Solapur University, Solapur

B.Sc. Part III PHYSICS

New CGPA Syllabus with effect from June 2016

(Theory Course)

SEMESTER – V

Paper IX: Mathematical Physics & Statistical Physics

100 Marks (3 Credits)
(UA-70, CA-30 Marks)

Paper X: Solid state Physics

100 Marks (3 Credits)
(UA-70, CA-30 Marks)

Paper XI: Classical Mechanics

100 Marks (3 Credits)
(UA-70, CA-30 Marks)

Paper XII: Nuclear Physics

100 Marks (3 Credits)
(UA-70, CA-30 Marks)

Total (A)……400 Marks
12 Credits

Solapur University, Solapur

B.Sc. Part III PHYSICS

New CGPA Syllabus with effect from June 2016

(Theory Course)

SEMESTER - VI

Paper XIII: Electrodynamics

100 Marks (3 Credits)
(UA-70, CA-30 Marks)

Paper XIV: Materials Science1

100 Marks (3 Credits)
(UA-70, CA-30 Marks)

Paper XV: Atomic, Molecular Physics and Quantum Mechanics

100 Marks (3 Credits)
(UA-70, CA-30 Marks)

Paper XVI: Electronics & Instrumentation

100 Marks (3 Credits)
(UA-70, CA-30 Marks)

Total (B)……400 Marks
12 Credits

-

Solapur University, Solapur

B.Sc. Part III PHYSICS

New CGPA Syllabus with effect from June 2016

Practical Course of Semester – V & VI – (C)

ANNUAL - (AT THE END OF SIXTH SEMESTER)
400 Marks 20 Credits
(UA – 280 Marks + CA – 120 Marks)

Group (I to VI) experiments UA (30 * 6) + CA (20 * 6) = 180 + 120=300 Marks
5*3=15 Credits

Scale down of 20 Marks for CA per Group: -
(15 Marks for experimental performance and 03 Marks for attendance 02 Marks for Oral)

Scale down of 30 Marks for UA per Group: As per given in the practical slips

Assessment Part of Practical Course…..……100 Marks (5 Credits)

1. **Journal ……..…….……20 Marks**
   Certified Journal…….10 Marks
   Neatness & Punctuality (5+5)...…….....10 Marks
2. **Seminar report & Seminar report….....15 Marks**
3. **Tour report …….……...15 Marks**
   (Tour of minimum 2-3 Days / Two different industrial visits)

4. **Project of at least 4 – 5 experiments length ..……...50 Marks**
   Theme of the project.....05 Marks
   Data collection……....05 Marks
   Workout / Success….....15 Marks
   Applicability……..10 Marks
   Report writing……...15 Marks

Total (C) ……400 Marks
20 Credits

Grand total of B Sc. III Physics: (A) + (B) + (C) = 400 + 400 + 400 =1200 Marks. Whose C redits are (12 + 12 + 20 = 44 Credits)

NB:

During University Practical examination one practical examiner will assess the first three assessment events of the students along with their assessment of experiment from Group I

And anther examiner will assess the third assessment event of the student along with assessment of experiment from Group V

NATURE FOR COLLEGE ASSESSMENT (CA) OF 30 MARKS

CGPA SEMESTER PATTERN (w e f June 2016)

Time: - 1 hrs **Total marks: - 20**

Q.No.1) Select the correct answer from the given alternatives. (05)

1) ----------

a) ……b)……..c)…….d)……

2) ……. ..Do …….

3) …… Do …….

4) …… Do …….

5) …… Do …….

Q.No.2) Answer any one of the following (05)

1)

2)

Q.No.3) A) Answer any one of the following (10)

1)

2)

