**Electrical Circuits and Static Electricity** (Phys)

RAG your understanding.

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|  | **Start of Topic** | **End of Topic** | **Revised** |
| **2.1 Current, potential difference and resistance** |  |  |  |
| P.2.1.1.a - I can draw and interpret circuit diagrams, including the circuit symbols for: switch, cell, battery, diode, resistor, variable resistor, LED, lamp, fuse, voltmeter, ammeter, thermistor, LDR. |  |  |  |
| P.2.1.2.a - I can define electric current as the rate of flow of electrical charge around a closed circuit. |  |  |  |
| P.2.1.2.b - I can calculate charge and current by recalling and applying the formula:  Q = It |  |  |  |
| P.2.1.2.c - I can explain that current is caused by a source of potential difference and it has the same value at any point in a single closed loop of a circuit. |  |  |  |
| P.2.1.3.a - I can describe and apply the idea that the greater the resistance of a component, the smaller the current for a given potential difference (p.d.) across the component. |  |  |  |
| P.2.1.3.b - I can calculate current, potential difference or resistance by recalling and applying the equation:  V = IR |  |  |  |
| ***Required Practical 3:*** I can investigate, using circuit diagrams to set up a circuit, the factor(s) that affect the resistance of an electrical component. |  |  |  |
| P.2.1.4.a - I can define an ohmic conductor as one for which current through it is directly proportional to the potential difference across it (at a constant temperature) and sketch/interpret the current-voltage graph of an ohmic conductor. |  |  |  |
| P.2.1.4.b - I can explain that the resistance of components such as lamps, diodes, thermistors and LDRs is not constant, and sketch/interpret IV graphs of their characteristic electrical behaviour. |  |  |  |
| P.2.1.4.c - I can explain how to measure the resistance of a component by measuring the current through, and potential difference across, the component, drawing an appropriate circuit diagram using correct circuit symbols. |  |  |  |
| ***Required practical 4:*** I can investigate, using circuit diagrams to construct circuits, the V-I characteristics of a filament lamp, a diode and a resistor at constant temperature. |  |  |  |
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| **2.2 Series and parallel circuits** |  |  |  |
| P.2.2.1.a - I can show by calculation and explanation that components in series have the same current passing through them, and the total potential difference shared between them. |  |  |  |
| P.2.2.1.b - I can show by calculation and explanation that components connected in parallel have the same the potential difference across each of them, and the total current through the circuit shared between them. |  |  |  |
| P.2.2.1.c - I can calculate the total resistance of two components in series as the sum of the resistance of each component using the equation:  Rtotal = R1 + R2 |  |  |  |
| P.2.2.1.d - I can explain qualitatively why adding resistors in series increases the total resistance whilst adding resistors in parallel decreases the total resistance. |  |  |  |
| P.2.2.1.e - I can solve problems for circuits which include resistors in series using the concept of equivalent resistance. |  |  |  |
| **2.5 Static electricity (Physics only)** |  |  |  |
| **P.2.5.1.a - I can describe how insulating materials may become electrically charged when rubbed against each other due to electrons being moved from one material to the other. I can explain why one material becomes positively charged and the other becomes negatively charged.** |  |  |  |
| **P.2.5.1.b - I can describe evidence that charged objects exert forces of attraction or repulsion on one another when not in contact and determine whether charged objects will attract or repel based on their charges.** |  |  |  |
| **P.2.5.1.c - I can explain how the transfer of electrons between objects can explain the phenomenon of static electricity, including how sparks are created.** |  |  |  |
| **P.2.5.2.a - I can draw the electric field pattern for an isolated charged sphere.** |  |  |  |
| **P.2.5.2.b - I can explain the concept of an electric field, and the decrease in its strength as the distance from it increases and sketch the electric field pattern for an isolated charged sphere.** |  |  |  |
| **P.2.5.2.c - I can explain how the concept of an electric field helps to explain the non-contact force between charged objects as well as other electrostatic phenomena such as sparking.** |  |  |  |