I Semester
PHC 103: General Physics I

Unit-I: Mechanics-I

Review of vectors . Instantaneous velocity and acceleration. Derivative of a planar vector of constant magnitude but changing direction. Arbitrary planar motion, radial and transverse component of velocity and acceleration. Deduction of the results of uniform circular motion

Geometrical symmetries - Translation in space, rotation in space, translation in time. Symmetry aspects of conservation laws.

Conservation of linear momentum, motion of a rocket, multistage rockets- rocket fuel, rocket shape, elements of satellite motion. Orbital velocity, time period of the satellite, geostationary satellites, shapes of the orbits, perturbation of orbits, injection conditions, entry problems, uses of artificial satellites. Indian Space Programme.

Central force, Law of conservation of angular momentum – under the action of central forces. Mention of Kepler's laws, Deduction of Kepler's second law of planetary motion. Problems. (12 Hrs)

Unit-I: Mechanics-II .

Rotational dynamics of a rigid body – Angular momentum, kinetic energy. Moment of inertia and radius of gyration. Theorem of moment of inertia – parallel and perpendicular axes theorems with proof. Calculation of MI of regular shaped bodies - rectangular lamina, thin rod, circular disc (about different axes).

Theory of compound pendulum: expression for time period. Reversibility of centre of oscillation and centre of suspension. Bar pendulum. Determination of g and K. Problems.

Conservation of energy: conservative and non conservative forces and deduction of Conservation of energy in conservative force field.

SHM, Vertical oscillations of the light loaded spring, expression for force constant. Problems. (12 Hrs)

Unit-III: Thermal Physics

Types of thermal processes, Derivation of PV^{γ} in an adiabatic process, Expression for work done during Isothermal and adiabatic processes.

Carnot's engine: Carnot's cycle. Efficiency of Carnot's engine. Reversibility of Carnot's engine. Refrigerator (principle only),coefficient of performance. Derivation of Claussius-Clepeyron first latent heat equation and applications. Second law of thermodynamics. Kelvin's and Claussius Statements.

Entropy : Change in entropy during isothermal, adiabatic, reversible and irreversible processes ,T-S diagram of Carnot's cycle ,relation between entropy and thermodynamic probability , order and disorder of a system. .

Problems. (12 Hrs)

Unit-IV: Physics of Low Temperature & Low Pressure

Distinction between real and perfect gases, Andrews experiment and discussion of results, Concept of critical Temperature, Boyle temperature, Joule – Thomson effect, Porous Plug experiment – Expression for inversion temperature, principle of regenerative cooling, adiabatic demagnetization for extremely low temperature. Cryogenics.

Production & measurement of low pressure . Thermo e.m.f & Thermocouple.

Problems. (12 Hrs)

Books for reference :

1. Mechanics --J.C.Upadhyaya
2. Newtonian Mechanics --A.P.French
3. Classical Mechanics --K.N.Srinivasa Rao
4. Classical Mechanics --Rann &Joag
5. Heat & Thermodynamics --Brijlal & Subramanyam
6. Heat &Thermodynamics --D.S.Mathur
7. Thermal Physics – C. Kittel & Kroemer
8. Vector analysis – Shaum's series
9. Statistical Physics & Thermodynamics – V.S. Bhatia

PRACTICALS I PHC 104

Note: A minimum of eight experiments should be done.

Si No.	Name
1	Parallel axes Theorem of M I
2	Specific heat by cooling
3	Cantilever Bending
4	Fly Wheel
5	Viscosity by Stoke's method
6	Viscosity by Poisuilli's method
7	Monte Carlo expt.
8	Oswald Viscometer
9	Surface tension by drop weight method
10	Inclined Plane
11	Law of conservation of liner momentum
12	BAR Pendulum – Two hole method
13	g by Spiral spring

II Semester
PHC 152: General Physics II

Unit-I: Properties of Matter

Elasticity: Hooke's law, moduli of elasticity and Poisson's ratio, derivation of relation connecting elastic constants, limiting values of Poisson's ratio, work done (energy stored) in stretching a wire, twisting couple on a wire – work done in twisting.

Beams, bending of beams uniform & non uniform, expression for bending moment, light cantilever bending with theory, I-section girders.

Fluid dynamics: Viscosity – Poiseuille's equation, Stokes law, Viscosity by Stokes method.

Lubrication: Basics of lubricants.

