



ARULMIGU PALANIANDAVAR ARTS COLLEGE FOR WOMEN
(Autonomous)
(Re-Accredited with 'A' Grade by NAAC)
(A Government Aided College - Affiliated to Mother Teresa Women's University,
Kodaikanal)
CHINNAKALAYAMPUTHUR (PO), PALANI -624 615.

DEPARTMENT OF PHYSICS



SYLLABUS

2011-2014

<p style="text-align: center;">I-B.Sc. PHYSICS SEMESTER - I PAPER-1 MECHANICS, PROPERTIES OF MATTER AND SOUND</p>
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PREAMBLE

The purpose of this paper is to give an introduction to conservation principles, properties of matter and sound.

UNIT-I CONSERVATION LAWS

Impulse and momentum - Conservation of linear momentum - center of mass – collision - Direct and oblique – Final velocities and loss of K.E.

ROCKET MOTION

Expression for thrust and velocity - multistage rocket – escape velocity.

MOTION OF RIGID BODY

Moment of inertia - Parallel and perpendicular axes theorems - M.I. of circular disc - solid sphere - hollow sphere and cylinder about all axes - compound pendulum - Torque and angular momentum - Relationship between them - K.E. of rotation – conservation of angular momentum - Top precessional motion-gyroscopic motion, gyrocompass.

UNIT II - GRAVITATION

Kepler's laws of planetary motion and derivation of law of Gravitation - Newton's universal law of Gravitation - Boy's method - Acceleration due to Gravity - compound pendulum - Bar pendulum - Minimum time period - variation of with Altitude - variation of g with Depth - variation of g with rotation of the earth - Difference between mass and weight - Gravitational field - Gravitational potential - Gravitational potential energy - Gravitational potential due to uniform solid sphere.

UNIT-III - ELASTICITY

Elasticity-Definitions-yield point, Elastic limit-Elastic fatigues-Poisson's ratio-Poisson's Ratio for Runner work done in deforming a body-Bulk modulus-modulus of Rigidity-Relation between Elastic constants (Y , G , K and γ) limiting values of γ -Twisting of a cylinder-Torsion Pendulum-Bending of beams-Bending moment-Basic assumption for theory of Bending-Cantilever-Uniform & Non uniform bending (microscopes)-Section Girders-Determination of Y by Bending-Determination of Elastic constants by Searle's method.

UNIT-IV-VISCOSITY AND SURFACE TENSION

Introduction-Stream line motion and rate of flow-equation of continuity-Energy of a liquid in motion-Bernoulli's theorem & proof- practical applications-viscosity-Stoke's law- Poiseuille's method for co-efficient of viscosity-correction to Poiseuille's equation-Ostwald's Viscometer-Rankine's method for viscosity of a gas.

Introduction-surface tension-explanation of surface tension-Pressure difference across a spherical surface-Example of surface tension-surface energy and surface tension-Excess of pressure inside a spherical liquid drop or an air bubble inside a liquid-capillarity-Expression for surface tension-Experiment to determine surface tension of water-Examples of capillarity-Jaeger's method for determining surface tension of liquid at various temperature.

UNIT-V - SOUND

S.H.M – S.H.M as the projection of uniform circular motion – Composition of two S.H.Ms of the same – Period at right angles to each other - Lissajou's figures – Free vibrations of a body – Damped vibrations – Force d oscillations.

Longitudinal and Transverse waves – Surface waves – Relation between wavelength, frequency and wave velocity – characteristics of progressive waves – Intensity of sound – Phase velocity and group velocity – Beats (definition only) – Velocity of I, II, and III laws – Electrically maintained tuning fork (Melde's string experiment).

Ultrasonics – Production, Deduction and Applications – Acoustics of buildings, Reverberations and importance of Sabine's formula – Sound distribution in auditorium.

BOOK FOR STUDY:

Brijlal and Subramaniam - I units I to V.

BOOK FOR REFERENCE:

1. Mechanics, Properties of matter and Sound - R.Murugesan
2. Elements of properties of matter - D.S.Mathur
3. Engineering physics - G. Senthil Kumar

<p style="text-align: center;">SEMESTER I</p> <p style="text-align: center;">PAPER-II-ELECTRICITY AND ELECTROMAGNETISM</p>
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PREAMBLE

This paper deals with static electricity, capacitors, electric circuits, AC current and AC bridges.

UNIT-I-ELECTROSTATICS & CAPACITORS

Electric field and flux – Gauss law – Application of Gauss field due to charge sphere – Coulomb's theorem - mechanical force on the surface of a charged conductor – electric potential – equipotential surface - relation between field and potential energy – Capacity of a condenser – spherical, cylindrical and parallel plate condensers – types of condensers – energy stored in a capacitor.

UNIT-II-ELECTRIC CIRCUITS

Kirchhoff's laws-application of Kirchhoff's law to Wheat stone's bridge-Sensitiveness of a Wheat stone's bridge – Carey Foster's Bridge – Potentiometer – Measurement of Potential and Calibration of voltmeter – Measurement of current and calibration of Ammeter – Measurement of Resistance.

UNIT-III-MAGNETIC FIELDS OF ELECTRIC CURRENTS

Magnetic fields – Magnetic Flux – Biot Savart law- Magnetic induction due to straight conductor - Force on a current element in magnetic field - Torque on a current loop in a uniform magnetic field - Ampere's law - Maxwell's equation III – Magnetic Induction at any point on the axis of a solenoid - Magnetic induction due to circular loop – solenoid and toroid – Moving coil Galvanometer.

Dead beat and Ballistic – Damping correction – Applications – Determination of figure of merit of dead beat Galvanometer – Experiment to determine charge sensitivity of ballistic galvanometer – Experiment to find absolute capacity of a condenser – Experiment to compare the capacities of condensers – Experiment to compare the electromotive forces of the cells.

UNIT-IV- ELECTROMAGNETIC INDUCTION AND TRANSIENT PHENOMENA

Laws of electromagnetic induction - Introduction – self-inductance – Mutual inductance – Determination of self - inductance by using Rayleigh's method – Determination of Mutual inductance (M) – Comparison of Mutual inductances – coefficient of coupling - eddy current – uses - Maxwell's equations and electromagnetic theory.

Growth and decay of current in a circuit containing inductance L and resistance R with steady emf – growth and decay of charge in a CR circuit – determination of high resistance by leakage – growth and decay of charge in LCR circuit - condition for the discharge to be oscillatory – frequency of oscillations.

UNIT – V - ALTERNATING CURRENT AND AC BRIDGES

Introduction – R.M.S for effective value of A.C – mean value of the alternative e.m.f – Phase difference – Resistance, Capacitance and Inductance are connected to A.C. source - L, C and R in series Resonance - Impedance of an Ac circuit – Circuit analysis with complex numbers – Parallel resonance circuit – AC applied to LCR in parallel – Q-factor – Power in AC circuit – Signification of power factor – skin effect – Power losses & uses - Transformers – Detailed theory of Transformer – Transformer losses.

AC bridges for measuring inductance – Maxwell's bridge – Owen's bridge – Anderson's bridge – Wien's Bridge for measuring capacitance – Desauty's bridge.

