Edexcel Physics – 9PH0

Module 3: Electric Circuits

You should be able to demonstrate and show your understanding of:	Progress and understanding:			
	1	2	3	4
Electric Circuits				
Electric current and understand that it is **the rate of flow of charged particles** as well as the use of the equation: $$I = \frac{\Delta Q}{\Delta t}$$				
The equation $V = \frac{W}{Q}$ and how to use it				
Resistance and that it is defined by: $$R = \frac{V}{I}$$ and that **Ohm's law** is a special instance where $I \propto V$ at a constant temperature				
How the distribution current, in Amps, in a circuit is a consequence of charge conservation				
How the distribution of potential differences, in Volts, is a consequence of charge conservation				
How to derive the equations for combining resistances in series and parallel: $$Series: R = R1 + R2 + \cdots + Rn$$ $$Parallel: \frac{1}{R} = \frac{1}{R1} + \frac{1}{R2} + \cdots + \frac{1}{Rn}$$				
How to use and apply the equations $P = VI, W = VIt$ as well as derive and use the related equations $P = I^2R$ and $P = \frac{V^2}{R}$				
Current-potential difference graphs for various components such as ohmic conductors, filament bulbs, thermistors and diodes and also how to sketch, recognise and interpret them				

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	1	2	3	4
How to use the equation $R = \frac{\rho l}{A}$				
CORE PRACTICAL 2: Determine the electrical resistivity of a material				
How to use the equation: $$I = nAvq$$ to explain the large range of resistivities of various materials				
The potential along a uniform current-carrying wire and how it varies with distance				
the principles of a potential divider circuit and how to calculate potential differences and resistances in a potential divider circuit				
Potential divider circuits where one resistance is variable including thermistors and LDRs (light dependent resistors)				
The definitions for **electromotive force (e.m.f)** and understand what is meant by **internal resistance** and how to distinguish between **e.m.f. and terminal potential difference**				
CORE PRACTICAL 3: Determine the e.m.f. and internal resistance of an electrical cell				
How changes of resistance with temperature can be modelled in terms of lattice vibrations and the number of conduction electrons as well as model these metallic conductors and negative temperature coefficient thermistors				
How changes in resistance with illumination can be modelled in terms of number of conduction electrons and how to apply this model to LDRs				