Physics

DEGREE STANDARD

UNIT I
MECHANICS AND RELATIVITY
Centre of gravity - centre of gravity of a solid hemisphere Hollow hemisphere - Tetrahedron and solid cone - Friction - Laws of Friction - Cone of Friction - angle of Friction - Equilibrium of a body in a Inclined plane - Impulse - Impact Laws of Impact - Direct and oblique impact - impact between two spheres - Loss of Kinetic Energy - Movement of Inertia - Angular momentum and Kinetic Energy of a revolving body - Moment of Inertia of a sphere, shell and cylinder - compound pendulum - Newton's laws and their limitations - postulates of special theory of relativity - Lorentz Transformation equations and its applications - variation of Mass with velocity - Mass - energy equivalance - Physical significance.

UNIT II
PROPERTIES OF MATTER
Modulur of Elasticity - Relations - couple per unit twist Torsional oscillation - Bending of beams - Unifirm and Non uniform Bending - Elastic constants and their determinations Kepaler's Laws - Gravitational conshytant and their determination variation of 'g' - Viscosity of liquids - Highly viscous liquids stokes and searles method. Lubricants - surface Tension - capillary rise - Method of drops - Surface Tension of mercury - quincke's Method - Laws of osmotic pressure and experimental determination - Ficks laws of diffusion Analog with heat conduction - Determination of diffusivity - Applications.

UNIT III
HEAT AND THERMODYNAMICS
Specific heat capacity of gasses - Mayer's relation - Experimental determination of CP and CV - Amagat and Andraw's Experiment - Vanderwaal's equation - critical constants and vanderwaals constant - Merits and demerits - J K effect - Theory and experiment - Lique faction of gasses - Hydrogen, oxygen, air, Helium - Thermnal conductivity - Forbe's method - stefan's law experimental determination - solar constant - Temperature of the sun.
First law and second laws of thermodynamics - Isothermal and adiabatic change - carnot's engine - carnot cycle and Carnot's therorem - Entrophy - reversible and irreversible process - Maxwell's thermodynamical relations and its applications Third law of thermodynamics - Debye's theory of specific heat.

UNIT IV
WAVES AND OSCILLATIONS
Simple harmonic motion - Composition of two SHMS along a straight line and at right angles - Lissajou's figures - Laws of transverse vibrations - verification by sonometer and Melde's string - Forced vibrations and resonance - Beats - Dopplor effect velocity of sound insolids and gasses - theory and experiment - ultrasonics - production, properties and applications - Acoustics of buildings.

UNIT V
OPTICS
Defects of images - spherical aberration - enromatie aberration and their rectifications - eyepiece - Ramsden's and Huygen's eyepieces - interference - colours of thin films - Newton's rings - theory and experiment - diffraction - Fressnel and Fraunhofer types - Zone plate and diffraction grating - Prism spectra and grating spectra - dispersive and resolving power of a grating - Double refraction - Huygen's explanation - Nicol prism - Quarter and half wave plates - production and detection of plane, circular and elliptically polarised light - optical activity - Determination of specific rotatory power - polarimeter.

UNIT VI
SPECTROSCOPPY
UV and IR Spectroscopy - production, detection and applicaiton - Raman effect - Explanation on the basis of quantum theory - Experimental arrangements - Application of Raman effect - Optical fiber -

fiber optic sensors - Fibre optic communication systems and their advantages - Lasers - stimulated emission - population inverstion - Ruby and Neon Lasers and applications.

