Physics - Key Stage 3
Electricity and Magnetism

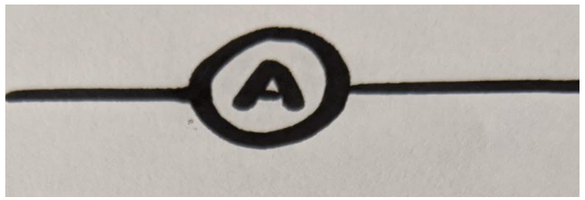
Electricity Review - Worksheet

Miss White

OAK NATIONAL ACADEMY

Questions from video

Fill in the missing gaps



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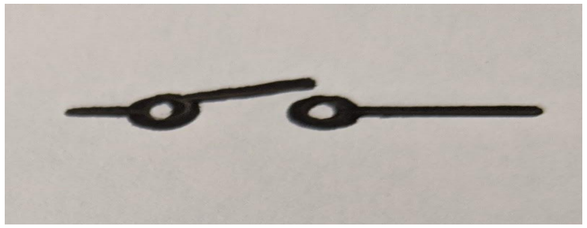
Open Switch



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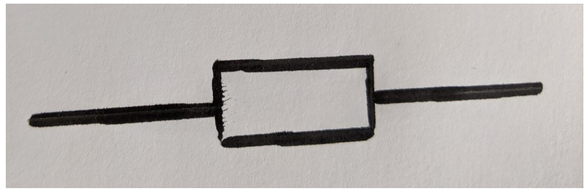
Lamp/bulb

Battery

?



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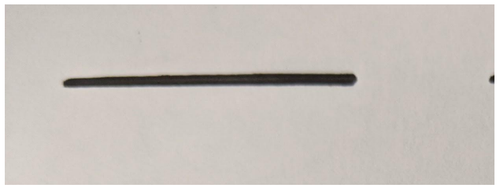

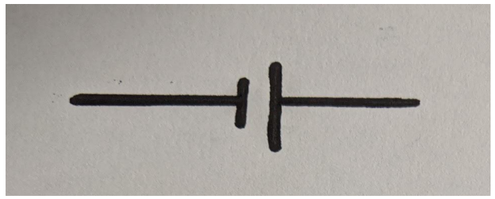

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Voltmeter

?

Independent task 1

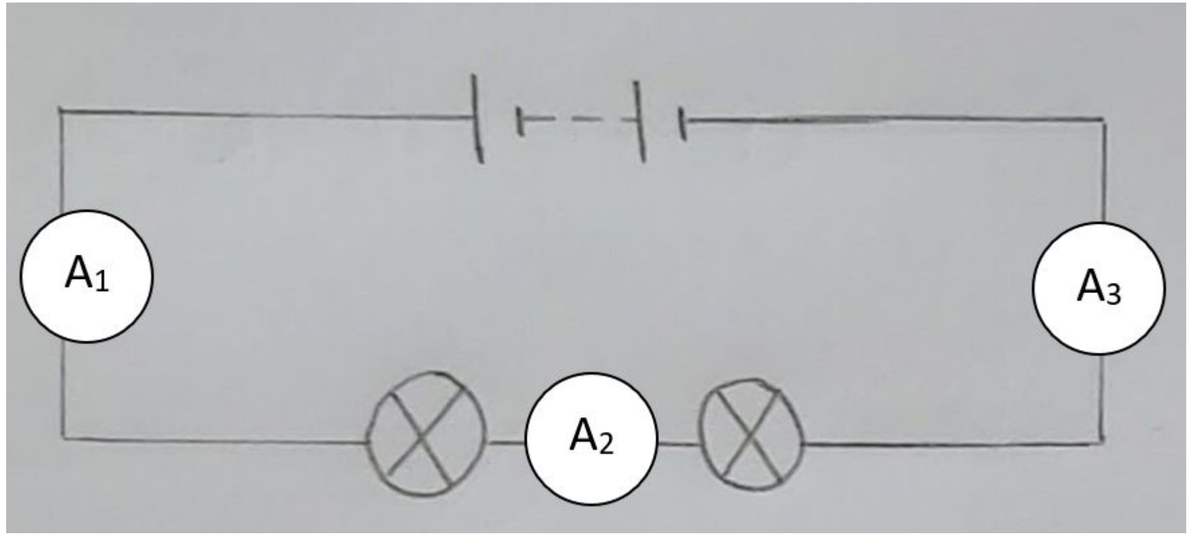
1. Draw a cell, 2 bulbs and an ammeter in series

