GIRRAJ GOVERNMENT COLLEGE (A), NIZAMABAD

B. Sc., PHYSICS SYLLABUS

III YEAR (V & VI Semesters)

W.E.F 2021-22

DEPARTMENT OF PHYSICS

GIRRAJ GOVERNMENT COLLEGE (A), NIZAMABAD

File No.GDCNZB-GEN/248/2021-O/o PRINCIPAL-GDC-NZB-CE

PROCEEDINGS OF THE PRINCIPAL, GIRRAJ GOVT. COLLEGE, NIZAMABAD

Present: Dr. E. Laxminarayana, M.A., Ph.D., Principal (FAC)

Sub: Constitute of the BOS in Physics Department for academic year 2021-22 and also for BOS meeting – Order issued.

ORDER

As per the UGC Guidelines, the Board of Studies (BOS) in the Department of Physics is constituted for the academic year 2021-22 with the following members with Chairperson.

1. Sri K. Bharath Raj, Head
   Department of Physics & BOS Chairperson
   Girraj Govt. College(A), Nizamabad
2. Dr. N. Mohan Babu
   BOS Chairperson
   Department of Physics, TU
   Nizamabad
3. Sir Ch. Shiva Prasad,
   Associate Professor,
   GDC, Bhainsa
4. Smt. E. Srilatha
   Asst. Engineer/Civil
   Civil Sub Div./TS Genco
   Pochampad, Nizamabad
5. Sri N. Raja
   Lecturer in Physics
   GGC, Nizamabad
6. Sri Ch. Arjun
   Asst. Prof of Physics
   GGC, Nizamabad
7. Smt. Vajeera Bhanu
   Asst. Prof of Physics
   GGC, Nizamabad
8. Ms. S. Shirisha
   Alumni of GGC, Nizamabad

CHAIRMAN BOS
Department of Physics
Telangana University
Nizamabad.

Assistant Engineer/Civil
Civil Sub-Divisidn/TSGENCO
PHES/Pochampad

Signed by Dr.e Laxmi Narayana
Date: 29-10-2021 12:10:36
Reason: Approved
PRINCIPAL

Girraj Govt. College (Autonomous), Nizamabad
(w.e.f 2019 - 2020), Nizamabad

B.Sc. (Physics)
SCHEME FOR CHOICE BASED CREDIT SYSTEM
(YEAR & SEMISTER -WISE SCHEME OF HPW, CREDITS & MARKS)

Year	SEM	Course/Paper	Course Type*	Hrs / Week	No. of Credits	Marks		
						Internal	SEM End	Total
I	I	Mechanics & Oscillations	DSC-1	4	4	30	70	100
		Mechanics & Oscillations Lab (Practicals)	DSC -1(Pr)	3	1	-	50	50
S	II	Thermal Physics	DSC-2	4	4	30	70	100
		Thermal Physics Lab (Practicals)	DSC-2(Pr)	3	1	-	50	50
II	III	Electromagnetic Theory	DSC-3	4	4	30	70	100
		Electromagnetic Theory Lab (Practicals)	DSC-3(Pr)	3	1		50	50
		I) Experimental methods & Error analysis 2) Electrical circuits & Networking	SEC-1 SEC-2	2 2	2 2	10 10	40 40	50 50
	IV	Waves & Optics	DSC-I	4	4	30	70	100
		Waves & Optics Lab (Practicals)	DSC-4(Pr)	3	1		50	50
		1) Basic instrumentation 2) Digital Electronics	SEC-3 SEC-4	2 2	2 2	10 10	40 40	50 50
III	V	(A) Modern Physics Or (B) Computational Physics	DSE-1	4	4	30	70	100
		(A) Modern Physics Lab (Practicals) Or (B) Computational Physics Lab (Practicals)	DSE- I (Pr)				50	50
		Basics of Energy & Fluid Mechanics	GE	4	4	30	70	100
	VI	(A) Electronics Or (B) Applied Optics	DSE-2		4	30	70	100
		(A) Electronics Lab (Practicals) Or (B) Applied Optics Lab (Practicals)	DOE-2 (Pr)	3	1		50	50
		Nano science	Project / Course in lieu of project	4	4	30	70	100
Total credits				30				

*DSC: Discipline Specific Course (Core);
DSE: Discipline Specific Elective (Elective);

GIRRAJ GOVERNMENT COLLEGE (A), NIZAMABAD

B. Sc. PHYSICS

Course Objectives/Description:

- To equip students with requisite theoretical and practical skills to enable them to pursue multidisciplinary courses at Post Graduate level.
- To develop a sense of inquiry and scientific temper among students and shape their attitudes to help them gain higher order and experiential knowledge.

