

**Credits : 5**

**Hours/Week : 6**

**Medium : English And Tamil**

Semester : 1

(For students admitted from 2011 onwards)

## **PROPERTIES OF MATTER AND SOUND**

### **Unit 1: Elasticity**

Stress – Strain Diagram – Elastic Module, Work done per unit volume in shearing strain – relation between elastic constants – Poisson’s Ratio- Expression for Poisson’s ratio in terms of elastic constants – Twisting couple on a wire – Work done in twisting – Torsional pendulum – Determination of rigidity modulus of a wire.

### **Unit 2: Bending of Beams**

Expression for bending moment – Cantilever – Expression for depression – Experiment to find Young’s Modulus – Cantilever oscillation – Expression for period – Uniform bending – Expression for elevation – Experiment to find Young’s modulus using microscope – Non Uniform bending – Expression for depression – Experiment to determine Young’s modulus using mirror and telescope.

### **Unit 3 a) : Surface Tension**

Definition and dimensions of surface tension – Excess of pressure over curved surfaces – Variation of surface tension with temperature – Jaegar’s Experiment.

#### **b): Physics of Low Pressure**

Production and measurement of low pressure – Grades molecular pump – rotary and diffusion pump Knudsen’s absolute gauge – Detection of leakage – Pirani and Mclead gauge.

### **Unit 4: Viscosity**

Streamlined motion – Turbulent motion – Coefficient of viscosity and its dimension- Rate of flow of liquid in a capillary tube – Poiseuilles’ formula – Experiment to determine the coefficient of viscosity of liquid.

### **Unit 5 : Sound**

Laws of transverse vibrations in strings – verification by Sonometer - Music and noise- Characteristics of musical sound.

Source in an enclosure – reverberation and time of reverberation – Sabine’s formula – Erring Formula – Optimum reverberation – Measurement of reverberation time – Absorption coefficient – Acoustics design – Ultrasonics – Production- Piezo electric oscillator and magnetostriction oscillator method – Properties – Applications.

**List of Books for study:**

1. Properties of matter – Brijlal and Subramanian
2. A text book of sound – N. Subrahmanyam and Brijlal

**References:**

1. Properties of matter – D.S. Mathur.
2. Properties of matter – Subramanian Iyer and Jeyaraman.
3. Oscillations, waves and sound – L.P. Sharma, H.C. Saxena.
4. A text book of sound R. L. Saigal .

**Question Paper Pattern:**

Maximum Marks : 75

Exam Duration : 3 Hours

**Part A** 10X2 = 20 Answer **All** Questions(Two Questions from each unit)

**Part B** 5X5 = 25 Answer **All** Questions(Either or Type - Two Question from each unit)

**Part C** 3X10 = 30 Answer Any **THREE**(One Question from fach unit)

**Signature of the HOD**

**Credits : 5**  
**Hours/Week : 3**  
**Medium : English And Tamil**

Semester : 1

(For students admitted from 2011 onwards)

## **MAJOR PRACTICAL –I**

Choose any Eight only.

1. Newton's rings-determination of radius of curvature of the lens R.
2. Meter bridge – determination of specific resistance.
- 3.Potentiometer –Voltmeter calibration(low range)
4. Newton's law of cooling – Specific heat capacity of the liquid.
- 5.Convex lens –Focal length – Combination method(two types)
6. Young's modulus - Non uniform bending – Scale and telescope .
7. Young's modulus – Non uniform bending –Pin and microscope.
8. Surface tension and interfacial surface tension by drop weight method.
9. Coefficient of viscosity – burette method.
10. Sonometer – Verification of laws.
11. Compound Pendulum – Determination of g and K.
- 12 .Screw Gauge and Vernier Caliper (Measurements)

**Question Paper Pattern:**

Maximum Marks : 60

Exam Duration : 3 Hours

**Signature of the HOD**

**Credits : 5**

**Hours/Week : 6**

**Medium : English And Tamil**

Semester : 2

(For students admitted from 2011 onwards)

## **MECHANICS AND RELATIVITY**

### **Unit 1: Projectile, Impulse & Impact**

Projectile- Path of a projectile is a parabola – Range on a inclined plane – Impulse – Impact – Impulsive force – Laws of impact – Impact of a smooth sphere on a horizontal plane – Direct & oblique impact – Loss of kinetic energy – Motion of two interacting bodies

### **Unit 2: Dynamics of rigid bodies**

Kinetic energy of rotation – Angular momentum of a rotating body – Compound pendulum – equivalent simple pendulum – centre of suspension & centre of oscillation – centre of percussion – minimum period – Determination of  $g$  and radius of gyration of a bar pendulum.

Law of conservation of momentum – Center of mass - Velocity and Acceleration of centre of mass – System of variable mass- Equation of a Rocket motion – conservation of linear and angular momentum.

### **Unit 3: Gravitation and Center of gravity**

Newton's law of gravitation – Gravitational potential and Field due to a spherical shell – Determination of  $G$  Boy's method – C.G. of solid cone and tetrahedron – C.G. of arc and sector of a circle.

### **Unit 4: Center of Pressure:**

Centre of pressure of a rectangular with vertex on surface, base on the surface, triangular, circular lamina, effect of centre of pressure on further immersion. Variation of atmospheric pressure with altitude difference in altitude measurement.- height of the homogeneous atmosphere.

### **Unit 5: Theory of Relativity.**

Galilean-Newtonian relativity, Galilean frames formations- Michelson Morley. Experiment and its importance – Einstein's postulates – Lorentz transformation – Relativity of space and time – Addition of velocities – Variation of Mass with velocity – Mass- Energy equivalence- Physical significance.

**List of Books for Study:**

1. Mechanics Unit I & II M. Narayanamoorthy and N. Nagarethnam – NPC-Chennai.
2. Modern Physics: R. Mugrugesan, Kiruthiga sivaprasath S. Chand & Co Ltd New Delhi
3. Hydrostatics – M.Narayanamoorthy and N.Nagarethnam

**Reference:**

- 1 Mechanics for B.Sc., Classes P. R. Subramaniam, T. Jayaraman and C. Rangarajan S.V. Publishers Chennai.
- 2 Mechanics D.S. Mathur S. Chand & Co Ltd New Delhi.