BOOK FOR STUDY

Electricity and Electromagnetism – M. Palaniappan

BOOK FOR REFERENCE

1. Electricity and Magnetism – K.K. Tewari
2. Electricity and Magnetism – Brijlal Subramaniam
3. Electricity and Magnetism – Nagarathinam and Lakshmi Narayan

<p style="text-align: center;">SEMESTER II</p> <p style="text-align: center;">PAPER III - HEAT AND THERMODYNAMICS</p>

PREAMBLE

This paper gives a deep knowledge in heat and thermodynamics, which is essential in everyday life.

UNIT-I - KINETIC THEORY OF GASES AND VANDERWALL'S EQUATION

Introduction-Postulates of Kinetic theory of gases-Expression for the pressure of a gas-kinetic energy per unit volume of a gas-kinetic interpretation of temperature-Derivation of Gas equation-Derivation of Gas law-Degrees of freedom and Maxwell's law of Equipartition of Energy-Atomicity of gases-Maxwell's law of distribution of velocity-Experimental verification of velocity distribution-Mean free path-Transport Phenomena-Viscosity of gases-Thermal conductivity of gases-Behavior of Gases at high pressure-Vander wall's equation of state-critical constants.

UNIT – II - LOW TEMPERATURE PHYSICS

Inter molecular attraction-Porous plug experiment-Theory of porous plug experiment-Joule Kelvin effect-Temperature of Inversion-Liquefaction of air, Nitrogen & Helium-I and Helium-II-Production of low temperatures-Adiabatic demagnetization.

UNIT-III-TRANSMISSION OF HEAT

Co-efficient of Thermal conductivity-Rectilinear flow of Heat along a Bar-Lee's method for bad conductors-Cylindrical flow of heat-Thermal conductivity of Glass-Heat flow through a compound wall-Accretion of ice in ponds-Wiedmann-Franz law-Convection-Applications of convection-convective equilibrium of the atmosphere-Black body-Stefan's law-

Mathematical derivation of Stefan's law-Determination of Stefan's constant (Laboratory method)-Derivation of Newton's law of cooling from Stefan's law-Experimental verification of Stefan's law-Disappearing filament optical pyrometer-Total radiation pyrometer-Distribution of Energy in the spectrum of a black body.

Solar constant-Temperature of the sun-water flow pyr heliometer
- Solar spectrum.

UNIT-IV-ZEROth & I LAWS OF THERMODYNAMICS:

Thermodynamic system-Thermal Equilibrium and concept of Temperature (Zeroth law of thermodynamics)-concept of Heat-comparison of Heat and Work-First law of thermodynamics -First law of thermodynamics for a change in state of a closed system-Applications of first law of thermodynamics-Isothermal process-Adiabatic process-Gas equation during Adiabatic process-Slopes of Adiabatics and Isothermal-Irreversible process-Reversible process.

UNIT-V-SECOND AND THIRD LAWS OF THERMODYNAMICS:

Second law of thermodynamics-Carnot's reversible engine-Carnot's engine and Refrigerator-Carnot's theorem-Entropy and the second law of thermodynamics-Entropy changes of a closed system during an irreversible process-entropy change in reversible process (Carnot's cycle) change in Entropy in an irreversible process.

Third law of Thermodynamics-Temperature-Entropy diagram-Entropy of a perfect gas-Maxwell's Thermo dynamical relations-Helmholtz function-Thermodynamic potential or Gibb's function-enthalpy- C_p , C_v and γ -Joule Kelvin coefficient-Equilibrium between liquid and its vapour-First order Phase Transitions.

BOOKS FOR STUDY

1. Heat and Thermodynamics-Brijlal & Subramaniam (Unit I-V)

BOOKS FOR REFERENCE

1. A text book of heat - J.B. Rajam
2. Thermodynamics and Statistical Mechanics-Sears and Salinger
3. Treatise on Heat-Saha & Srivastava
4. Heat and Thermodynamics-D.S.Mathur.

<p style="text-align: center;">SEMESTER III</p> <p style="text-align: center;">PAPER – IV – OPTICS AND SPECTROSCOPY</p>

PREAMBLE

This paper gives a sound knowledge about geometrical optics, physical optics, fibre optics and Raman & IR spectroscopy.

UNIT – I – GEOMETRICAL OPTICS

Lens – Refraction through lenses – Aberration – Chromatic aberration – Spherical aberration – Minimization of aberrations – Coma – Astigmatism.

Ramsden's eyepiece – Huygen's eyepiece – Oil immersion objective – Dispersion – Dispersion through a prism – Cauchy's dispersion formula – Theory of Rainbows – Primary and secondary Rainbows.

UNIT – II – INTERFERENCE

Interference in thin films - color of thin films – Air wedge – Determination of diameter of thin wire – Testing of planeness - Newton's rings – Determination of λ and μ of a liquid - Michelson interferometer – Types of fringes- visibility of fringes – applications of Michelson interferometer.

UNIT – III – DIFFRACTION

Fresnel and Fraunhofer classes of diffraction – Fresnel's explanation for the rectilinear propagation of light – Zone plate - Fresnel's diffraction at a straight edge – Fraunhofer diffraction at single slit, double slit and circular aperture – Theory of diffraction grating – Determination of wavelength – Dispersive power of a grating and Rayleigh's criterion for resolving power of a grating – Resolving power of Microscope and Telescope - Comparison between prism and grating spectra.

UNIT – IV– POLARISATION

Double refraction – Nicol prism construction and working - Huygen's explanation – Production, Detection and Analysis of Plane, Circularly and elliptically polarized light – Quarter and Half wave plates – Optical rotation – Fresnel's theory of optical rotation - Biot's laws – Laurent's half shade Polarimeter

UNIT-V-SPECTROSCOPY AND MODERN OPTICS

Classification of line, band and continuous spectra – Infrared spectroscopy – Application – Raman effect – Experimental setup – Characteristics of Raman lines – Basic concepts of resonance Spectroscopy – Nuclear magnetic resonance – Nuclear quadrupole resonance – Electron spin resonance – Experimental setup and any one of the applications(quantitative treatment only).

LASER absorptions, spontaneous and stimulated emission – Einstein coefficients - Population inversion - resonators (simple concepts) - Ruby, Helium and neon lasers - applications.

Optic fiber – Numerical aperture – Coherent bundle – Fiber optic communication systems and their advantages.

BOOK FOR STUDY:

1. Optics – Brijlal and Subramaniam
2. Optics & Spectroscopy – R. Murugesan.
3. Fundamentals of Spectroscopy – McCesh and Banwell

BOOK FOR REFERENCE:

1. Optics – S.P. Singh and J.P. Agarwal
2. Optics– Sathya prakash

<p style="text-align: center;">SEMESTER – IV PAPER –V– BASIC ELECTRONICS</p>
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PREAMBLE

The recent developments in the scientific and technological fields are based on electronic principles. This paper provides the basic concepts of electronics.

