

Question number	Answer	Notes	Marks
6 (a)	<p>resistor, battery, voltmeter, ammeter all present in a complete circuit</p> <p>variable resistor connected in series with resistor;</p> <p>ammeter in series with resistor;</p> <p>voltmeter in parallel with 60 ohm resistor;</p>	<p>all four symbols drawn correctly condone use of cell or dc power supply symbol for battery</p> <p>symbol drawn correctly</p> <p>condone incorrect yet identifiable ammeter symbol</p> <p>condone incorrect yet identifiable voltmeter symbol</p> <p>accept higher level answers involving potential divider circuits</p>	4
(b)	<p>any four from:</p> <p>MP1. measure voltage and current;</p> <p>MP2. idea of varying voltage (across resistor);</p> <p>MP3. take repeat readings and average (at each voltage);</p> <p>MP4. switch off circuit in between readings;</p> <p>MP5. other reasonable safety measure relating to equipment heating up</p>	<p>e.g. by altering the resistance of the variable resistor</p> <p>e.g. not using full range of voltages so current doesn't get too high ignore references to graph</p>	4
(c) (i)	<p>line passes through origin;</p> <p>line is straight throughout;</p> <p>line passes/would pass through the point (12,0.20);</p>	by eye	3
(ii)	<p>any three from:</p> <p>MP1. line will be same shape / straight line through origin / both components are resistors;</p> <p>MP2. line (for 120Ω resistor) will have a lower gradient;</p> <p>MP3. line (for 120Ω resistor) will have half the gradient;</p> <p>MP4. (because) larger resistance will result in a lower current in the circuit;</p>	<p>allow (still) directly proportional</p> <p>also award MP2</p> <p>allow relevant justification by $V=IR$ all three marks can be awarded from a correct new line on the graph.</p>	3

Total for Question 6 = 14 marks