CBCS -Syllabus

PHYSICS

B.Sc. (M.P.C.& M.P.E.)

(For the Students admitted in 20015-16 & Onwards)

Department of Physics
Nizam College (Autonomous)
Osmania University
Hyderabad – 500 001

NIZAM COLLEGE (AUTONOMOUS)
CBCS Pattern for Undergraduate B.Sc. Program

Semester I and II: Academic year 2015-16 onwards

Semester	Courses	Hours per week	Duration of Exam Hrs	Marks			No. of Credits
				Internal	External	Total	
SEM-I	**Theory**						
	DSC-IA: **Mechanics**(Paper-I)	4	2	10	40	50	4
	Practicals						
	DSC-IA: **Lab** (Paper-I)	3	2		25	25	2
SEM-II	**Theory**						
	DSC-IA: **Waves and Oscillation** (Paper-II)	4	2	10	40	50	4
	Practicals						
	DSC-IA: **Lab**(paper II)	3	2		25	25	2
SEM III	**Theory**						
	DSC-IC: **Thermodynamics**(Paper-III)	4	2	10	40	50	4
	Practicals						
	DSC-IC: **Lab** (Paper-III)	3	2		25	25	2
SEM IV	**Theory**						
	DSC-IC: **Optics**(Paper-IV)	4	2	10	40	50	4
	Practicals						
	DSC-IC**: Lab** (Paper-IV)	3	2		25	25	2
SEM V	**Theory**						
	DSC-IE: **Electricity and Magnetism** (Paper-V)	3	2	10	40	50	3
	DSE-IE: **Spectroscopy and Quantum mechanics** (Paper-VI:E)	3	2	10	40	50	3
	Practicals						
	DSC-IE:Lab(Paper-V)	3	2		25	25	2
	DSE-IE: Lab(Paper-VI)	3	2		25	25	2

Semester	Courses	Hours per week	Duration of Exam Hrs	Marks			No. of Credits
				Internal	External	Total	
SEM VI	**Theory**						
	DSC-IF: **AC Currents and Electronics**(Paper-VII)	3	2	10	40	50	3
	DSE-IF: **Nuclear physics and solid state physics** (Paper-VIII:E)	3	2	10	40	50	3
	Practicals						
	DSC-IF: Lab (Paper-VII)	3	2		25	25	2
	DSE-IF: (lab/Project) (Paper-VIII:	3	2		25	25	2

CC: Core Course DSC: Discipline Specific Course, DSE: Discipline Specific Elective

Course Type	Semester	Number of Paper	Marks for each paper	Total Marks	No. of Credits	Total Credits
Foundation Course	I, II, III, IV	8	50	400	32	32
Add on Courses						
AECC	I, II	2	50	100	4	8
SEC	III, IV	2	50	100	4	
Core Courses						
DSC: Theory	I, II, III, IV	12	50	600	48	132
	V, VI	6	50	300	18	
Practicals	I, II, III, IV	12	25	300	24	
	V, VI	6	25	150	12	
DSE: Theory	V, VI	6	50	300	18	
Practicals	V	3	25	75	6	
Project	VI	3	25	75	6	
Total of add on and core courses					140	172

Department of Physics, Nizam College

(W.e.f 2015-2016 admitted students)

B.Sc (Physics), Semester - I

Paper -— I: Mechanics

Unit – I **52 hrs(4 hrs / week)**

1. Vector Analysis (13)

Scalar and Vector fields, Gradient of a Scalar field and its physical significance. Divergence and Curl of a Vector field and related problems. Vector integration, line, surface and volume integrals. Stokes', Gauss's and Green's theorems- simple applications.

Unit – II

2. Mechanics of Particles (7)

Laws of motion, motion of variable mass system, motion of a rocket, multi-stage rocket, conservation of energy and momentum. Collisions in two and three dimensions, concept of impact parameter, scattering cross-section,

3. Mechanics of Rigid Bodies (6)

Definition of Rigid body, rotational kinematic relations, equation of motion for a rotating body, angular momentum and inertial tensor. Euler's equation, precession of a top, Gyroscope,

Unit – III

4. Central Forces (13)

Central forces – definition and examples, conservative nature of central forces, conservative force as a negative gradient of potential energy, equation of motion under a central force, gravitational potential and gravitational field, motion under inverse square law, derivation of Kepler's laws, Coriolis force and its expressions.