Learning outcomes :

- The combination integrating all Basic Science courses lays a strong foundation and prepares the learner for Post Graduation research in respective disciplines.
- Master a broad set of knowledge concerning the fundamentals in the basic areas of the Physics added with the necessary hands-on experience in various practical aspects of problem solving/experimentation. The program imparts students with an understanding of the basics of Physics, to develop proficiency in the practice of computing, and to prepare them for continued professional development.

Girraj Govt. College (A), Nizamabad
(w.e.f.2021-22)

B.Sc. (Physics) - III Year
Semester – V
Paper – V(A) : Modern Physics
(DSE-1: Elective)

Total : 56 Hrs
(4 Hrs / week)

UNIT - 1 : SPECTROSCOPY (14 Hrs)

Atomic Spectra: Introduction - Drawbacks of Bohr's atomic model - Sommerfeld's elliptical orbits - relativistic correction (no derivation). Stem & Gerlach experiment, Vector atom model and quantum numbers associated with it. L-S and j-j coupling schemes. Spectral terms, selection rules, intensity rules-spectra of alkali atoms, doublet fine structure, Zeeman Effect. Paschen-Back Effect and Stark Effect. (basic idea.).

Molecular Spectroscopy: Types of molecular spectra, pure rotational energies and spectrum of diatomic molecule. Determination of inter nuclear distance Vibrational energies and spectrum of diatomic molecule, Raman effect, classical theory of Raman effect. Experimental arrangement for Raman effect and its applications.

UNIT — II : Quantum Mechanics (14 Hrs)

Inadequacy of classical Physics: Spectral radiation - Planck's law (only discussion). Photoelectric effect – Einstien's photoelectric equation. Compton's effect - experimental verification.

Matter waves & Uncertainty principle: de Broglie's hypothesis - wavelength of matter waves, properties of matter waves. Phase and group velocities. Davisson and Germer experiment.

Double slit experiment. Standing de Brogile waves of electron in Bohr orbits. Heisenberg's uncertainty principle for position and momentum (x and p_x). Energy and time {E and t). Gamma ray microscope. Diffraction by a single slit. Position of electron in a Bohr orbit. Complementary principle of Bohr.

Schrodinger wave Equation

Schrodinger time independent and time dependent wave equations. Wave function properties. - Significance. Basic postulates of quantum mechanics. Operators, eigen functions and eigen values, expectation values.

Application of Schrodinger wave equation: Potential well

UNIT — III: Nuclear Physics (14 Hrs)

Nuclear Structure: Basic properties of nucleus - size, charge. mass. spin, magnetic dipole moment and electric quadrupole moment. Binding energy of nucleus, deuteron binding energy, p-p, n-n, and n-p scattering (concepts), nuclear forces. Nuclear models - liquid drop model, shell model.

Alpha and Beta Decays: Range of alpha particles, Geiger — Nuttal law. Gammow's theory of alpha decay. Geiger — Nuttal law from Gammow's theory. Beta spectrum - neutrino hypothesis,

Particle Detectors: GM counter, proportional counter, scintillation counter.

UNIT- IV: Solid State Physics & Crystallography (14 hrs)

Crystal Structure: Crystalline nature of matter, Crystal lattice, Unit Cell, Elements of symmetry. Crystal systems, Bravais lattices. Miller indices. Simple crystal structures (S.C., BCC, FCC, CsCl, NaCl, diamond and ZincBlende)

X-ray Diffraction: Diffraction of X -rays by crystals, Bragg's law, Experimental techniques - Laue's method and powder method.

