MANONMANIAM SUNDARANAR UNIVERSITY - TIRUNELVELI

DEGREE OF BACHELOR OF SCIENCE DDCE

(Effective from the Academic Year 2014-2015 onwards)

B.Sc. PHYSICS

Components of the B.Sc Physics (Major) Programme:

I Year

1.Tamil I / Any of 7 Indian languages
2.English I
3.Properties of Matter
4.EVS
5.Allied I Basic Electronics

II Year

1.Tamil II
2.English II
3.Electricity and magnetism
4.Mechanics and Accoustics
5.Allied II Energy Physics

III Year

1.Modern Physics
2, Optics and Thermal Physics
3.Digital Electronics
4.Practical Physics I
5.Practical Physics II

I Year

1.Tamil I / Any of 7 Indian languages
2.English I
3.Properties of Matter
4.EVS
5.Allied I Basic Electronics

Properties of Matter

ELASTICITY

UNIT I. Introduction - Modulus of elasticity - Poisson's ratio- Relation between elastic constants and Poisson's ratio - Energy stored - Twisting couple on a wire - Torsional pendulum (with and without weights) – determination of rigidity modulus of a rod by static torsion method.

BENDING OF BEAMS

UNIT II. Expression for Bending moment- Cantilever – expression for depression – Experiment to find youngs' modulus – Cantilever oscillation – expression for period – uniform bending – I form girders.

SURFACE TENSION

UNIT III. Molecular interpretation - surface energy- Pressure difference across a curved surface- Excess pressure in liquid drops and air bubbles - Molecular forces - Variation of surface tension with temperature - Capillary rise and energy consideration - Jaeger's method.

VISCOSITY

UNIT IV. Streamlined motion – turbulent motion – coefficient of viscosity – rate of flow of liquid in a capillary tube - Poiseuilles formula - Stoke's fall- analogy between liquid flow and current flow – equation of continuity of flow of liquid – energy possessed by a flowing liquid.

GRAVITATION

UNIT V. Laws of gravitation, gravitational field and potential, acceleration due to gravity and its variation, escape velocity, Kepler's laws and planetary motion, motion of satellites, Geostationary orbit.

Books for study
1. Properties of Matter - Brijlal & Subramaniam.
2. Properties of Matter - D.S. Mathur
3. Properties of Matter - Murugesan

Books for Reference

1. Physics, Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition.
2. H.R Gulati- fundamental of general properties of matter- R.Chand and co- fifth edition (197

Basic Electronics

Unit I
Diodes:

P-n junction diode – characteristics – Regulation with zener diodes – Bridge rectifier – clipping and clamping circuits with diodes.

Unit II
Transistors and Amplifiers:

Transistors – Transistor action – three modes of connection – biasing – load

line and Q –point – voltage divider bias – stabilization – CE amplifier.

Unit III

Oscillators:

Principles of negative voltage feed back in amplifiers – gain – advantages – principle of negative current feedback – Oscillation – Bark Hausen criterion for oscillation – colpitt's oscillator

Unit IV

Field Effect Transistor:

Principle , features and characteristics of FET – JFET and MOSFET – their characteristics – enhancement and depletion type

Unit V

Operational Amplifier:

Characteristics – slew rate – inverting and non-inverting amplifier – adder – sub tractor – integrator – differentiator

Books for study and reference:

3. Fundamentals of Electronics – B. Ghosh
4. Principles of Electronics - V.K. Mehtha

s for study

4. Properties of Matter - Brijlal & Subramaniam.
5. Properties of Matter - D.S. Mathur
6. Properties of Matter - Murugesan

Books for Reference

5. Physics, Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition.
6. H.R Gulati- fundamental of general properties of matter- R.Chand and co- fifth edition (1977)

II Year

1.Tamil II
2.English II
3.Electricity and magnetism
4.Mechanics and Accoustics
5.Allied II Energy Physics

ELECTRICITY AND MAGNETISM

Unit I : Electrostatics

Coulomb' s law – electric field – electric dipole – electric flux – Gauss' s Law – applications – electric potential – relation connecting electric potential and electric potential at appoint – potential at a point due to a point charge – potential due to an electric dipole – capacity – capacitance of a spherical and cylindrical capacitor – energy of a charged capacitor –

Unit II : Chemical Effects of Electric Current

Faraday's Laws of Electrolysis – electrical conductivity of an electrolyte – specific conductivity – Kohlrausch bridge – Thermoelectricity – Seebeck effect – Peltier effect – Thomson effect – total e.m.f – thermodynamics of thermocouple – thermoelectric power diagram – its uses – applications.