2. Add a voltmeter to measure the potential difference of bulb 1

3. Draw a battery and 2 bulbs in parallel

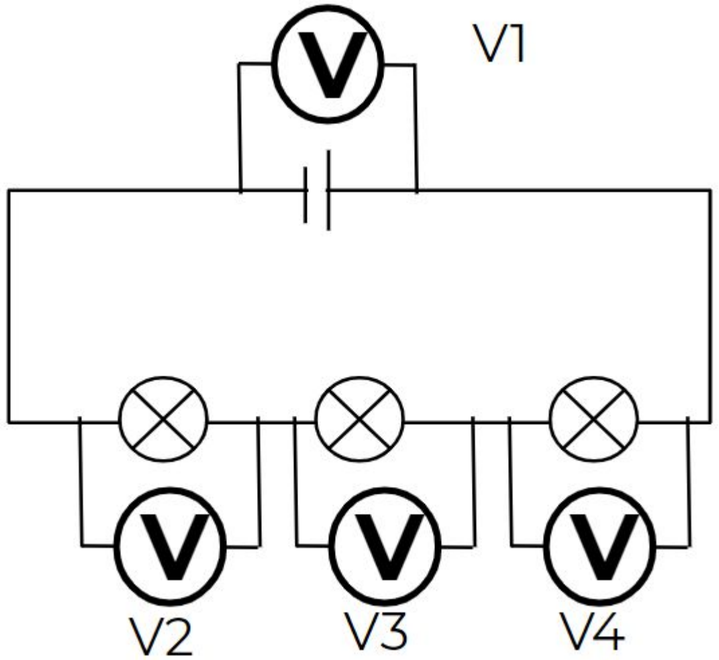
4. Add a voltmeter to measure the potential difference of the battery

Find the missing values 1:



1. A1 = 3 A
   A2 = 3 A
   A3 = ?

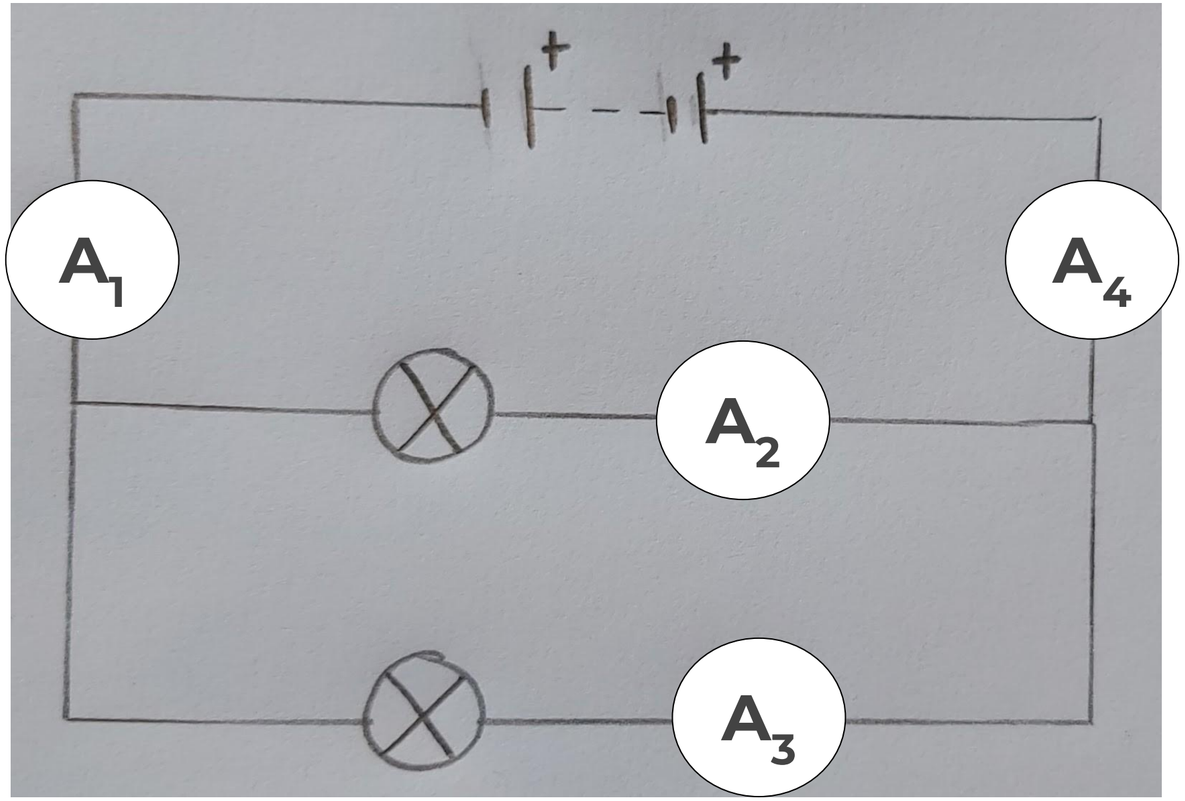
2. A1 = ?
   A2 = 1.5 A
   A3 = ?