**Question Paper Pattern:**

Maximum Marks : 75

Exam duration : Three Hours

**Part A** 10X2 = 20 Answer **All** Questions(Two questions from each unit)

**Part B** 5X5 = 25 Answer **All** Questions(Either or Type - Two question from each unit)

**Part C** 3X10 = 30 Answer Any **THREE**(One Question from each unit)

**Signature of the HOD**

**Credits : 5**  
**Hours/Week : 3**  
**Medium : English And Tamil**

Semester : 2  
(For students admitted from 2011 onwards)

## **MAJOR PRACTICAL-II**

(Choose any Eight only)

1. Spectrometer – Refractive index of the prism.
2. Potentiometer – Internal resistance of cells.
3. Meter bridge – verification of laws of resistance.
4. Lee’s disc –specific heat capacity of the bad conductor.
5. Focal length – Concave lens – Combination method (Two types)
6. Young’s modulus – Uniform – Scale and telescope.
7. Young’s modulus – Uniform – Pin and microscope.
8. Surface tension by capillary rise method.
9. Sonometer- Determination of unknown frequency and unknown weight.
10. Melde’s string Determination of frequency.
11. Junction diode and Zener – Characteristics.
12. Comparison of surface tension by capillary rise method.

**Question Paper Pattern:**

Maximum Marks: 60

Exam Duration: 3 Hours

**Signature of the HOD**

**Credits : 5**

**Hours/Week : 6**

**Medium : English And Tamil**

Semester : 3

(For students admitted from 2011 onwards)

## **HEAT AND THERMODYNAMICS**

### **Unit 1: SPECIFIC HEAT**

Specific Heat – Specific Heat of a Liquid by Joule’s Electrical Method, Specific Heat of a Gas – Mayer’s Relation - Specific Heat of a gas at  $C_v$  – Joly’s Steam Calorimeter –  $C_p$  Regnault’s Method - Dulong and Petit’s Law – Variation of Specific Heat and Atomic Heat with Temperature – Debye’s theory – Einstein’s Quantum Theory.

### **Unit 2: NATURE OF HEAT**

Degrees of freedom and Maxwell’s Law of Equipartition of Energy – Atomicity of Gases – Monatomic – Diatomic – Triatomic Gases – Molecular velocity distribution Maxwell’s Derivation – Mean Free Path – Transport Phenomena – Viscosity of Gases – Thermal Conductivity of Gases.

### **Unit 3: THERMODYNAMICS**

Carnot’s Theorem – Thermodynamic Scale of Temperature –Clapeyron Latent Heat Equation – Entropy – Change of Entropy in a Reversible and Irreversible Process – 3<sup>rd</sup> Law of Thermodynamics – T-S Diagram – Entropy of a Perfect Gas – Zero Point Energy And Negative Temperature – Maxwell’s Thermodynamical Relations Derivation.

### **Unit 4: TRANSMISSION OF HEAT**

Coefficient of Thermal Conductivity –Lee’s Disc method for bad conductors. Radial and cylindrical flow of heat – Wiedmann – Franz law – Stefan’s law – Mathematical derivation –Newton’s law of cooling from Stefan’s law –Experimental verification – Stefan’s constant – Experimental determination.

### **Unit 5: STATISTICAL THERMODYNAMICS**

Statistical equilibrium –M.B. distribution law –M.B. distribution law in terms of temperature – application to ideal gas – Quantum Statistics – Phase space – Fermi-Dirac Distribution Law – Electron gas – Fermi energy – Bose – Einstein Distribution Law – Photon gas – Comparison of three statistics.

### **LIST OF BOOKS FOR STUDY:**

1. Heat and Thermodynamics by Brijlal and Subramaniam. S.Chand Publishers
2. Heat and Thermodynamics by J.B.Rajam. S.Chand Publishers

**Question Paper Pattern:**

Maximum Marks : 75

Exam Duration : 3 Hours

**Part A** 10X2 = 20 Answer **All** Questions (Two questions from each unit)

**Part B** 5X5 = 25 Answer **All** Questions (Either or Type - Two questions from each unit)

**Part C** 3X10 = 30 Answer Any **THREE**(One Question from each unit)

**Signature of the HOD**



Page No: 9

**Code:R3PHP3**

**Credits : 5**  
**Hours/Week : 3**  
**Medium : English And Tamil**

Semester : 3  
(For students admitted from 2011 onwards)

## **MAJOR PRACTICAL-III**

(Choose any eight only)

1. Spectrometer –grating- minimum deviation.
2. Air wedge –determine the thickness of a thin wire.
3. Potentiometer – Calibration of ammeter.
4. Emissivity of a surface – Spherical calorimeter.
5. Static torsion – determine the rigidity modulus.
6. Logic gates – Discrete components.
7. Figure of merit- Table Galvanometer.
8. Deflection magnetometer – M & H.
9. Bridge Rectifier.
10. Voltage Doublers and Tripler.
11. Transistor characteristics – common emitter.
12. Specific heat by Joules calorimeter.

**Question Paper Pattern:**

Maximum Marks: 60

Exam Duration: 3 Hours

**Signature of the HOD**

**Credits : 5**

**Hours/Week : 6**

**Medium : English And Tamil**

Semester : 4

(For students admitted from 2011 onwards)

## **OPTICS AND SPECTROSCOPY**

### **Unit 1: GEOMETRICAL OPTICS**

Dispersive power of a prism - Deviation without dispersion - Dispersion without deviation - Spherical aberration in a lens -Methods of minimizing the spherical aberration - Chromatic aberration in a lens - Condition for achromatism for two thin lenses in contact, separated by a distance - Eye piece - Huygens's eye piece.

### **Unit 2: INTERFERENCE**

Condition for bright and dark fringes - Fresnel's biprism - Determination of Wave Length - Interference by reflected and transmitted light In Thin Films - Air wedge - Determination of Thickness of Thin wire - Michelson's interferometer - determination Of Wave Length.

### **Unit 3: DIFFRACTION**

Fresnel and Fraunhofer diffraction(Definition only) - Construction of half period zones - Zone plate - Construction, theory -Comparison of zone plate and convex lens - Fraunhofer diffraction at a single slit - Grating theory Determination of Wave length - Resolving power of a telescope - Relation between magnifying power and resolving power of a telescope - Resolving power of a microscope.

### **Unit 4: POLARISATION**

Brewster's law - Pile of plates -Double refraction - Uni axial crystals - Nicol Prism - Plane ,Circular, Elliptically polarized light (Theory of production and detection) - Quarter wave plate and Half wave plate - Specific rotation - Laurentz half shade polarimeter.