UNIT – I – NETWORK ANALYSIS

Thevenin's theorem – Norton's Theorem – Two port Network – Analysis – four types – Filter circuits – general theory – low pass, high pass, Band pass and band elimination filters.

UNIT – II – SEMICONDUCTOR PHYSICS

Semiconductor – Bonds in semiconductors - Crystals–Commonly used semiconductors – Energy band description of semiconductors - Effect of temperature on semiconductors – Hole current – Intrinsic semiconductor – Extrinsic semiconductor – n – type and p-type semiconductors – Majority and Minority carriers – pn junction – Properties of pn – junction – applying voltage across pn – junction – Current flow in a forward biased pn junction – Volt ampere characteristics of pn – junction – Important terms – Limitations in the operating condition of pn – junction.

UNIT – III – SEMICONDUCTOR DIODE

Semiconductor diode – Crystal diode as a rectifier – Resistance of crystal diode – Equivalent circuit of crystal diode – Important terms – crystal diode rectifiers – Half wave rectifier – Efficiency of half wave rectifier – Full wave rectifier – Centre tap full wave rectifier – Full wave bridge rectifier – Efficiency of full wave rectifier – Nature of rectifier output – Ripple factor – Comparison of rectifiers – Filter circuits – Types of filter circuits – Voltage stabilization – Zener diode – Equivalent circuit of diode – Zener diode as voltage stabilizer – Crystal diodes versus vacuum diodes.

UNIT – IV – TRANSISTORS

Transistor – Naming the transistor terminals – Some facts about the transistor - Transistor action - Transistor symbols - Transistor as an amplifier - Transistor connections – Common base connection – Characteristics of common base connection – Common emitter connection – Characteristics of common emitter connection - Common collector connection - Characteristics of Common collector connection – comparison of transistor connections – Commonly used transistor connection – Transistor as an amplifier in CE arrangement - Transistor load line analysis – Operating point – practical way of drawing CE circuit – Output from transistor amplifier – cut off and saturation points – Power rating of transistor – Semiconductor device numbering system – Transistor lead identification.

UNIT –V – TRANSISTOR BIASING

Faithful amplification – transistor biasing – Inherent of transistor parameters - Stabilization – Essentials of a transistor biasing circuit – Methods of transistor biasing – Base resistor method – Biasing with feedback resistor – Voltage divider bias - Amplifiers – CE, CB, CC amplifiers – calculation of voltage gain, current gain, input and output impedance in each case – power amplifiers – class A and class B push pull amplifiers – frequency response of amplifiers.

BOOKS FOR STUDY:

1. Principles of Electronics – V.K.Metha
2. Solid State Devices – Vincent & Ambrose

BOOKS FOR REFERENCE

1. Electronics – Gupta Kumar
2. Electronics – B.L. Theraja

<p style="text-align: center;">SEMESTER IV PAPER - VI- MODERN PHYSICS – I</p>

PREAMBLE

To have a brief discussion on atom models. To have an idea about photoelectric effect, X-rays & the theory of relativity.

UNIT- I - CRITICAL POTENTIALS

Critical potential - Experimental determination of critical potentials - Frank and Hertz's method.

UNIT- II - ATOM MODELS

Review of Bohr atom model - Sommerfield's relativistic model - vector atom model - various quantum numbers - LS and JJ coupling - Pauli's classification - Magnetic dipole moment due to orbit motion and spin motion - Bohr Magnetron - Stern and Gerlach experiment.

UNIT- III - PHOTO ELECTRIC EFFECT

Discovery of photoelectric effect - Results on photoelectric effect - Failure of the electromagnetic theory - Einstein's theory of photoelectric effect - Millikan's experiment - Photoelectric cells.

UNIT – IV- X-RAYS

Diffraction of x-rays - Bragg's law - Bragg x-ray spectrometer - X-ray spectra - Characteristic X-rays spectrum - Moseley's law - Compton scattering theory - Experimental verification.

UNIT- V- THEORY OF RELATIVITY

Michelson - Morley experiment – Interpretation of the Michelson - Morley experiment – Relative time – The Lorentz transformation – The relativistic velocity transformation – Time dilation – Illustration of time dilation – The twin paradox –Length contraction – Relativity of mass – Mass-energy equivalence.

BOOK FOR STYDY

1. Modern Physics – R.Murugesan
2. Modern Physics - Sehgal, Chopra, Sehgal

BOOKS FOR REFERENCE:

1. Modern Physics - J.B.Rajam

SEMESTER V PAPER VII – ADVANCED MECHANICS
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PREAMBLE

To understand the basic concepts of classical, quantum and statistical mechanics and wave mechanics. To deal with problems ranging from atoms to that of stellar system.

UNIT – I – CLASSICAL MECHANICS

Motion of center of mass of a system of particles – Reduced mass – Energy of a system of two bodies in center of mass frame - system of particles - conservation of energy – work energy theorem – conservative forces – example.

Generalized coordinates – Generalized velocities – Generalized momentum – Degrees of freedom under constraints – D'Alembert principle – Lagrangian function – Lagrangian equation (Derivation) – Application of Lagrangian's equation – simple pendulum – compound pendulum – Atwood's machine.

Hamiltonian – Hamiltonian equation with derivation – General features of motion under inverse square law – Kepler's problem.

UNIT – II – STATISTICAL MECHANICS

Microscopic and Macroscopic descriptions – Ensembles – phase space – probability – fundamental postulates to statistical mechanics – thermodynamic probability – Boltzmann's theorem on entropy and probability – statistical equilibrium.

Maxwell – Boltzmann distribution law – Maxwell – Boltzmann distribution in terms of temperature – molecular energies in an ideal gas – Maxwell Boltzmann velocity distribution law – quantum statistics – Bose-Einstein statistics – Bose Einstein distribution law - photon gas – Plank's law of radiation – deduction of Wien's and Rayleigh-Jeans laws.

Fermi – Dirac statistics - Fermi-Dirac distribution law – electron gas – Fermi energy – comparison of three statistics.

UNIT – III – QUANTUM THEORY

Plank’s Quantum theory of emission and absorption – Einstein’s theory of specific heat capacities of solids – Debye’s theory – phonons.

UNIT – IV – WAVE MECHANICS

Matter waves – De Broglie’s theory – De Broglie wavelength – experimental verification – Davission and German experiment – G.P.Thomson’s experiment with relativistic correction.

Wave velocity and group velocity – particle velocity and group velocity – Heisenberg’s uncertainty principle – illustration (i) diffraction of electron in a grating (ii) electron viewed through a microscope.

UNIT – V – QUANTUM MECHANICS

Basic postulates of wave mechanics – Momentum operators – Energy operators - The Schrodinger wave equation – wave function – interpretations to ψ – application of Schrodinger particle in one dimensional box – Linear harmonic oscillator – zero point energy – the barrier penetration problem and tunnel effect.

BOOK FOR STUDY

1. Elements of theoretical physics – M.Palaniappan

BOOKS FOR REFERENCE

1. Classical Mechanics – Gupta Kumar
2. Quantum Mechanics – Schiff
3. Classical Mechanics – Goldstein
4. Thermal Physics – Garg Bansal & Gosh

<p style="text-align: center;">SEMESTER V PAPER VIII – DIGITAL ELECTRONICS</p>
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PREAMBLE

The foundation level of understanding of integrated and digital electronics is dealt in this paper.