3. V1 = 3 V
   V2 = 1 V
   V3 = 1 V
   V4 = ?

4. V1 = 3 V
   V2 = 1.2 V
   V3 = ?
   V4 = 0.9 V

5. V1 = ?
   V2 = 0.9 V
   V3 = 0.9 V
   V4 = 0.9 V



Find the missing values 2:

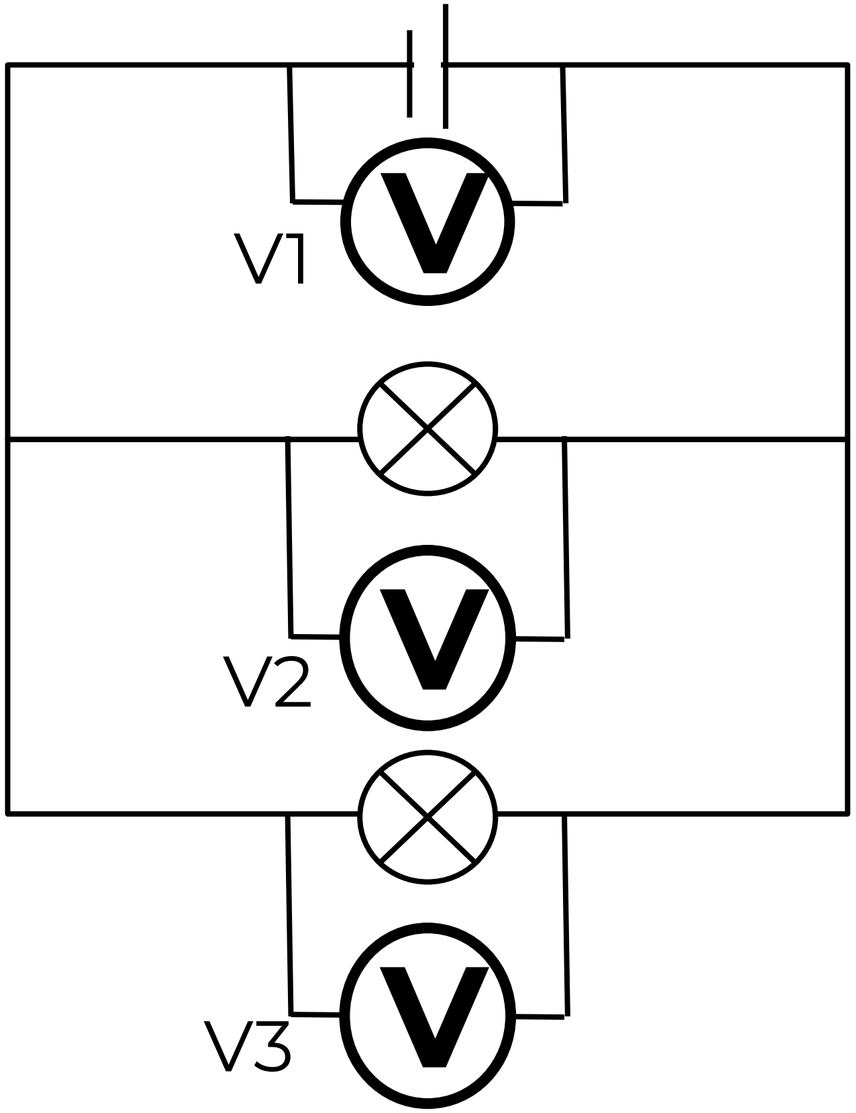
1. A1 = 3 A
   A2 = 1.5 A
   A3 = 1.5 A
   A4 = ?