### **Unit 5 : SPECTROSCOPY**

IR, UV Production, Detection and Uses -Rayleigh Scattering - Raman effect - Quantum theory .  
LASER characteristics - Induced absorption, Spontaneous, Stimulated emission - Einstein's coefficient, derivation - Population inversion - Pumping - Uses- semiconductor LASER.

**LIST OF BOOKS FOR REFERENCE**

1. Optics and Spectroscopy by R.Murugesan.
2. Optics and Spectroscopy by N.Subramanian and Brijlal.

**Question Paper Pattern:**

Maximum Marks : 75

Exam Duration : 3 Hours

**Part A** 10X2 = 20 Answer **All** Questions (Two questions from each unit)

**Part B** 5X5 = 25 Answer **All** Questions (Either or Type - Two questions from each unit)

**Part C** 3X10 = 30 Answer Any **THREE** (One question from each unit)

**Signature of the HOD**

**Credits : 5**  
**Hours/Week : 3**  
**Medium : English And Tamil**

Semester : 4

(For students admitted from 2011 onwards)

## **MAJOR PRACTICAL – IV**

Choose any Eight only

1. Spectrometer –grating –normal incidence.
2. Spectrometer – i-d- curve.
3. Potentiometer- high range voltmeter.
4. Potentiometer – Resistance of a coil determination.
5. Torsional pendulum- determination of the rigidity modulus of thin wire.
6. Stokes method – determine the viscosity of the given liquid.
7. Tan C – determination of M & B<sub>H</sub>.
8. Field along the axis of a coil- H determination.
9. Zener regulated power supply.
10. Transistor characteristics-common base.
11. LCR series & parallel resonance circuit.
12. Torsional pendulum – comparison of radii.

### **Question Paper Pattern:**

Maximum Marks: 60

Exam Duration: 3 Hour

**Signature of the HOD**

**Credits : 4**  
**Hours/Week : 7**  
**Medium : English And Tamil**

Semester : 5

(For students admitted from 2011 onwards)

## **ELECTRICITY AND MAGNETISM**

### **Unit 1: ELECTROSTATICS**

Coulomb's law – Proof – Mechanical force experienced by unit area of a charged surface – Gauss Theorem (Statement), Derivation of Coulomb's inverse square law from Gauss law – Relation between electric field and potential – Potential at a point due to a uniformly charged conducting, Non conducting spheres.

### **Unit 2: CURRENT ELECTRICITY**

Kirchoff's Laws of Electricity(Statement), Wheatstone's bridge – Carrey Foster's Bridge – Seebeck effect, Peltier effect, Thomson effect – Thermodynamics of thermocouple – Thermo electric diagrams – Determination of Thomson, Peltier coefficient.

### **Unit 3: ELECTROMAGNETIC INDUCTION**

Electromagnetic Induction, Laws, Self induction, Mutual Induction, Self Inductance by Rayleigh Method - experimental determination of mutual inductance – coefficient of coupling – Charge and Discharge of a Capacitor through a resistor –High resistance by leakage.

### **Unit 4: ALTERNATING CURRENT**

Series and parallel resonance circuit – Resonance condition – their comparison – LC, LR, CR - AC Circuits – choke coil – Transformer – theory with and without load – uses.

### **Unit 5: MAGNETIC PROPERTIES OF MATERIALS**

Permeability, Susceptibility (Definition only) - Relation between them – Properties of dia,para and Ferro magnetic materials –Lange vein's theory of dia and para magnetism –B-H curve-Energy loss due to hysteresis –Importance of hysteresis curves.

### **LIST OF BOOKS FOR STUDY:**

1. Electricity and magnetism by R. Murugesan (2008)  
S. Chand & Company Ltd. New Delhi.
2. Electricity and Magnetism by Brijlal and N. Subrahmanyam.(2000)  
Ratan Prakashan Mandir. Agra.

**REFERENCES:**

- 1 Electricity and Magnetism by D.L. Sehgal, K.L. Chopra and N.K. Sehgal. 5<sup>th</sup> Edition (1996). Sultan chand & Sons. New Delhi.

**Question Paper Pattern:**

Maximum Marks : 75

Exam Duration : 3 Hours

**Part A** 10X2 = 20 Answer **All** Questions (Two questions from each unit)

**Part B** 5X5 = 25 Answer **All** Questions (Either or Type - Two questions from each unit)

**Part C** 3X10 = 30 Answer Any **THREE** (One question from each unit)

**Signature of the HOD**

**Credits : 4**

**Hours/Week : 7**

**Medium : English And Tamil**

Semester : 5

(For students admitted from 2011 onwards)

## **BASIC ELECTRONICS**

### **Unit 1: Diodes and Rectifiers**

P N junction diode – characteristics- Zener diode – Characteristics- LED- Full wave rectifier - ripple factor - filters - L-section,  $\Pi$ -section filters - zener voltage regulated power supply, Photo Diode and Uses.

### **Unit 2: Transistors**

Junction Transistors –construction – Mechanism of amplification – Modes of operation – Alpha & Beta of a Transistor – Current expression – Transistor static characteristics in CB and CE modes –Transistor biasing(voltage divider biasing) – Two port representation of a Transistor – Parameters- Determination of h-parameters.

### **Unit 3: Special devices**

Special semiconductor devices – FET, JFET, MOSFET(Construction And Working) - FET parameters – Comparison between FET and Transistor - Phototransistor – SCR, UJT, characteristics- Application of SCR as relay and UJT as relaxation oscillator.

### **Unit 4: Amplifiers and Oscillators**

Power amplifier – Class A power amplifier –Class B power amplifier - Push pull – Gain of amplifier with feed back – Effects of negative feed back – Oscillators – Types – Concepts of feedback oscillators – Hartley- Collpitt's oscillators.

### **Unit 5: Modulators and Detectors**

Modulation – Amplitude modulation-Modulation factor – Power in AM waves – Limitations of amplitude modulation-Frequency modulation – Phase modulation – Demodulation-Essentials in demodulation- Linear Diode Detector.

