



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

2016-2019

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

PREAMBLE

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

UNIT-I CONSERVATION LAWS

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

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 and 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 g with altitude and 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 fatigue and Elastic moduli - Poisson's ratio-Poisson's ratio for Rubber - work done in deforming a body - Relation between Elastic constants (Y , G , K and γ)- limiting value of γ – Torsion - Twisting of a cylinder-Torsion Pendulum-Bending of beams-Bending moment-Basic assumptions for theory of Bending-Cantilever-Uniform & Non uniform bending (microscopes)- I Section girders-Determination of Y by bending-Determination of elastic constants by Searle's method.

UNIT-IV-VISCOSITY

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

UNIT-V- SURFACE TENSION

Introduction-surface tension-explanation of surface tension-pressure difference across a spherical surface-examples 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.

BOOK FOR STUDY:

Properties of Matter by Brijlal and Subramaniam - 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

<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 and magnetism.

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 - 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.

UNIT-IV- ELECTROMAGNETIC INDUCTION

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.

UNIT-V-MAGNETISM

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.

BOOK FOR STUDY

Electricity and Electromagnetism – R.Murugesan

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 Equi-partition 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 Gases:** Air, Nitrogen & Helium – Liquid 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 pyrliometer - Solar spectrum.

UNIT-IV-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 Adiabatic 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.

II B.Sc Physics SEMESTER III

PAPER – IV – OPTICS

PREAMBLE

This paper gives a sound knowledge about Physical optics

UNIT – I –LENSES AND ABBRATIONS:

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

UNIT- II - EYEPIECES, DISPERSION AND RAINBOWS

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

UNIT – III –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: Determination of wavelength of monochromatic light and determination of difference in wavelengths of two spectral lines

UNIT – IV – 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 and Rayleigh's criterion for resolving power of a grating.

UNIT – V– 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 Polari meter.

BOOK FOR STUDY:

1. Optics – Brijlal and Subramaniam

BOOK FOR REFERENCE:

1. Optics – S.P. Singh and J.P. Agarwal
2. Optics– Sathya prakash
3. Optics & Spectroscopy – R. Murugesan

<p style="text-align: center;">SEMESTER – IV</p> <p style="text-align: center;">CORE PAPER V - BASIC 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 electronics.

UNIT – I – NETWORK ANALYSIS

Super position theorem - 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 - BAND STRUCTURE OF SEMI CONDUCTOR & REGULATED POWER SUPPLIES

Band structure – carrier energy distribution – carrier concentration in an intrinsic crystal. Donor and acceptor impurities - Fermi level – continuity equation – theory of tunnel diode – Avalanche and Zener breakdown – Zener diode.

Zener voltage regulator, series and shunt voltage regulators – Three Terminal regulated power supplies – Choke input filter – Capacitance input filter – RL and LC filters – voltage multipliers – clipping and clamping circuits.

UNIT – III – TRANSISTORS

Transistors – biasing the transistor for active region – Transistor action- relation connecting α and β of a transistor – three modes of transistor connection - transistor characteristics in CE, CB and CC modes – load line – Quiescent point – Fixed bias – universal divider bias – emitter feedback bias. Field Effect Transistors (FET) – Junction Field Effect Transistors (JFET) – P

channel and N channel JFET - Characteristics of an N channel JFET – applications of JFET –metal oxide semiconductor FET (MOSFET) – types – characteristics – applications – Uni junction transistor (UJT) and its characteristics.

UNIT – IV - AMPLIFIERS

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.

UNIT –V - OSCILLATORS & MULTIVIBRATORS

Feedback – types of feedback – advantage of negative feedback – Barkhausen criterion – Hartley, Colpitt and Phase shift oscillators – multivibrators using transistors - relaxation oscillators using UJT.

