PHYS

SUBJECT : PHYSICS

Preamble :

This Higher Secondary level Physics syllabus has been framed in such a way that it can serve as a bridge between the general physical science course taught at the secondary level and the discipline based curriculum followed at higher education. Effort has been given to make this crucial transition as smooth as possible.

The syllabus is divided into **Units** spread over two year's duration. The Units are logically so arranged that the students can gradually learn the different topics of Physics with higher degree of difficulty. Conventional topics as well as modern concepts have been included in the syllabus so that the students can cope up with the present day needs of the society committed to the use of Physics and technology. Both breadth and depth wise the syllabus is comparable with the national as well as international standards. At the same time emphasis has been given to reduce the syllabus load by eliminating overlapping contents within the subject or with other subjects.

Hope the students will enjoy learning Physics at this stage and will develop passion for the subject.

Outcome :

- The students will learn the basic physics laws and will develop conceptual understanding of the physical processes.
- Students will be able to understand and analysis the real-life events from physics point of view.
- Develop problem solving ability, experimental ability and analytical skills.
- Sufficient conceptual background of physics will be created to make the students competent to meet the requirements of academic and professional courses after the higher secondary stage.
- Interest will be developed for pursuing career in Physics.
- Inculcate scientific aptitude in the learners.

Course Structure :

Class	Semester	Contact Hours				Marks		Credit	
		Theory	Remedial Tutorial	Practical	Total	Theory	Practical	Theory	Practical
11	I	70	10	30 + 20 (50)	110	35	30		
	II	60	10		90	35			
12	III	70	10	30 + 20 (50)	110	35	30		
	IV	60	10		90	35			

CLASS - XI

SUBJECT : PHYSICS (PHYS)

SEMESTER – I

FULL MARKS : 35 **CONTACT HOURS : 70 Hours**

COURSE CODE : THEORY

UNIT No.	TOPICS	CONTACT HOURS	MARKS
1	**PHYSICAL WORLD AND MEASUREMENT** Physics - scope and excitement, nature of physical Law, physics technology and society. Need for measurement, units of measurement, length, mass and time measurement, accuracy and precision of measuring instruments, error in measurement, rounding off and order of magnitude, significant figures. Dimensions of physical quantities, dimensional analysis and its applications.	6	3

UNIT No.	TOPICS	CONTACT HOURS	MARKS
2	**KINEMATICS** **SUB TOPIC : MOTION IN A ONE DIMENSION AND TWO DIMENSION** Frame of reference (inertial and non-inertial frames).Motion in a straight line, position - time graph, speed and velocity. Elementary concepts of differentiation and integration for describing motion. Uniformly accelerated motion. Graphical analysis: position - time and velocity - time graph and calculation of relevant quantities Relations for uniformly accelerated motion (using graphical and calculus method). **SUB TOPIC : MOTION IN A PLANE** Scalar and vector quantities, position and displacement vectors, general vectors and their notations, equality of vectors, multiplication of vectors by a real number, addition and subtraction of vectors. Relative velocity. Unit vector, resolution of a vector in a plane - rectangular and non - rectangular components. Scalar and vector product. Motion in a plane. Cases of uniform velocity and uniform acceleration - projectile motion.	24	12
3	**LAWS OF MOTION** Intuitive concept of force. Inertia, Newton's first law of motion. Momentum and Newton's second law of motion, impulse and concept of impulsive force, Newton's third law of motion and its examples. Law of Conservation of Linear Momentum and its application, concept of free body diagram and its application (simple cases). Equilibrium of concurrent forces. Static and kinetic friction, laws of friction, ideas of coefficient of friction, angle of friction and angle of repose. Rolling friction. Dynamics of uniform circular motion, centripetal force, and example of circular motion (motion of a cyclist, vehicle on level circular road, vehicle on bank road). Concept of centrifugal force.	16	8

