**CLASS:- XII**                     **SUBJECT: PHYSICS**                     **TERM I**

### Prescribed Textbooks
1. Physics for Class XII NCERT
2. Practical Physics Laboratory Manual XII

| TERM I | | |
|---|---|---|
| **Month** | **Contents** | **Wt.** |
| **March/ April** | **Unit I: Electrostatics** <br> Electric Charges; Conservation of charge, Coulomb's law-force between two point charges, forces between multiple charges; superposition principle and continuous charge distribution. Electric field, electric field due to a point charge; electric field lines, electric dipole, electric field due to a dipole, torque on a dipole in uniform electric field. Electric flux, statement of Gauss's theorem and its applications to find field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell (field inside and outside). Electric potential, potential difference, electric potential due to a point charge, a dipole and system of charges; equipotential surfaces, electrical potential energy of a system of two point charges and of electric dipole in an electrostatic field. Conductors and insulators, free charges and bound charges inside a conductor. Dielectrics and electric polarisation, capacitors and capacitance, combination of capacitors in series and in parallel, capacitance of a parallel plate capacitor with dielectric medium between the plates, energy stored in a capacitor. | **15** |
| **April/ May** | **Unit II: Current Electricity** <br> Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current; Ohm's law, electrical resistance, V-I characteristics (linear and non-linear), electrical energy and power, electrical resistivity and conductivity. Carbon resistors, colour code for carbon resistors; series and parallel combinations of resistors; effect of temperature on resistance. emf and potential difference of a cell, internal resistance of a cell, combination of cells in series and in parallel. Kirchhoff's laws and simple applications. Wheatstone bridge, metre bridge. Potentiometer - principle and its applications to measure potential difference and for comparing emf of two cells; measurement of internal resistance of a cell | |
| **June** | **Unit III: Magnetic Effects of Current and Magnetism** <br> Concept of magnetic field, Oersted's experiment. Biot - Savart law and its application to current carrying circular loop. Ampere's law and its applications to infinitely long straight wire, Straight and toroidal solenoids **(Only qualitative treatment)**. Force on a current-carrying conductor in a uniform magnetic field. Cyclotron. <br> Force between two parallel current-carrying conductors-definition of ampere. Torque experienced by a current loop in uniform magnetic field; moving coil galvanometer-its current sensitivity and conversion to ammeter and voltmeter. 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. Torque on a magnetic dipole (bar magnet) in a uniform magnetic field; bar magnet as an equivalent solenoid, magnetic field lines; Earth's magnetic field and magnetic elements. Para, dia and ferro - magnetic substances (with examples), Electromagnets and factors affecting their strengths, Permanent magnets. | **16** |
| **July** | **Unit IV: Electromagnetic Induction and Alternating Currents** <br> Electromagnetic induction; Faraday's laws, induced emf and current; Lenz's Law, Eddy currents. Self and mutual induction, displacement current. Alternating currents, peak and rms value of alternating current/voltage; reactance and impedance; LC oscillations (qualitative treatment only), LCR series circuit, resonance; power in AC circuits, wattless current. AC generator and transformer. | |
| **August** | **Unit V:  Electromagnetic waves** <br> **Basic Idea of displacement current**, Electromagnetic waves and their characteristics (qualitative ideas only). Transverse nature of electromagnetic waves. Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses. <br> **Unit VI: Optics (Ray Optics)** <br> 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. Magnification, power of a lens, combination of thin lenses in contact. Combination of a lens and a mirror, 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: Microscopes, astronomical telescopes (reflecting and refracting) and their magnifying powers. | **17** |
| **September** | **Revision and 1ˢᵗ Summative Examination** | |
| **TERM II** | | |
| **October** | **Unit VI: Optics (Wave Optics)  cont.** <br> wavefront and Huygens' principle, reflection and refraction of plane wave at a plane surface using wavefronts. Proof of laws of reflection and refraction using Huygens' principle. Interference, coherent sources, Young's double slit experiment and expression for fringe width. Sustained interfernce of light. Diffraction due to a single slit, width of central maximum. Resolving power of microscopes and astronomical telescopes. Polarisation, plane polarised light; Brewster's law, uses of | |