2. A1 = 4.5 A
   A2 = 3 A
   A3 = ?
   A4 = ?

3. A1 = ?
   A2 = 1.7 A
   A3 = 2 A
   A4 = ?

3. A1 = 4.2 A
   A2 = ?
   A3 = ?
   A4 = ?

Find the missing values 3:



1. V1 = 6 V
   V2 = ?
   V3 = ?

2. V1 = ?
   V2 = 1.5 V
   V3 = 1.5 V

2. V1 = ?
   V2 = 3.2 V
   V3 = ?

Independent task 2

1. The resistance of a resistor is 34 Ω and the current through it is 0.3 A. What is the potential difference across the resistor?

2. The resistance of an iPhone is 3 kΩ and the current through it is 4 mA.

   What is the potential difference of its power source?

3. The potential difference across a 50 Ω resistor is 6 V. What is the current through the resistor?

4. The potential difference across a lamp is 10 V and the current through the lamp is 3 A. Calculate the resistance of the lamp

5. The current through an ipad is 100mA and the potential difference of its power supply is 12V. Calculate the resistance of the ipad

Measuring the resistance of a wire - put the method in the correct order

Repeat, decreasing the distance between the crocodile clips by 10cm each time until you have at least 5 readings

Connect the voltmeter in parallel with the 1m wire using crocodile clips

Connect the power pack and ammeter in series with the wire

Switch off the power pack. Turn dial back to zero.

Switch power pack on, adjust p.d. so that current through the wire is 0.50A then record current and p.d.

Independent Task 3

Objects become charged due to _____ (when rubbed together).

One of these materials must be an _____.

_____ causes _____ to transfer from one material to the other.

Electrons have a _____ charge

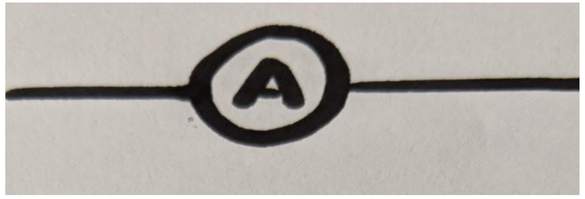
The material which loses electrons becomes _____ charged, and the material which _____ electrons becomes negatively charged.

Exam style question

Explain why a baby’s hair stands on end when it is rubbed by a balloon (4 marks)