Problems. (12 Hrs)

Unit-II: Relativity

Inertial frames with uniform linear velocity. Galilean transformation equation, Galilean principle of relativity. Classical velocity addition theorem. Galilean invariance of space and time. Non–inertial frames with uniform linear acceleration. Fictitious forces.

Search for absolute frame of reference – ether hypothesis. Velocity of light and Galilean transformation.. Significance of the null result of Michelson Morley experiment. Constancy of speed of light. Postulates of special theory of relativity. Lorentz transformation (no derivation). Length contraction. Relativity of simultaneity. Time dilation, velocity addition theorem. Einstein's mass energy equivalence- (derivation based on photon gun experiment). Relativistic expression for kinetic energy. Relation between energy and momentum. Rest mass of the photon.

Minkowski's four dimensional space time continuum. Elementary ideas of General theory of relativity.

Problems. (12 Hrs)

Unit-III: Astrophysics

Stellar parallax and units of stellar distances. Definition of arcsec, parsec (pc), astronomical unit (AU), light year (ly) and their relations. Hubble's law. Spectra of stars and their classification. Radius of a star. Mass – Luminosity relationship and expression

characteristics. Star formation and main sequence evolution, White dwarfs, Pulsars, Neutron stars and Black holes. Variable stars, Supernova explosion, Chandrasekhar limit, Virial Theorem. Doppler Effect of light. Universe, concept of evolution, Planck's length and time. Experimental evidence of Big-Bang, Penzias and Wilson experiment. Dark Matter and Dark Energy (Mention) .

Problems. (12 Hrs)

Unit-IV: Waves & Oscillations

Free and forced oscillations: Equation for a harmonic oscillator. Free oscillations, damped oscillations. Setting up of equation for forced oscillations and its solution, condition for resonance.

Progressive waves: Equation for a progressive wave in one dimension. Differential equation of wave motion. Expression for velocity of longitudinal waves in a fluid. Newton`s formula for velocity of sound in air – Laplace correction. Longitudinal vibrations in a rod. Velocity of transverse vibrations in a string. Expression for frequency of fundamental and overtones.

Fourier's theorem: Statement and explanation– expression for Fourier coefficients (complex form). Limitations of Fourier theorem. Mathematical analysis of a square wave.

Problems. (12 Hrs)

Books for Reference:

1. Properties of matter – D.S. Mathur
2. Properties of matter - J.C. Upadhyaya
3. Special relativity – A.P. French
4. Special theory of relativity – Resnick
5. Astrophysics for Physicists – Arnab Rai Choudhuri
6. Structure of the universe – Jayanth V. Narlikar
7. Astronmy- The Evolution of the Universe – Michel Zeilik
8. Theoritical Astro Physics – T.Padmanabhan
9. Chandrashekhar and his Limit – B.Venkataraman
10. Waves and Oscillations- A.P.French

PRACTICALS II PHC 153

Note: A minimum of eight experiments should be done.

1	Double coil T.G.
2	Uniform bending
3	Melde's experiment
4	Perpendicular axes Theorem of MI & Rigidity modulus
5	q by Koenig's Method
6	Damped oscillations
7	Interfacial tension
8	Maxwell's distribution of velocities
9	Platinum resistance thermometer
10	BAR Pendulum using h – T Graph
11	Searle's double bar
12	Static Tortion
13	Sonometer – Determination of linear & marerial densities assuming frequency

III Semester
PHC 203: Optics

Unit-I: Interference

Interference: Coherent sources, Production of coherent sources, Biprism – construction, working and experiment to find wavelength , white light fringes. Coherent sources by Amplitude division, Colors of thin films – theory, reflected system ,theory and experiment of air wedge, Newton's Rings, Michelson's interferometer – determination of λ and $d\lambda$.

Problems. (12 Hrs)

Unit-II: Polarization and diffraction

Polarization: Plane polarized light and methods of production. Polarisation by double refraction crystals. Analytical treatment of production of different types of polarized light. - Huygens' explanation of double refraction–retarding plates. Theory of quarter wave plate (QWP) and half wave plate (HWP) & uses. Optical activity.

Fraunhofer diffraction – Single slit ,double slit , theory , many slits , grating ,theory of normal & oblique incidence , dispersive power , resolution , Rayleigh's criterion – expression for resolving power of grating and telescope.