Unit – IV

5. Special theory of Relativity (13)

Galilean relativity, absolute frames, Michelson-Morley experiment, Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation. Concept of four vector formalism.

NOTE: Problems should be solved at the end of every chapter of all units.

Suggested Books

1. Berkeley Physics Course. Vol.1, **Mechanics** by C. Kittel, W. Knight, M.A. Ruderman - *Tata-McGraw hill Company Edition 2008*.
2. **Fundamentals of Physics**. Halliday/Resnick/Walker *Wiley India Edition 2007*.
3. **First Year Physics** - *Telugu Academy*.
4. **Introduction to Physics for Scientists and Engineers**. F.J. Ruche. *McGraw Hill*.
5. **Fundamentals of Physics** by Alan Giambattista et al *Tata-McGraw Hill Company* Edition, 2008.
6. **University Physics** by Young and Freeman, *Pearson Education, Edition 2005*.
7. **Sears and Zemansky's University Physics** by Hugh D. Young, Roger A. Freedman *Pearson Education Eleventh Edition*.
8. **An introduction to Mechanics** by Daniel Kleppner& Robert Kolenkow. *The McGraw Hill Companies*.
9. **Mechanics**. Hans &Puri. *TMH Publications*.
10. **Engineering Physics**. R.K. Gaur & S.L. Gupta. *DhanpatRai Publications*.
11. **The Feymman Lectures in Physics, Vol.-1**, R P Feymman, RB Lighton and M Sands, BI Publications,
12. **Mechanics-**P.K. Srivastava - New Age International.

FIRST SEMISTER PRACTICALS - Practical Paper – I **39 hrs**
(3 hrs / week)

Mechanics Practicals

1. Measurement of errors –simple Pendulum.
2. Calculation of slope and intercept of a Y= mX +C graph by theoretical method
3. Study of a compound pendulum- determination of 'g' and 'k'.
4. Y' by uniform Bending
5. Y by Non-uniform Bending.
6. Moment of Inertia of a fly wheel.
7. Rigidity moduli by torsion Pendulum.
8. Determine surface tension of a liquid through capillary rise method.
9. Determination of Surface Tension of a liquid by any other method.
10. Determine of Viscosity of a fluid.

Note: *Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.*

Suggested Books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (PragatiPrakashan, Meerut).
3. Worsnop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, AnchalSrivastava

Department of Physics, Nizam College

(W.e.f 2015-2016 admitted students)

B.Sc (Physics), Semester - II

Paper -— II: Waves and Oscillations

Unit – I

1. Fundamentals of Vibrations (13)

Simple harmonic oscillator, and solution of the differential equation– Physical characteristics of SHM, torsion pendulum, - measurements of rigidity modulus , compound pendulum, measurement of 'g', combination of two mutually perpendicular simple harmonic vibrations of same frequency and different frequencies, Lissajous figures

Unit – II

2. Damped and forced oscillations (13)

Damped harmonic oscillator, solution of the differential equation of damped oscillator. Energy considerations, comparison with undamped harmonic oscillator, logarithmic decrement, relaxation time, quality factor, differential equation of forced oscillator and its solution, amplitude resonance, velocity resonance. Coupled Oscillators.

Unit – III

3. Vibrating Strings (13)

Transverse wave propagation along a stretched string, general solution of wave equation and its significance, modes of vibration of stretched string clamped at ends, overtones, energy transport, transverse impedance

Unit – IV

4. Vibrations of bars (13)

Longitudinal vibrations in bars- wave equation and its general solution. Special cases (i) bar fixed at both ends ii) bar fixed at the midpoint iii) bar free at both ends iv) bar fixed at one end. Transverse vibrations in a bar- wave equation and its general solution. Boundary conditions, clamped free bar, free-free bar, bar supported at both ends, Tuning fork.

Ultrasonics:
Introduction to Ultrasonics. Properties of ultrasonic waves. Production of ultrasonics by piezoelectric and magnetostriction method. Applications of ultrasonic waves.

NOTE: Problems should be solved at the end of every chapter of all units.