### **List of Books for study**

1. Principles of electronics – V.K. Mehta, S.Chand & Co.- 7<sup>th</sup> Rev. Edition (2005).
2. Basic Electronics and Linear Circuits –N.Bhargava, D.Kulshreshtha and S.Gupta,Tata McGraw-Hill Publishing Co.(1983)

**Reference:**

1. Electronic Devices and circuits – Sarjeer Gupta – Dhaanpat rai Publications – New Delhi – Reprint – 2008.
2. Elements of solid state electronics – A. Ambrose and T. Vincent Devaraj – Mera publications -1993.
3. Basic electrical, Electronics and computer Engineering – R. Muthusubramanian, S. Salivahanan, K.A. Muraleedharan – Tata McGraw Hill publishing Co. Ltd., New Delhi – Reprint (2004)
4. Electronic Devices and circuits – Jacob Millman, Christos. C. Halkib – Tata McGraw Hill publishing Co., Ltd., New Delhi – Reprint (2002).

**Question Paper Pattern:**

Maximum Marks : 75

Exam Duration : 3 Hours

**Part A** 10X2 = 20 Answer **All** Questions (Two questions from each unit)

**Part B** 5X5 = 25 Answer **All** Questions (Either or Type - Two questions from each unit)

**Part C** 3X10 = 30 Answer Any **THREE** (One question from each unit)

**Signature of the HOD**



**Credits : 4**  
**Hours/Week : 7**  
**Medium : English And Tamil**

Semester : 5  
(For students admitted from 2011 onwards)

## **ATOMIC AND SOLID STATE PHYSICS**

### **Unit 1 : ATOMIC STRUCTURE**

Excitation of atoms – Critical Potential – Excitation Potential – Ionisation Potential – Experimental determination of critical potential – Frank and Hertz's method – Sommerfield atom model – Qualitative treatment – Derivation of condition for the allowed elliptical orbits – Vector atom model - Quantum numbers associated with Vector atom model.

### **Unit 2: FINE STRUCTURE OF SPECTRAL LINES**

Coupling schemes – L-S and J J coupling \_ Pauli's exclusion principle and verification – Periodic table and its classification – Magnetic dipole moments due to orbital and spin motion – Selection rule for electron transition – Intensity rules – Interval rule – Fine structure of D line – Zeeman effect – Normal and Anomalous (Experimental study and results) – Debye's theory of normal Zeeman effect – Lorentz theory of anomalous Zeeman effect - paschen Back effect and Stark Effect (definition only).

### **Unit 3: X-Rays**

Production of x-rays-Coolidge tube - Origin of X-Rays – Polarization of x-rays- Absorption of X-Rays – Continuous, Characteristic X-Rays – Diffraction of x-rays – Laue's experiments – Bragg's law – Bragg x-ray spectrometer – powder crystal method - Mosley's Law – Importance of Mosley's Law – Compton Effect – Compton Theory – Experimental Verification.

### **Unit 4: PHOTO ELECTRICITY**

Photo electric effect – Einstein's Photo electric equations – Lenard's method to determine  $e/m$  of photo electrons – Experimental investigation on photoelectric effect – laws of photoelectric emission – Richardson and Compton Experiment – Planck's constant – Millikan's Experiment – Photo electric cells - Photo Emissive, Photo Voltaic, Photo Conductive cells – Photo Multiplier – Applications of photo electric cells.

**Unit 5: CRYSTAL STRUCTURE**

Types of solids – Crystalline and Amorphous solids - Space Lattice – The Basis and the crystal structure unit cell and Primitive lattice cell – Lattice parameter – Symmetry elements in a cubic crystals - Point groups – Bravais lattice in two dimension – Seven crystal systems – coordination number for sc, bcc and fcc - Miller Indices – Features of miller indices – Crystal Structure – NaCl, Diamond, Zinc Blende.

**LIST OF BOOKS FOR STUDY:**

1. Modern Physics by R.Murugesan S.Chand Publishers
2. Modern Physics by Sehgal Chopra Sehgal S.Chand Publishers
3. Modern Physics by J.B. Rajam.
4. Solid state physics by Gupta Kumar.
5. Solid State Physics – R- L Singhal. Wiley Eastern Ltd.

**REFERENCE:**

1. Modern Physics by B.L. Theraja.
2. Modern Physics by Beiser.
3. Solid state physics by Saxena Gupta Saxena .

**Question Paper Pattern:**

Maximum Marks : 75

Exam Duration : 3 Hours

**Part A** 10X2 = 20 Answer **All** Questions (Two questions from each unit)

**Part B** 5X5 = 25 Answer **All** Questions (Either or Type - Two questions from each unit)

**Part C** 3X10 = 30 Answer Any **THREE** (One question from each unit)

**Signature of the HOD**

**Credits : 4**

**Hours/Week : 3**

**Medium : English And Tamil**

Semester : 5

(For students admitted from 2011 onwards)

## **MAJOR PRACTICAL – V**

Any Thirteen Experiments:

1. Koenig's – Non Uniform Bending Method – Young's Modulus.
2. Spectrometer – i-i' Method – Refractive Index.
3. Spectrometer – Cauchy's Constants.
4. Potentiometer – E.M.F of a Thermocouple.
5. Carey Foster Bridge – Specific Resistance.
6. B.G – Figure of Merit – Voltage and Current Sensitiveness.
7. FET Characteristics and constants determination.
8. Hartely Oscillator – Frequency and self inductance (L).
9. RC Coupled Transistor Amplifier – Band width.
10. IC – Gates Truth Table Verifications
11. Half Adder, Full Adder using basic logic gates-IC.
12. Demorgan's Theoram Verification - IC-Gates.
13. Operation Amplifier – Adder, Subtractor
14. Emitter Follower
15. BG – Absolute capacitance of a capacitor
16. Microprocessor – 8 bit addition and subtraction
17. Microprocessor – 8 bit multiplication and division
18. Monostable multivibrator using transistor

### **Question Paper Pattern:**

Maximum Marks: 60

Exam Duration: 3 Hours

**Signature of the HOD**

**Credits : 4**  
**Hours/Week : 7**  
**Medium : English And Tamil**

Semester : 6  
(For students admitted from 2011 onwards)

## **WAVE MECHANICS AND NUCLEAR PHYSICS**

### **Unit 1:**

Dual nature of light – De' Broglie's concept of matter waves – De' Broglie wavelength – Wave and group velocity – Relation between wave and group velocity – Davisson and Germer experiment – G.P. Thompson experiments – Heisenberg's Uncertainty Principle.

### **Unit 2 :**

Basic Postulates of wave mechanics – Quantum operators, Linear operator, Hermitian operator, Parity operators – Properties of wave Function – Orthogonal and normalized wave functions – Eigen Values and Eigen Functions – Schrodinger's Equations – Time Independent – Time Dependent – Application – Particle in a box.

