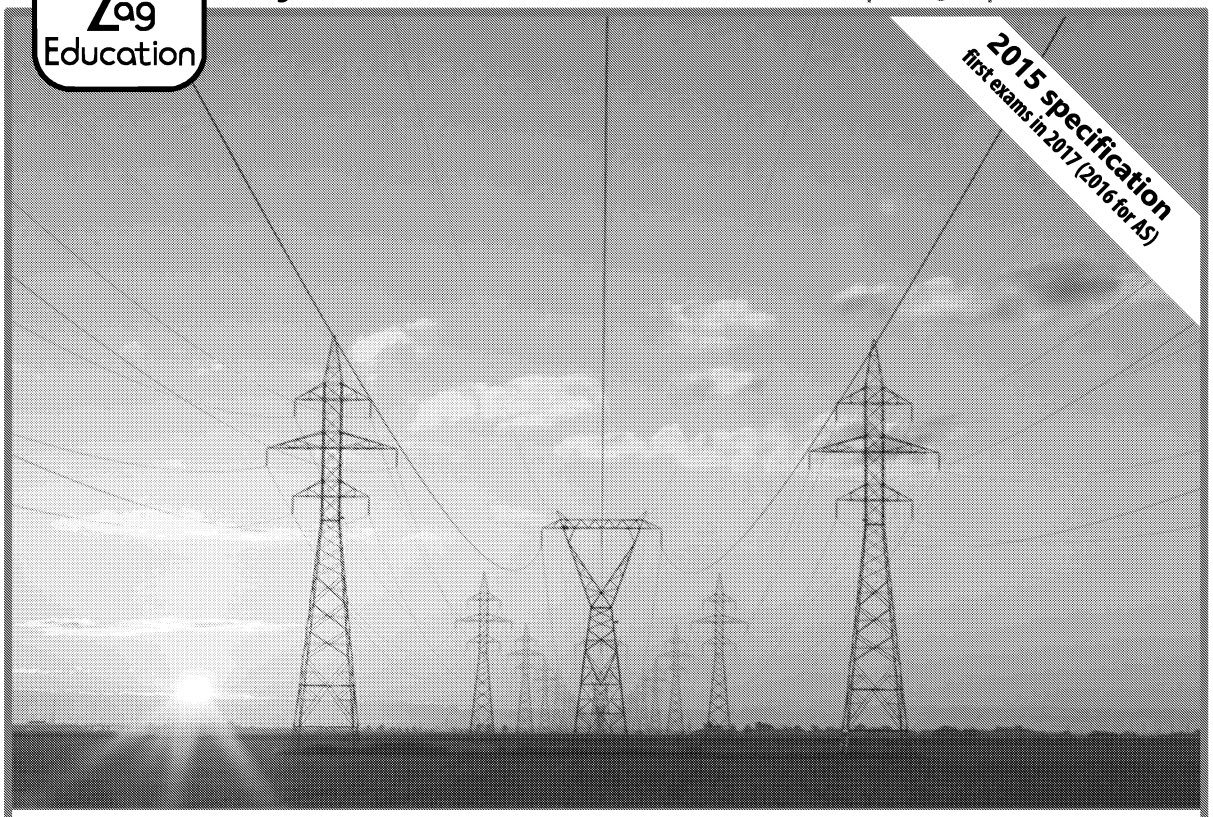
Zig Zag Education

Physics

A Level | AQA | 7407/7408



Revision Grids for A Level AQA Physics

Section 5: Electricity

zigzageducation.co.uk

POD 8584a

Contents

Teacher's Introduction

These revision grids are designed to help your students independently learn content and help you to assess their knowledge during teaching of each section of Section 5 – Electricity, within the AQA A Level Year 1 and AS Physics specification. The concept is that your students are assigned a set of pages to read from the relevant book and then are asked to complete the relevant revision grids, possibly for homework or as a refresher for a topic. These activities are particularly useful for students who need more support, but they contain some thought-provoking reasoning questions which will stimulate highly engaged students.

This resource directly references:
AQA A Level Physics Year 1 and AS, 2nd Edition; Breithaupt; Oxford, 2015

and

AQA A-Level Physics Year 1 and AS; England, Davenport, Pollard, Thomas; Hodder, 2015

Each revision grid is closely linked to the AQA 2015 specification and to the approved textbooks. Relevant textbook page numbers are provided at the top of each worksheet, to allow easy cross-referencing. Separate resources cover Units 1, 2, 3 and 4.

Each revision grid contains a range of question styles, including:

- **Quick-testing questions** – these may be a phrase, a definition or a numeric response.
- **Missing-information/Match-terms-to-definitions questions** – test key knowledge quickly.
- **Explain-a-process questions** – encourage students to recognise cause and effect in physical processes.
- **Graph questions** – will require understanding of how to draw graphs, use log scales and interpret data.
- **Applied knowledge questions** – challenge students to apply knowledge in unfamiliar situations.
- **Experiment time** – asks students to analyse a practical, interpret its results and recognise strengths and weaknesses.