UNIT No.	TOPICS	CONTACT HOURS	MARKS
4	**WORK , ENERGY AND POWER** Work done by a constant force and variable force, kinetic energy. Work - energy theorem, power. Notion of potential energy, potential energy of a spring, conservative forces, conservation of mechanical energy (kinetic and potential energies). Non-conservative forces. Motion in a vertical circle. Elastic and inelastic collisions in one and two dimensions.	10	5
5	**MOTION OF SYSTEM OF PARTICLES AND RIGID BODY** Centre of mass of a two - particle system. Momentum conservation and motion of centre of mass. Centre of mass of a rigid body (examples of simple geometrical bodies). Moment of a force, torque, angular momentum, conservation of angular momentum with examples. Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motion, moment of inertia, radius of gyration. Values of moment of inertia for simple geometrical objects (no derivation). Statement of parallel and perpendicular axis theorem and their applications.	14	7

FOR SEMESTER – I

- **CONTACT HOURS FOR THEORY PART – 70 HOURS**
- **CONTACT HOURS FOR PRACTICAL PART – 30 HOURS**
- **CONTACT HOURS FOR REMEDIAL CLASSES AND TUTORIAL – 10 HOURS**

SO TOTAL CONTACT HOURS FOR 1st SEMESTER IS 110 HOURS.

CLASS - XI

SUBJECT : PHYSICS (PHYS)

SEMESTER – II

FULL MARKS : 35 **CONTACT HOURS : 60 HOURS**

COURSE CODE : THEORY

UNIT No.	TOPICS	CONTACT HOURS	MARKS
6	**GRAVITATION** The universal law of gravitation. Acceleration due to gravity and its variation with altitude, depth and rotation of earth. Kepler's laws of planetary motion. Gravitational potential energy, Gravitational potential. Escape velocity, Orbital velocity of a satellite. Geostationary satellite.	9	5
7	**PROPERTIES OF BULK MATTER** **SUB TOPIC : MECHANICAL PROPERTIES OF SOLIDS** Elastic behavior, stress - strain relationship. Hooke's law, Young's modulus(Y), bulk modulus(K), shear modulus of rigidity(η), Poisson's ratio(σ), relation between Y, K, η,σ (no derivation). Elastic energy for stretched string andextended spring. **SUB TOPIC: MECHANICAL PROPERTIES OF FLUIDS** Streamline and turbulent flow, Critical velocity. Viscosity, Newton's law of viscosity, Stoke's law, terminal velocity, Reynolds' number. Bernoulli's theorem and its applications. Surface energy and surface tension, angle of contact, excess of pressure, application of surface tension, ideas to drops, bubbles. Capillary rise and fall (no derivation, only analytical treatment). **SUB TOPIC : THERMAL PROPERTIES OF MATTER** Heat, temperature, thermal expansion of solids, liquids, and gases. Anomalous expansion of water and its effects. Specific heat capacity, principle of calorimetry, change of state, latent heat capacity. Heat transfer: conduction, convection and radiation, black body radiation, Kirchhoff's law, absorptive and emissive powers, thermal conductivity. Newton's law of cooling, Wien's displacement law, Stefan's law and Boltzmann's correction.	17	10