UNIT – I – BINARY NUMBER SYSTEM

Binary addition – Binary to Decimal conversion – Decimal to Binary conversion – Binary Subtraction – Multiplication – 4 bit BCD codes – Hexadecimal code.

UNIT – II – LOGIC GATES

OR, AND & NOT gates – Positive and negative logic – their implementation – calculation of output voltages - OR, AND, NOT gates – Boolean logic diagrams and truth tables for these – Boolean equations of logic circuits – NOR, NAND gates – DeMorgan's theorem – NAND, NOR as universal building blocks – laws and theorems of Boolean algebra – two input TTL NAND gates – DTL, RTL circuits – logic cards – Experimental investigation of equivalence of Boolean expressions of exclusive OR function and investigation of logical properties of the exclusive OR - Half adder and Full adder properties and their implementation with EX-OR.

UNIT – III – MULTIVIBRATORS

The RS Flip Flop (Transistor & logical version) - clocked RS Flip Flop, JK Flip Flop. The Schmitt trigger (using transistor & op-amp) - Astable and Monostable multivibrators - working and uses (No derivations) - Duty cycle - Monostable multivibrator and Astable multivibrator using IC 555.

UNIT – IV OPERATIONAL AMPLIFIER

OP-AMP characteristics resistance feedback – expression for gain (inverting mode only) – virtual earth – application as adder, subtractor, integrator and differentiator – analog computer.

UNIT –V – COUNTERS, REGISTERS AND MICRO COMPUTER

Binary counter – decade counter – four bit binary counter – shift register – ring counter – A/D conversion – D/A conversion.

BOOKS FOR STUDY:

1. Digital Electronics – A. Ubal Raj & G. Jose Robin
2. Digital Principles and computer design – Malvino and Leach

BOOKS FOR REFERENCE:

1. Integrated electronics – Milman & Halkins
2. Digital Principles and computer design – Morris Mano

<p style="text-align: center;">SEMESTER V ELECTIVE - COMPUTER PROGRAMMING IN C</p>
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PREAMBLE

This paper helps the students to understand the powerful language 'C'.

UNIT – I INTRODUCTION TO C

The C character set – Identifiers and keywords - data types – Constants – Variables – Declaration – Expressions - Various types of Operators – Bit wise operations - Input and output functions and writing simple programs.

Conditional and unconditional control statements – Branching, Looping - Nested control structures – Switch – Break – Continue – Goto.

Sum of n-natural numbers – To find the Fibonacci series – To find the roots of a quadratic equation $ax^2+bx+c=0$. To find and print Armstrong numbers - To find simple interest and Compound interest.

UNIT – II – FUNCTION

Over view – Defining a function – Accessing a function – Passing arguments to a function – Recursion – Library function – the preprocessor directives. Storage classes - Scope of the variables – Automatic variables – Global variables – Static variables – Register variables.

To determine the factorial of a given number – check whether given number is odd or even. Using function to sum integer values between 1-N using recursion techniques.

UNIT – III – ARRAYS

Defining, initialization rules and processing of arrays and subscripted variables – Passing arrays to functions – Multi dimensional arrays – Arrays and strings.

To arrange the given set of numbers in ascending order – To arrange given set of numbers in descending order - To find the largest number in the given set of numbers – To multiply two matrices of order (l x m) And (m x n) – To add and subtract two matrices.

UNIT – IV- POINTERS & FILES

Fundamentals – Declaration - Accessing a variable – Pointers and Arrays – Dynamic memory allocation – Pointers and functions – Pointers and strings.

Introduction – Defining and Opening file – Closing a file – Input & Output operations on files.

UNIT –V – STRUCTURES AND UNIONS

Introduction – Defining and initializing a structure – accessing and giving values to member – structure within structures – arrays of structures – arrays within structures.

Union – declaration and initializing a union – To prepare the salary bill for employees of a company.

BOOK FOR STUDY

1. Programming in C and Application by D. Arulselvam
2. Computer programming in C – Jayasree.
3. Programming in C – Cgottfried

BOOK FOR REFERENCE

1. Programming in C – E. Balagurusamy

<p style="text-align: center;">SEMESTER – V - ELECTIVE</p> <p style="text-align: center;">ENERGY PHYSICS</p>
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PREAMBLE

To make the students to know about the energy and their sources. To deal with the study of different non-conventional sources.

UNIT- I – AN INTRODUCTION TO ENERGY SOURCES

Energy consumption as a measure of prosperity – World Energy Future – Energy Sources and their availability – Commercial or Conventional energy sources – Non – Conventional sources – Renewable energy sources – other forms of solar energy – wind – Biomass – Geothermal and OTEC.

SOLAR RADIATION AND ITS MEASUREMENT

Introduction – Solar constant – Solar radiation at the Earth's surface – Solar radiation geometry – Solar radiation measurements – Solar radiation data.

UNIT- II - SOLAR ENERGY COLLECTION AND STORAGE

Introduction – Physical Principles of the conversion of solar radiation into heat – Flat plate collectors – Concentrating collectors – Focusing type – Advantages and disadvantages of concentrating collectors over flat plate collectors. Solar energy storage – Solar energy storage systems – Solar pond.

UNIT- III - APPLICATIONS OF SOLAR ENERGY

Introduction – Solar water heating – Space heating – Passive and active heating systems – Solar thermal electric conversion – Solar electric power generation – Solar photo voltaic – Solar cell principle – Basic Photo voltaic system for power generation – Solar cell connecting arrangements – Battery storage – Applications of photo voltaic systems – Advantages and disadvantages of photo voltaic conversion – Agriculture and industrial process

heat – Solar distillation – Solar pumping – Solar furnace – Solar cooking – Design principles and constructional details of box type solar cooker – Solar green house – Advantages of solar green house.

UNIT – IV- ENERGY FROM BIOMASS

Introduction – Biomass conversion Technologies – Wet processes – Dry processes – Biomass generation – Classification of Biogas Plants – Types of Biogas plants.

ENERGY FROM OCEAN

Introduction – Ocean Thermal Electric conversion – Methods of ocean thermal electric power generation – Energy from Tides.

UNIT- V- THERMO NUCLEAR FUSION ENERGY

Introduction – The Basic Nuclear Fusion and Reactions – Requirement for Nuclear Fusion – Plasma Confinement – Magnetic Confinement fusion – Methods of plasma heating.

BOOKS FOR STUDY

1. G.D. Rai – Non- Conventional Sources of Energy, (IV Edn) Unit-I: ch: 1& 2, Unit-II: ch: 3 & 4, Unit-III: ch: 5, Unit-IV: ch: 7 & 9, Unit-V: ch: 15.

BOOKS FOR REFERENCE

1. G.D. Rai – Solar Energy Utilization
2. Sukatme – Solar Energy
3. H.C. Jain – Non-Conventional Sources of Energy
4. M.P. Agarwal – Solar Energy
5. Janet Ramage – Energy A guide book.