Textbooks

1. **Waves and Oscillations**. S. Badami, V. Balasubramanian and K. Rama Reddy *Orient Longman*.
2. **First Year Physics** - *Telugu Academy*.
3. **Mechanics of Particles, Waves and Oscillations**. Anwar Kamal, *New Age International*.
4. **College Physics-I**. T. Bhimasankaram and G. Prasad. *Himalaya Publishing House*.
5. **Introduction to Physics for Scientists and Engineers**. F.J. Ruche. *McGraw Hill*.
6. **Waves and Oscillations**. N. Subramaniyam and Brijlal*Vikas Publishing House Private Limited*.

Reference Books

1. **Fundamentals of Physics** by Alan Giambattista et al *Tata-McGraw Hill Company* Edition, 2008.
2. **University Physics** by Young and Freeman, *Pearson Education, Edition 2005*.
3. **Sears and Zemansky's University Physics** by Hugh D. Young, Roger A. Freedman *Pearson Education Eleventh Edition*.
4. **Engineering Physics**. R.K. Gaur & S.L. Gupta. *DhanpatRai Publications*.
5. **Fundamental vibrations,** Kinsler and Firaj, Meerut publications

SECOND SEMISTER PRACTICALS

Practical Paper – II **39 hrs**

(3 hrs / week)

Waves and Oscillations Practicals

1. Study of damping of an oscillating disc in Air and Water logarithmic decrement.
2. Study of Oscillations under Bifilar suspension-Verification of axis theorems
3. Study of oscillations of a mass under different combination of springs-Series and parallel.
4. Verification of Laws of a stretched string (Three Laws).
5. Determination of frequency of a bar-Melde's experiment.
6. Observation of Lissajous figures from CRO-Frequency ratio.Amlitude and phase difference of two waves.
7. Volume Resonator –determination of frequency of a tuning fork.
8. Velocity of Transverse wave along a stretched string.
9. Study of damping of a bar pendulum-damping factor
10. Study of coupled oscillator-resonance

Note: Minimum of eight experiments should be performed.Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Suggested books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (PragatiPrakashan, Meerut).
3. Worsnop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, AnchalSrivastava

Department of Physics, Nizam College

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B.Sc (Physics), Semester - III

Paper — III: Thermodynamics and statistical mechanics

60 hrs(6 hrs/week)

Unit -I

Thermodynamics: Heat and work, Work done in isothermal and adiabatic processes, First law of thermodynamics, significance and applications of first law, of thermodynamics, Reversible and irreversible process, Carnot's theorem, Carnot's engine, Clausius-Clapeyron equation, Second law of thermodynamics - different statements, Thermodynamic scale of temperature, Entropy concept, Entropy and disorder, Measurement of entropy changes in reversible and irreversible processes, Entropy of universe, Entropy—temperature diagrams.

Unit — II

Thermodynamic potentials and Maxwell's equations: Thermodynamic potentials: Enthalpy, Gibbs, Helmholtz and internal energy functions,Derivation of Maxwell's thermodynamic relations, Specific heats - Derivations for ratio and difference of two specific heats, Joule-Kelvin effect — expression for Joule-Kelvin coefficient.

Kinetic theory of gases: Deduction of Maxwell's law of distribution of molecular speeds, Transport phenomena, Viscosity, Thermal conduction and diffusion of gases. Law of equipartition energy and its applications to specific heat of gasses, monoatomic and diatomic gasses.

Unit — III

Low temperature Physics: Liquefaction of gases using Joule-Kelvin effect; Porous-plug experiment; Distinction between Joule's expansion, Adiabatic expansion and Joule-Thomson's expansion; Expression for Joule- Thomson cooling; Liquefaction of helium- Kapiza's method; Adiabatic demagnetization — production of low temperatures; Principle of refrigeration-vapor compression type.

Unit — IV

Quantum theory of radiation: Black body-Fery's black body, distribution of energy in the spectrum of a black body; Wien's displacement law, Wein's law, Raleigh — Jeans law; Quantum theory of radiation — Plank's law; deduction of Wein's law, Raleigh jeans law, Measurement of radiation — types of pyrometers; Disappearing filament optical pyrometer— experimental determination; Angstrom's pyrometer — determination of solar constant and temperature of sum.

Statistical Thermodynamics: Introduction to statistical mechanics; statistical equilibrium; probability theorems in statistical thermodynamics; Maxwell's Boltzman distribution law (statement and expression only) - application to ideal gas; quantum statistics; phase space; Fermi-Dirac distribution law (statement and expression only)-application to electron gas; Bose — Einstein distribution law (statement and expression only) - application to photon gas, Comparison of three statistics.