UNIT No.	TOPICS	CONTACT HOURS	MARKS
8	**THERMODYNAMICS** Thermal equilibrium and definition of temperature, Zeroth law of thermodynamics. Heat, work and internal energy, First law of thermodynamics, C_P and C_V and determination of their relation. Isothermal and Adiabatic processes. P-V diagram, calculation of external work done in different cases. Second law of thermodynamics, reversible and irreversible processes. Heat engine, Calculation of efficiency of Carnot engine only, efficiency of refrigerator (only qualitative idea).	9	5
9	**KINETIC THEORY OF GASES** Assumptions for the kinetic theory of gases, RMS speed of gas molecules, degrees of freedom. Concept of pressure, kinetic energy and temperature in the light of kinetic theory, ideas of gas laws in the light of kinetic theory of gases. Law of equipartition of energy (statement only) and application regarding of specific heats of the gases. Concept of mean free path, Avogadro's number.	8	5
10	**OSCILLATION AND WAVES** **SUB TOPIC : OSCILLATION** Periodic motion-period, frequency, displacement as a function of time, Periodic functions. Simple harmonic motion (S.H.M) and its equation, phase, oscillation of a spring - restoring force and force constant, combination of springs, energy in S.H.M - kinetic and potential energies. Simple pendulum, loaded spring - derivation of expression for time period. Free, damped and forced oscillations, resonance (qualitative ideas only). **SUB TOPIC : WAVES** Wave Motion: longitudinal and transverse waves, speed of travelling wave motion. Velocity of sound in gaseous medium - Newton's law and Laplace's correction. Displacement relation for a progressive wave. Principle of superposition of waves. Formation of Stationary waves, reflection of waves in string and organ pipes: fundamental mode and harmonics. Formation of beats. Doppler effect of sound.	17	10

FOR SEMESTER II

- **CONTACT HOURS FOR THEORY PART – 60 HOURS**
- **CONTACT HOURS FOR PRACTICAL PART – 20 HOURS**
- **CONTACT HOURS FOR REMEDIAL CLASSES AND TUTORIAL – 10 HOURS**

SO TOTAL CONTACT HOURS FOR 2nd SEMESTER IS 90 HOURS.

CLASS : XI

COURSE CODE: PRACTICAL

SUBJECT: PHYSICS (PHYS)

FULL MARKS: 30 **CONTACT HOURS: 50 HOURS (30+ 20)**

PRACTICAL WORKS + VIVA (16+4) = 20 MARKS

Given below is a list of required experiments.

In each experiment students are expected to record their observations in tabular form with unit at the column head.

Students should plot an appropriate graph where required, work out the necessary calculation and arrive at the result.

SECTION : A

No. OF EXPT.	TOPICS
1	To measure diameter of a small spherical / diameter and length of a cylindrical body using slide calipers, hence calculate its volume with proper formula
2	To measure the internal diameter and depth of a beaker using slide calipers and hence find its volume.
3	To measure diameter of a given thin wire using screw gauge
4	To determine the volume of an irregular but uniform thickness lamina using screw gauge and graph paper.
5	To determine the radius of curvature of a given spherical surface by a spherometer.
6	Consider equilibrium of three concurrent coplanar forces. To verify the parallelogram Law of forces and to determine weight of a body.
7	To study the force of limiting friction for a wooden block placed on horizontal plane surface and to study is relationship with normal reaction. To determine the coefficient of friction.
8	To study the downward force acting along the inclined plane on a roller due to gravitational pull of earth and to study its relationship with angle of inclination(θ) by plotting graph between force and $\sin\theta$.

SECTION : B

No. OF EXPT.	TOPICS
1	To study the acceleration due to gravity by measuring variation in time period (T) with effective length (L) of a simple pendulum, plot graphs of L - T and L - T^2. Determine the effective length of second pendulum from L - T^2 graph
2	To study the force constant of a spring and to study variation in time period of oscillation with mass (m) of a body suspended by a spring. To find the spring constant by plotting a graph of m – T^2
3	To study the force constant of a helical spring by plotting graph between load and extension.
4	To study the variation in volume with pressure for a sample of air at constant temperature by plotting graphs between P – (1 / V) and between P - V
5	To study the fall in temperature of a body (like hot water) with time, by plotting a cooling curve.
6	To study the surface tension of water by capillary rise method.
7	To study the coefficient of viscosity of a given viscous liquid by measuring the terminal velocity of given spherical body.
8	To study the speed of sound of in air at room temperature using resonance column apparatus by two resonance positions.
9	To study the frequency of a tuning fork using resonance column apparatus is by two resonance positions, where the data of the speed of sound in air medium at room temperature will be supplied
10	To study the relationship between frequency and length of a given wire under constant tension using sonometer

The students have to do one practical each from section A and section B in the examination.