<p style="text-align: center;">SEMESTER – V - ELECTIVE COMMUNICATION ELECTRONICS</p>
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PREAMBLE

The recent developments in the scientific and technological fields are based on electronic principles. The paper provides the basic concepts of electronic communications.

UNIT- I – MODULATION

Introduction – Modulation – Methods of modulation – Amplitude modulation – Percentage modulation – Upper and lower frequencies - Upper and lower side bands – Forms of amplitude modulation – Generation of SSB – Methods of amplitude modulation – AM modulating circuits – Frequency modulation (qualitative), digital modulation(qualitative).

UNIT- II – DEMODULATION

Introduction – Essentials of AM detection – Diode detector for AM signals – Transistor detectors for AM signals – FM detection – Quadrature detector – Frequency conversion – Super heterodyne AM receiver – FM receiver – Comparison between AM and FM – The four fields of FM.

UNIT- III –RADIO RECEIVERS

Introduction – Super heterodyne receivers – Choice of intermediate and oscillator frequencies – Image rejection – Adjacent channel selectivity – Spurious responses – Tracking – Automatic gain control – Double conversion receivers.

UNIT- IV – ANTENNAS, TV TRANSMISSION & RECEPTION

Types of antennas – Dipole antenna – Yagi antenna – Parabolic reflection – Introduction to transmission lines – Characteristic impedance – Principles of transmission & reception of colour TV signals.

UNIT - V – DIGITAL COMMUNICATION

Communication – starting along the high way – the practical uses of communications connectivity – telephone related communication services –

video/voice communication, video conferencing and picture phones – on line information services – the internet – shared resources work group computing – electronic data interchange and intranets – telecommunicating the virtual offices – using a micro computer to communicate analog and digital signals – modems, ISDN levels and cables – modems communications channels – communications data transmission.

BOOKS FOR STUDY

UNIT I & II

Basic Electronics (Solid state) by B.L.THERAJA (IIIrd Edition 1988)

UNIT III, IV & V

- Electronic communication by (IIIrd edition DENNIS RODDY and JOHN COOLEN.
- Basic electronics and applied electronics by A.UBALD RAJ & G.JOSE ROBIN.

BOOKS FOR REFERENCE

- Principles of electronics – V.K.METHA
- Electronic communication system by KENEDDY & DAVIS.

<p style="text-align: center;">SEMESTER - VI</p> <p style="text-align: center;">PAPER – IX- SOLID STATE PHYSICS</p>

PREAMBLE

To study crystalline state, lattice vibrations, free electron theory of metals. To know about the fundamental concepts of magnetic materials and super conductivity.

UNIT- I – CRYSTAL STRUCTURE

Introduction – Basic concept of crystallography – Symmetry elements – Bravais lattice - Crystal planes and Miller indices –Crystal Structure – Basic definition of Crystal structures – Simple cubic (sc) Structure – Body Centered Cubic (BCC) Structure – Face Centered Cubic (FCC) Structure – Hexagonal Closed Packed (HCP) Structure – Important Crystal Structures.

UNIT- II - DIFFRACTION OF X – RAYS BY CRYSTALS

Introduction – Bragg's law – Bragg's law and crystal structure – Experimental methods in X – ray diffraction – the Laue methods of X- ray diffraction – reciprocal lattice – interpretation of Bragg's law – Van Laue equations – the rotating crystal method – the powder method (Debye – Scherrer method).

UNIT-III - SPECIFIC HEAT CAPACITY OF SOLIDS

Lattice vibrations – vibration of monoatomic one dimensional lattice – vibrations of diatomic one dimensional lattice – phonons – basic definitions – Dulong and Petit's law – classic theory of specific heat capacity – Einstein's theory of specific heat – Debye's theory of specific heat.

UNIT- IV – MAGNETIC MATERIALS

Introduction – Basic definitions – classification of magnetic materials–diamagnetic materials - classical theory of diamagnetism(Langevein theory) – paramagnetic materials – Langevein theory of para magnetism –

Weiss theory of paramagnetism - ferromagnetic materials – Weiss theory of ferromagnetism – domain theory of ferromagnetism – distinction between magnetic materials.

UNIT – V - SUPERCONDUCTIVITY

Introduction – properties of superconductors - Critical temperature - Critical field – isotopic effect – Meissner effect – Entropy – specific heat types of superconductors - Type-I superconductors – soft superconductors - Type-II superconductors – hard superconductors - intermediate or vortex state - BCS theory of superconductors – electron lattice – electron interaction – Cooper pair – existence of energy gap - London equations – first London equations – second London equations – penetration depth – Josephson's effect -DC Josephson's effect – AC Josephson's effect – application of Josephson's effect
Superconducting materials – applications of superconductors

BOOK FOR STUDY:

1. Solid state Physics – Dr.K.Ilangovan
2. Solid state Physics - S.O.Pillai
3. Solid state Physics - Saxena Gupta Saxena

BOOKS FOR REFERENCE:

1. Solid state Physics - C.M. Kachhava
2. Solid state Physics - C.Kittel

<p style="text-align: center;">SEMESTER - VI PAPER – X-MODERN PHYSICS -II</p>

PREAMBLE

To have an idea about nucleus, particle accelerators and detectors, radioactivity, nuclear reactions and cosmic rays.

UNIT- I - NUCLEUS

Nucleus spin, Magnetic dipole moment - Electric quadrupole moment effect on spectral lines (Hyper line structure).

Nuclear stability - Theories of nuclear composition – Proton – Electron – Hypothesis – Proton-Neutron hypothesis - Nuclear forces - Yukawa's theory - Discovery of π meson models of the nuclear structure - The liquid drop model semi empirical binding energy formula – Shell model evidences - collective model.

UNIT-II - NUCLEAR ENERGY

Nuclear fission – energy released in fission – Explanation on the basis of liquid drop model. Nuclear fusion - Thermonuclear reactors - Proton- proton cycle - Carbon nitrogen cycle - Energy release in controlled thermo nuclear reaction - Introduction to plasma - Magnetic bottle plasma - Design of thermonuclear reactor.

UNIT- III - PARTICLE ACCELERATORS AND DETECTORS

Particle accelerators and detectors – Synchrocyclotron - Betatron - Electron Synchrotron - Proton synchrotron (Betatron).

Ionization chamber - The Wilson cloud chamber - Bubble chamber - Photographic emulsion technique - G.M.counter.

UNIT- IV - RADIO ACTIVITY & NUCLEAR REACTIONS

Alpha rays – Range - Geiger Nuttal law - Experimental determination by Geiger Nuttal experiment – α - Disintegration energy – Theory of α - decay (Qualitative).

Beta- Rays - Beta rays spectra – Origin - Neutrino theory of β - Electron capture - Gamma rays - Determination of wavelength by Dumond method - Origin of Gamma rays - Internal conversion.

Q value - threshold energy - nuclear transmutation by alpha particles, protons, deuterons, neutrons and electrons - Photo disintegration – Cross-Section.