Unit III : Transient Current

Growth and decay of current in a circuit containing resistance and inductance – Growth and decay of charge in a circuit containing resistance and capacitance – Detremination of high resistance by leakage – Growth and decay of charge in a LCR circuit –

Unit IV : Alternating Current

I operator – properties – use of I operator in the study of A.C Circuit with R only – inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit – Wattless current – choke coil – construction and working of AC generator, 2 phase and 3 phase AC generator – distribution of 3 phase AC –

Unit V : Magnetic Properties of Materials

Magnetic induction – Magnetism – Relation between B, H and M – Magnetic susceptibility – Magnetic permeability – Relation between them – Election theory of dia, para and ferromagnetism – Determination of susceptibility – Curie balance method – Moving coil Ballistic galvanometer – construction – theory – correction for damping in B.G – Measurement of Charge sensitiveness – absolute capacity of a condenser.

Books for Study and reference

1. Electricity and Magnetism   -   D.N. Vasudeva
2. Electricity and Magnetism   -   Brijlala and Subramanian
3. Electricity and Magnetism   -   R. Murugeshan
4. Electricity and Magnetism   -   K.K. Tewari

MECHANICS AND ACOUSTICS

Unit 1: Linear velocity,angular velocity, relation between Linear velocity and angular velocity, angular momentum ,torque,relation connecting torque and angular momentum ,Centrifugal and centripetal forces, Kinetic energy of rotation, moment of inertia, centre of mass , expression for reduced mass,moment of inertia of a diatomic molecule,acceleration of a body rolling down an inclined plane.

Unit2: Projectile –Path of a projectile is a parabola- expression for ,the maximum height ,time of flight , range on the horizontal plane and range on an inclined plane - Rocket equation

Unit3: Pressure and thrust, center of pressure, center of pressure on a rectangular and triangular lamina, laws of floatation ,conditions for stability of floating bodies,equation of continuity, Bernoulli's equation, Venturimeter

Unit 4 : simple harmomic motion,composition of two simple harmonic motions along (1)a straight line and (2)at right angles to each other, Lissajous figures and their applications.Acoustics of buildings –reverberation time ,Sabine's formula,conditions of an acoustically good auditorium

Unit5: Transverse vibrations of stretched strings.Expression for the velocity of tranverse waves.A.C frequency measurement using sonometer-Ultrasonics-Piezoelectric method- uses of ultrasonics

Books for study
Mechanics and mathematical methods- R.Murugeshan,S.Chand &Co pvt Ltd ,New Delhi.
Waves and Oscillations –Brijlal Subramaniam, S.Chand &Co **pvt Ltd ,New Delhi.**
Books for Reference
Physics,Robert Resnick ,David Haliday,Jearl Walker Wiley and Sons inc.Sixth edition

Energy Physics

ENERGY SOURCES

UNIT I**.** Conventional Energy Sources – Coal – Oil – Gas – Agriculture And Organic Wastes – Water Power – Nuclear Power – Thermal Power

 UNIT II. Non Conventional Energy Sources – Solar Energy – Wind Energy – Energy From Bio-Mass And Bio-Gas – Ocean Energy – Tidal Energy – Geo Thermal Energy – Advantages Of Renewable Energy

SOLAR ENERGY

 UNIT III. Solar Radiation – Solar Constant – Solar Radiation Measurements – Pyrheliometers – Pyranometers – Estimation Of Average Solar Radiation – Applications Of Solar Energy

WIND ENERGY

UNIT IV. The Nature Of Wind – Power In The Wind – Wind Energy Conversion – Basic Components Of A Wind Energy Conversion System(WECS)- Advantages And Disadvantages Of WECS.