PROJECT WORK (MARKS – 7)

All candidates will be required to do one project involving physics related topic/topics of their theory syllabus under the guidance of the Physics teacher.

Candidate should take under any one of the following types of projects:

1) Theoretical project

2) Working model

Candidates are to prepare a technical report formally written including title, abstract, some theoretical discussion, experiment set up, observations with tables of data collected, graph / chart (if any), analysis and discussion of result, deduction, conclusion etc. The report should be kept simple but neat and elegant.

No extra credit shall be given for typewritten material or decorative cover etc.

Suggested heading of project file for theory based project

Title of the project
Introduction
Contains
Analysis / material aid (graph, Data, Structure, diagram etc)
Conclusions/ comments

Suggested heading of project file for model based projects

Title of the project
Model construction
Principle used, concise project report
Conclusion / comments

PRACTICAL FILE – (MARKS – 3)

Teachers are required to access the students on the basis of Physics practical file maintained by them during the academic year. Generally students are not expected to write the procedure of the experiments. The students will write the working formula, draw the figure or circuit diagram, collection of data in proper tabular form, results and few ideas of precautions associated with the experiments.

PRACTICAL MARKS SCHEME

EXPERIMENT						SUB TOTAL (16)	VIVA (4)	L.N.B (3)	PROJECT (7)	TOTAL (30)
No. 1(2+5+1=8)			No. 2 (2+5+1=8)							
THEORY	RECORD	RESULT	THEORY	RECORD	RESULT					

CLASS - XII

SUBJECT : PHYSICS (PHYS)

SEMESTER – III

FULL MARKS : 35 **CONTACT HOURS : 70 Hours**

COURSE CODE : THEORY

UNIT No.	TOPICS	CONTACT HOURS	MARKS
1	**ELECTROSTATICS** **SUB TOPICS: ELECTRIC CHARGES AND FIELDS** Electric charges, conservation of charge. Coulomb's law - force between two point charges, forces between multiple charges, superposition principle and continuous uniform distribution of charges. Electric field: electric field due to a point charge, electric field lines. Electric dipole, electric field due to a dipole (at a point on its axis, at a point on its perpendicular bisector, at any point), torque on a dipole in uniform electric field. Electric flux, statement of Gauss's theorem and its application to find the field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell (field inside and outside) **SUB TOPICS: ELECTROSTATIC POTENTIAL AND CAPACITANCE** Electric potential, potential difference, relation between electric field intensity and potential, electric potential : due to a point charge, a dipole and system of point charges, equipotential surface and its properties, electrical potential - energy of a system of two point charges and of electric dipole in electrostatic field. Conductors and insulators, free charges and bound charges inside a conductor. Dielectrics and electric polarization. Capacitors and capacitance, combination of capacitors in series and in parallel. Capacitance of parallel plate capacitors with or without dielectric medium between the plates. Capacitances of solid and hollow spherical capacitors. Energy stored in a capacitor. Example of capacitors in our daily life (only qualitative idea).	**18**	**8**