UNIT- V - COSMIC RAYS

Cosmic rays – discovery - origin of cosmic rays - latitude effects – east- west effect - altitude effect – north - south effect - primary & secondary cosmic rays - cosmic rays showers - positron discovery - pair production & annihilation of matter - Van Allen belts.

BOOK FOR STYDY

1. Modern Physics – R.Murugesan
2. Modern Physics - Sehgal, Chopra, Sehgal

BOOKS FOR REFERENCE:

1. Modern Physics - J.B.Rajam

<p style="text-align: center;">SEMESTER – VI- ELECTIVE – FUNDAMENTALS OF MICROPROCESSOR – 8085</p>
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PREAMBLE

Microprocessor technology is an exciting, challenging and growing field. To meet the challenges of this growing technology one has to be conversant with programmable aspect of microprocessor.

UNIT I - MICROCOMPUTER ORGANISATION AND 8085 MICROPROCESSOR

Microcomputer arrangement – Memory, a general discussion – Read Only Memory (ROM) – Random Access Memory (RAM) – Microprocessor as CPU – Input unit – Output unit – System bus and bus structure – Execution of an instruction.

Introduction to Intel processors – Pin functions of 8085 – Architecture of 8085.

UNIT II – INSTRUCTION SET OF 8085 I AND II

Machine language and Assembly language – Programmer's model of 8085 – Data transfer instructions –I – Arithmetic instructions – Logic instructions - Special instructions – Assembly language to Hex code.

Data transfer instructions-II – Branch instructions – Stack and Stack related instructions – I/O and Machine control instructions – 8085 addressing Modes.

UNIT III – ASSEMBLY LANGUAGE PROGRAMS

Addition – Subtraction – Multiplication – Division – Square and Square root – Sorting and Searching – Code Conversion – Debugging a program.

UNIT IV – 8085 INSTRUCTION TIMINGS

Introduction – Memory Read cycle – Memory Write cycle – Wait States – Halt States – Hold State – Timing diagrams for some instructions – Delay Calculations.

UNIT V – 8085 MEMORY INTERFACE & MICROPROCESSOR APPLICATIONS

Memory Interface-basics – Demultiplexing Address / Data bus – Generating control signals.

LED Interface (Flashing LEDs, Hex counter, BCD counter and traffic light control) – Seven segment display interface – Hex keyboard interface.

BOOKS FOR STUDY

Fundamentals of Microprocessor-8085 – V.Vijayendran

BOOKS FOR REFERENCE

Microprocessor – Ramesh S. Gaonkar

Microprocessor Principles and Applications – Ajit Pal

Microprocessor and Its Applications – A.Nagoor Kani

<p style="text-align: center;">SEMESTER – VI – ELECTIVE – III BIOMEDICAL INSTRUMENTATION</p>
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PREAMBLE

There is a tremendous increase in the use of modern medical equipment in the hospitals and research institutes. It is necessary for every student to understand the design and functioning of various medical equipment.

UNIT-I - SAFETY INSTRUMENTATION

Introduction – Radiation safety instrumentation – physiological effects due to 50 Hz current passage – Micro shock and macro shock – Electrical accidents in hospitals – Devices to protect against electrical hazards.

UNIT-II-ADVANCES IN BIOMEDICAL INSTRUMENTATION

Introduction – Computer in medicine – Lasers in medicine – Endoscopes – Cryogenic surgery – Nuclear imaging Techniques – Thermography – ultrasonic imaging systems – Magnetic Resonance imaging (MRI) – imaging processes – MRI instrumentation – positron emission Tomography.

UNIT-III - SPECIALISED MEDICAL EQUIPMENT

Introduction – Blood cell counter – Electron microscope – Radiation detectors – Photometers and colorimeters – Digital thermometer – Audiometers – X-ray tube – X-ray machine – Radiography and fluoroscopy – image intensifiers – Angiography – Applications of X-ray.

UNIT –IV- BIO-POTENTIAL RECORDERS

Characteristics of basic recording system – Electro cardio Graphy (ECG) - Block diagram – E.C.G leads – unipolar and bipolar – ECG recording setup – Electro Encaphalo graph (EEG) – Origin – Block diagram of EGG unit – Electro myograph EMG. Block diagram EMG recorders – Digital thermometer – Computer to myography (CT) principle – Block diagram of CT scanner.

UNIT – V – PHYSIOLOGICAL ASSIST DEVICES

Introduction – pacemakers – methods of stimulation – Different modes of operation – Ventricular synchronous pace makers – pacemaker batteries – Artificial Heart valves – Heart-lung machine – kidney machine.

BOOKS FOR STUDY

1. Biomedical Instrumentation - Dr.M.Arumugam

BOOK FOR REFERENCE

1. Hand book of Biomedical Instrumentation –
R.S. Khandpur 1999 Tata Mecraw - Hill

I B.Sc Physics
SEMESTER I & II
CORE PRACTICAL PAPER-I
(Suggestive – Minimum any sixteen)

PREAMBLE

To give a practical knowledge in the field of properties of matter, mechanics, sound and electricity.

LIST OF EXPERIMENTS

1. Estimation of errors
2. Acceleration due to gravity & Moment of inertia – Compound
3. Rigidity Modulus – Static Torsion
4. Rigidity Modulus of a wire – Torsion Pendulum
5. Young's Modulus – Uniform bending – Pin and Microscope
6. Young's Modulus – Uniform bending – Scale and Telescope
7. Young's Modulus – Non-Uniform bending – Pin and Microscope
8. Young's Modulus – Non-Uniform bending – Scale and Telescope
9. Thermal Conductivity of a bad conductor – Lee's disc method
10. Voltmeter Calibration (Low Range) – Potentiometer
11. Voltmeter Calibration (High Range) – Potentiometer
12. Ammeter Calibration – Potentiometer
13. Resistance & Resistivity – Potentiometer
14. Temperature co-efficient of resistance – Carey – Foster's bridge
15. Laws verification – Sonometer
16. Surface Tension – Capillary rise method
17. Viscosity of a liquid – Capillary flow method
18. Comparison of viscosities – Ostwald Viscometer
19. Conversion of Galvanometer into Ammeter and its calibration
20. η -determination – Sonometer

II – B.Sc. Physics
SEMESTER III & IV
CORE PRACTICAL PAPER – II
(Suggestive – Minimum any sixteen)

PREAMBLE

To give a practical knowledge in the field of optics and magnetism.

LIST OF EXPERIMENTS

1. Sonometer – AC frequency
2. Determination of refractive index of a prism – spectrometer
3. Airwedge – Thickness of wire – Microscope
4. Newton's Rings – Radius of curvature – Microscope
5. Prism – I-d curve, to find n – spectrometer
6. Prism – I-I' curve, to find n – spectrometer
7. Grating – Normal incidence Dispersive power – Spectrometer
8. Resolving power of grating – Spectrometer
9. Field along the axis of the coil – H determination
10. Voltage sensitivity and current sensitivity – B.G
11. Charge sensitivity – B.G
12. Comparison of e.m.f.s – B.G
13. Comparison of capacitances – B.G
14. Comparison of capacitances – Desauty's bridge (A.C)
15. Frequency of the Fork – Melde's String
16. Resolving power of telescope
17. Dispersive power of a prism – Spectrometer
18. Temperature co-efficient of resistance of a coil – Potentiometer
19. Newton's Rings – 'n' of a lens

III-B.Sc Physics
SEMESTER V & VI
CORE PRACTICAL - PAPER III
(Suggestive – Minimum any sixteen)

PREAMBLE

To provide a practical knowledge in the fields of AC circuits, AC bridges and optics.