AND ASSIGNMENT OF 10 MARKS FOR EACH PAPER

Semester V

Physics Paper VII

Mathematical physics and Statistical physics

1. Vector theorems and introduction to partial differential equation. (6)

1.1 Gauss's theorem.

1.2 Green's theorem

1.3 Stoke's theorem

1.4 Partial differential equation

1.4.1 Degree

1.4.2 Order

1.4.3 Linearity

1.4.4 Homogeneity

1.5 Frobenius method for power series solution of

1.5.1 Legendre differential equation (without solution)

1.5.2 Bessel differential equation (without solution)

1.5.3 Hermite differential equation (withsolution)

2. Orthogonal Curvilinear Coordinates (8)

2.1 Introduction to Cartesian, Spherical polar and Cylindrical Coordinate system

2.2 Concept of Orthogonal Coordinate system

2.3 Gradient in Orthogonal Coordinate system

2.4 Divergence in Orthogonal Coordinate system

2.5 Curl in Orthogonal Coordinate system

2.6 Laplacian Operator in Orthogonal Coordinate system

2.7 Extension of Orthogonal Coordinate system in Cartesian, Spherical polar and Cylindrical Coordinate system

3. Basic Concept in Statistical Physics (8)

3.1 Micro and Macro States

3.2 Micro canonical and Canonical Ensemble

3.3 Phase Space

3.4 Accessible microstates

3.5 A Priory Probability

3.6 Thermodynamic Probability

3.7 Probability Distribution

3.8 Entropy and Probability

4. Maxwell Boltzman Statistics (7)

4.1 Maxwell Boltzman Distribution Law

4.2 Evaluation of constants α and β

4.3 Molecular Speeds

4.4 Thermodynamic functions in terms of partition function

5. Quantum statistics - I (9)

5.1 Bose Einstein Statistics

5.2 Bose Einstein Distribution Law

5.3 Experimental study of black body radiation

5.4 Derivation of Plank's radiation formula

5.6 Deduction of Wein's Formula from Plank's radiation formula

5.7 Deduction of Rayleigh's Jeans Law from Plank's radiation formula

5.8 Deduction of Wein's Displacement Law from Plank's radiation formula

5.9 Stefan's Law from Plank's radiation formula

6. Quantum Statistics - II **(7)**

6.1 Fermi Dirac Distribution Law

6.2 Application to free electrons in metals

6.3 Electron energy Distribution

6.4 Fermi Energy

6.5 Electronic Specific heat of metals

6.6 Comparison of M.B., F.D. and B.E. statistics

Reference Books: -

1. Theory and problems of vector analysis- Schaum outline series- Murray R, Spiegel
2. Mathematical methods for physics – George Arfken
3. Thermodynamics and statistical physics – Sharma, Sarkar
4. Statistical Mechanics –B.B. Laud
5. Statistical and thermal physics – S. Loknathan
6. Statistical Mechanics – Satya Prakash, J.P. Agrawal
7. Elementary Statistical Mechanics – Kumar, Gupta
8. An approach to Statistical Physics – Debi Prasad Ray

Semester V

Physics Paper VIII

Solid state Physics

1. Crystallography: **(09)**

1.1Lattice and Basic

1.2 Unit cell

1.3 Bravis lattices (2-D, 3-D),

1.4 Inter-planer spacing,

1.5 Miller indices,

1.6 Packing fraction and co-ordination number for BCC, SC, FCC & HCP structures.

2. X- ray Diffraction by Crystals: **(07)**

2.1 Reciprocal Lattice and its properties,

2.2 Bragg's Law in reciprocal lattice,

2.3 Powder method of X-ray diffraction for crystal structure,

3. Free electron Theory: **(8)**

3.1 Free electron model (Drude & Lorentz model).

3.2 Sommerfield's theory.

3.3 Fermi-Dirac distribution.

3.4 Fermi energy, degeneracy and non-degeneracy of metals.

4. Band theory of solids: **(08)**

4.1 Origin of energy bands,

4.2 One electron approximation,

4.3 Motion of electron in one dimensional periodic potential (Kronig Penny model),

4.4 Effective mass of electron,

4.5 Difference between metals semiconductors and insulators,

4.6 Hall Effect. And its applications

5. Magnetic materials: **(7)**

5.1classification of magnetic materials,

5.1.1Dimagnetic material

5.1.2 Paramagnetic material

5.1.3 Ferromagnetic material

5.1.4 Anti-ferromagnetic material

5.1.5 Ferri-magnetic and ferrites,

5.2 Energy loss in the hysteresis,

6. Superconductivity: **(6)**

6.1 Superconductor

6.2 Type I and Type II superconductors

6.3 Critical temperature,

6.4 Effect of magnetic field

6.5 Meissner effect,

6.6 Application of superconductor

Reference Books: -

Solid State Physics – S.O. Pillai (wiley easten Ltd)