UNIT No.	TOPICS	CONTACT HOURS	MARKS
2	**CURRENT ELECTRICITY** Electric current, flow of electric charge in a metallic conductor. Drift velocity, mobility and their relation with electric current. Ohm's law, electrical resistance, resistivity and conductivity. V-I characteristics for ohmic resistance, temperature dependence of resistance. Series, parallel and mixed grouping of resistances. Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel and in mixed grouping. Parallel combination of two cells of unequal emfs, series combination of n cells of unequal emfs. Kirchhoff's law and simple applications. Wheatstone bridge principle, Metre Bridge principle (end error correction not required). Potentiometer: principle and its applications to measure the potential difference and for comparing emfs of two cells and measurement of internal resistance of a cell.	16	8
3	**MAGNETIC EFFECTS OF CURRENT AND MAGNETISM** SUB TOPICS: MOVING CHARGE AND MAGNETIC FIELD Concept of magnetic field, Oersted's experiment. Biot - Savart law, calculation of magnetic field for linear and circular current carrying conductors and its simple applications. Ampere's circuital law and its application to infinitely long straight wire and straight solenoid. Force on a moving charge in a uniform magnetic and electric fields - Lorentz force. Motion of a charged particle in a perpendicular magnetic field (Cyclotron frequency). Force on a current carrying conductor in a uniform magnetic field. Force between two parallel current carrying conductors - definition of ampere. Torque experienced by a current carrying loop in uniform magnetic field, moving coil galvanometer -its current sensitivity. Conversion of galvanometer into ammeter and voltmeter. SUB TOPICS: MAGNETISM AND MATTER Current loop as a magnetic dipole and its magnetic dipole moment. Magnetic dipole moment of a revolving electron. Magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis.	16	8

UNIT No.	TOPICS	CONTACT HOURS	MARKS
	Torque on a magnetic dipole (bar magnet) in a uniform magnetic field, magnetic field lines. Magnetic properties of a material: magnetic permeability, magnetic susceptibility, intensity of magnetization, magnetic retentivity and coercivity. Hysteresis: B - H loop and its significance, (only qualitative idea) Earth's magnetic field and magnetic elements. Dia, Para and Ferro - magnetic substances with examples. Electromagnets and factor affecting their strengths.		
4	**ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENT** SUB TOPICS : ELCTROMAGNETIC INDUCTION Electromagnetic induction, concept of magnetic flux. Faraday's laws, induced emf and current, Lenz's law, Eddy current. Concept of self and mutual inductance, self-inductance of a solenoid and mutual inductance of two coaxial solenoids (qualitative ideas). SUB TOPICS : ALTERNATING CURRENT Alternating current, peak and RMS values of alternating current/voltage, reactance and impedance. Concept of phasor diagram, only resistive circuit, only inductive circuit , only capacitive circuit, LR circuit, CR circuit, and LCR series circuit, resonance, LC oscillator (qualitative idea only). Power in AC circuit, power factor in AC circuit, wattless current. AC generator and transformer.	**15**	**8**
5	**ELECTROMAGNNETIC WAVES** Basic idea of displacement current, electromagnetic waves and their characteristics (qualitative ideas only). Transverse nature of electromagnetic waves. Electromagnetic spectrum (radio waves, infrared, visible, ultraviolet, X-rays, Gamma Rays) including elementary facts about their uses.	**5**	**3**

FOR SEMESTER – III

- **CONTACT HOURS FOR THEORY PART – 70 HOURS**
- **CONTACT HOURS FOR PRACTICAL PART – 30 HOURS**
- **CONTACT HOURS FOR REMEDIAL CLASSES AND TUTORIAL – 10 HOURS**

SO TOTAL CONTACT HOURS FOR 3RD SEMESTER IS 110 HOURS.

SUBJECT CODE : PHYSICS (PHYS)