Superconductivity

Introduction - critical temperature, properties of superconductors - critical field – critical current, Meissner effect – Isotope effect - Type I and type II superconductors - applications of superconductors.

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

Suggested books:

1. Modem Physics by G. Aruldhas&P. Rajagopal. Eastern Economy Edition.
1 Concepts of modern Physics by ArthurBeiser. Tata McGraw-Hill Edition.
3. Modern Physics by R. Murugeshan and Kiruthiga SivaPrasath.S. Chand & CO.
4. Nuclear Physics by D.C. Tayal. Himalaya Publishing House.
5. Molecular Structure and Spectroscopy by G.Aruldhas. Prentice Hall of India, New Delhi.
6. Spectroscopy -Atomic and Molecular by Gurdeep R Chatwal and Shyam Anand -Himalaya Publishing House.
7. Third Year Physics – Telugu Academy.
8. Elements of Solid State Physics by J.P. Srivastava. (for chapter on nano materials)-Prentice-hallof India Pvt. Ltd.

B.Sc. (Physics) - III year
Semester - V
Paper- V(A) : Modern Physics Practicals
(DSE 1: Elective)

1. Measurement of Planck's constant using black body radiation and photo-detector.
2. Photo-electric effect: photo current versus intensity and wavelength of light; maximum energy of photo-electrons versus frequency of light
3. To determine the Planck's constant using LEDs of at least 4 different colors.
4. To determine the ionization potential of mercury,
5. To determine the absorption lines in the rotational spectrum of Iodine vapour.
6. To determine the value of e/m by (a) Magnetic focusing or (b) Bar magnet.
7. To setup the Millikan oil drop apparatus and determine the charge of an electron.
8. To show the tunneling effect in tunnel diode using I-V characteristics.
9. To determine the wavelength of laser source using diffraction of single slit.
10. To determine the wavelength of laser source using diffraction of double slits.
11. To determine (1) wavelength and (2) angular spread of He-Ne laser using plane diffraction grating.
12. To determine the value of e/m for electron by long solenoid method.
13. Photo Cell —Determination of Planck's constant.
14. To verify the inverse square law of radiation using a photo-electric cell.
15. To find the value of photo electric work function of a material of the cathode using a photo-electric cell.
16. Measurement of magnetic field — Hall probe method.
17. To determine the .dead time of a given G.M. tube using double source.
18. Hydrogen spectrum - Determination of Rydberg's constant
19. Energy gap of intrinsic semi-conductor
20. G. M. Counter — Absorption coefficients of a material.
21. To draw the plateau curve for a Geiger Muller counter.
22. To find the half-life period of a given radioactive substance using a G.M. Counter.
23. **Verification of Brags law.**
24. **Calculation of 'd' values using powder diffraction method.**
25. **Hall effect (Hall coefficient).**

Reference Books:

1. Advanced Practical Physics for students. B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogbom, 4th Edition, reprinted 1985, Heinemann Educational Publishers
3. A Text Book of Practical Physics, 1. Pr h & Ramakrishna, 11 Edn, 2011,Kitab Mahal

Note: Minimum of eight experiments should be performed.

B.Sc. (Physics) - III Year

Semester — V

Paper – V (B) : Computational Physics

(DSE-1: Elective)

Total: 56 hrs

UNIT I: Programming in C (14 Hrs)

Flow charts, algorithms, Integer and floating-point arithmetic, precision, variable types. arithmetic statements, input and output statements. control statements, executable and non-executable statements, arrays, Repetitive and logical structures. Subroutines and functions, operation with files. operating systems, Creation of executable programs.

UNIT II: Numerical methods of Analysis (14 Hrs)

Solution of algebraic and transcendental equation, Newton Ramphan method, Solution of simultaneous linear equations. Matrix inversion method, Interpolation, Newton and Lagrange formulas, Numerical differentiation. Numerical integration. Trapezoidal. Simpson and gaussian quadrature methods. Least square curve fitting, Straight line and Polynomial fits.