BOOKS FOR STUDY:

1. Elements of solid-state electronics – Ambrose and Devaraj[Unit I,II, IV&,V]
2. Electronics – G.Jose Robin & Ubald Raj[Unit I,II, III,IV&V]
3. Electronics I – M.Palaniappan.[Unit V]

BOOKS FOR REFERENCE

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

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

To have a brief discussion on atom models, photoelectric effect and X-rays and 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 Magneton - Stern and Gerlach experiment-Fine structure of Sodium D lines-Zeeman effect: Normal and Anomalous-Experimental set up-Quantum theory of normal Zeeman effect-Paschen-Back effect -Stark effect.

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.

BOOKS FOR STYDY

1. Modern Physics – R.Murugesan.

BOOKS FOR REFERENCE

1. Modern Physics - J.B.Rajam
2. Modern Physics - Sehgal, Chopra, Sehgal

<p style="text-align: center;">III B.Sc Physics SEMESTER – V CORE PAPER – VII - ADVANCED MECHANICS</p>
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PREAMBLE

The classical, quantum, statistical and wave mechanics deal with problems ranging from structure of atom to that of stellar system.

UNIT – I – CLASSICAL MECHANICS-LAGRANGIAN

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- Simple Harmonic Oscillator.

UNIT – II – CLASSICAL MECHANICS-HAMILTONIAN

Hamiltonian- Hamiltonian equation with derivation-Physical significance of Hamiltonian function- General features of motion under inverse square law- Kepler's problem

Application of Hamiltonian equations of motion- simple pendulum – compound pendulum-Linear Harmonic Oscillator –motion of a particle in a central field

UNIT – III – 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 – 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

SEMESTER V – CORE PAPER - VIII

DIGITAL ELECTRONICS

PREAMBLE

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

UNIT – I – 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 USING ICs

The RS Flip Flop - clocked RS Flip Flop, JK Flip Flop. The Schmitt trigger (using 555Timer) - Monostable multivibrator and Astable multivibrator using IC 555- working (No derivations) and uses - Duty cycle.

UNIT – IV – COUNTERS AND REGISTERS

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

UNIT – V - OPERATIONAL AMPLIFIER

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

BOOKS FOR STUDY:

1. Digital Electronics – A. Ubal Raj & G.Jose Robin[Units- I, II & V]
2. Digital Principles and computer design – Malvino and Leach [Units III & IV]

BOOKS FOR REFERENCE:

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

<p style="text-align: center;">SEMESTER V CORE ELECTIVE - I 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

BOOK FOR REFERENCE

1. Programming in C – E. Balagurusamy
2. Computer programming in C – Jayasree.

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

PREAMBLE

As India like developing countries are having increasing demands for energy. To make the students to know about the energy and their sources, this paper deals with the study of different non-conventional energy 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. H.C. Jain – Non-Conventional Sources of Energy
3. M.P. Agarwal – Solar Energy

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

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 - INFORMATION TECHNOLOGY

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.

Internet concepts – World Wide Web – advantages of Internet software – browsers HTTL and HTML.

BOOKS FOR STUDY

UNIT I & II

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

UNIT III & IV

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

PREAMBLE

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

UNIT- I - CRYSTAL STRUCTURE

Introduction – Basic concepts of crystallography - Symmetry elements – Bravais lattice – Crystal planes and Miller indices – Reciprocal lattice– Classification of crystal systems- Basic definitions of crystal structure – Simple cubic (SC) structure – Body centered cubic (BCC) structure - Face centered cubic (FCC) structure – Hexagonal close packed (HCP) structure – Determination of crystal structure: The Laue method of X – ray diffraction - The rotating crystal method – The powder method (Debye – Scherrer method).

UNIT-II- DEFECTS IN SOLIDS

Crystal Imperfections-point defects:Schottky Defect, Frankel defect, impurity defects and Electronic defects-Line defects: edge dislocation-Surface defects:Grain Boundaries, Tilt boundaries, Twin boundaries and Stacking faults-Volume defects: effects of crystal imperfections

UNIT-III – SPECIFIC HEAT CAPACITY OF SOLIDS

Lattice vibrations – Vibrations of monoatomic one dimensional lattice – Vibrations of diatomic one dimensional lattice – Phonons – Basic definitions – Dulong and Petit’s law – Classical 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 (Langevin theory) - Paramagnetic materials - Langevin theory of Paramagnetism – 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 - Isotope 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 order London equation – Second order London equation – penetration depth – Josepson Effect – DC Josepson effect - AC Josepson effect – Superconducting materials – Applications of superconductors.

