PART III: SYLLABUS FOR ENTRANCE EXAMINATION SRMJEEE (UG) B.TECH AND HEALTH SCIENCE (UG PROGRAMS)

PART 1 – PHYSICS (35 Questions)

Unit 1: Units and Measurement, Mechanics

Units for measurement, system of units-S.I., fundamental and derived units, measurements - errors in measurement - significant figures, dimensions - dimensional analysis - applications.

Laws of Motion: Newton's laws of motion - force and inertia - impulse and momentum - law of conservation of linear momentum - applications - projectile motion-uniform circular motion - friction - laws of friction - applications - centripetal force.

Work, Energy and Power: Work - energy- potential energy and kinetic energy – power - collision-elastic and inelastic collisions.

Unit 2: Gravitation, Mechanics of Solids and Fluids

Gravitation: The universal law of gravitation, acceleration due to gravity - variation of 'g' with altitude, latitude and depth - gravitation potential - escape velocity and orbital velocity - geostationary satellites - Kepler's laws of planetary motion.

Mechanics of solids and fluids: Solids - elastic behaviour, stress-strain - Hooke's law - Modulli of elasticity - relation between them - surface tension capillarity - applications – viscosity - Poiseuille's formula - Stokes law applications - streamline and turbulent flow - Reynolds number - Bernoulli's theorem - applications.

Unit 3: Electrostatics

Electric charge - Conservation laws - Coulomb's law-principle of superposition - continuous charge distribution - electric field - electric field lines - electric dipole -electric field due to a dipole - torque on a dipole in uniform electric field - Electric flux - Gauss's theorem - field due to infinitely long straight wire - uniformly charged infinite plane sheet and uniformly charged thin spherical shell.

Electric potential - potential difference - equipotential surfaces - electrical potential energy - Dielectrics and electric polarization - capacitors and capacitance - combination of capacitors in series and in parallel - capacitance of a parallel plate capacitor with and without dielectric medium - energy stored in a capacitor

Unit 4: Current Electricity

Electric current - drift velocity - mobility - Ohm's law -V-I characteristics - electrical energy and power - electrical resistivity and conductivity - Carbon resistors - series and parallel combinations of resistors - temperature dependence - Internal resistance of a cell - potential

difference and emfof a cell - combination of cells in series and in parallel - Kirchhoff's laws – applications - Wheatstone bridge - Metre bridge - Potentiometer - comparison of EMF of two cells - measurement of internal resistance of a cell.

Unit 5: Magnetism and Magnetic effects of current

Earth’s magnetic field and magnetic elements -magnetic field due to a magnetic dipole - torque on a magnetic dipole - tangent law, tangent galvanometer deflection magnetometer - magnetic properties of a material – dia, para and ferromagnetic materials - applications. Magnetic effects of electric current - BiotSavart’s law - force on a moving charge in an uniform magnetic field - moving coil galvanometer - conversion of a galvanometer into voltmeter and ammeter.

Unit 6: Electromagnetic Induction, Alternating Currents andElectromagnetic Waves

Electromagnetic induction - Faraday's laws, induced EMF and current - Lenz's Law - Eddy currents - Self and mutual induction - Alternating currents, peak and RMS value of alternating current/voltage - reactance and impedance - LC oscillations - LCR series circuit - resonance - power in AC circuits - power factor - wattless current - AC generator and transformer - Electromagnetic waves – characteristics - Electromagnetic spectrum .

Unit 7: Optics

Reflection of light - spherical mirrors - mirror formula - refraction of light -total internal reflection- optical fibers - refraction at spherical surfaces – lenses - thin lens formula - lensmaker's formula – magnification - power of a lens - combination of thin lenses in contact - refraction of light through a prism - Scattering of light -Microscopes and astronomical telescopes .

Wave front and Huygen's principle - reflection and refraction of plane wave at a plane surface- laws of reflection and refraction using Huygen's principle – Interference - Young's double slit experiment and expression for fringe width - diffraction due to a single slit -width of central maximum – polarization - plane polarised light - Brewster's law.

Unit 8: Dual Nature of Radiation and Matter&Atomic Physics

Dual nature of radiation - Photoelectric effect - Hertz and Lenard's observations - Einstein's photoelectric equation-particle nature of light.Matter waves-wave nature of particles - de-Broglie relation - Davisson-Germer experiment - Alpha-particle scattering experiment - Rutherford's model of atom - Bohr model - hydrogen spectrum.

Unit 9: Nuclear Physics

Nuclear radius, mass, binding energy, density, isotopes, mass defect- Bainbridge mass spectrometer-nuclear forces neutron discovery – radioactivity-α, β and γ decay-half life - mean life-artificial radio activity-radio isotopes-radio carbon dating-radiation hazards. Nuclear fission-nuclear reactor-nuclear fusion-hydrogen bomb - cosmic rays-elementary particles.

Unit 10: Electronic Devices

Semiconductors-doping-types-PN junction diode – biasing-diode as a Rectifier – Special purpose PN junction diodes – LED – photodiode - solar cell and zener diode - characteristics - zener diode as a voltage regulator- transistors-transistor characteristics – amplifier – gain-feedback in amplifiers-logic gates-basic logic gates-NOT, OR, AND, NOR, NAND-universal gates-De Morgan's theorems.