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| | plane polarised light and Polaroids. | |
| | **Unit- VII : Dual Nature of Matter and Radiation :**<br><br>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, Davisson & Germer experiment(Experimental details should be omitted; only conclusion should be explained). | **10** |
| **November/ December** | **Unit – VIII : Atomic and Nuclei**<br><br>Alpha – particle scattering experiment, Rutherford's model of atom, Bohr's model, energy level, hydrogen spectrum. Composition and size of the nucleus, Radioactivity – α, β, γ particles / rays and their properties & radioactive decay law, Mass – energy relation, mass defect, binding energy per nucleon, its variation with mass number, nuclear fission and fusion. | |
| | **Unit – IX : Electronic Devices :**<br><br>Energy bands in solids (Qualitative ideas only) conductor, insulator and semi conductor; semi-conductor diode, I-V characteristics in forward and reverse bias, diode as a rectifier, I-V characteristics of LED, photodiodes, solar cell and Zener diode, Zener diode as a voltage regulator. Junction transistor, transistor action, characteristics of a transistor, transistor as an amplifier (common emitter configuration). Logic gates (OR, AND, NOT, NAND and NOR).<br><br>**Unit – X : Communication Systems :**<br><br>Elements of a communication system (block diagram only), bandwidth of signals (speech, TV and digital data) bandwidth of transmission medium, Propagation of electromagnetic waves in the atmosphere, Sky and space wave propagation, Need for modulation, satellite communication, amplitude modulation, frequency modulation, advantages of frequency modulation over amplitude modulation. Basic ideas about internet, mobile telephony and global positioning system (GPS). | **12** |
| **Upto 15th Dec.** | Revision | |
| **January** | Pre-Board Examination (Whole CBSE Syllabus) | |

# BLUE PRINT-1ST SUMMATIVE EXAMINATION
## Class : XII
## Physics

Time: 3 Hrs.                                                                                              Max. Marks : 70

### I.   Weightage to content/subject units:

| Unit No. | Title | Marks |
|---|---|---|
| Unit I | Electrostatics | 13 |
| Unit II | Current Electricity | 13 |
| Unit III | Magnetic Effect of Current and Magnetism | 13 |
| Unit IV | Electromagnetic Induction and Alternating Current | 13 |
| Unit V | Electromagnetic Waves | 05 |
| Unit VI | Optics (Ray Optics) | 13 |
| | Total | 70 |

### II.   Weightage to form of Questions:

| S.No. | Form of Questions | Marks for each question | No. of questions | Total Marks |
|---|---|---|---|---|
| 1. | Long Answer Type (LA) | 5 | 03 | 15 |
| 2. | Value Based Question | 4 | 01 | 04 |
| 3. | Short Answer (SA I) | 3 | 12 | 36 |
| 4. | Short Answer (SA II) | 2 | 05 | 10 |
| 5. | Very Short Answer (VSA) | 1 | 05 | 05 |
| | Total | | 26 | 70 |

### III.   Scheme of Options:
1. There will be no overall option.
2. Internal choices in five questions have been given as follows:
   a. Any one question in two-mark questions.
   b. Any one question in three-mark questions.
   c. All the three questions in five-mark questions.

### IV.   Numerical:
Weightage of nearly 15 marks in total would be assigned to numericals.

### V.   Weightage to difficulty level of questions:

| S.No. | Estimated difficulty level | Percentage | Marks |
|---|---|---|---|
| 1. | Easy | (nearly) 15% | 11 |
| 2. | Average | 70% | 49 |
| 3. | Difficult | (nearly) 15% | 10 |

A weightage of nearly 20% has been assigned to questions which test higher order thinking skills of students.

# BLUE PRINT-2nd  SUMMATIVE EXAMINATION
## Class : XII
## Physics

Time: 3 Hrs.                                                                                   Max. Marks : 70

### I.    Weightage to content/subject units:

| S.No | Unit No. | Title | Marks |
|---|---|---|---|
| 1. | Unit I | Electrostatics | 15 |
|  | Unit II | Current electricity |  |
| 2. | Unit III | Magnetic Effect of Current and Magnetism | 16 |
|  | Unit IV | Electromagnetic Induction and Alternating Current |  |
| 3. | Unit V | Electromagnetic Waves | 17 |
|  | Unit VI | Optics |  |
| 4. | Unit VII | Dual Nature of Radiation and Matter | 10 |
|  | Unit VIII | Atoms and Nuclei |  |
| 5. | Unit IX | Electronic Devices | 12 |
|  | Unit X | Communication System |  |
|  |  | Total | 70 |

### II.   Weightage to form of Questions:

| S.No. | Form of Questions | Marks for each question | No. of questions | Total Marks |
|---|---|---|---|---|
| 1. | Long Answer Type (LA) | 5 | 03 | 15 |
| 2. | Value Based Question | 4 | 01 | 04 |
| 3. | Short Answer (SA I) | 3 | 12 | 36 |
| 4. | Short Answer (SA II) | 2 | 05 | 10 |
| 5. | Very Short Answer (VSA) | 1 | 05 | 05 |
|  | Total |  | 26 | 70 |

### III.  Scheme of Options:

3.  There will be no overall option.
4.  Internal choices in five questions have been given as follows:
   a.  Any one question in two-mark questions.
   b.  Any one question in three-mark questions.
   c.  All the three questions in five-mark questions.

### IV.  Numerical:

Weightage of nearly 15 marks in total would be assigned to numerical.

### V.   Weightage to difficulty level of questions:

| S.No. | Estimated difficulty level | Percentage | Marks |
|---|---|---|---|
| 1. | Easy | (nearly) 15% | 11 |
| 2. | Average | 70% | 49 |
| 3. | Difficult | (nearly) 15% | 10 |

A weightage of nearly 20% has been assigned to questions which test higher order thinking skills of students.