Physics L.O. 1st Term Grade 11-- 2020

Learning Outcome:	Key Concepts:	Skills:
General Law Of Gravitation	1. Newton's Law of Universal Gravitation • 2. Gravitation constant. • 3. Gravitational field • 4. Field Force • 5. Inverse square law • 6. Launching velocity of satellites. • 7. Orbital velocity of satellites. 8. escape velocity of a satellite	1. Determine the gravitational force between any two bodies - both celestial or earthly • 2. Deduce the factors affect the gravitational field intensity at a point. •3. Use universal gravitation to explain why g near earth is 98m/s^2 • 4. Calculate the ratio between the gravitational field strength on two different planets • 5. Calculate the escape velocity for different planets • 6. Calculate the orbital velocity of satellite at a certain height. • 7. Compare the free fall acceleration on Earth and on the Moon
2- Electric Fields and Forces	1. Static electricity 2. Coulomb's Law 3. Electric Field, Electric Field intensity 4. Conservation of electric charge. 5. Repulsion and attraction of electric charges. 6. Methods of electrification 7. Electroscope 8. Electric Field Lines 9. electric potential	1. Explain the repulsive and attractive force between two charges 2. Explain methods of electrification 3. Identify the type of accumulated electric charge on an object by using electroscope. 4. Compare electrostatic force between two objects to the gravitational force between them 5. Determine direction of total electrostatic force on a charge in the presence of other charges, using vector addition 6. Determine direction of the total electric field at a point in space in presence of nearby electric charges, using vector addition 7. Qualitatively describe the electric field near a dipole 8. Draw electric field lines near a charge distribution 9. determine where (if any) field-free regions exist near a charge distribution
3- Direct Current Circuits	1. Dynamic electricity 2. Electric current 3. Current density 4. Potential difference & voltage 5. Electrical resistors 6. Resistivity & conductivity 7.Electromotive force (emf) 8. internal resistance 9. terminal voltage 10. Ohm's law 11. Ohmic vs. non-Ohmic	1. Explain the required conditions for continuous flow of electric charge. 2. Measure some physical quantities as voltage, current intensity and ohmic resistance of a conductor. 3. Verify Ohm's law practically and measure V-I diagrams 4. Use the graph between terminal voltage of the battery and the current intensity to find the EMF of the cell and its internal resistance 5. Solve DC circuit problems that require use of Ohm's law 6. Differentiate between

	materials	Ohmic and non-Ohmic materials 8. Understand how the length and cross-sectional area of a conducting wire affects its electrical resistance
4- Direct Current Circuits	1. Connections of resistors (series & parallel) 2. Kirchoff's current law 3. Kirchoff's voltage law	1. Determine the net resistance of series and parallel combinations of resistors in a DC circuit 2. Analyze a DC circuit containing only series and/or parallel resistors to predict current, and voltage through all devices 3. Given a set of resistors and a power supply, design electric circuits to obtain the largest total current leaving the power supply and the smallest total current leaving the power supply 4. Use Kirchoff's Laws to solve for current and voltage, in a multi-loop DC circuit containing resistors
5- Capacitors & Inductors	1. Capacitor charging and discharging 2. Energy storage 3. dielectric material 4. Time constant 5. Exponential charge/discharge 6. Capacitance in series and parallel group of connected capacitors	1. Use the fact that capacitance increases with size of surface but decreases with increasing separation to explain why capacitors in parallel 2. Use the fact that capacitance increases with size of surface, but decreases with increasing separation to explain why capacitors in series add reciprocally. 3. Calculate charge and voltage across capacitors in DC circuits once equilibrium is reached 4. Describe i and v characteristics of capacitor in DC circuit with respect to time mathematically and graphically 5. Measure and predict time constants in simple RC circuits 6. Calculate the energy stored in the electric field inside a fully charged capacitor
6- Magnetic Fields & Forces	1. Magnetic field: strength and direction 2. Magnetic field lines 3. Magnetic flux and magnetic flux density . 4. Magnetic domain 5. Magnetic field due to a straight wire 6. Magnetic field due to a loop. 7. Magnetic field due to a solenoid. 8 Rules to determine the direction of magnetic field (Ampere's rule) 9. Polarity of a solenoid.	1. Draw the pattern of magnetic field (i.e. magnetic field lines) of two magnetic poles close to each other (similar and different, i.e north- north and north-south). 2. Draw the pattern of magnetic field (i.e. magnetic field lines) near current-carrying wires in various configurations (eg. straight wires, circular and square loops). 3. Calculate the magnetic field strength and direction at a normal distance from a straight current-carrying wire 4. Calculate the magnetic field strength and direction at the center of a current-carrying loop. 5. Calculate the magnetic field intensity at a point on the axis of a solenoid. 6. Determine the position of the neutral point near two long parallel wires carrying

		currents in the same or in opposite direction (i.e. the position where the magnetic field = 0)
7- Magnetic Fields & Forces	1. Force on moving charge in magnetic field 2. Force on current-carrying wire in magnetic field 3. Magnetic torque and motors. 4. Measuring devices: (sensitive galvanometer, ammeter, voltmeter, ohmmeter)	1. Determine the direction of magnetic force on charges moving in constant magnetic fields 2. Determine the direction of magnetic force on a current-carrying wire in a constant magnetic field 3. Explain the torque that exists on current-carrying loop in a magnetic field (if loop positioned correctly) 4. Explain how an electrical motor works 5. Explain how a galvanometer works 6. Explain how to convert a galvanometer into an ammeter. 7. Explain how to convert a galvanometer into a voltmeter.