ENERGY FROM BIOMASS

UNIT V. Biomass Conversion Technologies – Wet Process – Dry Process – Photosynthesis – Bio Gas Generation – Bio Gas From Plant Wastes – Methods For Maintaining Biogas Production – Fuel Properties Of Bio Gas

Books for Study

 Non- Conventional Energy Sources - G.D. Rai   - Khanna Publishers

Books for Reference

1. Solar Energies of Thermal Processes, A.Duffie and W.A.Beckmann, John-Wiley,1980.
2. Principle of Solar Engineering, F.Kreith and J.F.Kreider, McGraw-Hill,1978
3. Alternate Energy Sources, T.N. Veziroglu, Vol.5 and 6, McGraw –Hill,1978.
4. Solar Energy -Principles of Thermal Collection and Storage, *S P Sukhatme* and J K Nayak, Tata Mc Graw Hill.Tata, 2008

III Year
1.Modern Physics
2, Optics and Thermal Physics
3.Digital Electronics
4.Practical Physics I
5.Practical Physics II

MODERN PHYSICS

Unit I Crystal Structure:

Lattice Translation Vectors- Basis And The Crystal Structure- Primitive Lattice Cell-

Types Of Lattices- Two Dimensional Lattice Types- Three Dimensional Lattice Types -

Index System For Crystal Planes- Sodium Chloride Structure- Cesium Chloride Str

Unit II Dielectric Properties:

Local Field –   Clausius - Mossotti Relation –   Polarizability - Electronic Polarizability –

Ionic Polarizability –   Orientational Polarizability –   Dielectric Constant –   Frequency

Dependence Of Dielectric Constant - Measurement Of Dielectric Constant –   Ferro

Electricity –   Hysteresis –   Piezoelectricity

Superconductivity:

Unit III

Statistical Mechanics- probability- principle of equal a priori probability -microstate and macro state- thermodynamic probability -constrains on a system -static and dynamic systems -most probable state (equilibrium state) -concept of a cell in a compartment - ensemble and average properties Degrees of freedom -position space -momentum space- phase space- the mu- space and gamma space-

UNIT IV NUCLEAR PHYSICS AND RADIATION PHYSICS: Nuclear Physics: Nuclear constituents, size, mass, spin and charge - binding energy - binding energy curve - nuclear fission - chain reaction – nuclear reactor - Radiation Physics: radioactive disintegration – half-life period - radiation hazards

UNIT V RELATIVITY AND QUANTUM MECHANICS: Relativity: Frames of references - postulates of special theory of relativity - Lorentz transformation equations - Wave mechanics: matter waves - de Broglie wavelength - properties of wave functions - Quantum mechanics: postulates of quantum mechanics -Schrödinger equation - time dependent form

Reference Book:

1.Introduction To Solid State Physics (8th Ed) - Charles Kittel

2.Solid State Physics – R.J. Singh – Pearson Education

3.Thermodynamics and statistical physics Brij Lal N.Subramanium P.S Hemne S.Chand publications

4. Atomic and Nuclear Physics: Brij Lal & Subramaniam, S Chand & Co., 2000

5. Quantum Mechanics :V. Devanathan, Narosa, Chennai, 2005.

OPTICS AND THERAL PHYSICS

Unit 1:Refraction through a thin lens, power of a lens, effective focal length of two thin lenses in and out of contact, chromatic and spherical aberration and their removal, refraction of light through a thin prism, Dispersion of light and dispersive power of a prism

Unit 2:Conditions for interference,Young's experiment- theory -Newton's rings- determination of wavelength of light(theory & expt),airwedge,determination of diameter for thin wire(theory & expt)

Unit 3:Fresnel and Fraunhofer diffraction, theory of plane transmission grating, - wavelength determination,dispersive and resolving power of a grating- Zone plate - theory

Unit 4:Double refraction, nicol prism, quarter wave and half wave plate, production,detection and analysis of plane,circularly and elliptically polarized light-Specific rotation- Laurent's half shade polarimeter

Unit 5. KINETIC THEORY OF GASES: Concept of heat and temperature –ideal and perfect gas – kinetic theory of gases – Expression for a pressure of a gas – interpretation of temperature – Gas laws – Gas equation – Avogadro's hypothesis – Transport of momentum - Transport of energy - Transport of matter – behavior of gases at high pressure – Vander Waals equation of state – critical constants – experimental determination – Porous plug experiment – theory –

Books for study

A Text book of OPTICS – N.Subramaniam, Brijlal revised by M.N. Avadhanulu, S.Chand &Co pvt Ltd ,New Delhi

OPTICS AND SPECROSCOPY - R.Murugeshan,S.Chand &Co pvt Ltd ,New Delhi.