Solid State Physics - A. J. Dekker

Solid State Physics - Charles Kittel

Solid State Physics - R.L. Singhal

Solid State Physics – Saxena and Gupta

Semester V

Physics Paper – IX

Classical Mechanics

1. Mechanics of a particle and system of particles: (7)

1.1 Mechanics of a particle using vector algebra and vector calculus.

1.2 Conservation theorems for linear momentum, angular momentum and energy of a particle.

1.3 Mechanics of a system of particles, concept of centre of mass.

1.4 Conservation theorems for linear momentum, angular momentum and energy of a system of particles.

1.5 Application of Newton's law of motion - Projectile motion in resistive medium

2. Lagrangian Formulation: (10)

2.1 Limitations of Newtonian Formulation

2.2 Introduction of Lagrangian Formulation

2.3 Constraints

2.4 Degrees of freedom

2.5 Generalised coordinates 2.6 Principle of virtual work

2.7 D'Alembert's Principle

2.8 Lagrange's equation from D'Alembert's Principle.

2.9 Application of Lagrange's equation to

i) A particle in space (Cartesian coordinates)

ii) Atwood's Machine and

iii) A bead sliding on uniformly rotating wire

iv) Simple pendulum

v) Simple harmonic Oscillator.

3. Moving Coordinate systems: (8)

3.1 Moving origin of coordinates

3.2 Pseudo forces 8

3.3 Rotating coordinate systems

3.4 Coriolis force

3.5 Foucault's pendulum

3.6 Effects of Coriolis force in nature

3.7 Effect of Coriolis force on freely falling body.

4. Techniques of Calculus of Variation: (6)

4.1 Hamilton's principle

4.2 Deduction of Lagrange's equations from Hamilton's principle

4.3 Applications:

i) Shortest distance between two points in a plane

ii) Brachistochrone problem

iii) Minimum surface of revolution.

5. Coupled Oscillations: (6)

5.1 Frequencies of coupled oscillatory system

5.2 Normal modes and normal coordinates

5.3 Energy of coupled oscillations

5.4 Energy transfer in coupled oscillatory system.

6. Motion of rigid body: (8)

6.1 Motion of rigid body in space

6.2 Euler's theorem

6.3 Angular momentum and energy

6.4 Euler's equations of motion

6.5 Motion of a symmetric top (without nutation).

References:

1. Classical Mechanics: Herbert Goldstein

2. Classical Mechanics: N. C. Rana and P.S.Joag

3. Introduction to classical Mechanics: R. G. Takawale and P.S. Puranic

4. Clasical Mechanical: Gupta, Kumar and Sharma

5. Classical Mechanics: P.V.Panat

Semester - V

Physics Paper X
Nuclear Physics

1. Nuclear structure and properties **(10)**

1.1 Composition of nucleus

1.2 Nuclear radius

1.3 Nuclear spin

1.4 Nuclear magnetic moment

1.5 Electric quodrupole moment

1.6 Mass defect

1.7 Binding energy

1.8 Packing fraction

1.9 Liquid drop model of nucleus

1.10 Semi-empirical mass formula

2. Nuclear reactions **(6)**

2.1 General scheme of nuclear reactions

2.2 Q value of nuclear reactions

2.3 Threshold energy

2.4 Cross section of nuclear reactions (qualitative)

2.5 Stripping reactions

2.6 Pick-up reactions

3. Particle Accelerators: **(8)**

3.1 Need of accelerator

3.2 Cyclotron

3.3 Limitations of cyclotron

3.4 Phase stable orbit

3.5 Synchrocyclotron

3.6 Betatron

4. Nuclear radiation detectors **(7)**

4.1 Classification of detectors

4.2 Geiger Muller counter

i. Construction and working

ii. Dead time, recovery time and resolving time

iii. Self quenching mechanism

4.3 Bubble chamber

4.4 Scintillation counter

4.4 Cloud chamber

5. Nuclear Energy levels **(8)**

5.1 Alpha decay- α disintegration energy

5.2 α particle spectra

5.3 Nuclear energy levels

5.4 Beta decay –Experimental study of β decay 5 .5 Continuous β ray spectrum

5.6 Pauli's neutrino hypothesis

5.7 Nuclear energy levels from β decay

6. Elementary Particles **(6)**

6.1 Types of interactions

6.2 Classification of elementary particles

6.3 Properties of particles

Reference Books:

1. Nuclear Physics : Irving Kaplan (Addison Wesley)

2. Nuclear Physics : S.N. Ghoshal (S.Chand Publising Co.)

3. Nuclear Physics : D.C.Tayal (Himalayan Publishing House)

4. Nuclear Physics : J.B.Rajam (S.Chand Publising Co.)

5. Concepts of Modern Physics : Arthur Beiser (Tata McGraw Hill Publishing)

6. Atomic and Nuclear Physics : N. Subhramanyam & Brijlal(S.Chand Pub. Co.)

7. Concepts of Nuclear Physics : B.L.Cohen (Tata McGraw Hill Publishing)

8. Nuclear Physics an introduction: W E Barcham

Semester VI
Physics Paper XI
Electrodynamics

1. Electrostatics and Charged particle dynamics: (8)

1.1 Coulomb's law
1.2 Gauss law in differential form
1.3 Poisson's and Laplace's equations
1.4 Applications of Poisson's and Laplace's equation to spherical systems
1.5 Motion of charged particles in constant electric field
1.6 Motion of charged particles in constant magnetic field
1.7 Motion of charged particles in constant crossed uniform electric and magnetic fields.

2. Time varying fields: (7)

2.1 Electromotive force
2.2 Electromagnetic induction-Faraday's law
2.3 Lenz's law
2.4 Faraday's laws-Integral & Differential forms
2.5 Self inductance
2.6 Application to - solenoid
2.7 Mutual inductance
2.8 Application to transformer

3. Maxwell's equations: (9)

3.1 Magnetic Susceptibility and Permeability
3.2 Biot - Savart law

3.3 Derivation of $\nabla . \vec{B} = 0$

3.4 Ampere's law

3.5 Derivation of $\nabla \times \vec{B} = \mu_0 \vec{j}$ OR Differential form of Ampere's law.

3.6 Displacement current density

3.7 Equation of continuity

3.8 Maxwell's correction to Ampere's law

3.9 Maxwell's equations for time dependent electric and magnetic fields in vacuum

3.10 Maxwell's equations for time dependent electric and magnetic fields in material medium.

3.11 Physical significance (Integral form)of Maxwell's Equation

4. Electromagnetic waves: (9)

4.1 Conservation of energy in electromagnetic field and Poynting's theorem.

4.2 Conservation of momentum in electromagnetic fields.

4.3 Wave equations for electric and magnetic fields in vacuum

4.4 Plane wave solutions, orthogonality of $\vec{E}$, $\vec{B}$ and propagation vector $\vec{k}$

4.5 Plane E. M. waves in Dielectrics

4.6 Plane E. M. waves in conductors, Attenuation of wave in metal (skin depth)

5. Reflection and Refraction of E.M. waves: (7)

5.1 Boundary conditions for E. M. field vectors ($\vec{D}$, $\vec{B}$, $\vec{E}$ & $\vec{H}$)

5.2 Reflection and refraction of E. M. waves at a boundary of two dielectrics (Normal incidence only)

5.3 Total internal reflection.

6. Radiation from Electric Dipole: (5)

6.1 Electric dipole

6.2 Retarded time and retarded potential

6.3 Electric dipole radiation

6.4 Radiation reaction for Electric dipole

Reference Books:

1. Introduction to Electrodynamics (second edition) – David J. Griffiths
2. Introduction to Electrodynamics (third edition) – David J. Griffiths
3. Classical Electrodynamics – J. D. Jackson
4. Classical Electrodynamics – S. P. Puri
5. Electrodynamics – B. B. Laud
6. Foundations of Electromagnetic theory – Reitz and Milford

Semester VI

Physics Paper XII (Materials Science)

1. **Materials and their properties:** (8)
   - 1.1 Classification of materials
   - 1.2 Organic, inorganic and biological materials
   - 1.3 Properties of materials

1.3.1 Mechanical properties

1.3.2 Thermal properties

1.3.3 Optical properties

1.3.4 Electrical properties

1.3.5 Magnetic properties

2. **Polymer materials:** (12)