UNIT VII
ELECTRICITY AND MAGNETISM
Coublom's law - Permitivity of free space - relative permitivity - electric field - Intensity of field due to a point charge - Guass theorem and its application - Electric potential - relation between potential and intensity - Electric dipole moment - potential and intensity due to a dipole- Electical images and its applications - capacitance - capacity of a spherical, parallel and cylinderical capacitors - Energy of a charge capacitor - Electrometers - measurement of potential and dielectric constant - ohm's law - Resistivity and conductivity - Internal resistance of a cell - EMF and Potential difference - Thermo Electricity - Peltier and Thomson Co Efficients - Laws of Electrolysis - Conductivity of an electrolyte 0 Arrheinius theory of electrolytic conduction - calculation of emf a of Daneil cell as reversible cell.
Magnetic field arround a current carrying conductor - Biot and savart's law Ampere's law of magnetic force due to a current - Force between two current carrying parallel conductions Force on an electron moving in a magnetic field - Electron microscope - Faraday's laws of elctromagnetic induction - self and mutual inductance - Induction coils and its uses - Eddy currents - Transformers - Energy losses - Skin effect - Advantages of AC distribution over DUC - Dynamos and motors
Magnetic poles - Magnetic moments - susceptibility relation between susceptibility and permeability - Hysteresis - Dia, para, ferra magnetism - Electromagnetic waves in free space - Velocity of light.

UNIT VIII
ELECTRICAL CIRCUITS AND ELECTRONICS
Kirchoff's laws for a loop and a junction - Measurements of circuit parameters (R,L and C) - AC circuits - complex impedance and phasor diagram - R-L and R-C, Circuits - Series and parallel resonant circuits - Sharpness or resonance q factor - Tuned transformer.
Semiconductors - Energy bank theory of solid insulators conductors and semiconductors - intrinsic and extrinsic semiconductors - Electrons and holes as charge carriers - P-type and n-type semiconductors - Junction diodes - Characteristic curve of a diode - Diode applications - Junction transistors - V - I characteristic of transistors - Rectifier, Amplifier and or oscillator circuits - AM and FM transmission with block diagrams - Basic principles of super hetrodyne receiver with block diagram - photo conductive cell - photo diode - solar cell - LED and LCD - construction and working.
T.V. Camera - Vertical and Horizontal scanning - T.V. Transmission and reception with block diagrams - T.V. Antenna (Yogi type) - Colour TV - Three colour theory - Radar - radar becon - Uses of radar.
Logic circuits - AND, OR, NOT NAND, NOR and EX-OR gates - Truth tables - Multivibrators - Flip flap circuits.

UNIT IX
MODERN PHYSICS
Canal rays - e/m of positive ions - Thomson's parabola method - Aston's mass spectrograph - Plank's quantum theory of black body radiation - Photoelectric effect - photo electric multipliers - Eintein's equation for photo electric effect - Millikan's experiment - Determination of plank's constant.
Bohr's theory of hydrogen atom sepectra of Hydrogen and Hydrogen like atoms - Rydberg's constant - stationary states - spacial quantisation - Sommer field atommodel - orbital quantum numbers - Electronic structres - Puuli's exclusion principle - Examples of electronic configuration - Magnetic moment due to orbital motion and electron spin - Bohr magneton - Vector atom model - Experimental verification - Fine structure of sodium D Line - Seeman effect - Anamalovs zeeman effect - Therorectical explanation - Wave nature of particles - De Broglie waves - Davisson and germer experiments - waves and particle duality - Heisenberg's Uncertainty principle - Schrodinger equation - Probability amplitude - Particle in a box (one dimension only)

UNIT X
NUCLEAR AND SOLID STATE PHYSICS
Properties of nucleus - size, charge, mass and spin - Nuclear magnetic dipole moment - Binding energy - Packing fractions - Nuclear forces - Nuclear models - shell model and liquid drop model - Nuclear reactions - induced ratio activity - Artificial transmutation Techniques - Application of Radio isotopes - Discovery, Production and detection of neutron - Accelerattors - Betatron - Proton Synchotron - Particle Detectors - Ionization chamber - GM counter - Elementary particle - lBaryons

and Leptons - Cosmicrays.
Structure of crystals - periodicity and plane in crystale - symmetry elements and symmettry groups - classificatiodn of crystals unit cell Bond and crystal types - ionic, covalent, metallic and Vanderwall's.
X-rays - Bragg's law and absorption of X rays - Mosley's law - complon effect.