PHYSICS

1. Mechanics : Units and dimensions, S.I.Units motion in one and two dimensions. Newton's laws of motion with applications, variable mass system, frictional forces, work, power and energy, conservative and non conservative system. Collisions conservation of energy, linear and angular momentum, rotational Kinematics, rotational, dynamics, equilibrium of rigid bodies, gravitation, planetary motion, artificial satellites, surface tension and viscosity, fluid dynamics, streamline and turbulent motion. Bernoulli's equation with applications. Stocke's law and its application. Special theory of relativity Lorentz transformation. Mass energy equivalence.

2. Waves and oscillations : Simple harmonic motion, traveling and stationary waves, superposition of waves, forced oscillations, damped oscillations, resonance, sound waves, vibrations of air columns, strings and rods, ultrasonic waves and their application, Doppler's Effect.

3. Optics : Matrix methods in paraxial optics, thin lens formulae, nodal planes, system of two thin lenses, chromatic and spherical aberration, optical instruments, eyepieces, nature and propagation of light, interference, division of wave front, division of amplitude. Simple interferometers, diffraction, Gratings, resolving power of optical instruments, Rayleigh criterion, polarization, production and detection of polarized light, Rayleigh scattering, Raman scattering lasers and their applications.

4. Thermal physics : Thermometry, laws of thermodynamics, heat engines, entropy, thermodynamic potentials and Maxwell's relations, Van der-Walls equation of state, critical constants, Joule- Thomson effect, phase transition transport phenomenon, heat conduction and specific heat in solids, kinetic theory of gases, ideal gas equation, Maxwell' velocity distribution, equiparation of energy, mean free path, Brownian motion, black-hour relation, Plank's law.

5. Electricity and magnetism : Electric charge fields and potentials, Coulomb's law capacitance, dielectrics. Ohm's law, Kirchofts, laws, magnetic field currents, ICR circuits, series and parallel resonance, Q-- factor thermoelectric effort and their applications, electromagnetic waves, motion of changes particles in electricity and magnetic fields, particle accelerators, Vende-Graffs generator, Cyclotron betatron mass spectrometer, hall effect, dia-para and ferro magnetism.

6. Modern Physics : Bohr's theory of hydrogen atom, Optical and X-ray spectro-photo-electric effect, Compton effect, wave nature of matter and wave particle quality, natural and artificial radio-activity, alpha, beta and gamma radiation, electron decay, nuclear fission, and fusion elementary particles and their classifications.

7. Electronics : Vacuum tubes-diode and triode p and r-type materials, p-n diodes and transistors, circuits for rectification, amplification and oscillations, logic gates.