UNIT III: Numerical solution of ordinary differential equations (14 Hrs)

Eulers and Runge kutta methods, simulation. Generation of uniformly distributed random integers. statistical tests of randomness. Monte-Carlo evaluation of integrals and error analysis, Non-uniform probability distributions, Importance sampling, Rejection method.

UNIT IV: Computational methods (14 Hrs)

Metropolis algorithm, Molecular diffusion and Brownian motions, Random walk problems and their Montecarlo simulation. Finite element and Finite difference methods. Boundary value and initial value problems, density functional methods.

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

Suggested Books:

1. Computational methods in Physics and Engineering: Wong
2. Computer Oriented Numerical methods: Rajaraman
3. Computer Programming in Fortran 77: Rajaranian
4. Applied Numerical Analysis: Gerald
5. A Guide to Manto -Carlo simulations Statistical Physics: Land

B.Sc. (Physics) - III year
Semester – V
Paper — V(B) : Computational Physics Practicals
(DSE-1: Elective)

1. Jacobi Method of Matrix diagonalization
2. Solution of Transcendental or Polynomial equations by the Newton Raphson
3. method Linear curve fitting and calculation of linear correlation coefficients
4. Matrix Simulation: Subtraction and Multiplication.
5. Matrix Inversion and solution of simultaneous
6. equations Lagrange interpolation based on given input
7. data Numerical integration using the Simpsons method.
8. Numerical integration using the Gaussian quadrature method.
9. Solution of first order Differential Equation using Runge-kutta method.
10. Numerical first order differentiation of a given function.
11. Fast Fourier
12. transform Monte
13. Carlo Integration
14. Use of a package for data generation and graph plotting.
    Test of Randomness for random numbers generators.

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.

B.Sc. (Physics) - III Year
Semester – VI
Paper – VI(A) : Electronics
(DSE-2: Elective)

Total: 56 hrs
(4 Hrs / week)

Unit I: (14 Hrs)

1. Band theory of P-N junction: Energy band in .solids (band theory),. valence band, conduction band and forbidden energy gap in solids, insulators, semi conductors and pure or intrinsic semiconductors and impure or extrinsic semi-conductors. N-type semi-conductors, P-Ape semi-conductors, Fermi level, continuity equation.
2. Diodes: P-N junction diode. Half-wave, full-wave and rectifier. Zener diode & its characteristics. Zener diode as voltage regulator.

Unit-II: (14 Hrs)

3. Bipolar Junction Transistor (BJT) - p-n-p and n p-n transistors, current components in transistors, CB, CE and CC configurations transistor as an amplifier -RC coupled amplifier — Frequency response (Qualitative analysis).
4. Feedback concept & Oscillators: Feedback. General theory of feedback concepts of oscillators, Barkhausen's criteria Phase shift oscillator — Expression for frequency of oscillation.

Unit-III: (14 Hrs)

5. Special devices- Construction and Characteristics: Photo diode - Shockley diode -Solar cell, Opto - couplers - Field Effect Transistor (FET) - FET as an Amplifier – Uni-Junction Transistor UJT as a relaxation oscillator - Silicon controlled rectifier (SCR) - SCR as a switch.

Unit-IV: (14 Hrs)

6. Digital Electronics

Binary number system, conversion of binary to decimal vice-versa. Binary addition and subtraction (1's and 2's complement methods).Hexadecimal number system. Conversion from binary to hexadecimal and vice-versa, Decimal to hexadecimal and vice-versa.

7. Logic gates:

OR, AND, NOT gates, truth tables, realization of these gates using discrete components. NAND, NOR as universal gates, Exclusive — OR gate (EX-OR). De Morgan's Laws — Verification.

NOTE: Problems should be solved from every chapter of all units.

Suggested Books:

1. Electronic ‹devices and circuits — Millman .and Halkias. be. *Graw-Hill Education.*
2. principles of Electronics by V.K. Mehta — *S. Chand & Co.*
3. Basic Electronics (Solid state) — B. L. Theraja , S. Chaud & Co.
4. A First Course in Electronics- Anwar A. Khan&Kanchan K. Dey, PHI.
5. Physics of Semiconductor Devices- S. M. Sze
6. Physics of Semiconductors- Streetman.
7. Basic Electronics — Bemod Grob.