Revision grids in this section will on average take 20–30 minutes each. However, this resource includes substantial opportunities to develop mathematics skills, and students who find maths challenging may find that these resources take longer to complete.

These resources can be used to engage students and allow those who have missed lessons to catch up quickly. The worksheets can be used as the basis for a homework exercise, and the answer scheme allows them to be easily used in cover lessons. Students could also use the worksheets as an independent learning and revision resource. All resources can be photocopied in black and white.

We hope you and your students enjoy this resource!

Selected Question and Answer Pages

For demonstration only, the sample answer pages immediately
follow their corresponding question pages

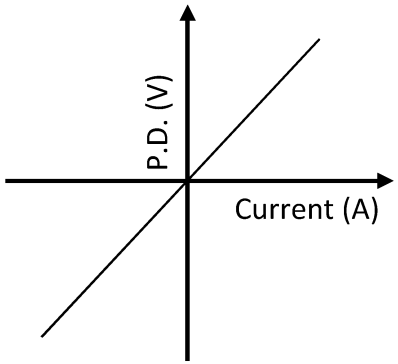
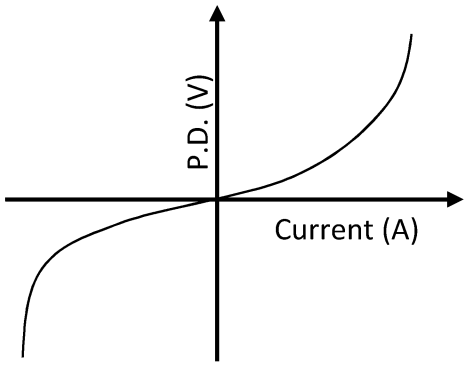
	Question	Answer
3.5.1.1 Basics of Electricity (cont.)	**A charge of 350 mC flowed through a lamp when a current of 50 mA was flowing through the lamp.** **Calculate the amount of time the lamp was switched on for.**	
	Calculate the current in a component that has a charge of 1.5 C passing through it in 60 s, in mA.	

	Question	Answer
3.5.1.1 Basics of Electricity (cont.)	**A charge of 350 mC flowed through a lamp when a current of 50 mA was flowing through the lamp.** **Calculate the amount of time the lamp was switched on for.**	$I = \frac{\Delta Q}{\Delta t}$ $\Delta t = \frac{\Delta Q}{I}$ $\Delta t = \frac{350 \times 10^{-3}}{50 \times 10^{-3}}$ $t = 7\ \text{s}$
	Calculate the current in a component that has a charge of 1.5 C passing through it in 60 s, in mA.	$I = \frac{\Delta Q}{\Delta t}$ $I = \frac{1.5}{60}$ $I = 25\ \text{mA}$

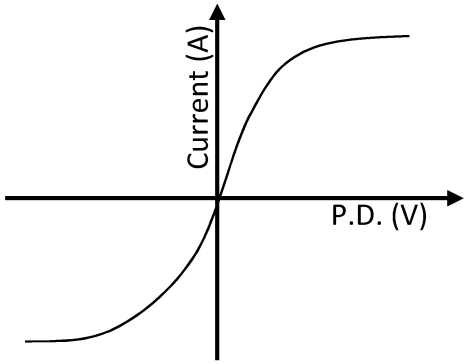
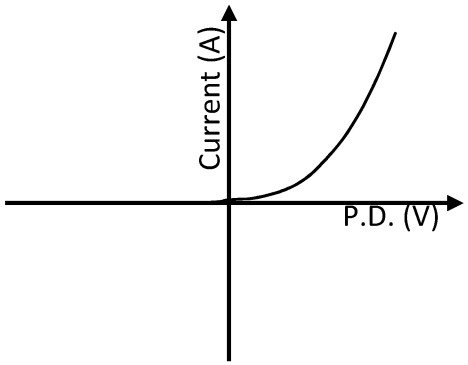
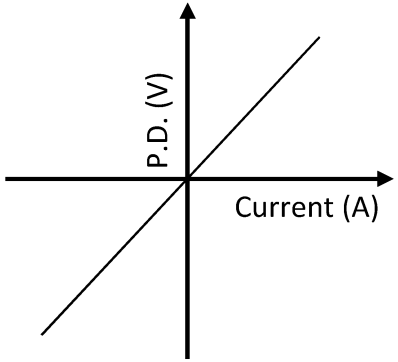
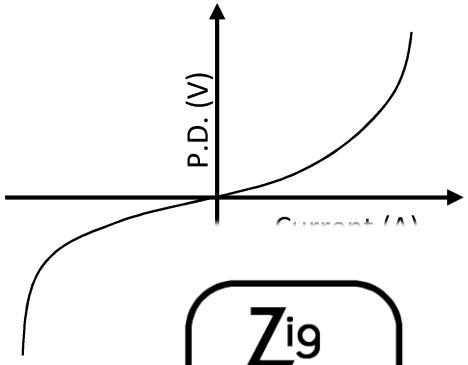
3.5.1.2 Current – Voltage Characteristics (cont.)