### **Unit 3:**

Classification of Nuclei – General Properties of Nucleus – Size, Mass, Density Charge, Angular momentum and Dipole moments – Binding Energy – Packing fraction – Nuclear stability – Semi Empirical Mass formula – Liquid Drop Model – Shell Model.

### **Unit 4:**

Ionisation Chamber – Wilson Cloud Chamber – Linear Accelerator – Betatron – Radioactivity – Properties of Alpha, Beta and Gamma Rays – Geiger-Nuttal Law – Nuclear Isomerism – Soddy Fajan's displacement law – Radioactive disintegration Law – Half Life, Mean Life periods – Law of Successive disintegration.

### **Unit 5:**

Types of Nuclear Reaction – Energy balance – Q value – Transmutation by Alpha, Proton, Deutrons and Neutrons – Artificial Radioactivity – Radio Isotopes – Applications – Nuclear Fission – Chain reaction – Nuclear Reactor – Nuclear Fusion – Thermo Nuclear Reactions – Carbon-Nitrogen Cycle – Proton-Proton Cycle.

**LIST OF BOOKS FOR STUDY:**

1. Modern Physics by R.Murugesan S.Chand & Co New Delhi 1995.
2. Modern Physics by M.A. Thangaraj & N. Anandha Krishnan.
3. Mordern Physics by J.B. Rajam, S. Chand & Co New Delhi 1980.

**Question Paper Pattern:**

Maximum Marks : 75

Exam Duration : 3 Hours

**Part A** 10X2 = 20 Answer **All** Questions (Two questions from each unit)

**Part B** 5X5 = 25 Answer **All** Questions (Either or Type - Two questions from each unit)

**Part C** 3X10 = 30Answer Any **THREE** (One question from each unit)

**Signature of the HOD**

**Credits : 4**

**Hours/Week : 7**

**Medium : English And Tamil**

Semester : 6

(For students admitted from 2011 onwards)

## **DIGITAL ELECTRONICS**

### **Unit 1: NUMBER SYSTEM AND LOGIC GATES**

Decimal – Binary – Octal – Hexadecimal Number Systems – Inter Conversion – BCD Codes – 8 - 4 - 2 - 1 Codes, Excess – 3 Code – Gray Code – Binary Arithmetic Operations – Addition – Subtraction – Multiplication – Division – 1's Complement – 2's Complement Binary Operation.

Basic Logic Gates AND, OR, NOT, NAND, NOR, X – OR, X – NOR – Universal Building Blocks.

### **Unit 2: BOOLEAN ALGEBRA AND KARNAUGH MAPS**

Basic law of Boolean algebra – Demorgan's theorems – Duality Theorem – Reducing Boolean expressions Using Boolean laws – Minterms – Maxterms – Sum of Products – Products of Sums.

3 Variable K – Map – 4 - Variable K – Map sum of product only – Simplification of K-Maps.

### **Unit 3: ARITHMETIC AND COMBINATIONAL CIRCUIT**

Half Adder – Full Adder – BCD Adder – Half Subtractor – Full Subtractor – Multiplexer – 4 to 1 Multiplexer – Demultiplexer – 1 to 4 Demultiplexer.

Decoder – Binary to Gray Decoder – BCD to Seven Segment Decoder – Encoder (Introduction only).

### **Unit 4: SEQUENTIAL LOGIC DESIGN**

Flip Flops – R/S Flip Flop – D-F/F – T-F/F – JK F/F – Master Slave Flip Flops – Registers – Shift Left – Shift Right (4 bit only) – Synchronous Counters - Mod 3, Mod 5, Mod 10 Counters.

### **Unit 5: OPERATIONAL AMPLIFIER**

Op-Amp Characteristics and Parameters – Inverting Summing Amplifier (Adder)- Inverting Difference Amplifier (Subtractor) - Differentiator – Integrator – Comparator.

Op-Amp Generators - Astable Multivibrator – Monostable Multivibrator.

**List of Books for study**

1. Digital Principles and Applications – Albert Paul Malvino and Donald P. Leeach
2. Digital circuits & design. S. Salivaganan and S. Arivalakan- Vikas Publishing house

**Reference**

1. Operational Amplifier – Chowdhry.

**Question Paper Pattern:**

Maximum Marks : 75

Exam Duration : 3 Hours

**Part A** 10X2 = 20 Answer **All** Questions (Two questions from each unit)

**Part B** 5X5 = 25 Answer **All** Questions (Either or Type - Two questions from each unit)

**Part C** 3X10 = 30 Answer Any **THREE** (One question from each unit)

**Signature of the HOD**

**Credits : 4**  
**Hours/Week : 7**  
**Medium : English And Tamil**

Semester : 6

(For students admitted from 2011 onwards)

# **MICROPROCESSOR AND C PROGRAMMING**

## **Unit 1: BASICS OF DIGITAL COMPUTER**

Basic components of a digital computer - Evolution of microprocessors - Important INTEL microprocessors - Buses - Hardware, Software and Firmware - Memory - Semiconductor memories - RAM,ROM - Flash memory.

## **Unit 2: INTEL 8085 AND ITS ARCHITECTURE**

INTEL 8085 - Pin Diagram - Architecture - Various registers - Status Flags - Interrupts and their order of priority - Addressing modes - Direct ,Register, Register indirect, Immediate and implicit addressing - Instruction set - Data transfer group - Arithmetic Group - Logical group - Branch control group and stack and I/O- Machine control group.

## **Unit 3: ASSEMBLY LANGUAGE PROGRAMMING**

Addition - Subtraction - Multiplication -Division of two 8- bit numbers - Finding the largest number in a data array - Finding the smallest number in a data array- Arranging a list of numbers in ascending or descending order.

## **Unit 4: Introduction to C**

Structure of 'C' – Fundamentals of C – Character set – identifiers and key words – data types constants – variables – declarations – expressions – symbolic constants – arithmetic operators- Relational, Logical and assignment operators, Unary, Bitwise and Ternary operators – conditional operators – I/O function – library function.

## **Unit 5: Preliminaries and Functions**

Data input and output – getchar, putchar, scanf, printf, gets, puts functions – Control statements- while, do.... While, for nested loops, if ... else, switch, break, continue and goto statements.

Basic functions – Return values and their types- Calling functions – storage class- automatic variables- External Variables- Static Variables- Recursion.