B.Sc. (Physics) — III year
Semester — VI
Paper-VI(A) : Electronics Practicals
(DSE-2: Elective)

1. Construction of logic gates (AND, OR, NOT gates) with discrete components- Truth table Verification
2. AND, OR. NOT — gates constructions using universal gates — Verification of truth tables.
3. Construction of NAND and NOR gates with discrete components and truth table verification
4. Characteristics of a Transistor in CE configuration
5. R.C. coupled amplifier frequency response.
6. Verification of De Morgan's Theorem.
7. Zener diode V-1 characteristics.
8. P-n junction diode V- I characteristics.
9. Zener diode as a voltage regulator
10. Construction of a model D.C. power supply
11. R C phase shift Oscillator —determination of output frequency
12. **LED Characteristics**
13. **FET Characteristics.**

Note: Minimum of eight experiments should be performed.

Suggested Books:

I. B.Sc. Practical Physics C. L. Arora — S. Chand & Co.
2. Viva-voce in Phy sics R.C. Gupta. Pragathi Prakashan, Meerut.
3. Laboratory manual for Physics Course by B.P. Khandelwal.
4. Practical Physics by M. Arul Thakpathi by Cornptex Publishers.
5. B.Sc. practical physics- Subbi Reddy.

B.Sc. (Physics)- III Year
Semester — VI
Paper — VI(B) : APPLED OPTICS
(DSE-2: Elective)

Total: 56 Hrs
(4 Hrs / week)

Unit I: Principles or LASER (14 Hrs)
Emission and absorption of Radiation, -Einstein Relations- Pumping Mechanism- optical feedback- Laser rate equation for two. three and Four level Lasers, pumping threshold condition- Principle of Laser beams. Classification of LASER Systems- Gas, Liquid and solid lasers He-Ne and Argon Lasers, their energy level schemes- Ruby Laser and YAG laser, GA-As Laser and their applications in various fields.

Unit II: Holography (14 Hrs)
Basic principle of Holography- Recording of amplitude and phase. The recording medium- reconstruction of original wave front- Image formation by wave front reconstruction- Gaber Hologram- limitations of Gaber Hologram-Fourier Transform Hologram-Volume Hologram- Applications of holograms.

Unit III: (14 Hrs)
Fourier and Non-Linear Optics: Thin lens as phase transformation-thickness function-various types of lenses- Fourier transforming properties of lenses-Object placed in front of the lens- Object placed behind the lens.
Noa-Linear Optics: harmonic generation- second harmonics generation-phase matching condition- Optical mixing- parametric generation of Light- Self focusing of light.

Unit IV: Optical Fibers (14 Hrs)
Fiber types and their structures. Ray optic representation, Acceptance angle and numerical aperture. Step index and graded index fibers. Single mode and multi-mode fibers. Fiber materials for glass fibers and plastic fibers. Signal attenuation in optical fibers. Absorption, Scattering and bending losses in fibers, core and cladding losses. Material dispersion, wave guide dispersion, intermodes distortion and pulse broadening.
Note:-Problems should be solved at the end of every chapter of all units

Suggested Books:

1. Opto electronics .an Introduction-Wilson & IFB Hawkes 2 nd edition
2. Introduction to fourier optics-JW Goodman
3. Lasers and Non linear Optics—BB Laud
4. Optical electronics — Ghatak and Thyagarajan
5. Principles .of Lasers- O. Svelto
6. Optical fiber communication -By Geradkeiser
7. Optical fiber communication-by John M Senior(PHI)

B.Sc. (Physics) — III year
Semester – VI
Paper — VI(B) : Applied Optics Practicals
(DSE-2: Elective)

1. Study of the Profile of a laser beam
2. Determination of the diameter of a thin wire using laser
3. Determination of wavelength of He-Ne laser by transmission grating
4. Construction and recording of a Hologram
5. Study of Fourier transforming properties of lenses
6. Study of second harmonic generation by KDP crystal
7. Measurement of numerical aperture of an optical fiber
8. Measurement of coupling losses in optical fiber
9. Measurement of bending losses in optical fiber
10. Study of audio signal transmission through optical fiber
11. To study the interference of light using optical fiber

Note: Minimum of eight experiments should be performed.

