AQA Physics - 7407/7408

Module 5: Electricity

You should be able to demonstrate and show your understanding of:	Progress and understanding:			
	1	2	3	4
5.1 Current Electricity				
5.1.1 Basics of Electricity				
Electric current as the rate of flow of charge; potential difference as work done per unit charge.				
$I = \Delta Q / \Delta t$ $V = W / Q$				
Resistance defined as: $R = V / I$				
5.1.2 Current-Voltage Characteristics				
IV characteristics for an ohmic conductor, semiconductor diode, and filament lamp.				
Ohm's law as a special case where $I \propto V$ under constant physical conditions.				
Unless specifically stated in questions, ammeters and voltmeters should be treated as ideal (having zero and infinite resistance respectively).				
Questions can be set where either I or V is on the horizontal axis of the characteristic graph.				
5.1.3 Resistivity				
Resistivity: $\rho = RA / L$				
Description of the qualitative effect of temperature on the resistance of metal conductors and thermistors.				

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Only negative temperature coefficient (ntc) thermistors will be considered.				
Applications of thermistors to include temperature sensors and resistance–temperature graphs.				
Superconductivity as a property of certain materials which have zero resistivity at and below a critical temperature which depends on the material.				
Applications of superconductors to include the production of strong magnetic fields and the reduction of energy loss in transmission of electric power.				
Critical field will not be assessed.				
5.1.4 Circuits				
Resistors: *in series,* $R_T = R_1 + R_2 + R_3 + \ldots$ *in parallel,* $1/R_T = 1/R_1 + 1/R_2 + 1/R_3 + \ldots$				
Energy and power equations: $E = IVt$ $P = IV = I^2 R = V^2/R$				
The relationships between currents, voltages and resistances in series and parallel circuits, including cells in series and identical cells in parallel.				
Conservation of charge and conservation of energy in dc circuits.				
5.1.5 Potential Divider				
The potential divider used to supply constant or variable potential difference from a power supply.				
The use of the potentiometer as a measuring instrument is not required.				
Examples should include the use of variable resistors, thermistors, and light dependent resistors (LDR) in the potential divider.				

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	1	2	3	4
5.1.6 Electromotive Force and Internal Resistance				
$\varepsilon = E/Q$ $\varepsilon = I(R + r)$				
Terminal pd and emf				
Students will be expected to understand and perform calculations for circuits in which the internal resistance of the supply is not negligible.				