**LIST OF BOOKS FOR STUDY:**

1. B.Ram.Fundamentals of Microprocessors and Microcomputers.  
Dhanpat Rai publication pr. Ltd., New Delhi.
2. Ramesh. S.Goankar, Microprocessor Architecture, Programming and Applications  
with the 8085, Penram International Publishing (India) Pvt.Ltd.

**REFERENCES:**

1. Programming in C -E. Balagurusamy – Tata McGraw Hill Pub. Co.
2. Programming with C - Venugopal, K.R. And Sudep, R.P.- Tata McGraw Hill  
Pub. Co. Ltd

**Question Paper Pattern:**

Maximum Marks : 75

Exam Duration : 3 Hours

**Part A** 10X2 = 20 Answer **All** Questions (Two questions from each unit)

**Part B** 5X5 = 25 Answer **All** Questions (Either or Type - Two questions from each unit)

**Part C** 3X10 = 30 Answer Any **THREE** (One question from each unit)

**Signature of the HOD**

**Credits : 4**

**Hours/Week : 3**

**Medium : English And Tamil**

Semester : 6

(For students admitted from 2011 onwards)

## **MAJOR PRACTICAL – VI**

Any Thirteen Experiments:

1. Koenings – Uniform Bending Method – Young’s Modulus.
2. Spectrometer – Dispersive Power of a Grating.
3. Spectrometer – Small Angled Prism.
4. Potentiometer – Thermister – Temperature Coefficient.
5. Carey Foster Bridge - Temperature Coefficient.
6. Half Subtractor , Full Subtractor.
7. Flip Flop.
8. Zener Regulated Power Supply – percentage of regulation.
9. Construction of Dual Power Supply 5 -0 -5v, 9 -0-9v.
10. Colpits Oscillator frequency and L determination.
11. FET Amplifier – Band width.
12. Operational Amplifier – Differentiator, Integrator.
13. Feedback Amplifier - Transistor.
14. B.G. – Comparision of Capacitance
15. B.G. – Comparision of mutual inductance
16. NAND, NOR Universal gates – Verification
17. Microprocessor – Decimal to Octal Conversion
18. Astable Multivibrator

### **Question Paper Pattern:**

Maximum Marks: 60

Exam Duration: 3 Hours

**Signature of the HOD**

**Credits : 4**

**Hours/Week : 4**

**Medium : English And Tamil**

Semester : 3

(For students admitted from 2011 onwards)

## **ALLIED PHYSICS – I**

### **Unit 1: MECHANICS**

Centre of gravity- Determination of C.G – Centre of gravity of a solid hemisphere and Solid cone-Floatation-stability of floating bodies – Meta centre-Determination of met centric height of a ship-Variation of atmospheric pressure with altitude- Height of homogeneous atmosphere.

### **Unit 2: SOUND**

Characteristics of musical sound- Intensity of sound-Decibel and phon –Noise pollution-Ultrasonic production - piezo electric method, properties and application-Acoustic design-Reverberation and time of reverberation -Sabine's formula (no derivation)- Requisites for good auditorium.

### **Unit 3: PROPERTIES OF MATTER**

Gravitation-Kepler's laws of motion-Newton's law of Gravitation-Density of the earth-Mass of the earth and the sun-Variation of g with latitude-altitude and depth-variation of g with rotation of the earth –Difference between mass and weight.

### **Unit 4: THERMAL PHYSICS**

Newton's Law of cooling - Black body radiation - Newton's law of cooling-Stefan's law of radiation-Newton's law from Stefan's law - Experimental verification of Stefan's law-Determination of Stefan's Constant - Solar constant - Measurement of solar constant - Angstrom's pyroheliometer-temperature of the sun.

### **Unit 5: OPTICS**

Electromagnetic spectrum - Solar spectrum - Raman Effect - Theory-Experiment-Application of Raman effect.

UV, IR Spectra , Spectrometer, applications.

**LIST OF BOOKS FOR STUDY / REFERENCE:**

1. Mechanics-D.S.Mathur.
2. A Text Book of Sound-Brijlal and Subramanian
3. Properties of Matter-Brijlal and Subramaniam .
4. Properties of Matter - R.Murugeshan.
5. Heat and Thermodynamics-Brijlal and Subramanian.
6. A text book of Optics-Brijlal and Subramaniam.
7. Allied Physics Paper I-A.Sundaravelusammy.

**Question Paper Pattern:**

Maximum Marks : 75

Exam Duration : 3 Hours

**Part A** 10X2 = 20 Answer **All** Questions (Two questions from each unit)

**Part B** 5X5 = 25 Answer **All** Questions (Either or Type - Two questions from each unit)

**Part C** 3X10 = 30 Answer Any **THREE** (One question from each unit)

**Signature of the HOD**

**Credits : 4**

**Hours/Week : 4**

**Medium : English And Tamil**

Semester : 4

(For students admitted from 2011 onwards)

## **ALLIED PHYSICS – II**

### **Unit 1: ELECTROSTATICS**

Coulombs theorem-Mechanical force on the surface of a charged conductor- Electro statistics energy in the medium- Capacitors-Principles of a capacitor -Capacity of an isolated sphere -Energy of a charged capacitor - Loss of energy due to sharing of charges.

### **Unit 2: ELECTRICITY**

Kirchoff's Laws ( statement only) wheat stone bridge - Condition for bridge balance-Carey Fosters bridge - Variation of resistance with temperature-Laws of Electromagnetic induction – self induction – Raleigh's method of finding self inductance of a coil – Mutual induction – Absolute determination of M (B.G) – Coefficient of coupling.

### **Unit 3: ATOMIC PHYSICS**

Atom models-Sommerfield's and vector atom models-Paulis exclusion principle- Various quantum numbers. X-rays - Continuous and characteristic X-rays - Mosley's law and its importance - Bragg's law - Bragg's spectrometer.

### **Unit 4: NUCLEAR PHYSICS**

Nucleus-Nuclear size-charge-mass and spin-Liquid drop -Nuclear reactions- Elementary particles -Baryons and Leptons - Anti particles - Discovery and properties of neutrons.

### **Unit 5: ELECTRONICS AND DIGITAL ELECTRONICS**

Junction diode- characteristics study- zenar diode- characteristics study- bridge rectifier- Transistor- statics characteristic in CE mode- Number systems- Binary, Decimal, Octal, Hexa- Gates – OR, AND, NOT,NOR,NAND- Demorgan's Theorem- NAND & NOR Universal gates.