SEMESTER – IV

FULL MARKS : 35 **CONTACT HOURS : 60 HOURS**

COURSE CODE : THEORY

UNIT No.	TOPICS	CONTACT HOURS	MARKS
6	**OPTICS** **SUB TOPICS : RAY OPTICS AND OPTCAL INSTRUMENTS** Reflection of light, spherical mirrors, mirror formula, refraction of light, total internal reflection and its applications, optical fibers. Refraction at spherical surfaces, lenses, thin lens formula. Lens -Maker's Formula. Displacement method to find the position of image (conjugate points), magnification power of a lens. Combination of thin lenses in contact, combination of lens and mirrors. Refraction and dispersion of light through a Prism. Scattering of light - blue colour of the sky and reddish appearance of the sun at sunrise and sunset. Optical instruments: human eye, image formation and accommodation, correction of eye defects (myopia and hypermetropia) only qualitative Ideas. Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers. **SUB TOPICS : WAVE OPTICS** Wave front and Huygens' principle, reflection and refraction of plane wave at a plane surface using Huygens' principle. Interference: interference of monochromatic light by double slits –Young's experiment, conditions for sustained interference of light - coherent sources, condition of maxima and minima in the term of path difference and phase difference, expression for the fringe width. Diffraction: Fraunhoffer's diffraction due to single slit, width of central maximum. Resolving power of microscope and astronomical telescope. Polarization, plane polarized light. Brewster's law, uses of plane polarized light and polaroid.	25	14
7	**DUAL NATURE OF RADIATION AND MATTER** Dual nature of radiation. Photoelectric effect. Hertz and Lenard's observations, Einstein's Photoelectric equation - particle nature of light. Matter waves - wave nature of particles, de Broglie relation and its simple applications.	7	4

UNIT No.	TOPICS	CONTACT HOURS	MARKS
8	**ATOMS AND NUCLEI** **SUB TOPICS : ATOMS** Alpha - particle scattering experiment, Rutherford's model of atom, Bohr model of hydrogen like atoms, energy levels, hydrogen spectrum. Elementary theory of X -ray production, continuous and characteristic X-ray(their origin and properties only),Moseley's law. **SUB TOPICS : NUCLEI** Composition and size of nucleus, atomic mass, isotope, isobar, isotone. Radioactivity: alpha, beta and gamma particles / rays and their properties, radioactive decay law. Mass - energy relation, mass defect, binding energy per nucleon and its variation with mass number, Nuclear fission and fusion.	10	6
9	**ELETRONIC DEVICES** Thermal emission of electrons and only the basic concepts of vacuum diode and triodes. Energy bands in solids: conductors, insulators and semiconductors (qualitative idea only) Intrinsic and extrinsic semiconductors, band diagram. P- N junction diode, forward and reverse bias, I - V characteristics of junction diode (nonlinear concept). Special type of diodes: LED, photodiode, solar cell and Zener diode with their characteristics. Zener diode as a voltage regulator. Junction transistor, npn and pnp transistor, transistor action, characteristics of a transistor, transistor as an amplifier (common emitter configuration). Transistor as a switch. Elementary idea of analogue and digital signals. Concepts of decimal and binary numbers. Logic gates : OR,AND,NOT,NAND,NOR (Symbols, input, output Boolean equations, truth table, qualitative explanation). Simple cases of combination of gates.	15	8
10	**COMMUNICATION SYSTEM** Elements of a communication system (Block diagram only), concepts of amplitude and frequency modulation. Band width of signals (speech, TV and digital data). Band width of transmission medium. Propagation of electromagnetic waves in the atmosphere, sky wave and space wave propagation (qualitative idea only).	5	3

FOR SEMESTER – IV

- **CONTACT HOURS FOR THEORY PART – 60 HOURS**
- **CONTACT HOURS FOR PRACTICAL PART – 20 HOURS**
- **CONTACT HOURS FOR REMEDIAL CLASSES AND TUTORIAL – 10 HOURS**

SO TOTAL CONTACT HOURS FOR 4TH SEMESTER IS 90 HOURS.

CLASS: XII

SUBJECT : PHYSICS (PHYS)

COURSE CODE : PRACTICAL

FULL MARKS : 30 **CONTACT HOURS : 50 HOURS (30+ 20)**

PRACTICAL WORKS + VIVA (16+4) = 20 MARKS

The experiments for laboratory work are from two groups :

1) Experiment based on current electricity and Magnetism

2) Experiments based on ray optics and Semiconductor devices.

The main skill required in group 1 is understanding the circuit diagram and making connections, polarity of cells, meters, their ranges, zero error, least count, concept of magnetic lines of force and neutral point.