Heat and Thermodynamics – Brijlal and Subramanium – S.Chand and company Ltd.

Books for Reference
Physics,Robert Resnick ,David Haliday,Jearl Walker Wiley and Sons inc.Sixth edition

Digital Electronics

Unit I
Number System:
> Decimal – binary – octal – hexadecimal number system – conversion from one system to another – binary arithmetic – 1's complement – 2's complement – BCD, excess 3, gray , alpha numeric codes.

Unit II
Boolean algebra:
> Boolean operation – rules and laws of Boolean algebra – De Morgan's theorems – implication of expressions using Boolean algebra – Karnaugh map .

Unit III
Basic Logic gates:
> AND, OR, NOT (symbol , truth table , circuit diagram, working) NAND , NOR, EX-OR, EX- NOR (symbol, truth table)

Unit IV
Combinational Circuits:
> Half adder – full adder – half sub tractor – full sub tractor – binary adder – BCD adder – decoder – encoder – multiplexer – de multiplexer.

Unit V
Flip flops:

RS, JK, D, T flip flops – master slave flip flop - IC 555 timer – astable multi vibrator - mono stable multi vibrator.

Books for study and reference :

1. Digital principles & applications – Albert paul Malvino & Leach
2. Digital Logic & Computer Design – Morris Mano.

Practical I

1. Young's modulus – uniforms bending – pin & microscope
2. Compound Pendulum.
3. Viscosity – Stokes method
4. Spectrometer – refractive index of prism
5. Series resonance circuit
6. Zener diode characteristics
7. De sauty's bridge – comparison of capacitances

Practical II

1. Young's modulus – non-uniforms bending – scale & telescope.
2. Potentiometer – calibration of voltmeter.
3. Sono meter - A.C frequency.
4. Newton's law of cooling – verification.
5. Logic gates – AND, OR, NOT
6. Parallel resonance circuit.
7. Bridge rectifier.

Paper I   **Properties of Matter and Oscillations**

Unit I. ELASTICITY: - Modulus of elasticity- Poisson's ratio- Relation between elastic constants and Poisson's ratio-Energy stored- Twisting couple on a cylinder- Torsional pendulum (with and without weights)- Bending of beams- Bending moment- Cantilever loading- -Non-uniform and uniform bending of a beam

Unit II. VISCOSITY AND LOW PRESSURE: - Newton's law- Poiseuilles flow- Stoke's fall- Rotation viscometer- Ostwald viscometer- Meyer's formula for viscosity of gas-Rankine's method- Effect of temperature and pressure on viscosity- Air pump- Rotary oil pump-Mercury diffusion pump-Knudsen Gauge.

Unit III. SURFACE TENSION: - Molecular interpretation- surface energy- Pressure difference across a curved surface- Excess pressure in liquid drops and air bubbles-Molecular forces- Shape

of liquid meniscus in capillary tube-Angle of contact- Capillary rise and energy consideration-Jaeger's method.

OSCILLATIONS

Unit IV. Simple Harmonic Motion: Simple Harmonic Oscillator, Motion of simple and compound pendulum (Bar and Kater's pendulum), loaded spring, Energy in simple harmonic motion. Superposition of two SHM: (i) collinear SHM of same frequency (ii) SHM of same frequency but perpendicular to each other and (iii) Lissajous figures.

Unit V. Damped Harmonic Motion: Equation of motion, Dead beat motion, Critically damped system, Lightly damped system: relaxation time, logarithmic decrement, quality factor. Forced Oscillations: Equation of motion, complete solution, Steady state solution, Resonance, Sharpness of resonance, Quality factor. Wave Motion: One dimensional plane wave; Classical wave equation; Superposition principle; Standing wave on a stretched string (both ends fixed).