BOOK FOR STUDY:

1. Solid state Physics – Dr.K.Illangovan[Unit I, II & III]
2. Solid state Physics - S.O.Pillai[Unit IV& V]

BOOKS FOR REFERENCE:

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

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

A brief discussion on nucleus, radioactivity, cosmic rays and elementary particles.

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 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 (Bevatron).

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 decay - 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 AND ELEMENTARY PARTICLES

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.

Classification of Elementary particles - properties of Elementary particles-Antiparticles – Anti-matter – Fundamentals of Interaction- Quantam Numers- Conservation laws & symmetries – Quark Model.

BOOKS FOR STYDY

1. Modern Physics – R.Murugesan[Unit I,II,II,IV &V]
2. Nuclear Physics – M.Palaniappan [Unit V]

BOOKS FOR REFERENCE:

1. Modern Physics - J.B.Rajam
2. Modern Physics - Sehgal, Chopra, Sehgal

<p style="text-align: center;">SEMESTER – VI - CORE ELECTIVE – III 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

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.

UNIT III – INSTRUCTION SET OF 8085 - II

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

UNIT IV – ASSEMBLY LANGUAGE PROGRAMS

Addition, Subtraction, Multiplication and Division (for 8-bits and BCD only)– Square and Square root – Sorting and Searching – Debugging a program.

UNIT V – ASSEMBLY LANGUAGE PROGRAMS- CASE STUDIES

Assembly Language Programmes - N- Factorial, largest among two numbers, generating the Fibonacci (binary), Ascending and descending order and Code Conversion.

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

<p style="text-align: center;">I B.Sc Physics SEMESTER I & II CORE PRACTICAL PAPER-I (Suggestive – Minimum any Twelve Experiments)</p>

LIST OF EXPERIMENTS

1. Estimation of errors
2. Acceleration due to gravity & Moment of inertia – Compound Pendulum
3. Rigidity Modulus – Static Torsion apparatus
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. Resistance & Resistivity – 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. Frequency of a Fork – Sonometer

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

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.fs – 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
20. Half shade Polarimeter

<p style="text-align: center;">III-B.Sc Physics SEMESTER – V & VI CORE PRACTICAL - PAPER III (Suggestive – Minimum any Sixteen)</p>
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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 spectral lines of sodium light – Spectrometer
17. Determination of wavelength of spectral lines of mercury – Grating minimum deviation - Spectrometer
18. Impedance and power factor - LR – Circuit

<p style="text-align: center;">III-B.Sc Physics SEMESTER –V & VI CORE PRACTICAL - PAPER IV (Suggestive – Minimum any Sixteen)</p>
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List of Experiments

1. Zener diode as a voltage regulator
2. Logic gates
3. using Discrete components.
4. Transistor characteristics – CE mode.
5. Bridge rectifier.
6. Junction Diode characteristics[Forward bias] and Zener diode characteristics[Reverse bias]
7. Voltage multiplier using Diodes.
8. Single stage amplifier.
9. Astable Multivibrator using IC 555 Timer
10. Operational amplifier as an adder and a subtractor.
11. Hartley oscillator.
12. Colpitt's oscillator.
13. Construction of Dual power supply using IC 7805 & IC 7905.
14. Integrating & differentiating circuits using discrete components.
15. FET characteristics.
16. Verification of truth tables of logic gates using ICs
17. NAND and NOR as Universal gates
18. XOR and XNOR using IC's
19. Multiplexer and De-Multiplexer
20. Verification of De-Morgan's theorems
21. Verification of truth tables of Half and Full adders
22. Verification of truth tables of Half and Full subtractors
23. DA Converter

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- 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.