Reference Books

1. B.Sc Heat — Telugu Academy. .
2. B.Sc. Physics Vol. II — Shankar Rao and BabuRao, S. Chand & Co.
3. Heat and thermodynamics - Zemansky, McGraw Hill Publications.
4. Thermodynamics — D C Tayal, Himalayan Pubications,
5. Heat and Thermodynamics — Brijlal and Subrahmanyam, S Chand & Co
6. Thermodynamics, kinetic theory & statistical thermodynamics, F.W. Sears & G L Salinger, 1998, Narosa.

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(W.e.f 2015-2016 admitted students)

B.Sc. (Physics), Semester - IV

Paper — IV: Optics and Laser

UNIT—I

Matrix methods in paraxial optics: Concepts and derivation of translation, refraction and system matrices, position of the image planes and magnification of the optical system, application of matrix methods to simple optical systems — (1) a thick lens, (2) thin lenses in contact, (3) two thin lenses separated by a distance, cardinal points of lens system, unit and nodal planes. Aberrations: Chromatic aberration in a lens, the achromatic doublet, achromatism for two lenses in contact and separated by a distance. Monochromatic aberration, the spherical aberration (longitudinal spherical aberration) due to (1) a plane refracting surface and (2) a spherical surface (expression without proof), minimization of spherical aberrations, explanation of coma, astigmatism.

UNIT-II

Interference: The superposition principle, coherence, temporal and spatial conditions for interference of light , interference by division of wave front — Fresnel's biprism, determination of wave length of light, change' of phase on reflection, determination of thickness of a transparent sheet. Interference by division of amplitude- oblique incidence of plane wave on a thin films, Interference by a plane parallel film illuminated by a point surface, Interference by film with two non-parallel, reflecting surfaces (Wedge shaped film)- Determination of diameter of wire, Newton's rings in reflected and transmitted light — Determination of wave length of monochromatic light Michelson interferometer — Types of fringes, Determination of wave length of monochromatic light, thickness of a thin transparent sheet.

UNIT-III

Diffraction: Fraunhofer diffraction - diffraction due to a single slit and circular aperture, Limit of resolution; Two— slit Fraunhofer diffraction ; Fraunhofer diffraction pattern with N slits; Fourier transform and its properties — the shifting theorem and application of the FT to Fourier diffraction due to single slit, double slit and the diffraction grating; The diffraction grating- normal and oblique incidence, determination of wave length of light; Resolving power and dispersive power of grating. Fresnel's diffraction: Fresnel's half period zones, zone plates, diffraction on a straight edge, diffraction of plane waves at straight edge.

UNIT-IV

Polarization and double refraction: Polarized light, Brewster's law; Malus law, phenomenon of 'double refraction, concept of o-ray and e-ray, Nicol prism, path difference between e-ray and o-ray, positive crystal and negative crystal. Polarizer and analyzer, quarter and half wave plates. Babinet compensator. Optical activity, Laurent's half shade polarimeter experiment.

Lasers, fiber Optics and holography: Characteristics of laser light, Basic principles of laser — Absorption, spontaneous emission, stimulated emission, population inversion, pumping mechanisms, Einstein's coefficients, Ruby laser, He-Ne laser, application of laser.
Principle of optical fiber, Types of optical fibers- Step index and graded index fibers, numerical aperture and acceptance angle, principles of fiber communication (qualitative treatment only).
Basic principle of holography, Recording and reconstruction of hologram, Application of hologram.

Text books:

1.B.Sc Optics — Telugu Acadamy.
2. B.Sc. Physics Vol — II Shankar Rao and BabuRao, S.Chand& Co.
3. Optics — Brijlal and Subramanyam, S.Chand& Co. i
4. Optics — Ajay Ghatak
5. Optics — Z.Hact.

Practical Paper – III

SECOND YEAR: SEM - III

1. Pulfrichrefractometer – determination of refractive index of liquid.
2. Optical Bench.
3. Resolving power of a telescope.
4. Determination of wavelength of light using diffraction grating minimum deviation method.
5. Spectrometer-cauchy's constants.
6. Refractive index of a liquid and glass (Boys Method).