The main skill required in group 2 is to remove parallax between a needle and a real image of another needle. Basic circuit idea and knowledge of characteristic graphs of Semiconductor devices.

A graph is a convenient and effective way of representing result of measurement so it is an important part of the experiments. (Where it is applicable).

All the calculations should be rounded off up to proper decimal places or significant figures.

SECTION : A

No. OF EXPT.	TOPICS
1	Verify Ohm's law for a given unknown resistance (a 100 cm uniform wire) by plotting a graph of potential difference versus current. Calculate the resistance and hence resistance per cm of the wire from the slope of the graph.
2	Using a Metre Bridge determine the resistance of about 100 cm of uniform wire. If its length and diameter are supplied, calculate the specific resistance of the material of the wire.
3	To verify the law of series combination of resistances, using two resistances (2 ohm / 3 ohm range) in the Metre Bridge circuit.
4	To verify the law of parallel combination of resistances using two resistances (2 ohm / 3 ohm range) in Metre Bridge circuit.
5	To compare emfs of two cells using potentiometer circuit.

6	To determine the internal resistance of a cell using potentiometer circuit.
7	To determine resistance of a galvanometer by half deflection method and to find its figure of merit.
8	To convert a given Galvanometer (of known resistance and figure of merit) into an ammeter and voltmeter of desired range and verify same.
9	Draw the lines of forces for a magnet placing its north pole towards the geographic north. Also determine the position of neutral points on two sides of the magnet.

SECTION : B

No. OF EXPT.	TOPICS
1	To find the value of image distance (v) for different values of object distance (u) of a concave mirror. By drawing 1/ v - 1/ u graph determine the focal length of the mirror.
2	To find the focal length of a convex mirror, using a convex lens.
3	To find the focal length of a convex lens by plotting graphs between u - v and between 1/u - 1/ v
4	To find the focal length of a concave lens using a convex lens.
5	To determine the angle of minimum deviation for a given prism by plotting a graph between angle of incidence and angle of deviation
6	To determine the refractive index of a glass slab using a travelling microscope.
7	To draw I - V characteristic curves of a P - N junction diode in forward and reverse bias.
8	To draw the reverse bias characteristics of Zener diode and to determine its breakdown voltage
9	To study the characteristic of common emitter configuration of NPN or PNP transistor and to find dynamic resistances and amplification factor.

The students have to do one practical each from section A and section B in the examination.

PROJECT WORK (MARKS – 7)

All candidates will be required to do one project involving physics related topic/topics of their theory syllabus under the guidance of the Physics teacher.

Candidate should take under any one of the following types of projects:

1) Theoretical project

2) Working model

Candidates are to prepare a technical report formally written including title, abstract, some theoretical discussion, experiment set up, observations with tables of data collected, graph / chart (if any), analysis and discussion of result, deduction, conclusion etc. The report should be kept simple but neat and elegant.

No extra credit shall be given for typewritten material or decorative cover etc.

Suggested heading of project file for theory based project

Title of the project
Introduction
Contains
Analysis / material aid (graph, Data, Structure, diagram etc)
Conclusions/ comments

Suggested heading of project file for model based projects

Title of the project
Model construction
Principle used, concise project report
Conclusion / comments

PRACTICAL FILE – (MARKS – 3)

Teachers are required to access the students on the basis of Physics practical file maintained by them during the academic year. Generally students are not expected to write the procedure of the experiments. The students will write the working formula, draw the figure or circuit diagram, collection of data in proper tabular form, results and few ideas of precautions associated with the experiments.

PRACTICAL MARKS SCHEME

EXPERIMENT						SUB TOTAL (16)	VIVA (4)	L.N.B (3)	PROJECT (7)	TOTAL (30)
No. 1(2+5+1=8)			No. 2 (2+5+1=8)							
THEORY	RECORD	RESULT	THEORY	RECORD	RESULT					