

**ISC · CLASS 12**

## Physics

Official CISCE ISC Physics curriculum providing advanced mathematical and experimental training in electrostatics, circuit currents, magnetic effects, wave optics, quantum physics, and semiconductor devices.

**Board:** Council for the Indian School Certificate Examinations (Higher Secondary)**Theory:** 70 Marks**Internal/Practical:** 30 Marks (Practical & Project)**Exam Duration:** 3 Hours

### UNIT-WISE SYLLABUS & MARKS BREAKDOWN

| UNIT       | CHAPTERS & PRESCRIBED TOPICS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | MARKS |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Unit 1     | <b>Electrostatics</b><br>Electric charges, Coulomb's law, electric field, electric dipole, torque on dipole, Gauss's theorem and applications; Electrostatic potential, potential difference, potential energy of a dipole, conductors and dielectrics, capacitance, parallel plate capacitor, combination of capacitors, energy stored in a capacitor                                                                                                                                                                                                                                                                                   | 14    |
| Unit 2     | <b>Current Electricity</b><br>Electric current, drift velocity, Ohm's law, electrical resistance, V-I characteristics, electrical energy and power, resistivity, temperature dependence, internal resistance, EMF and terminal potential difference; Kirchhoff's laws and applications, Wheatstone bridge, potentiometer principle and applications                                                                                                                                                                                                                                                                                      | 14    |
| Unit 3 & 4 | <b>Magnetic Effects of Current, Magnetism &amp; EMI/AC</b><br>Biot-Savart law, Ampere's circuital law, magnetic field of a solenoid, force on moving charge in magnetic field, force on current-carrying conductor, force between parallel currents, torque on current loop, moving coil galvanometer; Magnetic properties of materials (diamagnetic, paramagnetic, ferromagnetic); Electromagnetic induction: Faraday's laws, Lenz's law, self and mutual inductance; Alternating current: Peak and RMS value, reactance, impedance, LCR series circuit, resonance, power in AC circuit, wattless current, AC generator and transformer | 16    |
| Unit 5 & 6 | <b>Electromagnetic Waves &amp; Optics</b><br>Electromagnetic waves characteristics, transverse nature, EM spectrum; Ray Optics: Reflection, refraction, total internal reflection, lens maker's formula, prisms, optical instruments (compound microscope, astronomical telescope); Wave Optics: Huygens' principle, wave fronts, proof of reflection and refraction laws, interference of light, Young's double slit experiment, diffraction at a single slit, resolving power                                                                                                                                                          | 18    |
| Unit 7 & 8 | <b>Dual Nature of Radiation &amp; Atoms/Nuclei</b><br>Photoelectric effect, Hertz and Lenard's observations, Einstein's photoelectric equation, de Broglie relation; Alpha-particle scattering, Rutherford & Bohr atomic models, hydrogen energy levels; Nucleus composition, atomic mass unit, mass defect, binding energy curve, nuclear fission and fusion                                                                                                                                                                                                                                                                            | 12    |
| Unit 9     | <b>Electronic Devices</b><br>Energy bands in solids, intrinsic and extrinsic semiconductors, p-n junction diode: forward and reverse bias characteristics; Diode as a rectifier (half-wave and full-                                                                                                                                                                                                                                                                                                                                                                                                                                     | 06    |

| UNIT | CHAPTERS & PRESCRIBED TOPICS                                         | MARKS |
|------|----------------------------------------------------------------------|-------|
|      | wave); Zener diode as voltage regulator; Photodiode, solar cell, LED |       |

### INTERNAL / PRACTICAL ASSESSMENT SCHEME (30 MARKS (PRACTICAL & PROJECT))

| EVALUATION COMPONENT                                                                                | MARKS WEIGHTAGE |
|-----------------------------------------------------------------------------------------------------|-----------------|
| <b>Practical Examination</b><br>Execution of two experiments from mechanics, optics, or electricity | <b>15 Marks</b> |
| <b>Project Work</b><br>Approved physics investigatory project report                                | <b>10 Marks</b> |
| <b>Practical File &amp; Viva</b><br>Laboratory record and viva voce                                 | <b>05 Marks</b> |

### RECOMMENDED REFERENCE LITERATURE

**Prescribed Textbooks:** Nootan ISC Physics Class 12 (Kumar & Mittal), HC Verma, Excellence Physics Problem & Derivation Sheets

**The Excellence Tuition Edge**

Every unit in this curriculum is taught with structured conceptual lectures, followed by weekly speed-testing, detailed mistake analysis, and dedicated 1:1 doubt-clearing sessions to build board exam confidence.