Practical Paper – IV

SECOND YEAR: SEM – IV

1. Spectrometer- I-D curve.
2. Study of optical rotation-polarimeter.
3. Determination of wavelength of light- Newton's rings.
4. Wavelength of light using diffraction grating – normal incidence method.
5. Cardinal points of lens system.
6. Determination of wavelength of light –Biprism.

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(W.e.f 2015-2016 admitted students)

B.Sc (Physics), Semester - V

Paper — V: Electricity and magnetism

60 hrs(6 hrs/week)

Unit - I

Electrostatics: Gauss law and its application, electric field due to an infinite conducting sheet of charge, uniformly charged sphere and charged cylindrical conductors, mechanical force on a charged conductor, electric potential, potential due to charged, spherical conductor, and electric dipole and an infinite line of charge.

Unit — II

Dielectrics: An atomic view, potential energy of a dipole in an electric field, Polarization and charge density, dielectrics and Gauss's law. Relation between D, E, and P — Dielectric constant and susceptibility, Boundary conditions at the dielectric surface. Capacitance: Capacity of concentric spheres and cylindrical condensers, capacity of parallel plate condenser with and without dielectric. Electric energy stored by a charged, condenser, force between plates of condenser, attracted disc electrometer construction and working.

Unit — III

Magneto statics: Magnetic shell, potential due to magnetic shell, filed due to magnetic shell, equivalent of electric circuit and magnetic application of field due to magnetic shell, magnetic induction (B) and (H), Permeability and susceptibility, -Hysteresis loop, B-H curve-theory and as experiment.

Moving Charge in Electric and Magnetic Fields: Force on a current carrying conductor, force and torque on current loop, Biot-Savart's law and calculation of B due to long straight wire, circular current loop and solenoid. Hall Effect, cyclotron, synchrocyclotron and synchrotron.

Unit — IV

Electromagnetic Induction: Faraday's law, Lenz's law, expression for induced emf — time varying magnetic fields, Betatron, Ballistic galvanometer. Theory damping correction self and mutual inductance, coefficient of coupling, calculation self-inductance of long solenoid- toroid- energy stored in magnetic field- principles of transformer.

Reference Books

1. Physics Vol. II: Halliday and Resnick. l
2. Electricity: Berkeley physics series. -
3. Electricity and Magnetism: Brijlal and Subramaniam. »
4. Electricity and Magnetism: C. J. Smith.
5. Electricity and Magnetism: C. J. Smith and.Rangawala. . '
6. Electricity and Magnetism with Electronics: K.K.Tewari (R. Chand).
7. Electricity and magnetism, D C Tayal, 1998, Himalaya publishing house
8. Introduction to Electrodynamics, D.J. Griffiths, 3rdEdn., 1998, Benjamin Cummings.

Department of Physics, Nizam College

(W.e.f 2015-2016 admitted students)

B.Sc. III Year (Physics), Semester – VI

Paper — VI; Spectroscopy & Quantum Mechanics

Unit - I

Atomic Spectroscopy: Fine structure of spectral lines, space quantization, vector atom model. quantum numbers, L-S and J-J coupling schemes, Magnetic moment of an atom, Lande's 'g' factor and Larmer's theorem- Stern-Gerlach experiment - Spectral terms and notation, Pauli's exclusion principle, spectra of alkali elements, Theory of normal Zeeman effect, anomalous Zeeman effect, Paschen-Back and Stark effect.

Unit - II

Molecular Spectroscopy: Origin of molecular spectra, pure rotational spectra and determination of rotational constants- rotational vibrational spectra- electronic spectra and determination of vibrational constants and Delender's table qualitative treatment of Raman spectra — applications.

Unit –III

Quantum Mechanics: Planck's theory of blackbody radiation; Photoelectric effect-Einstein's equation; Compton effect; wave particle duality; de-Broglie matter waves; Davison and Germer Experiment, G.P Thomson's experiment. Heisenberg's uncertainty principle, electron diffraction; Bohr's principle of uncertainty.

Unit — IV

Principles of Quantum Mechanics: Schrodinger's wave equation, time-independent and time dependent form, properties of wave function, concept of stationary states. Applications of Schrodinger's equation: particle in a one-dimensional infinite potential well, finite potential well, Potential step, rectangular potential barrier, tunneling.