LIST OF EXPERIMENTS

1. LCR – Series Resonance Circuits
2. LCR – Parallel Resonance Circuits
3. Determination of self inductance L – Maxwell's bridge
4. Determination of self inductance L – Owens's bridge
5. Determination of self inductance L – Anderson's bridge
6. M1/M2 – comparison of Mutual Inductance – B.G
7. Determination of Mutual Inductance – B.G
8. Solar Spectrum – Fraunhofer lines – Spectrometer
9. Cauchy's constants – Spectrometer
10. Hartmann's Interpolation formula – Spectrometer
11. Resolving powers of a prism – Spectrometer
12. Small angled prism – Spectrometer
13. Determination of absolute capacity of a condenser – B.G
14. Boltzmann's constant using transistor
15. E.m.f of thermocouple – Potentiometer
16. Biprism – Determination of wavelength of sodium light – Spectrometer
17. Grating minimum deviation – Spectrometer
18. LR – Circuit

<p style="text-align: center;">III-B.Sc Physics SEMESTER V & VI CORE PRACTICAL - PAPER IV</p>
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PREAMBLE

To give a practical knowledge in the field of electronics.

List of Experiments

1. Zener diode as a voltage regulator
2. Logic gates (AND, OR, NOT) using Discrete components.
3. Transistor characteristics – CE mode.
4. Transistor characteristics – CB mode.
5. Bridge rectifier.
6. Diode characteristics.
7. Single stage amplifier.
8. Zener diode characteristics.
9. Operational amplifier as an adder and a subtractor.
10. Hartley oscillator.
11. Colpitt's oscillator.
12. FET characteristics.
13. Verification of truth table of logic gates using ICs.
14. Demorgan's Theorems – verification.
15. RS-flip-flop, JK-flip-flop and D-Flip-flop using ICs.
16. NAND and NOR gates as universal gates.
17. Design of Half adder and Full adder circuits.
18. XOR & XNOR logic gates using ICs.
19. Design of Half Subtractor and Full subtractor.
20. D/A Converter.
21. IC- Logic gates – Boolean components.
22. Multiplexer and Demultiplexer.

ANCILLARY

PHYSICS

INTER DEPARTMENT COURSE (IDC)

I MATHS/ II CHEMISTRY

PAPER I-MECHANICS, PROPERTIES OF MATTER AND THERMAL PHYSICS

PREAMBLE

This paper gives the basic concepts of Mechanics, Properties of matter and Thermal physics.

UNIT – I – ROTATIONAL MOTION AND GRAVITATION

Angular velocity - Normal acceleration (no derivation) – Centrifugal and centripetal force – Torque and angular acceleration – Work and Power in rotational motion. – Angular momentum – K.E of rotation – Moment of inertia – Laws of parallel and perpendicular axes theorems – Moment of inertia of circular ring, circular disc.

Compound Pendulum expression for period – Experiment to find ‘g’- variation of ‘g’ with attitude and depth – Artificial satellites.

UNIT – II – ELASTICITY

Elastic Moduli – Poisson’s ratio – Beams – Expression for bending moment – Determination of Young’s modulus by uniform and non uniform bending section girders, Torsion – Expression for couple per unit twist – Work done in twisting – Torsion pendulum – Determination of rigidity modulus of the material of a wire.

UNIT-III-VISCOSITY & SURFACE TENSION

Derivation of Poiseuille’s formula (analytical method) – Bernoulli’s theorem - Proof – Applications - Pitot tube -Venturimeter.

Surface tension –Surface tension of water, Jaeger’s method.

UNIT – IV- ISOTHERMAL AND ADIABATIC CHANGES

Derivation of equation for both C_p and C_v of a gas – relation between them – Experimental determination of C_p by Joly's method – determination of C_p by Regnault's method.

UNIT – IV – CONDUCTION, CONVECTION

Lee's disc method for conductivity of a bad conductor – Analogy between heat flow and electric current – Wiedmann – Franz law.

Convection in atmosphere – Laps rate – Stability of atmosphere – Greenhouse effect – Atmosphere pollution.

Stefan's law- Determination of Stefan's constant by filament heating method – Solar constant – Measurement – Water flow pyrhelimeter – Temperature of the sun - Solar spectrum – Energy distribution in black body spectrum – Plank's law (no derivation) – Derivation of Wien's and Rayleigh Jeans laws from Plank's law.

BOOKS FOR STUDY

- Ancillary Physics (Mechanics & Properties of matter) – M.Palaniappan
- Ancillary Physics (Thermal Physics) – M.Palaniappan

BOOKS FOR REFERENCE

- Ancillary Physics (Mechanics & Properties of matter) – Venkatachalam
- Ancillary Physics (Thermal Physics) - N.Venkatachalam
- Ancillary Physics (Mechanics & Properties of matter) – R.Murugesan
- Ancillary Physics (Thermal Physics) - R.Murugesan

<p style="text-align: center;">INTER DEPARTMENT COURSE (IDC) I MATHS/ II CHEMISTRY PAPER II – ELECTRICITY, ELECTRONICS AND OPTICS</p>
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PREAMBLE

To give a clear knowledge in the fields of electricity, electronics and optics.

UNIT – I - ELECTROSTATICS

Gauss law (No proof) – Applications – Field due to a charged sphere and an infinite plane sheet – Field near a charged conducting cylinder – Coulomb's Theorem – Electric potential – relation between potential and field – capacitors – Expression for 'C' of parallel plate, spherical (outer sphere earthed) and cylindrical capacitors – Energy of charged capacitors – Loss of energy due to sharing of charges.

UNIT – II - CURRENT ELECTRICITY AND LOGIC CIRCUITS

Application of Wheat stone's network in Carey Foster's bridge – Measurement of resistance and Temperature Coefficient of resistance.

Boolean algebra – De Morgan's theorem – Basic gates OR, AND and NOT gates – Inverters NOR and NAND gates - NOR and NAND gates as universal building blocks – XOR gate.

UNIT – III – ELECTRONIC DEVICES

Junction diode characteristics – Zener diode characteristics – bridge rectifier with π filters – transistor characteristics in CE mode – single stage amplifier – feed back principle - oscillators – Hartley oscillator (Principle and circuit only).

UNIT – IV –INTERFERENCE & DIFFRACTION

Interference in thin films – Air wedge – Newton’s rings (reflected beam only) – Determination of Jamin’s interferometer – Principle and uses.

Theory of plane transmission grating (normal incidence only) – Experiment to determine wavelength.

UNIT – V – POLARISATION

Introduction – Brewster’s - Double refraction – Nicol prism – construction, action and uses – QWP and HWP – Optical activity (no theory) – Biot’s laws – Specific rotatory power.

