of convection, Stefan's law, Laws of Thermodynamics, Entropy and its change.</p>	
4	<p>CRYSTAL PHYSICS AND SOLID STATE ELECTRONICS</p> <p>Introduction, Lattice point and space lattice, The basis and crystal structure, Unit cells and lattice parameters, Unit cells and Primitive cells, Crystal system, Crystal symmetry, The bravis space lattice, Metallic crystal structure- SC, BCC, FCC and HCP, Miller indices- Important features, Crystal Binding- Van der Waals interactions, Ionic bond, Covalent bond.</p> <p>Introduction -Metals, Semi-conductors and Insulators, Extrinsic and intrinsic semiconductors-Doping, The p-n junction (energy band diagrams with Fermi energy), The unbiased diode, forward and reverse biased diodes – its characteristics, Filters- Series inductor filter and Shunt capacitor filter, Zener effect and Avalanche effect & Zener diode characteristics, Tunnel effect and Tunnel diode characteristics, Photo-diode, Light Emitting Diode (LED), Photo-voltaic cell, The transistor- its characteristics, common base, common emitter, common collector, DC Load line- Q –point.</p>	
	Practical:	
	<ul style="list-style-type: none"> • B_H & M by Deflection and Vibration Magnetometer • M_1 / M_2 by Vibration Magnetometer 	



	<ul style="list-style-type: none"> • Hall effect measurements • e/m by Thomson method • p-n Diode-characteristics • Zener Diode-Characteristics • PNP transistor - Common Base characteristics • PNP transistor- Common Emitter characteristics • Determination of Miller Indices • Determination of Stefan index • To trace the B-H curve for given material (B-H Hysteresis) • Determination of Young's Modulus • Determination of Poison ratio 	
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Basic Text & Reference Books:

- Concepts of Modern Physics (6th Ed.) by Arthur Beiser
Tata Mc-Graw-Hill Publishing Company Ltd., New Delhi, (ISBN-0-07-049553-X)
- Fundamentals of Physics (6th Ed.) by Halliday/Resnick/Walker
John Wiley & Sons, Inc., New York, (ISBN-9971-51-330-7)
- Engineering Physics by R. K. Gaur and S. L. Gupta
Dhanpat Rai Publications (P) Ltd., New Delhi
- Electronics Principles (6th edition) by A. P. Malvino
Tata Mc-Graw-Hill Publishing Company Ltd., New Delhi, (ISBN-0-07-463728-2)
- Electronic Device & Circuits by David A. Bell
Prentice- Hall of India Private Ltd., (ISBN-81-203-2358-0)
- Integrated Electronics by Jacob Millman & Chaistos C. Halkias
Tata Mc-Graw-Hill Publishing Company Ltd., New Delhi, (ISBN-0-07-462245-5)
- Electricity and Magnetism by A. S. Mahajan and A. A. Rangwala
Tata Mc-Graw-Hill Publishing Company Ltd., New Delhi, (ISBN-0-07-460225-X)
- Solid State Physics by S. O. Pillai
New Age International (P) Ltd., (ISBN-81-224-1430-3)
- A textbook of Sound by M. Ghosh