2.1 Polymers

2.2 Polymerization mechanism

2.2.1 Additional polymerization

2.2.2 Condensation polymerization

2.2.3 Homo-polymer

2.2.4 Co-polymer

2.3 Degree of polymerization

2.4 Defects in the polymers

2.5 Mechanical properties of polymers, deformation, reinforced polymers

2.6 Applications of polymers.

3. **Ceramic Materials:** (6)

3.1 Classification of ceramic materials

3.2 Structure of ceramics

3.3 Ceramic possessing

3.4 Properties of Ceramics

3.5 Applications of Ceramics

4. **Composite Materials:** (6)

4.1 Fabrication of composites

4.2 Mechanical properties of composites

4.3 Particle-Reinforced Composites

4.4 Fiber-Reinforced composites

4.5 Applications of composites

5. **Nano-structured Materials:** (7)

5.1 Synthesis of nano-structured materials (Different Types with advantages and disadvantages)

5.1.1 Chemical Bath Deposition method (CBD)

5.1.2 Laser Ablation

5.2 Properties of nano-structured materials

5.3 Characterization of nano-structured materials

5.4 Carbon nano tubes (CNT)

5.5 Applications of nano-structured materials

6. **Biomaterials:** (6)

6.1 Bio-mechanism

6.2 Classification of biomaterials

6.3 Processing of biomaterials

6.4 Properties of biomaterials

6.5 Applications of biomaterials

References:

1. Material science by S.L. Kakani, Amit Kakani, New age international publishers.
2. Materials science and engineering, V. Raghavan, 5th edition, PHI
3. Materials science by R.S. Khurmi, S. Chand
4. Materials science, G.K. Narula, K.S. Narula, V.K. Gupta, Tata McGraw-Hill.
5. Semiconductor physics and devices by S.S. Islam, Oxford university press, 1st edition
6. Nanotechnology: An Introduction to Synthesis, Properties and Applications of Nanomaterials, by Thomas Varghese & K.M. Balakrishna, Atlantic publication
7. Introduction to nanoscience and nanotechnology, by Chattopadhyay K.K., Banerjee A.N., PHI
8. Materials science – V. Rajendran & A. Marikani (TMHl).
9. Elements of material Science & engineering.- I.H.Van Vlack (4th Edition.).

Semester VI

Physics Paper XIII

Atomic Physics, Molecular Physics and Quantum Mechanics

1. Atomic Spectra (6)

1.1 Review of quantum numbers

1.2 Electronic configuration of alkali metals

1.3 Spectral notations

1.4 Optical spectral series

1.5 Doublet fine structure of alkali metals

1.6 Spectrum of Sodium

1.7 Selection rules

1.8 Intensity rules

2. Effects of Magnetic and Electric fields on Atomic Spectra (6)

2.1 Anomalous Zeeman effect and its explanation from vector atom model

2.2 Paschen Back effect

2.3 Paschen Back effect in principal series doublet

2.4 Selection rules for Paschen Back effect

2.5 The Stark effect of hydrogen

2.6 Weak field Stark effect in hydrogen

2.7 Strong field Stark effect in hydrogen

3. Molecular Spectra and Raman Effect (10)

3.1 Molecular bond

3.2 Rotational energy levels and Rotational spectra

3.3 Vibrational energy levels and Vibrational spectra

3.4 Vibration-Rotation spectra

3.5 Electronic spectra of a diatomic molecule

3.6 Franck-Condon principle

3.7 Raman effect

3.8 Characteristic properties of Raman lines

3.9 Classical theory of Raman effect

4. Quantum Mechanics (5)

4.1 Heisenberg's uncertainty principle (Statement) and its similarity with concept of matter waves

4.2 Physical significance of ψ

4.3 Time dependent and time independent Schrödinger wave equations

4.4 Eigen values and Eigen functions

4.5 Probability current density

5. Application of Schrodinger's time independent wave equation (10)

5.1 Particle in a Box (one and three dimensional cases), its Eigen values and Eigen functions.

5.2 Step Potential (Statement, boundary conditions, Schrodinger's equations in different regions and Discussion of results)

5.3 Potential Barrier (Statement, boundary conditions, Schrodinger's equations in different regions and Discussion of results)

5.4 Potential Well (Statement, boundary conditions, Schrodinger's equations in different regions and Discussion of results)