Books for study
1. Properties of Matter - Brijlal & Subramaniam.
2. Properties of Matter - D.S. Mathur
3. Properties of Matter - Murugesan
4. Waves & Oscillations - Brijlal & Subramaniam
5. Satya Prakash and Akash Saluja- oscillations and waves- pragati prakashan (2002)

Books for Reference

1. Physics, Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition.
2. Waves and Oscillations, Berkeley Physics Course, Vol. 3. F. S. Crawford, Tata McGraw Hill
3. H.R Gulati- fundamental of general properties of matter- R.Chand and co- fifth edition (1977)
4. N.k Bajaj- The physics of waves and oscillations- Tata McGraw-Hill (1988)

Paper II   OPTICS

UNIT – I   GEOMETRICAL OPTICS: Refraction through a thin lens – power of a lens – Effective focal length of two thin lenses in and out of contact – chromatic and spherical aberration and their removal. Dispersion of light – Refraction of light through a thin prism – dispersive power of a prism – deviation without dispersion – dispersion without deviation – Direct vision spectroscope.

UNIT – II PHYSICAL OPTICS:- INTERFERENCE: Conditions for interference – Fresnel's prism determination of wavelength of light (Theory & Expt) – Newton's ring – Determination of wavelength of light (Theory & Expt) – Airwedge – Determination of diameter for thin wire (Theory & Expt) – Testing a surface for planeness – Michelson's interferometer – Determination of wavelength of light.

UNIT – III DIFFRACTION: Fraunhofer diffraction – single slit – double slit – theory of plane transmission grating – oblique incidence – wavelength determination – resolving power of a

grating – diffraction by a circular aperture – Fraunhofer diffraction – theory of half period zones – theory of zone plate – diffraction at a circular aperture.

UNIT – IV POLARISATION: Double refraction – nicol prism quarter wave plate – half wave plate – production, detection and analysis of plane, circularly and elliptically polarized light – optical rotation – Fresnel's theory of optical rotation – Laurentz half shade polarimeter – determination of specific rotatory power.

UNIT – V MODERN OPTICS:- Principles of fiber optics – optical fiber – critical angle of propagation – modes of propagation – acceptance angle – numerical aperture – types of optical fibers – single mode fiber and multimode fiber. Lasers – Einstein A and B coefficients – Ruby and He – Ne Lasers – Three level pumping scheme for laser operation – Holography and simple applications.

BOOKS FOR STUDY

1. A text book of OPTICS by N. Subramaniyam, Birjlal revised by M.N. Avadhanulu, S. Chand & Company Ltd., Ram Nagar, New Delhi – 110055.
2. OPTICS and SPECTROSCOPY by R. Murugeshan, S. Chand & Company Ltd., Ram Nagar, New Delhi – 110055.
3. Physics, Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition.

Paper III   Mechanics and Relativity

Unit 1. MATHEMATICAL BACKGROUND : Components of a vector , angular momentum as a vector product, work as a scalar product, Gradient of a scalar point function, Divergence and curl, line, surface and volume integrals, Gauss divergence, Stokes and Greens theorems.

Unit 2. CONSERVATION LAWS: Conservation of Energy, Momentum, Angular Momentum work and energy, work done in a gravitational field, in a stretched spring, conservative and non-conservative force, potential energy curve, motion in in a gravitational field , keplers laws, potential due to a spherical body. Moment of Inertia, principal moment of inertia and axes, moment of Inertia of a diatomic molecule, reduced mass, center of mass.

Unit 3. COLLISION AND PROJECTILES: Collisions, impulse and linear momentum, elastic and in elastic collisions, conservation principles on impact, direct and oblique impact of smooth spheres and loss of energy, projectile motion on a horizontal and inclined plane, range, trajectory of a projectile, systems with varying mass – rockets.

Unit 4. HYDROSTATICS AND DYNAMICS: Pressure and Thrust, thrust on a plane immersed in a liquid, center of pressure, center of pressure on a rectangular lamina, triangular lamina, laws of floatation, meta centric height, Equation of continuity, Euler's equation, Bernoulli s equation, Venturimeter

Unit 5. RELATIVITY: Reference frames, inertial frames, propagation of light , Michelson Morley experiment. Postulates of special theory of relativity, Lorentz transformations, time dilation,

velocity addition, mass variation with velocity, mass energy equivalence, particle with zero rest mass.

