

Topic 5 - Electricity & Magnetism

#	Physical Quantity	Definition
1	The Charge	" Is a scalar property of matter that can cause it to experience a force in an electromagnetic field."
2	The Fundamental Charge	" Is the smallest amount of charge that exists in ordinary matter; $e = 1.6 \times 10^{-19} \text{ C}$."
3	Electric Field	" Is a region in which a charged particle would experience a non-contact force."
4	Electric Field Strength, E	" Is defined as the electric force per unit charge experienced by a small positive test charge placed at that point."
5	Electric Current	" Is the rate of flow of charge through the cross section of a conductor."
6	Potential Difference between two Points	" Is the work done per unit charge to move a point charge from one point to the other."
7	Resistance of a Conductor, R	" Is defined as the potential difference required to drive unit current through the conductor."
8	Drift Velocity	" Is defined as the constant velocity with which electrons drift through the conductor lattice in the presence of electric field."
9	Coulomb's Law	" States that the magnitude of the electrostatic force F between two point electric charges is directly proportional to the product of the magnitudes of charges and inversely proportional to the square of the distance between them."
10	Voltmeter	" Is an instrument used for measuring the voltage across a component by being placed in parallel with the component."
11	An Ideal Voltmeter	" Is one which draws no current from the circuit, so has infinite resistance."
12	Ammeter	" Is an instrument used for measuring the current intensity through a component by being placed in series with the component."
13	An Ideal Ammeter	" Is one which does not affect the current, so has zero resistance."
14	Electromotive Force (emf) - Def.1	" Is the total electric potential energy supplied to each coulomb of charge flowing through the entire circuit."
15	emf - Def.2	" Is the work done per unit charge taking the charges from the low potential to the high potential."
16	emf - Def.3	" Is the terminal potential difference when no current is supplied."
17	emf - Def.4	" Is the power provided by the battery per unit current."
18	The Internal Resistance, r	" Is the electrical resistance of the cell itself, associated with the electrochemical reactions within it."
19	Electronvolt	" Is the work done when a charge equal to one electron charge is taken across a potential difference of one volt."
20	Ohm's Law	" The current through a conductor is directly proportional to the potential difference across it, assuming the temperature of the conductor remains constant."
21	The Potentiometer	" Is a potential divider which can give a continuously variable voltage output from a fixed battery."
22	Primary Cell	" Is a cell that can convert chemical energy into electrical energy until all chemicals in the cell are exhausted. Recharging the cell is not possible; e.g. AA, AAA batteries."
23	Secondary Cell	" Is a cell that can be recharged by the application of a direct-current voltage; e.g. Lead-acid accumulator, NiCd (Nickel Cadmium), NiMH (Nickel-Metal Hybrid), Lithium-ion cells."
24	Capacity of a Cell - Def.1	" Is the amount of charge that can flow through the cell before it stops working. It is measured in Ah (Amp-hours)."
25	Capacity of a Cell - Def.2	" Is the constant current that it can supply for a given discharge time. It is measured in Ah (Amp-hours)."
26	The Power Dissipated	" The power dissipated in the resistor is the amount of electrical energy converted to heat per unit time."
27	The Electrical Permittivity, ϵ	" Is a measure of the resistance offered by the substance in creating an electric field within it and affects the transmission of the electric force. A material that is easily polarised has a high permittivity. The SI unit for permittivity is farad.m^{-1} ."
28	Kirchhoff's First Law	" The sum of the currents flowing into a junction equals the sum of the currents away from a junction, i.e. conservation of charge."
29	Kirchhoff's Second Law	" In a complete circuit loop, the sum of the emfs in the loop is equal to the sum of the potential differences in the loop, i.e. conservation of energy."
30	Magnets	" Are objects that have two pole types, which by arbitrary convention are called north (N or north-seeking), and south (S or south-seeking)."