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BOOKS FOR STUDY

1. Ancillary Physics (Electricity and Electronics) – M.Palaniappan
2. Ancillary Physics (Optics and Modern Physics) – M.Palaniappan

BOOKS FOR REFERENCE

1. Ancillary Physics (Electricity and Electronics) – N.Venkatachalam
2. Ancillary Physics (Electricity and Electronics) – R.Murugesan
3. Ancillary Physics (Optics and Modern Physics) – R.Murugesan
4. Ancillary Physics (Optics and Modern Physics) – N.Venkatachalam

II – B.Sc CHEMISTRY/ I – B.Sc MATHS ANCILLARY PHYSICS PRACTICALS

PREAMBLE

To give a practical knowledge in the fields of properties of matter, electricity, electronics and optics.

LIST OF EXPERMENTS

1. Uniform bending – Pin and Microscope
2. Non uniform bending – Scale and telescope
3. Torsion pendulum
4. Compound pendulum
5. Estimation of errors
6. Carey Foster's Bridge – Resistance and Resistivity
7. Potentiometer – Calibration of low range voltmeter
8. Diode characteristics
9. Surface tension – Capillary rise method
10. Carey Foster's Bridge – Temperature coefficient of resistance
11. Non - uniform Bending – pin and microscope
12. Non - uniform Bending – scale and telescope
13. AND, OR, NOT logic gates using discrete components
14. Zener diode characteristics
15. Air wedge – thickness of a wire
16. NAND, NOR – logic gates – verification of truth tables

PART -IV

PART -IV

Semester	Sub Code	Course	Title	Duration		Marks		
				T	P	Int	Ext	Total
III	KUED3	Skilled based course	Entrepreneurship development	2		25	75	100
IV	KUIM4	SBC	Instrumentation	2		25	75	100
V	KU5CG	SBC	Computer 'C' programming practical		2	40	60	100
VI	KUGMP6	SBC	Mathematical physics	2		25	75	100
	KUES6		Environmental science	2		25	75	100
III	KUPN1	Non Major Elective- I	Solar energy utilization- I & II	2		25	75	100
VI	KUPN2	Non Major Elective II	Instrumentation	2		25	75	100

IV Semester

INSTRUMENTATION – Skill Based Course

ELECTRICAL APPLIANCES

Objectives: To enable the students to apply the principles of Physics in electrical appliances

UNIT I

1. ELECTRICAL FANS
2. WASHING MACHINE
3. OHP AND TAPE RECORDER GENERAL PRINCIPLES AND WORKING

UNIT II

1. REFRIGERATORS
2. AIR CONDITIONER – GENERAL PRINCIPLES AND WORKING

UNIT III

1. INTRODUCTION – WIRING MATERIALS AND ACCESSORIES – TYPES OF WIRING – BASIC PRINCIPLES OF EARTHING – TYPES OF EARTHING

BOOKS FOR STUDY

1. INSTRUMENTATION – **K.ARUMUGAM**
2. ELECTRICITY AND MAGNETISM – **R.MURUGESAN**

III-B.Sc Physics
SEMESTER V- SKILLED BASED COURSE
COMPUTER PROGRAMMING 'C' PRACTICALS

LIST OF EXPERIMENTS

1. Arranging data in ascending / descending order.
2. Finding area of a triangle.
3. Finding standard deviation of a collection of data.
4. Fahrenheit to Celsius conversion.
5. Upper and lowercase conversion.
6. Sum of the digits.
7. Sum of the given series.
8. Reversing the numbers.
9. Reversing the string.
10. Compound interest calculation.
11. Simple interest calculation using function.
- 12. Factorial of a number.**

III B.Sc., physics

Semester VI

Skilled Based Course: Mathematical Methods in Physics.

Objectives: To enable the students

- ◆ To learn the various mathematical techniques
- ◆ To apply these techniques to physical problems
- ◆ To appreciate the close connection of mathematics with physics

And

- ◆ To prepare themselves for pursuing study in physics.

UNIT – I – VECTORS

Introduction – Representation of vectors – Kinds of vectors – Addition of vectors – Subtraction of vectors – Multiplication of a vector by a scalar – Vector space or linear space – Conditions for a physical quantity to be represent able by a vector – Resolution of vectors – Linear combination of vectors – Product of four vectors – Reciprocal system of vectors – Vector equations – Simple applications of vectors to mechanics – Differentiation of vectors – Some rules for differentiation – Partial differentiation of vectors – Rules for partial differentiation of vectors – The scalar and vector fields – Directional derivatives – Level surfaces – The gradient of a scalar field – The gradient of sun of two scalar Point function – The gradient of product of two scalar point functions – The divergence of a vector – Point function – The divergence of sum of two vector functions – The divergence of product – The curl or rotation of a vector point function – Curl of the sum of two vector – Point functions – Curl of the product of two vector – Point function – To express gradient of scalar product in terms of curl – To express divergence of vector product in terms of curl.

UNIT – MATRICES

Definitions and notations – Equality of matrices – Addition of matrices – Properties of matrix – Addition – Multiplication of matrices - Properties of matrix – Multiplication – Partitioning of matrices – Product of matrices by partitioning – Special matrices with their properties – Rank of a matrix – Some theorems on rank – Solutions of liner equations – Cramer’s rule – Characteristic matrix and characteristics equation of a matrix.

BOOK FOR STUDY

Mathematical Physics – B.D.GUPTA

SEMESTER III
NON-MAJOR ELECTIVE -I
SOLAR ENERGY AND ITS UTILISATION

PREAMBLE

To make the students to know about the energy and their sources.

UNIT-I

An Introduction to Energy Sources – Energy sources and their availability – prospects of Renewable energy sources – Structure of the Sun.

UNIT-II

Solar cells – Need for solar cells –Production and working of solar cells –Efficiency of solar cells – characteristics – Cds/CdTe solar cell – Cell construction – A basic Photovoltaic system for power generation – Applications of Solar photovoltaic system.

UNIT-III

Applications of solar energy – Solar water heating – Space heating – Space cooling – Agricultural and industrial process –Solar distillation –Solar pumping.

UNIT-IV

Introduction – Advantages of green houses – Types of Green houses – Solar furnace – Solar cooker.

BOOKS FOR STUDY:

1.Solar Energy utilization: G.D.Rai.

<p style="text-align: center;">SEMESTER VI NON-MAJOR ELECTIVE - II INSTRUMENTATION</p>

ELECTRICAL APPLIANCES

UNIT I

1. ELECTRICAL FANS
2. WASHING MACHINE
3. OHP AND TAPE RECORDER GENERAL PRINCIPLES AND WORKING

UNIT II

1. REFRIGERATORS
2. AIR CONDITIONER – GENERAL PRINCIPLES AND WORKING

UNIT III

1. INTRODUCTION – WIRING MATERIALS AND ACCESSORIES – TYPES OF WIRING – BASIC PRINCIPLES OF EARTHING

BOOKS FOR STUDY

1. INSTRUMENTATION – **K.ARUMUGAM**
2. ELECTRICITY AND MAGNETISM – **R.MURUGESAN**