Year 9 Electric Circuits Worksheet - Mark Scheme

Year 9 · KS3 Physics · Current, voltage, resistance and circuits

Section A: Circuit components and measuring [13 marks]

1	Switch; ammeter; voltmeter; bulb; fuse; battery; resistor. Guidance: 1 mark each.	**7**
2	Ammeter: current; amps (A); series. Voltmeter: potential difference (voltage); volts (V); parallel (across the component). Guidance: 1 mark for each correct box.	**6**

Section B: Series and parallel circuits [15 marks]

3	Paths: one; more than one. Current: the same everywhere; splits between branches and adds up. Voltage: shared between components; the same across each branch. If one bulb breaks: all go out; the others stay on. Guidance: 1 mark for each correct box (8 boxes).	**8**
4(a)	9 ? 2 ? 3 (1) = 4 V (1)	**2**
4(b)	0.5 A (the same in a series circuit)	**1**
5	0.3 + 0.5 (1) = 0.8 A (1)	**2**
6	Each light can be switched on or off separately (1). If one bulb fails the others still work / each bulb gets the full voltage (1).	**2**

Section C: Resistance and Ohm’s law [12 marks]

7	How difficult it is for current to flow through a component (1). Ohm (?) (1).	**2**
8(a)	I = V ÷ R = 12 ÷ 4 (1) = 3 A (1)	**2**
8(b)	V = 0.5 × 6 (1) = 3 V (1)	**2**
8(c)	R = 9 ÷ 0.3 (1) = 30 ? (1)	**2**
9	The bulbs get dimmer (1) because the total resistance increases so the current decreases (1).	**2**
10	Make the wire longer; make the wire thinner; use a material with higher resistivity. Guidance: 1 mark each, any two.	**2**

Section D: Data and practical skills [10 marks]

11(a)	Axes labelled with units (1); points plotted correctly (1); straight line of best fit through origin (1).	**3**
11(b)	Current is directly proportional to voltage (1); the graph is a straight line through the origin (1).	**2**
11(c)	R = 8 ÷ 1.6 (1) = 5 ? (1)	**2**
11(d)	The filament gets hot as current increases (1) so its resistance increases (1).	**2**
12	Water conducts electricity, so there is a risk of electric shock.	**1**

Total: 50 marks. Accept any scientifically correct alternative wording.