Suggested Books:

1. Introduction to Courier Optics- I Goodman
2. Optical Fiber Communication- john M senior
3. Principles of Lasers-by O.Svelto
4. Modem Optics by Cirant Fowles
5. Principles of Optics by Bom & Wolf
6. Fundamentals of Optics by Jekins & White

B.Sc. (Physics)- III Year

Semester - V

Basics of Energy & Fluid Mechanics

(Generic Elective)

No. of Hours per week: 04 Total Lectures: 60

UNIT-I (15)

Translatory Motion: Newton's laws of motion - Applications of Newton's laws of motion - Principle of Conservation of Linear Momentum

WORK, POWER AND ENERGY: Work done by a constant force - Work done by a variable force - Kinetic Energy - Work - Energy Theorem - Significance of work-energy theorem - Power - Conservation of energy

UNIT-II (15)

Rotational Dynamics and Energy due to Rotation: Rigid body - Moment of inertia of a rigid body- Parallel axis theorem and perpendicular axis theorem - Angular momentum of a Rigid body Equation of motion for rotation of a rigid body - Kinetic energy of rotation of a rigid body - comparison of translational motion of a rigid body along a straight line with rotational motion about a fixed axis

UNIT-III (15)

Viscosity: Viscosity of a fluid - Coefficient of viscosity - streamline turbulent flow - Reynold's number - Poiseulle's equation for the flow of liquid through a tube.

Surface Tension: Molecular forces - Surface tension - Surface energy - Angle of contact - Shape of liquid surface in a capillary tube - rise of liquids in capillary tube - determination of surface tension by capillary rise method.

UNIT-V (15)

Fluid Dynamics: Fluids - Pressure and density - The variation of pressure in a fluid at rest - Pascal's principle - Archimedes' principle - Measurement of pressure, General concepts of fluid flow - streamlines - The equation of continuity - Bernoulli's equation - Applications of Bernoulli's equation and equation of continuity - dynamic lift.

Reference:

1. Physics - Part I David Halliday and Robert Resnick Wiley Eastern Edition
2. Physics - Marcelo Alonso and Edward J Finn - Addison Wesley Longman (AWL)
3. Unified Physics, Vol. I by S.L. Gupta and Sanjeev Gupta, 1997 Jaiprakashnath and Co., Meerut
4. Engineering Physics by R.K Gaur and S L Gupta Fifth Edition 1997 Dhanpat Rai and sons, Delhi

B.Sc. (Physics)- III Year
Semester – VI
Nano Science
(Paper in lieu of project)

Total: 56 Hrs
(4 Hrs / week)

Unit I: (12 Hrs)

Length scales in physics and Nano structures: lD, 2D and 3D nano structures (nanodots. thin films, nanowires, nanorods). Band structure and density of states of materials nano scale — Size effects in nano systems, **surface to volume ratio** — Quantum confinement in 3D, 2D and 1D nano structures and its consequences.

Unit II: (16 Hrs)

Synthesis of Nano structure materials: Top-down and Bottom-up approach - Photolithography — Ball milling — Gas phase condensation — Vacuum deposition — Physical vapor deposition (PVD) — Thermal evaporation — E-beam evaporation — Pulsed Laser deposition - Chemical vapor deposition (CVD) — Sol-Gel Electro deposition — Spray pyrolysis. Hydrothermal synthesis Preparation through colloidal methods — MBE growth of quantum dots

Characterization: X-Ray diffraction — Optical microscopy — Scanning Electron Microscope (SEM) — Transmission Electron Microscope (TEM) — Atomic Force Microscope (AFM) — Scanning Tunneling Microscope (STM).