Question	Answer
Draw I – V characteristic graphs for a filament lamp and an LED.	**I – V characteristic graph**
Complete the table to match each component with its V – I characteristic graph.	**V – I characteristic graph**

Component	Filament lamp	LED

Component		
		

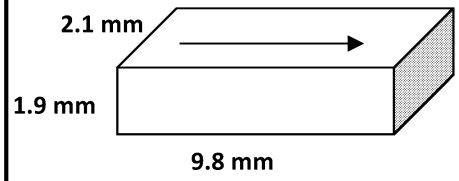
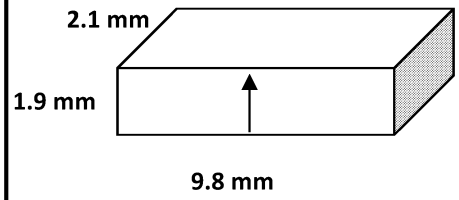
3.5.1.2 Current – Voltage Characteristics (cont.)

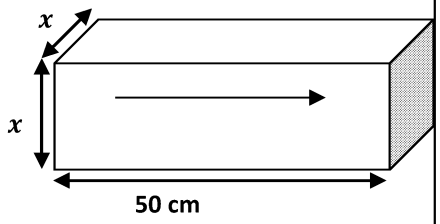
Question	Answer
Draw I – V characteristic graphs for a filament lamp and an LED.	**Component** / **Filament lamp** / **LED** **I – V characteristic graph**  
Complete the table to match each component with its V – I characteristic graph.	**Component** / **Fixed resistor** / **Filament lamp** **V – I characteristic graph**  

	Question	Answer	
3.5.1.6 Electromotive Force and Internal Resistance (cont.)	**A battery was connected to a variable resistor.** **The following readings were taken:** **Resistance (Ω) / Current (A)** **2.0 / 4.0** **4.0 / 3.0** **(a) Calculate the internal resistance of the battery.** **(b) Calculate the emf.**	**(a)**	**(b)**

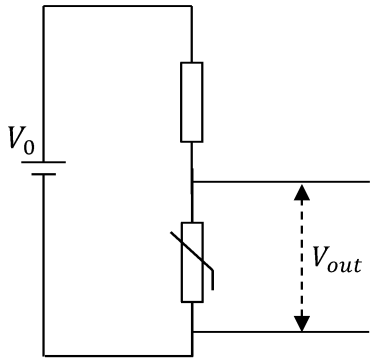
	Question	Answer	
3.5.1.6 Electromotive Force and Internal Resistance (cont.)	**A battery was connected to a variable resistor.** **The following readings were taken:** **Resistance (Ω) / Current (A)** **2.0 / 4.0** **4.0 / 3.0** **(a) Calculate the internal resistance of the battery.** **(b) Calculate the emf.**	**(a)** $\varepsilon = I(R + r)$ $V = IR$ For the first row: $V = 4 \times 2 = 8$ V $\varepsilon = 8 + 4r$ For the second row: $V = 3 \times 4 = 12$ V $\varepsilon = 12 + 3r$ Now, solve the equations simultaneously: $\varepsilon = 8 + 4r$ $\varepsilon = 12 + 3r$ Subtracting the equations from each other gives us: $0 = -4 + r$ Therefore: $r = 4.0\ \Omega$ (Other methods acceptable as long as they give the same solution.)	**(b)** Substituting this into one of our earlier equations gives us: $\varepsilon = 8 + 4 \times 4$ $\varepsilon = 24$ V (Other methods acceptable as long as they give the same solution.)

Additional Selected Question Pages

	Question	Answer	
3.5.1.3 Resistivity (cont.)	**The diagram below shows the dimensions of a metal wire with a resistivity of $1.2 \times 10^{-7}\ \Omega$ m.**  **(a) Calculate the resistance of the wire.** **(b) Calculate the resistance of the same wire if the current flowed in the direction shown below.**  	**(a)**	**(b)**

	Question	Answer
3.5.1.3 Resistivity (cont.)	**Calculate the resistivity of a wire which has a resistance of 6.0 Ω and a diameter of 0.20 cm, and a length of 75 cm.**	
	The dimensions of a wire are shown below.  **The resistance of the wire is 5.6 Ω and the material has a resistivity of 3.7×10^{-6} Ω m.** **Calculate x.**	

	Question	Answer
3.5.1.3 Resistivity (cont.)	**Explain what an NTC thermistor is.**	
	Explain the shape of the resistance – temperature curve for an NTC thermistor.	
	Sketch a graph to show the effect that temperature has on the resistance of a thermistor.	

	Question	Answer
3.5.1.3 Resistivity (cont.)	**Suggest a possible application of the circuit below, and explain why the circuit would be appropriate for this use.**  	
	Describe how the circuit below could be used in an experiment to create a calibration curve for a thermistor at different temperatures.