5.5 Linear Harmonics Oscillator – Eigen values and Eigen functions

5.6 Zero point energy

6. Operators (8)

6.1 Operators in quantum mechanics

6.2 Expectation values and properties

6.3 Angular momentum operators

6.4 Commutation properties for components L_x, L_y , L_z

6.5 Commutation for L^2 and L_z operators and their Eigen values

6.6 Schrodinger's equation for hydrogen atom

6.7 Separation of radial and angular parts

References:

1. Atomic Spectra – H.E. White
2. Molecular Spectroscopy - Banwell
3. Molecular Spectroscopy – Hertzberg
4. Quantum Mechanics - J. Powell and B. Creassman
5. Introduction to Quantum Mechanics - Pauling and Wilson
6. Elements of Quantum Mechanics - Kamal Singh and S.P. Singh.
7. Perspectives of Modern Physics – Arther Beiser
8. Quantum Mechanics – Chatwal Anand

Semester VI

Physics Paper XIV

Electronics & Instrumentation

1. Operational Amplifier: - **(9)**

1.1 Block diagram of OP-AMP

1.2 Characteristics of OP-AMP

1.3 OP-AMP parameters

1.4 OP-AMP as inverting amplifier

1.5 OP- AMP as non- inverting amplifier

1.6 Applications of OP-AMP

1.6.1 Adder

1.6.2 Substractor

1.6.3 Differentiator

1.6.4 Integrator

1.6.5 Comparator

1.6.6 Schmitt's trigger

2. Timer: - **(6)**

2.1 Functional Block diagram of IC 555, its Pin connections

2.2 Operating modes

2.2.1 Monostable

2.2.2 Astable

2.3 Applications of timer IC 555 as

2.3.1 Linear ramp generator

2.3.2 Square wave generator

2.3.3 Voltages to frequency converter

3. Power Electronics: - **(10)**

3.1 Four layer PNPN device

3.2 SCR construction and working

3.3 Characteristics of SCR,

3.4 Turn ON and Turn OFF methods of SCR,

3.5 Applications of SCR to control the speed of DC motor,

3.6 Construction, working and characteristics of Diac.

3.7 Construction, working and characteristics of Triac

3.8 Applications of Diac and Triac.

4. Display Devices **(7)**

4.1 Classification of Displays

4.2 Light Emitting Diodes

4.3 Liquid Crystal Display and its Important Features

4.4 Gas discharge plasma displays

4.5 Segmented gas discharge displays

4.6 Segmental displays using LEDs

5:-Transducers and Sensors **(7)**

5.1 Classifications of Transducers

5.2 Characteristics of transducers

5.3 Selection criteria for transducer

5.4 Temperature Transducers- Resistance temperature detector

5.5 Optical transducer- Photo conductors (LDR), Photodiode

5.6 Sensor- Dry reed relay

5.7 Servomotor sensors

6. Characterization techniques **(6)**

6.1 Resolution and Magnification of Electron microscope

6.2 Construction, working of SEM

6.3 Application of SEM

6.4 Construction and working of TEM

6.5 Application of TEM

6.6. UV-Visible spectroscopy

6. Construction and working of ultra-visible (UV) spectroscopy

6.8 Applications of ultra-visible (UV) Spectroscopy

References:

1. Electronic principles – Malvino & Leech

2. Basic Electronic – Grob

3. Electronic Circuits and devices – Allan Mottershed

4. Linear Op – Amp – Ramakanth Gaikwad

5. Electronic principles – V.K.Mehta

6. Electronic Instrumentation by H.S. Kalsi

7. Nanotechnology Principles & Practices– Sulbha K. Kulkarni

8. Spectroscopy - Y. R. Sharma

Group I
General Physics

01. Resonance Pendulum

02. S.T. of a Soap film

03. S.T. by Ferguson's modified method

04. Y and η using Flat Spiral Spring

05. Y by Koenig's method

06. Stefan's fourth power law

07. Y by Cornu's method

08. Logarithmic decrement to determine viscosity of a given liquid

09. Temperature of flame.

10. Motion of Spring and calculate (a) Spring Constant and (b) Value of G

11. Modulus of Rigidity of a Wire by Maxwell's needle.

12. Determine the Young's Modulus of a Wire by Optical Lever Method.

Group II
Optics

01. Cardinal points by turn table

02. Cardinal points by Newton's method

03. Diffraction due to cylindrical obstacle

04. Lloyd's single mirror

05. Diameter of a Lycopodium powder

06. Resolving power of prism

07. μ by total internal reflection

08. Elliptically and circularly polarized light

09. Transverse and Spherical aberration of thick lens

10) Dispersive Power of a Plane Diffraction Grating.