Reference Books

1. Introduction of atoms in spectrum: H.F. White '
2. Spectroscopy: Shatrughan and Walker k
3. Quantum Mechanics: Mathews and Venkateshan P

4. Introduction to Quantum Mechanics: Pauling and Wilson.
5. Physics of the atom: Wher and Richards
6. Elements of Modern Physics: Patil.

Practical Paper – V A

B.Sc III YEAR: SEM - V

1. Carey Foster's Bridge – comparison of resistances.
2. Carey Foster's Bridge – Temparature coefficient of existence of the given material.
3. Internal resistance of a cell by potentiometer.
4. Figure of merit of a moving coil galvanometer.
5. Voltage sensitivity of a moving coil galvanometer.
6. Determination of capacities by proportional Kick method using standard condenser.
7. Comparison of capacitors by proportional Kick method using a Ballistic galvanometer.
8. Comparison of capacitors by method of mixtures using a Ballistic galvanometer.
9. Mutual inductance by using Ballistic galvanometer.

Practical Paper – V B

B.Sc III YEAR: SEM - V

1. e/m of an electron by Thomson method.
2. Energy gap of an intrinsic semiconductor.
3. Energy gap of semiconductor using a junction diode
4. Temperature characteristics of thermistor
5. Design and construction of a multi meter
6. Construction of a model D.C. power supply.
7. Characteristics of a Junction diode
8. Characteristics of Zener diode

Department of Physics, Nizam College

(W.e.f2015-2016 admitted students).

B.Sc III Year (Physics), Semester –VI

Paper — VII: AC Currents and Electronics

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Unit — I

varying and Alternating mating Currents:.LCR Circuits, IR circuits, growth and decay of currents, LCR circuit, circuit damping alternating current, relation between current and voltage in pure RC and C vector diagrams LCR circuit power factor, series and parallel resonant circuit — Q factor.

Unit — II

Maxwell's Equations: A review of basic laws of electricity and magnetism, displacement current Maxwell's equations in differential form, Maxwell's wave equation.

Electromagnetic Waves: Plane electromagnetic waves- Transverse nature of electromagnetic waves, Poynting theorem, production of electromagnetic waves(Hertz Experiment) field due to a slow moving electron and accelerated electron. Rate of emission of electromagnetic energy.

Unit — III

Semiconductor Devices: Band theory of solids (qualitative)- Intrinsic and extrinsic semiconductors- continuity equation, P-N junction diode, Zener diode, Half wave and Full wave rectifiers and filters, ripple factor (quantitative)- PNP and i\1PN transistors. Current components CB, CE, CC configurations.

Unit — IV

Transistor hybrid parameters: Determination of hybrid parameters from transistorcharacteristics; Transistor as an amplifier.

Feedback: Concept of negative feedback and positive feedback; Barkhausen criteria, phase shift oscillator (qualitative).

Digital Principles: Binary arithmetic, logic gates using discrete components, Universal gates; Truth tables; half and full adders; DeMorgan's theorems: statements and proof.

Reference Books

l. Introduction of atoms in spectrum: I-I.F. White

2. Spectroscopy: Shatrughan and Walker

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B.Sc. III Year (Physics), Semester - VI

Paper — VIII: Nuclear Physics &Solid state Physics

Unit — I

Nuclear Physics: Structure of nucleus; Basic properties of the nucleus, binding energy, Nuclear Stability: liquid drop model; nuclear model; Nuclear forces. Radioactivity; radioactive equilibrium; radioactive dating; Alpha decay characterizations; Beta decay, the neutrino hypothesis, gamma decay, Mossbaeur effect(principles only),Artificial radioactivity, elements. Radiation detectors: GM Counter; Scintillation Counter; Cloud chamber; Bubble chamber; photographic emulsion.

Unit — II

Nuclear reactions: Nuclear reactions conservation laws and Q-value-examples for (alpha, P)(alpha A) and(alpha d) reactions Fission and nuclear at reactions Fusion and thermonuclear energy: hydrogen bomb.

Cosmic rays: Latitude, longitude and altitude effects: Vender Waals, primary and secondary cosmic rays, cosmic ray showers.

Unit — III

Solid State Physics: Crystalline nature of matter, crystal system, Bravais lattices, Miller indices, diffraction of X-rays, Laue method, Power diffraction method — Simple crystal structures (NaCl, CsCl and Diamond).Types of bonding in crystals, characteristics of crystals with different bodings, Lattice energy of ionic crystals — Madelung constant, Born's potential, calculation of repulsive exponent; Born Haber cycle.