**List of Books for study / Reference:**

1. Electricity and Magnetism – Brijilal and Subramaniam
2. Modern Physics – R.Murugasan
3. Principles of Electronics – V.K Mehta
4. Allied Physics II – A. Sundravelusamy
5. Digital Principles and Applications – Albert Paul Malvino and Donald P. Leach

**Question Paper Pattern:**

Maximum Marks : 75

Exam Duration : 3 Hours

**Part A** 10X2 = 20 Answer **All** Questions (Two questions from each unit)

**Part B** 5X5 = 25 Answer **All** Questions (Either or Type - Two questions from each unit)

**Part C** 3X10 = 30 Answer Any **THREE** (One question from each unit)

**Signature of the HOD**

**Credits : 4**

**Hours/Week : 3**

**Medium : English And Tamil**

Semester : 4

(For students admitted from 2011 onwards)

## **ALLIED PRACTICAL**

### **Choose any Fourteen only:**

1. Non uniform bending – Pin and Microscope Method
2. Surface Tension and Interfacial Tension – Drop Weight Method
3. Coefficient of Viscosity of liquid using graduated burette
4. Specific heat capacity of liquid by cooling Method
5. Lee’s Disc – Thermal Conductivity of Bad Conductor
6. Spectrometer – Grating – minimum deviation method
7. Spectrometer Refractive index of Solid Prism (A, D and  $\mu$ )
8. Newton’s Rings – Radius of curvature of a convex lens
9. Sonometer – Verification of Three Laws
10. Carey Foster’s Bridge – specific Resistance
11. Meter Bridge – Verification of Resistance in Series and Parallel
12. EMF of thermocouple – Direct Deflection method
13. Characteristics of a junction diode
14. Characteristics of a zener diode
15. AND, OR and NOT logic gates – verification of truth table using Discrete Components.
16. Meter Bridge – Determination of specific Resistance
17. Potentiometer – Low range voltmeter calibration
18. Bridge rectifier - Construction

### **List of Reference Books:**

1. A textbook of practical physics – M.N Srinivasan and others – Sultan Chand & sons, New Delhi.
2. Practical Physics – A. Dhana Lakshmi and K.R. Paramasivam – Apsara Publication, Trichy.

### **Question Paper Pattern:**

Maximum Marks: 60

Exam Duration: 3 Hours

**Signature of the HOD**

**Credits : 4**  
**Hours/Week : 4**  
**Medium : English**

Semester : 3

(For students admitted from 2011 onwards)

## **APPLIED PHYSICS – I**

### **Unit 1: ELECTROSTATICS**

Coulombs theorem-Mechanical force on the surface of a charged conductor- Electro statistics energy in the medium- Capacitors-Principles of a capacitor - Capacity of an isolated sphere -Energy of a charged capacitor - Loss of energy due to sharing of charges.

### **Unit 2: MAGNETOSTATICS**

Magnetic field- magnetic flux density – magnetization – Intensity of magnetization- Permeability – Susceptibility – relation between them – magnetic potential – potential due to a dipole – relation between potential and intensity – magnetic shell and its potential at any point – Properties of dia, para and ferro magnetic materials.

### **Unit 3: CURRENT ELECTRICITY**

Laplace law – Intensity due to a straight conductor carrying a current – field at a point on the axis of a circular coil and solenoid- Ohm’s law – Kirchoff’s law- Application to Wheatstone bridge – Carrey Foster’s bridge – Potentiometer – Measurement of current and resistance– Calibration of low range voltmeter – Fleming’s left hand rule – Theroy of moving coil galvanometer.

### **Unit 4: ELECTROMAGNETIC INDUCTION**

Laws of electro magnetic induction-Relation between induced emf and mutual induction – self induction by Rayleigh’ method – mutual induction – coefficient of coupling – absolute determination of M (B.G) – Transformer principle, construction and working.

### **Unit 5: ALTERNATING CURRENT**

Circuit with RL, RC, and LC measurement of current and voltages – Parallel and series resonant circuits – power in an AC circuit – Power factor – Choke coil.



**BOOKS FOR REFERENCE AND STUDY:**

1. Applied physics – Paper I –A.Sundaravelusamy – Priya publications.
2. Electricity and Magnetism – Brijlal and Subramaniam, Ratan Prakashan Mandir, New Delhi 1995.

**Question Paper Pattern:**

Maximum Marks : 75

Exam Duration : 3 Hours

**Part A** 10X2 = 20 Answer **All** Questions (Two questions from each unit)

**Part B** 5X5 = 25 Answer **All** Questions (Either or Type - Two questions from each unit)

**Part C** 3X10 = 30 Answer Any **THREE** (One question from each unit)

**Signature of the HOD**

**Credits : 4**  
**Hours/Week : 4**  
**Medium : English**

Semester : 4

(For students admitted from 2011 onwards)

## **APPLIED PHYSICS-II**

### **Unit 1: SEMICONDUCTORS PHYSICS**

Theory of energy bands in crystals -Distinguish between Conductors - Insulators and semiconductors - Hall effect in semiconductors -Junction diode - full wave rectifier - Zener diode - Zener diode as voltage regulators.

### **Unit 2: TRANSISTORS**

PNP and NPN Transistors-Transistor Action-DC characteristics of CE and CB configuration-Hybrid Parameters- Transistors as an amplifier, Oscillator- FET - N channel and P channel FET -performance –Characteristics.

### **Unit 3: LASER AND MASERS**

Basic concepts of stimulated emission – Optical pumping - population inversion and meta stable state - Ammonium Maser - Ruby laser and He - Ne laser production – Application of laser.

### **Unit 4: OPTO ELECTRONIC DEVICES**

Photo electric effect - Laws of Photo electric emission - Einstein's Photo Electric Equation - Photo electric cell - Photo voltaic cell - Applications - Materials for Light Emitting Diode - photo Transistors - Electronic Watches - Seven segment display - LCD.

### **Unit 5: OPERATIONAL AMPLIFIERS AND INTEGRATED CIRCUITS**

The Basic Operational amplifier - Inverting and Non inverting Operational amplifier - Differential Operational amplifier - CMRR- Basic uses of Operational amplifier as sign and scale changer - Phase shifter - Adder - Subtractor -Comparator- Integrator-Differentiator - D/A Converter - R-2R ladder method - A/D converter successive approximation method - Integrated circuit - Fabrication.

**LIST OF BOOKS FOR STUDY / REFERENCE:**

1. Applied Physics - Paper II- A.Sundaravelusamy -Priya Publications.
2. Basic Electronics - B.L. Theraja.
3. Basic Electronics - V.K. Metha.

