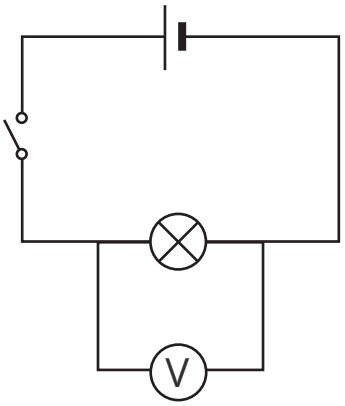
Question 1

Question	Answers	Extra information	Mark
01.1	correct symbol for voltmeter drawn voltmeter drawn in parallel to bulb  		**1** **1**
01.2	resistance = potential difference ÷ current	Allow correct rearrangement.	**1**
01.3	resistance = $\frac{12}{6}$ 2 ohms/Ω	Allow correct use of equation from **01.2**. An answer of 2Ω with no working shown scores **3** marks.	**1** **1** **1**
01.4	add another cell		**1**
Total			**7**

Question 2

Question	Answers	Extra information	Mark
02.1	**A** series (circuit) **B** parallel (circuit)	Answers in this order only.	**1** **1**
02.2	ammeter		**1**
02.3	series circuit/circuit A: • current is the same everywhere in the circuit • potential difference is split between the components parallel circuit/circuit B: • current is shared between the components/branches • potential difference is the same across the components in each branch		 **1** **1** **1** **1**
Total			**7**

Question 3

Question	Answers	Extra information	Mark
03.1	electrostatic (force)		**1**
03.2	electrons were transferred from the student's hair to the balloon the student's hair had more protons than electrons protons are positively charged		**1** **1** **1**
03.3	the balloon is negatively charged opposite charges attract		**1** **1**
Total			**6**

Question 4

Question	Answers	Extra information	Mark
04.1	Any **three** from: • wrap the insulated copper wire around the iron nail • attach crocodile clips to each end of the insulated copper wire • attach the crocodile clips to the power pack • switch on the power pack to allow a current to flow through the wire		**3**
04.2	the paperclips are magnetic/made of a magnetic material	Allow the paperclips are made of iron/ steel.	**1**
04.3	correct scale on y-axis	Scale must take up at least half of the grid.	**1**
	all points plotted correctly	Allow **1** mark for 4 or 5 points plotted correctly.	**2**
	straight line of best fit		**1**
04.4	as the current increases, the strength of the electromagnet increases		**1**
04.5	Any **one** from: • the electromagnet can be switched on and off • the strength of the magnetic field can be varied		**1**
Total			**10**