UNIT – V – RADIATION

Stefan's law- Determination of Stefan's constant by filament heating method – Solar constant – Measurement – Water flow pyrhelometer – 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

INTER DEPARTMENT COURSE (IDC)
I MATHS/ II CHEMISTRY
PAPER II – 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-GEOMETRICAL OPTICS

Lenses- Refraction through lenses- Aberration – Chromatic aberration- Spherical aberration- minimization of aberration- Coma- Astigmatism.

UNIT –V-PHYSICAL OPTICS

Interference in thin films – Air wedge – Newton’s rings (reflected beam only)- Theory of plane transmission grating (normal incidence only) – Experiment to determine wavelength- Brewster’s law
- Double refraction – Nicol prism – construction, action and uses

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

<p style="text-align: center;">II – B.Sc CHEMISTRY / I – B.Sc MATHS ANCILLARY PHYSICS PRATICALS –Suggestive - Minimum any Twelve Experiments</p>

LIST OF EXPERMENTS

1. Uniform bending – Pin and Microscope
2. 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. Potentiometer – Calibration of Ammeter
10. Air wedge – thickness of a wire
11. Non - uniform Bending – pin and microscope
12. Non - uniform Bending – scale and telescope
13. Newton’s Rings.
14. Zener diode characteristics
15. AND, NOT, NAND logic gates using discrete components
16. OR, NOT, NOR logic gates using discrete components
17. XOR & XNOR gates
18. Bridge Rectifier
19. IC – Logic gates
20. Demorgen’s laws Verification using IC logic gates.

PART –IV

Sem	Sub Code	Course	Title	Duration		Marks			Credit
				T	P	Int	Ext	Total	
I		VBE	Yoga & Meditation (Practical)		1				
I		SBC	Acoustics	2		25	75	100	2
II		SBC	Computer Fundamentals & MS Office	2		25	75	100	2
II		VBE	Yoga & Meditation (Theory)	1		25	75	100	2
III		SBC-EDP	Entrepreneurship Development	2		25	75	100	2
III		NME - I	Astrophysics	2		25	75	100	2
IV		SBC	Lasers, Fibre Optics & Spectroscopy	2		25	75	100	2
V		SBC	Computer 'C' programming - Practicals		2	40	60	100	2
VI		SBC	Project		2	25	75	100	2
VI		NME - II	Types of Energy & Their utilization	2		25	75	100	2
VI		EVS	Environmental Studies	2		25	75	100	2

Part - V

IV			Extension Activities	-	-	-	-	-	1
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SEMESTER – I –SBC PAPER - ACOUSTICS

UNIT-I - SOUND

Classification of sound- characteristics of musical sound- Loudness-Weber Fech

ner law- Longitudinal and Transverse waves – Relation between wavelength, frequency and wave velocity – characteristics of progressive waves – Intensity of sound – Phase velocity and group velocity – Beats (definition only).

UNIT-II - THEORY OF TRANSVERSE VIBRATIONS

Theory of Transverse vibrations along a stretched string - Verification of I, II, and III laws using sonometer – Electrically maintained turning fork (Melde's string experiment).

UNIT-III - SIMPLE HARMONIC MOTION

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

UNIT-IV - ULTRASONICS

Ultrasonics – Properties- Production - Magnetostriction method - Piezoelectric method - Methods of Detection - Applications.

UNIT-V- ACOUSTICS OF BUILDINGS

Reverberation- Reverberation time-Sabine's formula(definition only)-Absorption coefficient and its determination- Factors affecting acoustics of buildings and their remedies

BOOK FOR STUDY:

- Properties of matter and Acoustics - R.Murugesan
- Waves, Vibrations and Sound – C.L.Arora
- A Text Book of Waves and Oscillations – Ashok K. Ganguli
- Waves and Oscillations - S.R.Shankara Narayana

BOOK FOR REFERENCE:

1. Mechanics, Properties of matter and Sound - R.Murugesan
2. Engineering physics - G. Senthil Kumar

<p style="text-align: center;">SEMESTER – II –SBC Paper COMPUTER FUNDAMENTALS & MS- OFFICE</p>
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UNIT – I: COMPUTER FUNDAMENTALS

Introduction – History of computers – Characteristics of computers – Need for a computer – Computer applications – Concept of computer – Structure of computer (Block Diagram & components) – Classification of computers – Types of computer.