Problems. (12 Hrs)

Unit-III: Electromagnetism

Scalar and vector fields with examples, operator grad, gradient of a scalar function. Relation between field and potential. Integration theorems - line integral, surface integral, volume integral. Divergence and curl of a vector, physical significance. Gauss and Stokes' theorems. Equation of continuity - setting up of Maxwell's field equations - concept of displacement current, setting up of wave equations for E & B –. velocity of e.m. wave in a dielectric medium –light as e.m. wave - transverse nature of e.m. wave (proof). Mention of normal & anomalous dispersion, Poyenting theorem– Poyenting vector – energy density of e.m. waves.

Problems. (12 Hrs)

Unit-IV: Radiation & Lasers

Radiation: Energy distribution in a block body spectrum. Wien's displacement law. Kirchoff's law, Stefan–Boltzman law, Wien's distribution law and Rayleigh – Jeans law. Derivation of Planck's law. Deduction of Wien's distribution law, Rayleigh – Jeans law from Planck's law. Definition of Radiation pressure, solar constant and its determination. Estimation of surface temperature of the sun.

Lasers: General Principles – spontaneous and induced emissions – optical pumping, resonance cavity – active medium – population inversion – condition for laser action. Mention of Einstein's coefficients A & B. He-Ne & solid state lasers – pulsed and tunable lasers. Applications of Lasers (mention only) Elementary ideas of holography.

Problems. (12 Hrs)

Books for Reference:

1. Fundamentals of Optics – Jenkins and White
2. Optics – Khanna and Gulati
3. A Textbook of Optics – B.K.Mathur
4. A Textbook of Electro Magnetism – Khan Academy
5. Laser Fundamentals – Silfvast WT

PRACTICALS III PHC 204

Note: Aminimum of eight experiments should be done.

1	Air wedge
2	Low resistance by Potentiometer
3	Diffraction at straight wire
4	Grating minimum deviation
5	Stefan - Boltzmann law
6	Torsion Pendulum –moment of inertia of irregular body
7	R.I. of prism using Brewster's law
8	Low resistance by Carrey Foster Bridge
9	Thermocouple
10	Laser diffraction
11	Polari meter
12	Dispersive power of prism
13	Field along the Axis of a coil
14	Helmholtz Resonator

IV Semester

PHC 253: Electricity & X-ray Crystallography

Unit-I: Transients & DC Networks

Transient Currents: Theory of CR circuit (charging and discharging) –LR circuit (growth and decay), LCR circuit (discharging).

Network theorems: Superposition theorem, Thevenin's & Norton's theorems. Maximum power transfer theorem (derivation), some applications.

Problems. (12 Hrs)

Unit-II: Alternating Currents & Filters

Alternating currents: Expression for the RMS value of voltage and currents, j operator principles of superposition and phasor analysis. Response of LR, CR and LCR circuit to sinusoidal voltages using j operators. Series and parallel resonance circuits – expression for the 'Q' factor, bandwidth – expression for the power.

Filters: High and low pass filters using CR and LR circuits, frequency response curves, cutoff frequency, qualitative study of band pass filters.

Problems. (12 Hrs)

Unit-III: Electrical & Magnetic Measurements

Force acting on a moving charge in electric and magnetic fields - Lorentz force. Force on a current carrying conductor in a magnetic field. Torque on a current loop in a magnetic field.

Magnetic dipole moment – Torque on a magnetic dipole. Equivalence of a current loop and a magnetic dipole.

Ballistic galvanometer – charge sensitivity – effect of damping. Applications of B.G.- Determination of capacitance by absolute method - determination of high resistance by leakage. Theory of Andersons bridge & De-Sauty's bridge.

Problems. (12 Hrs)

Unit-IV: X- ray Crystallography & Superconductivity

X- ray crystallography: production of X-rays. Coolidge tube. Continuous and characteristic X-ray spectra. Moseley's law. Definition of a lattice, unit cell, seven crystal systems. Miller indices, Bragg's law. Bragg's spectrometer, structure of NaCl and KCl.

Superconductivity: Elementary ideas – experimental facts, transition temperature, critical field, critical current, Meissner effect. High temperature superconductivity. Applications of superconductivity – production of high magnetic field.