Books for Study
1. Mechanics – D S Mathur
2. Mechanics and Mathematical methods -R Murugesan (Chand)
3. Modern Physics – R Murugesan (Chand)

Books for reference
1.Physics -   Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition.

PAPER IV   Thermal Physics

Unit I. KINETIC THEORY OF GASES: Concept of heat and temperature –ideal and perfect gas – kinetic theory of gases – Expression for a pressure of a gas – interpretation of temperature – Gas laws – Gas equation – Avogadro's hypothesis –Maxwell's law of equi-partition of energy– Maxwell's law of distribution of velocity – experimental verification – mean free path – problems in all topics

Unit II. TRANSPORT PHEONOMENA : Transport of momentum - Transport of energy - Transport of matter – behavior of gases at high pressure – Vander Waals equation of state – critical constants – experimental determination – Porous plug experiment – theory – J-K effect – relation between temperatures - problems in all topics.

Unit III. THERMODYNAMICS I : Thermodynamic system – thermal equilibrium and concept of temperature – heat and work as path function – comparison – first law of thermodynamics – applications – isothermal process – adiabatic process– gas equation during adiabatic process – work done during isothermal and adiabatic processes – slopes of isothermal and adiabatic processes - problems in all topics.

Unit IV. THERMODYNAMICS II: Reversible and irreversible processes – second law of thermodynamics – Carnot's engine– Carnot's theorem – Thermodynamic scale of temperature - Clapeyron latent heat equation – entropy – second law of thermodynamics – change in entropy in a Carnot's cycle – change in entropy in an irreversible process – third law of thermodynamics – temperature-entropy diagram – entropy of a perfect gas - problems in all topics.

Unit V. THERMODYNAMICS III: Maxwell's thermodynamic relations – Helmholtz function – enthalpy – Maxwell's relations from the above functions –TdS equations – deduction of Clapeyron latent heat equation – relation between specific heat capacities for a perfect and Vander Waals gas – derivation of Clausius latent heat equation - problems in all topics.

Book for study:

1. Heat and Thermodynamics – Brijlal and Subramanium – S.Chand and company Ltd.

Book for reference:

1.Physics -   Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition

PRACTICAL   (12 experiments compulsory)

1. Non Uniform Bending – Pin and Microscope
2. Uniform Bending – Optic lever
3. Cantilever depression – Pin and Microscope
4. Torsion Pendulum – With and without mass
5. Viscosity – Capillary flow
6. Surface tension – drop weight method
7. Melde s string – Transverse and longitudinal
8. Resonance column
9. Newtons law of cooling verification
10. Specific heat of solid – method of mixures
11. Thermal conductivity of poor conductor -Lees disc
12. Newtons rings R determination and refractive index of liquid
13. Air wedge Thickness of insulator
14. Grating - Normal incidence
15. Grating Dispersive power

ALLIED PHYSICS – PAPER I

UNIT I ELASTICITY AND BENDING MOMENT: Hooke's law - Elastic modulli - Work done in stretching and work done in twisting a wire - Twisting couple on a wire - Determination of rigidity modulus of a wire using torsion pendulum - Expression for bending moment - Uniform bending - Experiment to determine young's modulus using pin and microscope method.

UNIT II FLUIDS: Surface Tension: Synclastic and anticlastic surface - Excess of pressure -Viscosity: Poiseuille's formula forb rate of flow of liquid in a capillary tube by dimensions - Analogy between current flow and liquid flow - streamlined motion – Stoke's formula

UNIT III THERMAL PHYSICS: Conduction in solids: Thermal conductivity - Lee's disc method - Wiedmann-Franz law - Convection: Newton's law of cooling – Radiation: Distribution of energy in the spectrum of a black body - results – Planck's law of radiation (no derivation) and its deduction

UNIT IV SOUND: Simple harmonic motion: free, damped, forced vibrations and resonance - Intensity and loudness of sound - Decibels – Melde's string experiment – Determination of frequency of tuning fork - Acoustics of buildings: Reverberation time - Sabine's formula

UNIT V ELECTRICITY: Current and Current density – Ohm's law - Resistors - I-V characteristics - colour coding- conversion of galvanometer into an ammeter and voltmeter – Kirchhoff's laws – Balance condition of Wheatstone's bridge - Potentiometer – Measurement of potential difference and current

Books for study

1. Properties of Matter: R. Murugeshan, S Chand & Co. Pvt. Ltd., New Delhi
2. Heat and thermodynamics: D S Mathur, S Chand & Co., New Delhi
3. Text book of Sound by M N Srinivasan – Himalaya Publications, 1991
4. Electricity & Magnetism by K K Tewari, S Chand & Co., 3rd Edition, 2001.