UNIT –II: INPUT & OUTPUT DEVICES

Input devices – Keyboard – Mouse – Bar code Reader – Output devices – Monitor – Printer Impact of non – impact printers – Main memory – Secondary storage devices.

UNIT – III: WINDOWS

Introduction – Elements of window – Various types of icons – Run through on window – Windows basic – Program manager – The file manager – Control panel.

UNIT – IV: MS WORD

Windows Layout – Menus – File – Edit – View – Insert tools – Tables –Windows – Saving & exiting – Spell check – Table creation – Inserting pictures- Mail merge.

UNIT – V: EXCEL

Building a Worksheet – Selecting Worksheet items – Using Autofill – Adding rows and columns – Copying and Moving information – Creating and Copying formulas –Naming ranges s– Using functions – Improving the appearance of worksheet – Changing column Width – Formatting Text and Numbers – Using auto format – Spell Checking – Using Chart Wizard – Creating, Enhancing and Printing a chart.

BOOKS FOR STUDY:

MS Office 2000 for every one – Sanjay Saxena

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

UNIT- I - LASER

Introduction — absorption – Spontaneous emission– stimulated emission – Einstein Coefficients– population inversion – active medium – principal pumping schemes – optical resonant cavity (simple concepts)- – ruby laser – He - Ne laser

UNIT – II – FIBRE OPTICS

Introduction – Optical fiber – features of optical fibers – principle of light ray propagation through optical fiber – propagation of light in optical fibers –Acceptance and numerical aperture-coherent bundle - fiber optics communication system –advantages - applications.

UNIT – III – IR SPECTROSCOPY

Types of spectra - absorption and emission spectra – IR spectra sources – detectors –Wadsworth prism – mirror spectrograph - application.

UNIT – IV- UV SPECTROSCOPY

Sources – detectors – quartz spectrograph – applications

UNIT – V- RAMAN SPECTROSCOPY

Raman effect – experimental study of Raman effect - quantum theory of Raman effect - applications of Raman effect.

BOOK FOR STUDY

- Optics and spectroscopy – R.Murugesan and Kiruthiga Sivaprasath
- Engineering physics - G. Senthil Kumar

<p style="text-align: center;">SEMESTER V- SBC COMPUTER PROGRAMMING 'C' PRACTICALS</p>
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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. $\text{Sum} = x + x^2 + x^3 + \dots + x^{15}$.
8. Reversing the numbers.
9. Reversing the string.
10. Compound interest calculation.
11. Simple interest calculation using function.
12. Factorial of a number.

<p style="text-align: center;">SEMESTER III - NME-I ASTROPHYSICS</p>
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PREAMBLE

To make the students know about fundamentals of telescopes, solar system, stars and galaxies.

UNIT – I: TELESCOPES

Reflecting and refracting telescopes - telescope mountings - equatorial and azimuth mounting.

UNIT – II: EARTH AND MOON

Earth - diameter, motion, spin, as a clock, interior, surface, atmosphere. Moon - motion, interior, surface, solar and lunar eclipses.

UNIT – III: SOLAR SYSTEMS

Planets orbital periods and distance - Bode's law - Asteroids, comets, meteors and meteorites, satellites, scales and regularities of planets.

UNIT – IV: STARS

Distance by parallax method, motion of stars, intrinsic properties of stars , sun and stars comparison , determination of mass , radius , luminosities and atmospheric temperature of stars - Hertzsprung – Russel diagram , binary stars , stars clusters , pulsating stars , white dwarfs , exotic stars.