Problems. (12 Hrs)

Books for Reference:

1. Electricity and magnetism – EM Purcell
2. Elements of Electromagnetics – Mathew and NO Sadiku
3. Introductory to Circuit Analysis – Robert Boylested
4. Electricity and magnetism – DC Tayal
5. Electricity and magnetism – Tareja
6. Elements of X-ray diffraction – Cullity & Stock
7. Solid state Physics – HC Guptha
8. Elementary Solid state Physics – Ali Omer

PRACTICALS IV PHC 254

Note: A minimum of eight experiments should be done.

1	De-Sauty's Bridge
2	Charge sensitivity BG
3	Newton's rings
4	Transient LR circuit
5	Charging of C R circuit
6	Grating normal incidence
7	Low pass filter
8	Max. Power transfer theorem
9	Diffraction at straight edge
10	Hi-pass filter
11	Phasor diagram
12	Caushy's constants
13	Series resonance
14	Superposition Theorem

V Semester
PHC 307: Modern Physics

Unit-I: Dual Nature of Matter

Evidences of Quantum nature of light :Photoelectric effect (Einstein's equation only), Compton effect – expression for Compton shift using relativistic expressions for momentum and energy.

Wave nature of particles: De-Broglie waves, Phase and group velocity of waves, Davisson and Germer experiment. Principle of an electron microscope, difference between optical and electron microscope, Uncertainty principle, three sets of uncertainty relations, γ ray microscope. Application of uncertainty relation – estimation of width of spectral lines, impossibility of the existence of electrons inside the nucleus. Problems. (12 Hrs)

Unit-II: Quantum Mechanics

Wave function, need to represent wave function in a complex form, properties of wave function. Setting up of time dependent Schrodinger wave equation and to arrive at the time independent wave equation. Expectation values. Eigen values and Eigen functions. Normalisation of wave functions. Solution of Schrodinger equation (i) for a free particle (ii) a particle in a one dimensional box. Graphs of ψ and $|\psi|^2$. Extension to three dimensional box. Degeneracy.

One dimensional harmonic oscillator (qualitative), zero point energy of harmonic oscillator-using uncertainty principle.

Problems. (12 Hrs)

Unit-III: Atomic Spectra

Atomic models, Concept of Spatial & spin quantization of electrons. Different quantum numbers associated with vector atom model, spectral terms and their notations, selection rules, coupling schemes, L-S and J-J coupling. Pauli's Exclusion Principle, expression for maximum number of electrons in an orbit. Fine structure of Sodium D-line, Larmour precession, Bohr magneton, Stern-Gerlach experiment. Zeeman effect, experimental study of Zeeman effect, theory of normal Zeeman effect and anomalous Zeeman effect (qualitative). Paschen-Back effect and Stark effect (qualitative).

Problems. (12 Hrs)

Unit-IV: Molecular Spectra & Scattering

Different regions of molecular spectra. Pure rotational spectra of diatomic molecules. Vibrational - rotational spectra of diatomic molecules. Electronic spectra. Applications of molecular spectra. Coherent and incoherent scattering. Rayleigh scattering, blue colour of the sky. Raman effect. Quantum theory of Raman effect, experimental arrangement, characteristic properties of Raman lines. Intensity, depolarization ratio of Raman lines, comparison of Raman shift with IR spectra, rule of mutual exclusion, applications . Laser Raman spectroscopy.

Problems. (12 Hrs)

Books for Reference:

1. Concepts of Modern Physics – Arthur Beiser
2. Modern Physics – Kenneth S Krane
3. Fundamentals of Spectroscopy – Banwell
4. Quantum Physics – AP French
5. Quantum Physics – Gasorovicz
6. Quantum Physics – G Aruldhas

V Semester
PHC 308: Condensed Matter Physics

Unit-I: Statistical Physics, Specific Heat & Nanomaterials

Statistical ideas in Physics, Maxwell – Boltzmann, Bose – Einstein and Fermi – Dirac statistics, MB statistics as the classical limit of BE and FD statistics.

Specific heat of solids: Molar specific heat, Dulong – Petit law, its limitations. Einstein's theory of specific heat at low and high temperatures and its limitations. Debye's theory of specific heat at low and high temperatures assuming the modes of vibration in the frequency interval ν and $\nu + d\nu$, its limitations, comparison of Einstein's and Debye's theories.

Nano Materials: concepts and applications.