11) Intensity Measurement by using Photo sensor and Laser in diffraction patterns of single and double slits.

12) Diameter of a thin wire by studying the diffraction produced by it

Group III

Electricity and Magnetism

1. Self inductance by Owen's bridge.
2. Earth inductor: Measurement of B_H, B_V and angle of deep (θ).
3. Hysteresis of ferromagnetic material by magnetometer method.
4. High resistance by leakage method
5. Absolute capacitance of condenser by B.G. method
6. Calibration of bridge wire carry fosters bridge method
7. Equivalent conductivity of solution at it's infinite dilution..
8. Resistance of moving coil galvanometer by kelvin's method.
9. Charge sensitivity of ballistic galvanometer
10. Magnetic flux density between pole pieces of an electromagnet with the help of search coil and ballistic galvanometer.

11. Measure the magnetic susceptibility of paramagnetic solution ($FeCl_3$) by Quincke;s method.
12. Hysteresis by BG Metod.

Group IV

Electronics and Instrumentation

1. Astable multi vibrator using IC 555
2. OP-AMP as inverting amplifier
3. OP-AMP as comparator –Schmitt's trigger
4. OP-AMP as adder and subs tractor
5. SCR firing by UJT
6. RS and JK flip flop
7. FET as VVR
8. Seven Segment Display
9. Study of mono-stable operation of IC 555
10. Characteristics of SCR
11. Build a regulated power supply of 6V by using IC 7805

12. Build a dual power supply by using IC 7805 and 7905..

Group –V

Use of computer and internet

1. To create resume by MS word.
2. Create worksheet of student mark sheet in Excel
3. Create an e-mail address, mail the documents, download the received documents and take its print..
4. Search any research paper or book and download from search engine
5. Create photo album with animations by power point presentation
6. Create mail merge letter (Application letter)
7. Draw graph or chart
8. Create poster of your seminar presentation by power point presentation
9. To make student presentee (Catlog) sheet using MS word.
10. From origin plot graph, calculate slope and make calculations.
11. Word to PDF conversion.

12. Create documents in IEEE format by using mathematical model, mathematical functions, various signs and symbols.

Group – VI
Applied Physics

1. Velocity of sound using CRO and microphone
2. Estimation of efficiency of GM counter
3. Determination of Beta particle range and maximum energy
4. Hall effect
5. Resistivity of semi conducting material by four probe method.
6. Themo-electric power of thin film
7. Band gap/temperature sensor suing semiconductor diode.
8. Study the Seebeck effect and Peltier effect with the help of thermocouple..
9. Temperature sensor (PTCR & NTCR)
10. Determination of yield point and the braking point of elastic material.
11. Thin film preparation by any chemical method with different preparative parameters.

12. Thin film characterization by any one method (XRD/ SEM/ FTIR/ EDAX)

NATURE OF THEORY QUESTION PAPER FOR UA OF

CGPA SEMESTER PATTERN (w e f June 2016)

Time: - 2 hrs **Total marks: - 70**

Q.No.1) Select the correct answer from the given alternatives. (14)

1) ----------

a) ……b)……..c)…….d)……

2) ……. ..Do …….

3) …… Do …….

4) …… Do …….

5) …… Do …….

6) …… Do …….

7) ……. ..Do …….

8) ……...Do ……

9) ……...Do …….

10) ……. Do ……

11) ……. Do ……

12) ……. Do …….

13) ……. Do …….

14) ……. Do …….

Q.No.2) Answer any seven of the following (14)

1)

2)

3)

4)

5)

6)

7)

8)

Q.No.3) A) Answer any two of the following (10)

1)

2)

3)

B) Write the answer (04)

Q.No.4 Solve any two of the following (14)

1)

2)

3)

Q.No.5) Solve any one of the following

1) Essay type long answer question / Derive an expression (10)

Example (04)

2) ……. Do …….

NB:

1. **At least two numerical based questions should be asked in Question No. 1**
2. **Question No. 2, 3A and 4 must be included one example to solve.**