Unit — IV

Magnetic properties of materials: Dia. Para and ferro-magnetic materials, Weiss theory of Ferromagnetism qualitative, ideas of magnetic domains, anti,-ferromagnetism and Ferromagnetism, superconductivity, Ferro-resistance, persistent currents, Meissner effect perfect diamagnetism, isotope effect, thermal and optical properties, energy gap.

Reference Books

l. Introduction of atoms in spectrum: I-I.F. White
2. Spectroscopy: Shatrughan and Walker
3. Quantum Mechanics: Mathews and Venkateshan
4. Introduction to Quantum Mechanics: Pauling and Wilsoftn.
5. Physics of the atom: Wher and Richards
6. Elements of Modem Physics: Patil.

Reference books

1. Introduction to solid state physics: Kittel
2. Nuclear Physics: Tayal
3. Elements of Modern Physics :Patil
4. Solid State Physics : Ali Omer
5. Solid State Physics :wahab.

Practical Paper – VII

B.Sc III YEAR: SEM - VI

1. RC circuit (Frequency response)
2. LCR circuit (Frequency response).
3. LCR circuit series/parallel resonance, Q-factor
4. Power factor of an A.C. circuit.
5. Determination of M and H by Vibration Magnetometer.
6. Hysteresis loop by plotting B-H curve.
7. Variation of magnetic field along the axis of a coil – using a Stewart and Geo's apparatus.
8. Determination of ac-frequency-sonometer.

Practical Paper – VIII

B.Sc III YEAR: SEM - VI

1. Characteristics of Transistor
2. R.C. coupled amplifier
3. Verification of Thevenin's Theorem.
4. Verification of Norton's Theorem.
5. Verification of Logic gates AND, OR NOT, X-OR gates
6. Phase shift oscillator.
7. Verification of Kirchoff's laws.

Model question paper (CBCS)

Duration 2 hours Max marks 40

Section A (4 x 2 =8)

1. Unit I
2. Unit II
3. Unit III
4. Unit IV
5. Unit I or II

Section B (4 x 8 = 32 marks)

6. .a. Unit III

   Or

   b. IV
7. a. Unit I

   Or

   b. Unit I
8. a. Unit II

   Or

   b. Unit II
9. a. Unit III

   Or

   b Unit III
10. a Unit IV

    Or

    b Unit IV

Nizam College (Autonomous)
Model Question Paper for Internal Exams
(BA/BCOM/B.SC)

Marks:10 **Time : 30 Min**

I. Fill in the blanks (5 X ½ = 2 ½)

1.
2.
3.
4.
5.

II. Multiple Choice Questions (5 X ½ = 2 ½)

1.
2.
3.
4.
5.

III. Short Answer Questions (5 x 1= 5)

1.
2.
3.
4.
5.

P R I N C I P A L

Nizam College (Autonomous)
Model Question Paper for Semester Exams
Faculty of Science (B.Sc)
Semester I-IV

Marks: 40 Time: 2 Hours

Section –A-----(4 x 3 =12)
(Short Answer Questions)

1. UNIT-I
2. UNIT-II
3. UNIT-III
4. UNIT-IV

Section –B------(4 x 7 =28)
(Essay Questions)

5 (a) UNIT-I
OR
5(b)
6 (a) UNIT-II
OR
6(b)

7 (a) UNIT-III
OR
7(b)

8(a) UNIT-IV

OR

8(b)

P R I N C I P A L

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Nizam College (Autonomous)
Model Question Paper for Semester Exams
Faculty of Science (B.Sc)
Semester V & VI

Marks: 40 Time: 2 Hours

Section –A-----(4 x 3 =12)
(Short Answer Questions)

1. UNIT-I
2. UNIT-II
3. UNIT-III
4. UNIT-IV or Question form Unit –I to Unit III

Section –B------(4 x 7 =28)
(Essay Questions)

5 (a) UNIT-I

OR

5(b)

6 (a) UNIT-II

OR

6(b)

7 (a) UNIT-III

OR

7(b)

8(a) UNIT-IVor Question form Unit –I to Unit III

OR

8(b)

P R I N C I P A L

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