UNIT – V: GALAXIES

MILKY WAY GALAXY:

Size of the galaxy, inter stellar medium, radio astronomy and interstellar gas, structure of the Milky Way galaxy - motions, rotations and mass evaluation of Milky Way galaxy, density wave theory of spiral arms.

BOOKS FOR STUDY:

1. Astrophysics :K.S.Krishnaswamy,
New age international Ltd.,publishers(1996).
2. Astronomy :S.Kumaravelu & Susheela Kumaravelu,
Muruga Bhavonam , chidambaranagar,
Nagercoil - 2.
3. Discovering Astronomy:R.D.Chopman,
W.H.Freeman CO., 1978.
4. The Frontier :J.V.Narliker , IIT,
Madras series 1989,
Between Physics & Astronomy.

<p style="text-align: center;">SEMESTER VI - NME-II</p> <p style="text-align: center;">TYPES OF ENERGY & THEIR UTILIZATION</p>
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PREAMBLE

The paper deals with energy sources and their availability.

UNIT-I-INTRODUCTION TO ENERGY

Introduction -work-energy-exchange of energy-power-units for energy.

**UNIT-II-CONVENTIONAL ENERGY SOURCES AND THEIR
AVAILABILITIES**

Introduction-fossil fuels-coal-petroleum-searching petroleum source-refining petroleum-agricultural and organic wastes-magneto hydrodynamic generation.

UNIT-III-NONCONVENTIONAL ENERGY SOURCES -I

Introduction-solar energy-heating of building -cooling of building-solar electric power generation: stream generation-solar photovoltaic cell.

UNIT-IV-NONCONVENTIONAL ENERGY SOURCES -II

Energy from biomass and biogas-wind energy-energy from hydropower-energy from ocean –tidal energy-ocean thermal energy-geothermal energy-storage of energy.

UNIT-V-ENERGY AND ENVIRONMENT

Introduction-disadvantage of fossil fuels –burning of fuels-effect of emission of CO₂ & CO-pollution due to heating effects-effect of radioactive element.

BOOKS FOR STUDY

Non Conventional Energy Sources – G.D.RAI.

B.Sc Physics Degree Course (Semester)
Pattern of question paper for Physics Core, Core Elective and
Ancillary subjects for the Academic Years **2016-19**

SUMMATIVE EXAMINATION

Time: 3hrs

Max.Mark:75

Section – A - 10 x 1 = 10 ----- No Choice
Section – B - 5 x 2 = 10 ----- 5 Out of 8 Questions
Section – C - 5 x 5 = 25 ----- 5 Out of 8 Questions
Section – D - 3 x 10 = 30 ----- 3 Out of 5 Questions

INTERNAL (Theory)

Test : 15marks
Seminar : 5marks
Assignment : 5marks

Total : 25marks

INTERNAL - PATTERN OF QUESTION PAPER

Duration – 1 hour

Total Marks - 15

Section – A - 3 x 1 = 3 ----- No Choice
Section – B - 1 x 2 = 2 ----- 1 Out of 2 Questions
Section – C - 1 x 4 = 4 ----- 1 Out of 2 Questions
Section – D - 1 x 6 = 6 ----- 1 Out of 2 Questions

B.Sc Physics (Semester) Degree Course

B.Sc Physics

Part – IV – SBC & NME

SECTION – A

SUMMATIVE EXAMINATION

Time: 3hrs

Total.Mark:75

Section – A - $5 \times 3 = 15$ ----- 5 Out of 8 Questions
Section – B - $5 \times 6 = 30$ ----- 5 Out of 8 Questions
Section – C - $3 \times 10 = 30$ ----- 3 Out of 5 Questions

INTERNAL - PATTERN OF QUESTION PAPER

Duration – 1 hour

Total Marks - 15

Section – A - $2 \times 2 = 4$ ----- 2 out of 3 Questions
Section – B - $1 \times 4 = 4$ ----- 1 out of 2 Questions
Section – C - $1 \times 7 = 7$ ----- 1 out of 2 Questions