Unit III: (14 Hrs)

Optical properties: Coulomb interaction in nano structures — concept of dielectric constant for nano structures and charging of nano structure — Quasi-particles and excitons — Excitons in direct and indirect band gap semiconductor nanocrystals — Quantitative treatment of quasi-particles and excitons — Charging effects — Radiative processes: general formalization — absorption, emission and luminescence — Optical properties of hetero structures and nano structures

Electron Transport: Carrier transport in nano structures — Coulomb blockade effect — thermionic emission - tunneling and hoping .conductivity — Defects and ÎnlptirÎtie5: Deep level and surface defects

Unit IV: (14 Hrs)

Applications: Applications of nano particles, quantum dots, nanowires and thin films for photonic devices (LED, solar cells) — Single electron devices (Qualitative only) — CNT based transistors — Nano material devices: Quantum dots — hetero structure Lasers

Optical switching and optical data storage — Magnetic quantum well — magnetic dots — magnetic data storage — Micro Electromechanical Systems (MEMS), Nano Electromechanical Systems (NEMS)

Suggested Books:

1. Introduction to .Nanotechnology — C.P. Poole, Jr. Frank, J. Owens — Wiley liidia Pvt, Ltd.
2. Nanotechnology: Principles & Practices — S.K. Kulkami — Capital Publishing to.)
3. Introduction to Nanoscience and Technology K.K. Chatopadhyay, A.N. Beneijee — PHI Learning Pvt. Ltd.
4. Nanotechnology Richard Booker. Earl Boysen - John Wiley and Sons
5. Nanoparticle Technology Handbook - M. Hosokawa, K. Nogi. M. Naita, T. Yokoyama. Elsevier, 2007.
6. Springer Handbook of Nanotechnology — Bharath Bhushan, Springer-Verlag, Berlin, 2004.

Scheme of Internal Question Paper

B.Sc. (Physics)

Internal Assessment Examination – I & II

Semester: I/II/III/IV/V/VI

Paper:

(For DSC, DSE, GE & Paper in lieu of Project)

Time: 60 min]

[Max.Marks: 25

Answer ALL questions. Each question carries equal marks (1 x 25 = 25)

I. Multiple choice questions (1x 10 = 10)

1.

2

3.

4.

5.

6.

7.

8.

9.

10.

II. Fill in blanks (1 x 15 = 15)

11.

12.

13.

14.

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19.

20.

21.

22.

23.

24.

25.

Note: Internal exam: 25 Marks

Assignment : 05 Marks

Total Internal marks : 30 Marks

FACULTY OF SCIENCE
SCHEME OF QUESTION PAPER
B.Sc (PHYSICS) I/II/III YEAR EXAMINATION
Semester : I/II/III/IV/V/VI
(For DSC, DSE, GE, & Paper in lieu of Project)

Time: 3 Hrs]

[Max. Marks.70

SECTION – A

Answer Any **SIX** questions. Each question carries equal marks (6 X 5 = 30)

1. From Unit I
2. from Unit I
3. From Unit 2
4. From Unit 2
5. From Unit 3
6. From Unit 3
7. From Unit 4
8. From Unit 4

SECTION - B

Answer the following questions. All questions carry equal marks (4 x 10 = 40)

9. (a) From Unit 1
   OR
   (b) From Unit 1

10. (a) From Unit 2
    OR
    (b) From Unit 2

11. (a) From Unit 3
    OR
    (b) From Unit 3

12. (a) From Unit 4
    OR
    (b) From Unit 4

ANNEXURE - IV
GIRRAJ GOVERNMENT COLLEGE (A), NIZAMABAD
Department of Physics

Details of changes made to the syllabus approved by the Telangana University

Subject: **Physics** w.e.f. **2021 -22**

S.No.	Semester	Name of the Topic Deleted, if any	Name of the topic introduced	Justification for change	Percentage of syllabus
1	V	---	**Potential well**	Useful for competitive exams	**15 %**
2	V	Bonding in crystals	**Superconductivity**	Supercond uctivity is more relevant to present trend	
3	V	---	**Practicals 1.Brags law verification 2. Calculation of "d' values 3. Hall effect**	Relevant to theory topics	

RICHARD
Dept. of Physics
Girraj Govt. College
NIZAMABAD