Problems. (12 Hrs)

Unit-II: Free Electron Theory of Metals & Hall Effect

Lorentz - Drude model, explanation of electrical resistance, expression for electrical conductivity, deduction of Ohm's law, limitations of classical theory. Quantum free electron theory, expression for Fermi energy and average energy of electrons at absolute zero – mention of expressions above absolute zero. Statement for F(E) and $\langle E \rangle$ at $T > 0$, Boltzmann tail.

Hall effect- expression for Hall co-efficient and its significance. Measurement of Hall co-efficient.

Problems. (12 Hrs)

Unit-III: Band Theory of Solids

Band formation in solids, explanation of electrical conductivity of metals, insulators and semiconductors. Intrinsic semiconductors – expression for conductivity of intrinsic semiconductors, variation of resistance with temperature. Extrinsic semiconductors, Fermi level, donor and acceptor levels, electrical conductivity of extrinsic semiconductors, p – n junction, expression for diode current (no derivation). LED, solar cell.

Problems. (12 Hrs)

Unit-IV: BJT

BJT: Transistors - construction, types, action, characteristics in CE mode, mention of CB and CC mode, Definition of α and β (dc and ac) - relation. Biasing, voltage divider bias only, voltage divider bias as a current source. CE amplifier with voltage divider bias. DC and AC load line analysis. DC and AC equivalent circuits. Hybrid parameters – general definitions. Hybrid model of transistor in CE configuration. Calculation of amplifier characteristics – expressions for voltage gain, current gain, input resistance and output resistance – frequency response. Comparison of CE, CB and CC amplifiers (qualitative).

Problems (12 Hrs)

Books for Reference:

1. Introduction to Solid-state Physics – C Kittel
2. Introductory Solid-state Physics – HP Myers
3. Solid-state Physics – HC Guptha
4. Electronic circuits – Boylested & Nashelsky
5. Electronic devices - Floyd

PRACTICALS V PHC 309

Note: A minimum of eight experiments should be done.

1	Diode Characteristics
2	Parallel resonance
3	Anderson's bridge
4	Thermistor
5	Resolving power of grating
6	Energy gap of PN Diode
7	Transistor Characteristics
8	Intensity of a spectral line
9	Specific charge of an electron
10	Discharging of C R circuit
11	Network Theorem – Verification for two circuits
12	Fermy energy
13	Bi-prism
14	Zener Voltage regulator

VI Semester
PHC 357: Nuclear Physics

Unit-I: Nuclear Decay and Spectra of Nuclear Radiation

Successive disintegration (A → B → C), expression for number of daughter nuclei, radio active equilibrium - transient and secular, radioactive series, radioactive dating - radio uranium and radio carbon dating.

Alpha decay, alpha particle disintegration energy, alpha ray spectra, range, velocity and energy relations. Geiger-Nuttal Law. Beta ray spectra and paradoxes, Pauli's neutrino hypothesis, modes of beta decay. Gamma ray emission, interaction of gamma rays with matter - photo electric effect (mention), Compton effect (mention) and pair production. Absorption of gamma rays with matter and absorption coefficient.

Nuclear radiations-units: Curie, Becquerel, Absorbed dose rate - Gray and dose equivalent - Sievert - definitions.

Problems. (12 Hrs)

Unit-II: Nuclear Structure and Models

Rutherford alpha scattering formula assuming impact parameter - nuclear cross section - differential and total. Properties of the nucleus - constituents - charge, mass, volume, density, spin, magnetic moment, nuclear angular momentum, electric dipole moment, charge distribution and quadrupole moment. Isotopes, isobars, isotones, isomers and mirror nuclei. Mass spectrographs - Dempster's mass spectrograph. Characteristics of nuclear forces, Yukawa's theory, estimation of mass of mesons using uncertainty principle.

Nuclear models: liquid drop model and explanation of nuclear fission, semi empirical mass formula, Shell model and magic numbers. Salient features of liquid drop model and shell model. Problems. (12 Hrs)

Unit-III: Artificial Transmutation of Elements, Nuclear Fission and Fusion

Rutherford experiment, Q values of nuclear reactions, threshold energy for endoergic nuclear reaction, Types of nuclear reactions. Discovery, classification and properties of neutron. Neutron sources (mention), interaction of neutrons with bulk matter, principle

of moderator. Induced radioactivity, applications of Radio isotopes. Transuranic elements.

Nuclear fission: Nuclear fission, chain reaction, critical size and mass, power reactor (diagram and explanation). Four factor formula.

