INDIAN SCHOOL MUSCAT

SENIOR SECTION

DEPARTMENT OF PHYSICS

CLASS XII

YEAR PLAN 2022-2023

STUDENT'S COPY

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UNIT NO	UNIT	MARKS
UNIT-1	**ELECTROSTATICS**	**16**
	Chapter–1: Electric Charges and Fields	
	Chapter–2: Electrostatic Potential and Capacitance	
UNIT-11	**CURRENT ELECTRICITY**	
	Chapter–3: Current Electricity	
UNIT-III	**MAGNETIC EFFECTS OF CURRENT AND MAGNETISM**	**17**
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	Chapter–5: Magnetism and Matter	
Unit-IV	**ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENTS**	
	Chapter–6: Electromagnetic Induction	
	Chapter 7: Alternating currents	
UNIT-V	**ELECTROMAGNETIC WAVES**	**18**
	Chapter–8: Electromagnetic Waves	
UNIT-VI	**OPTICS**	
	Chapter–9: Ray Optics and Optical Instruments	
	Chapter–10: Wave Optics	
UNIT-VII	**DUAL NATURE OF RADIATION AND MATTER**	**12**
	Chapter–11: Dual Nature of Radiation and Matter	
UNIT-VIII	**ATOMS AND NUCLEI**	
	Chapter–12: Atoms	
	Chapter–13: Nuclei	
UNIT–IX	**ELECTRONIC DEVICES**	**7**
	Chapter–14: Semiconductor -Electronics: Materials, Devices and Simple Circuits	
	Total	**70**

MONTH	UNIT/TOPICS
MARCH 2022	**Unit I: ELECTROSTATICS**
	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 and uniformly charged thin spherical shell (field inside and outside).
APRIL 2022	**Chapter-2: Electrostatics 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.
MAY 2022	**Chapter-2: Electrostatics Potential and Capacitance (Continued)** 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 a parallel plate capacitor with and without dielectric medium between the plates**,** energy stored in a capacitor (no derivation, formulae only).
	Unit II: CURRENT ELECTRICITY
	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, V-I characteristics (linear and non-linear), 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. Electric energy and Power
	Unit III: Magnetic Effects of Current and Magnetism
	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 a solenoid (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. Current loop as a magnetic dipole and its magnetic dipole moment. Moving coil Galvanometer-its current sensitivity and conversion to ammeter and voltmeter.
JUNE 2022	**Chapter-5: Magnetism and Matter** Bar magnet, bar magnet as an equivalent solenoid (qualitative treatment only), magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis (qualitative treatment only), torque on a magnetic dipole (bar magnet) in uniform magnetic field (qualitative treatment only), magnetic field lines. Magnetic properties of materials – Para-, dia- and ferro- magnetic substances with examples, Magnetization of materials, effect of temperature on magnetic properties.
AUGUST 2022	**Unit IV: Electromagnetic Induction and Alternating Currents**
	Chapter-6: Electromagnetic Induction Electromagnetic induction; Faraday's laws, induced EMF and current; Lenz's Law. Self and mutual induction.
	Chapter-7: Alternating Current Alternating currents, peak and RMS value of alternating current/voltage; reactance and impedance LCR series circuit (phasors only), resonance; power in AC circuits, power factor, wattles current LC oscillations (qualitative treatment only) AC generator, Transformer
	Unit V: Electromagnetic Waves
	Chapter-8: Electromagnetic Waves Basic idea of displacement current, Electromagnetic waves, their characteristics, their Transverse nature (qualitative ideas only). Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses.
SEPTEMBER 2022	**Unit V: Optics**
	Chapter-9: Ray Optics and Optical Instruments **Ray Optics:** Reflection of light, spherical mirrors, mirror formula, refraction of light, total internal reflection and 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, refraction of light through a prism.

	HALF YEARLY EXAMINATION
OCTOBER 2022	**Chapter-9: Ray Optics and Optical Instruments (Continued)** **Optical instruments:** Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.
	Chapter- 10: Wave Optics **Wave Optics:** Wave front and Huygen's principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws of reflection and refraction using Huygen's principle. Interference, Young's double slit experiment and expression for fringe width (No derivation final expression only), coherent sources and sustained interference of light, diffraction due to a single slit, width of central maxima (qualitative treatment only).
	Unit VII: Dual Nature of Radiation and Matter
	Chapter–11: 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. Experimental study of photoelectric effect Matter waves-wave nature of particles, de-Broglie relation.
	Unit VIII: Atoms and Nuclei
	Chapter–12: Atoms Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model of hydrogen atom, Expression for radius of nth possible orbit, velocity and energy of electron in his orbit, of hydrogen line spectra (qualitative treatment only)
NOVEMBER 2022	**Chapter–13: Nuclei** Composition and size of nucleus, nuclear force Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission, nuclear fusion.
	Unit IX: Electronic Devices
	Chapter–14: Semiconductor Electronics: Materials, Devices and Simple Circuits Energy bands in conductors, semiconductors and insulators (qualitative ideas only) Intrinsic and extrinsic semiconductors- p and n type, p-n junction Semiconductor diode - I-V characteristics in forward and reverse bias, application of junction diode -diode as a rectifier

TENTATIVE DATES FOR EXAMS		
18 APRIL 2022		PERIODIC TEST 1
9 MAY 2022		PERIODIC TEST 2
13 SEPTEMBER2022		HALF YEARLY EXAMINATION
15 NOVEMBER 2022		FIRST PREBOARD EXAMINATION
8 JANUARY 2023		SECOND PREBOARD EXAMINATION
30 JANUARY 2023		BOARD PRACTICAL EXAMINATION