Physics Class XII (Code N. 042) (2020-21)

Syllabus assigned for Term I (Theory)

Time: 90 Minutes **Max Marks: 35**

		No. of Periods	Marks
Unit–I	**Electrostatics**	**23**	**17**
	Chapter–1: Electric Charges and Fields		
	Chapter–2: Electrostatic Potential and Capacitance		
Unit-II	**Current Electricity**	**15**	
	Chapter–3: Current Electricity		
Unit-III	**Magnetic Effects of Current and Magnetism**	**16**	**18**
	Chapter–4: Moving Charges and Magnetism		
	Chapter–5: Magnetism and Matter		
Unit-IV	**Electromagnetic Induction and Alternating Currents**	**19**	
	Chapter–6: Electromagnetic Induction Chapter 7: Alternating currents		
Total		**73**	**35**

Unit I: Electrostatics **23 Periods**

Chapter–1: 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 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

Chapter–2: Electrostatic Potential and Capacitance

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 and without dielectric medium between the plates, energy stored in a capacitor.

Unit II: Current Electricity **15 Periods**

Chapter–3: Current Electricity

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; temperature dependence of resistance. Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel, Kirchhoff's laws and simple applications, Wheatstone bridge, metre bridge(**qualitative ideas only).** Potentiometer - principle and its applications to measure potential difference and for comparing EMF of two cells; measurement of internal resistance of a cell **(qualitative ideas only)**

Unit III: Magnetic Effects of Current and Magnetism 16 Periods

Chapter–4: Moving Charges and Magnetism

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 moving charge in uniform magnetic and electric fields. 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 loop in uniform magnetic field; moving coil galvanometer-its current sensitivity and conversion to ammeter and voltmeter.

Chapter–5: Magnetism and Matter

Current loop as a magnetic dipole and its magnetic dipole moment, magnetic dipole moment of a revolving electron, bar magnet as an equivalent solenoid, magnetic field lines; earth's magnetic field and magnetic elements.

Unit IV: Electromagnetic Induction and Alternating Currents 19 Periods

Chapter–6: Electromagnetic Induction

Electromagnetic induction; Faraday's laws, induced EMF and current; Lenz's Law, Eddy currents. Self and mutual induction.

Chapter–7: Alternating 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. AC generator and transformer.

Syllabus assigned for Practical for Term I

Total Periods:16

First term practical examination will be organised by schools as per the directions of CBSE. The record to be submitted by the students at the time of first term examination has to include a record of at least 4 Experiments and 3 Activities to be demonstrated by teacher.

Time Allowed: one and half hours **Max. Marks: 15**

Two experiments to be performed by students at time of examination	**8 marks**
Practical record [experiments and activities]	**2 marks**
Viva on experiments, **and** activities	**5 marks**
Total	**15 marks**

Experiments assigned for Term I

1. To determine resistivity of two / three wires by plotting a graph between potential difference versus current.
2. To find resistance of a given wire / standard resistor using metre bridge.

   OR

   To verify the laws of combination (series) of resistances using a metre bridge.

   OR

   To verify the laws of combination (parallel) of resistances using a metre bridge.
3. To compare the EMF of two given primary cells using potentiometer.

   OR

   To determine the internal resistance of given primary cell using potentiometer.
4. To determine resistance of a galvanometer by half-deflection method and to find its figure of merit.
5. To convert the given galvanometer (of known resistance and figure of merit) into a voltmeter of desired range and to verify the same.

   OR

   To convert the given galvanometer (of known resistance and figure of merit) into an ammeter of desired range and to verify the same.
6. To find the frequency of AC mains with a sonometer.

Activities assigned for Term I

1. To measure the resistance and impedance of an inductor with or without iron core.
2. To measure resistance, voltage (AC/DC), current (AC) and check continuity of a given circuit using multimeter.
3. To assemble a household circuit comprising three bulbs, three (on/off) switches, a fuse and a power source.
4. To assemble the components of a given electrical circuit.
5. To study the variation in potential drop with length of a wire for a steady current.
6. To draw the diagram of a given open circuit comprising at least a battery, resistor/rheostat, key, ammeter and voltmeter. Mark the components that are not connected in proper order and correct the circuit and also the circuit diagram.