Types of Nuclear Power reactors - pressurised water, boiling water, pressurised heavy water, breeder and fast breeder reactors. India's nuclear programme.

Nuclear Fusion: Thermonuclear reactions, principle of hydrogen bomb, carbon and nitrogen cycle, source of stellar energy, requirement for controlled thermonuclear reaction, magnetic confinement.

Problems. (12 Hrs)

Unit-IV: Particle Accelerators & Detectors, Cosmic Rays & Fundamental Particles

Accelerators: Linear accelerators, Cyclotron and Betatron, Microtron (principle only).

Detectors: Gas filled counters - G M counter - construction and working, principle of scintillation and semiconductor detectors.

Cosmic rays: latitude and altitude effect, east west effect, primary and secondary cosmic rays and composition, origin of cosmic rays, cosmic ray showers, Van Allen Radiation belts, Aurorae.

Fundamental particles: General properties - Dirac concept of anti particles - classification based on interactions. Leptons and Hadrons.

Quarks model and mediators of basic interactions.

Problems. (12 Hrs)

Books for Reference:

1. Introductory Nuclear Physics – KS Krane
2. Introduction to Atomic and Nuclear Physics – Semet and Albright
3. Nuclear Physics – Irving Keplan
4. Modern Physics – KS Krane

VI Semester
PHC 358: Electronics

Unit-I: OP-AMP, Regulated Power Supply

Operational amplifiers (OP-AMP): Differential amplifier – dual input and balanced output. Concept of an ideal OP-AMP. OP-AMP Characteristics for IC 741, inverting and non inverting amplifiers with feed back. Derivation of expression for voltage gain, Frequency response.

Regulated power supply: Block diagram, bridge rectifier- derivation of expressions for efficiency, ripple factor. Capacitor filter. Voltage regulator using Zener diode.

Problems (12 Hrs)

Unit-II : FET and MOSFET

FET: Types, construction and characteristics of n - channel FET. MOSFET – enhancement and depletion type and working. Comparison of BJT and FET. Problems.

Oscillators: Block diagrams for feedback network – positive and negative feedback – Barkhausen criterion for oscillations in electronic circuits, phase shift oscillator using BJT and Wein bridge oscillator using OP-AMP, expression for frequency of oscillation.

Problems. (12 Hrs)

Unit-III: Digital Electronics

Boolean Algebra. Logic gates – OR, AND and NOT using discrete components (diodes and transistor). Universal gates - Truth table. Boolean theorems, de-Morgan's theorems, simplification of Boolean expressions. SOP method of solving digital problems. Realization of basic gates and XOR gate using NAND gates only. Half adder and Full adder.

Sequential logic circuits (timing diagram for counters only). Introduction to flip-flops – RS, D and JK-FF (using NOR gates only). Serial shift register using D-FFs. Asynchronous binary counters using JK-FF. Working of a decade counter. Displaying the counter

output using BCD to seven segment decoder (block diagram) and seven segment display.

Problems. (12 Hrs)

Unit-IV: Communication Electronics

Communication electronics: Need for modulation, AM - expression for AM wave, power relations, SSB transmission in AM - advantages and disadvantages. Qualitative discussion of FM, comparison of AM and FM. Demodulation-diode detector, Super heterodyne receiver.

Ionosphere: Types of radio wave propagation, skip distance, maximum usable frequency, satellite communication & Remote sensing. Mobile communication.

CRO-CRT working, time base signals, scanning principle, uses of CRO. LCD and LED monitors (qualitative). Problems. Mobile communication

Problems (12 Hrs)

Books for Reference:

1. Electronic principles and devices – VK Mehta
2. OPAMPS and Linear Integrated Circuits – RA Gayakwad
3. Operational Amplifiers and Linear ICs – David A Bell
4. Electronic communication – Kennedy & Davis
5. Electronic communication – Miller & Beasley

PRACTICALS VI PHC 359

Note: A minimum of eight experiments should be done.

1	Logic gates – diode & transistor
2	GM Counters – Inverse square law
3	Bridge rectifier
4	Mutual inductance –BG
5	Rydberg Constant
6	CE amplifier
7	Inverting & non- inverting amplifiers using OPAMP
8	Absolute Capacity using BG
9	Wein bridge oscillator
10	M & C by Carey –foster bridge
11	High resistance by leakage
12	Logic gates Using NAND gates
13	Plank's constant using LED
14	Half adder & full adder