**Question Paper Pattern:**

Maximum Marks : 75

Exam Duration : 3 Hours

**Part A** 10X2 = 20 Answer **All** Questions (Two questions from each unit)

**Part B** 5X5 = 25 Answer **All** Questions (Either or Type - Two questions from each unit)

**Part C** 3X10 = 30 Answer Any **THREE** (One question from each unit)

**Signature of the HOD**

**Credits : 4**  
**Hours/Week : 3**  
**Medium : English**

Semester : 4

(For students admitted from 2011 onwards)

## **APPLIED PHYSICS PRACTICAL**

**Choose any Fourteen only:**

1. Carey Foster's Bridge – resistance and specific resistance.
2. Potentiometer – Resistance and specific resistance.
3. Potentiometer –calibration of ammeter.
4. Field along the axis of the coil-determine the magnetic flux using deflection magnetometer.
5. Moment of a magnet using a coil carrying current.
6. Series and parallel resonant circuit.
7. Characteristic of a diode.
8. Zener diode - Characteristics.
9. Static characteristic of transistor – common emitter configuration.
10. Bridge rectifier.
11. Zener controlled voltage regulator.
12. Characteristics of FET.
13. AND, OR, NOT, gates using discrete components
14. Single stage RC coupled transistor amplifier.
15. Astable multivibrator.
16. Determination of energy gap of a thermister and determination of energy.
17. Potentiometer – low range voltmeter calibration
18. Op Amp – Adder, subtractor

### **List of Reference Books:**

1. A textbook of practical physics – M.N Srinivasan and others – Sultan Chand & sons, New Delhi.
2. Practical Physics – A. Dhana Lakshmi and K.R. Paramasivam – Apsara Publication, Trichy.

### **Question Paper Pattern:**

Maximum Marks: 60

Exam Duration: 3 Hours

**Signature of the HOD**

Credits : 4

Hours/Week : 4

Medium : English And Tamil

Semester : 5

(For students admitted from 2011 onwards)

## **DOMESTIC ELECTRICAL APPLIANCES**

### **Unit 1: FUNDAMENTALS OF ELECTRICITY**

What is electricity -Current - AC -DC -Advantages of AC over DC -Advantages of DC over AC - Phase - Single phase - Poly Phase - Advantages of Poly Phase over Single Phase - Primary and secondary cells - Difference between primary and secondary cells.

### **Unit 2: ELECTRIC COMPONENTS AND MEASURING INSTRUMENTS**

Conductor - Insulator - Resistor -Capacitor -Transformers - Step up and Step down transformers - Galvanometer -Ammeter - Voltmeter - Ohm meter - AVO meter (multimeter) - Watt - Watt hour meter - Commercial electrical billing(problem).

### **Unit 3: LIGHTING AND HEATING APPLIANCES**

Design and working of Incandescent lamp - Fluorescent lamp - Electric iron - Electric hot plate - Room Heater - Immersion heater.

### **Unit 4: MODERN ELECTRICAL APPLIANCES**

Design and working of Water motors and its types - Fan - Refrigerator - Air Conditioning - Wet grinder - Microwave oven - Remote control.

### **Unit 5: SAFETY MEASURES AND STAND BY DEVICES**

Switch and its types - Fuse - SWG - Miniature circuit breaker (MCB) -Ground - UPS - Inverter. Electric shock and its effects -Symptoms and first aid - Safety tips - Home repair safety tips - Tips for conserving electricity.

**LIST OF BOOKS FOR STUDY:**

1. Basic Electrical Engineering - M.L.Anwani Dhanpat Roy and co.New Delhi - Reprint 2008.
2. Domestic Electric Appliances - General Interest book from market shelf.

**REFERENCE:**

1. <http://www.howstuffworks.com>.
2. <http://www.answers.com>
3. <http://www.wikipedia.org>

**Question Paper Pattern:**

Maximum Marks : 75

Exam Duration : 3 Hours

**Part A** 10X2 = 20 Answer **All** Questions (Two questions from each unit)

**Part B** 5X5 = 25 Answer **All** Questions (Either or Type - Two questions from each unit)

**Part C** 3X10 = 30 Answer Any **THREE** (One question from each unit)

**Signature of the HOD**

Credits : 4

Hours/Week : 4

Medium : English And Tamil

Semester : 6

(For students admitted from 2011 onwards)

## BIO-PHYSICS

### Unit 1: PHYSICAL PARAMETERS

Units Dimensions Mechanics - heat & light significant of physical quantities - dimensions significance of units – SI units –speed, velocity acceleration, momentum, force, work, power, energy.

### Unit 2: PHOTO BIOLOGY:

Introduction, Refractive index, wave nature of light, Intensity of light.  
Radiation:

Solar radiation- ultraviolet radiation - Infrared radiation - Absorption of a light – ground state - excited state, delocalized electron - photo synthesis de-excitation –singlet & triplet state , spin property of electron , fluorescence and phosphorescence.

### Unit 3: BIOLUMINESCENCE

Introduction - Types of Bioluminescence – Extra cellular Bioluminescence, Intra cellular Bioluminescence, Symbiotic Bioluminescence, Mechanism of Bioluminescence - physical characteristics – colour ,wave length , intensity of light, luminous efficiency , functions of luminescence - Food collection, protection from predators - sexual attraction.

### Unit 4: MEMBRANE CONDUCTIVITY:

Introduction - Diffusion, Active transport - Mechanism of active transport –Osmosis –biological significance of Osmosis – electrical conductivity.

### Unit 5: LABELLING TECHNIQUES:

Introduction – Isotopes – Radioactivity - General properties of alpha, beta & gamma radiations - half-life- unit of radioactivity – Detection of radioactivity – photographic film - Geiger-Muller counter, Scintillation counter- Biological uses of radioactivity

**LIST OF BOOKS FOR STUDY:**

1. Bio-Physics      Dr.S.Thiravia raj - Saras publication
2. Bio Physics      Dr.Vasantha Pattabi

**Question Paper Pattern:**

Maximum Marks : 75

Exam Duration : 3 Hours

**Part A** 10X2 = 20 Answer **All** Questions (Two questions from each unit)

**Part B** 5X5 = 25 Answer **All** Questions (Either or Type - Two questions from each unit)

**Part C** 3X10 = 30 Answer Any **THREE** (One question from each unit)

**Signature of the HOD**