ALLIED PHYSICS – PAPER II

UNIT I OPTICS: Interference: Air wedge - determination of diameter of a thin wire by air wedge – Diffraction: Fresnel diffraction & Fraunhofer diffraction - plane diffraction grating - theory and experiment to determine wavelength (normal incidence) - Polarization: Double refraction – half wave and quarter wave plate, plane, elliptically and circularly polarized light – production (theory)

UNIT II MAGNETISM AND ELECTROMAGNETISM: Magnetism: Susceptibility - permeability - intensity of magnetization - properties of dia, para and ferro magnetic materials – Electromagnetism: Faraday's laws of electromagnetic induction, Lenz's law – self-inductance - self-inductance of a toroid – mutual inductance – coefficient of coupling- determination of mutual inductance using a ballastic galvanometer

UNIT III ELECTRONICS: Diodes, transistors and ICs: - Zener diode – characteristics - transistor configuration CE mode - IC – Pin diagram of 741 – Digital electronics: binary numbers – conversion of decimal number to binary number - binary number to decimal number – binary addition, subtraction and basic logic gates (OR, AND, NOT. NOR & NAND) – EXOR gate – De Morgan's theorem.

UNIT IV NUCLEAR PHYSICS AND RADIATION PHYSICS: Nuclear Physics: Nuclear constituents, size, mass, spin and charge - binding energy - binding energy curve - nuclear fission - chain reaction – nuclear reactor - Radiation Physics: radioactive disintegration – half-life period - radiation hazards

UNIT V RELATIVITY AND QUANTUM MECHANICS: Relativity: Frames of references - postulates of special theory of relativity - Lorentz transformation equations - Wave mechanics: matter waves - de Broglie wavelength - properties of wave functions - Quantum mechanics: postulates of quantum mechanics -Schrödinger equation - time dependent form

Books for study

1. Optics: Brij Lal & Subramaniam, S Chand & Co., New Delhi
2 Electricity and magnetism: R Murugeshan , 8th Edn, 2006, S Chand & Co., New Delhi
3. Principles of Electronics: V K Mehta, 5th edition 2001, S Chand & Co., New Delhi,
4. Atomic and Nuclear Physics: Brij Lal & Subramaniam, S Chand & Co., 2000
5. Quantum Mechanics :V. Devanathan, Narosa, Chennai, 2005.
6. Modern Physics: R Murugeshan, Kiruthiga, Sivaprasath S Chand & Co. 2007
7. Physics of Radiation Therapy : FM Khan - Williamd and Wilkins, Third edition , 2003

Books for Reference
1. Fundamentals of Physics, 6th Edition by D Halliday, R Resnick and J Walker, Wiley NY
    2001.
2. Physics, 4th Edition vols. I, II & II Extended by D Halliday, R Resnick and K S Krane,
    Wiley NY 1994.
3. Nuclear Medicine Physics: Chandra , Lippincot Williams and Wilkins, 1998

ALLIED PHYSICS PRACTICALS (12 compulsory)

1. Young's modulus by uniform bending - Pin and Microscope.
2. Rigidity modulus - torsion. pendulum
3. Coefficient of viscosity of a liquid - capillary flow method
4. Thermal conductivity of a bad conductor - Lee's disc method.
5. Newton's law of cooling (with graphical plot)
6. Melde's string experiment – frequency of tuning fork (both modes)
7. Spectrometer - grating - normal incidence method.
8. Air wedge - thickness of a wire.
9. Potentiometer - calibration of low range voltmeter
10. Series resonance circuit - frequency response and self-inductance
11. Basic Logic gates (OR. AND, NOT)
12. Zener Diode characteristics; I-V curve and breakdown voltage

13. Potentiometer - calibration of ammeter
14. Coefficient of viscosity of a liquid – Stoke's method
15. Young's modulus by non-uniform bending – Optic lever and telescope method

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