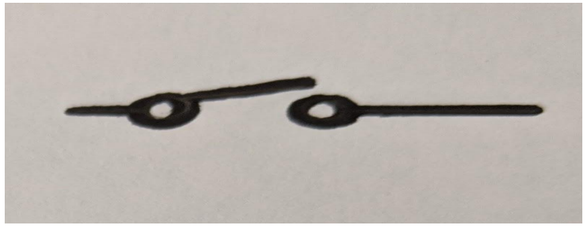
Answers

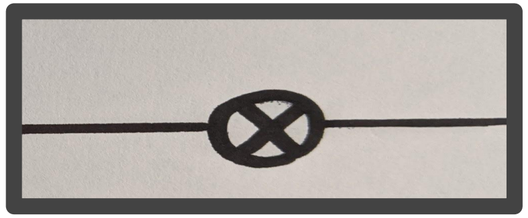
Fill in the missing gaps - answers



Ammeter

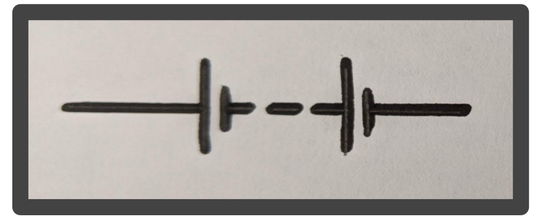
Open Switch

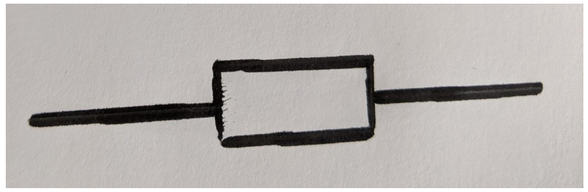




Lamp/bulb

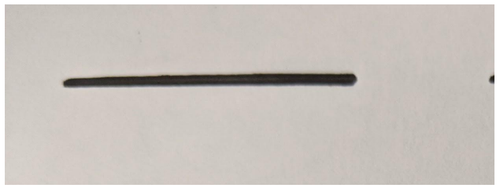
Battery

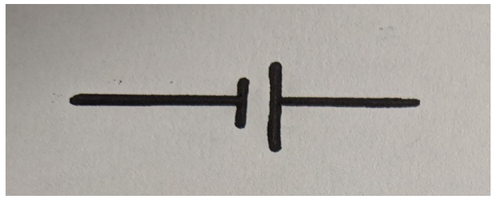




Resistor

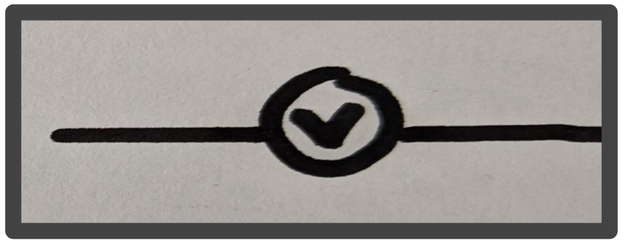
Wire





Cell

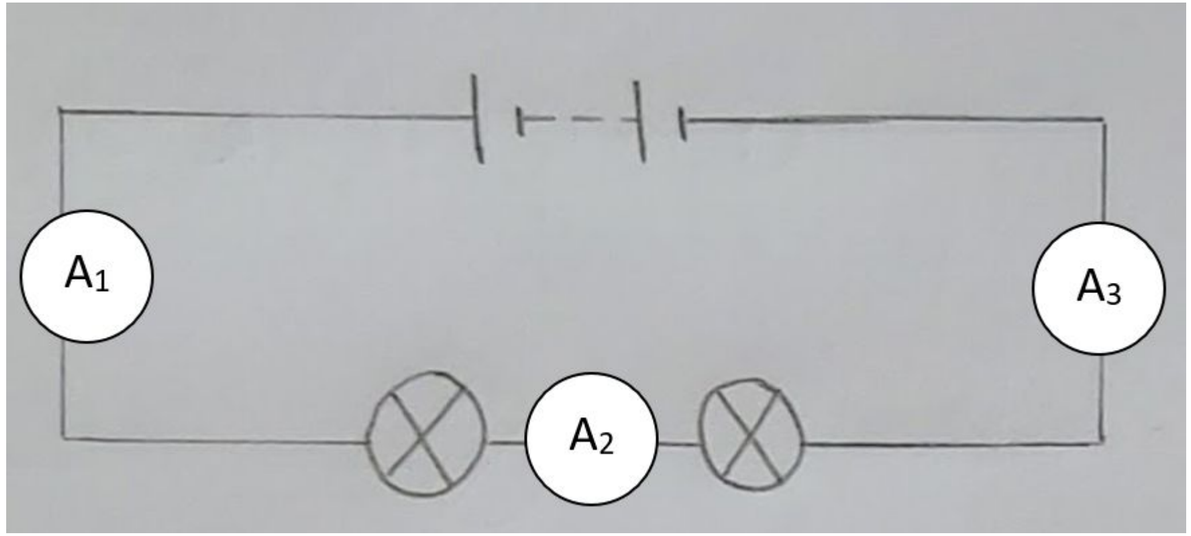
Voltmeter



Independent task 1 - answers

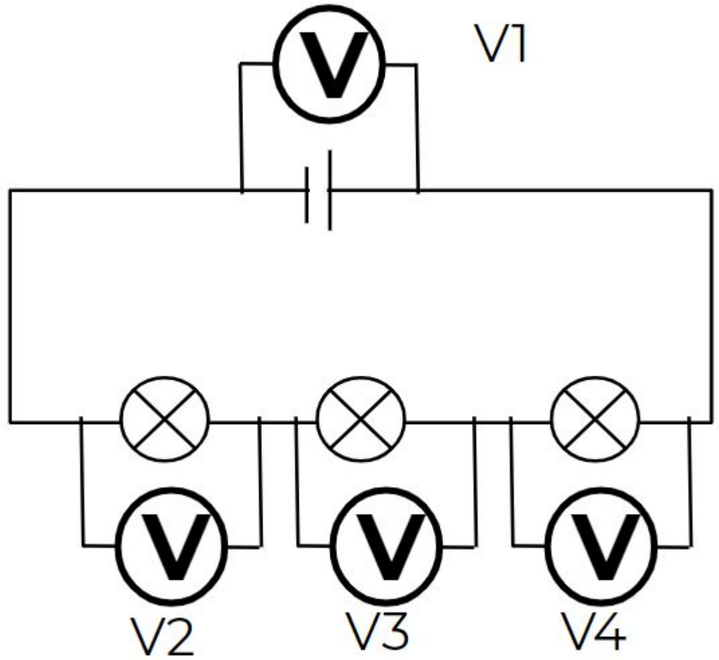
See video for answers - modelled on visualiser

Find the missing values 1 - Answers:



1. A1 = 3 A
   A2 = 3 A
   A3 = **3 A**

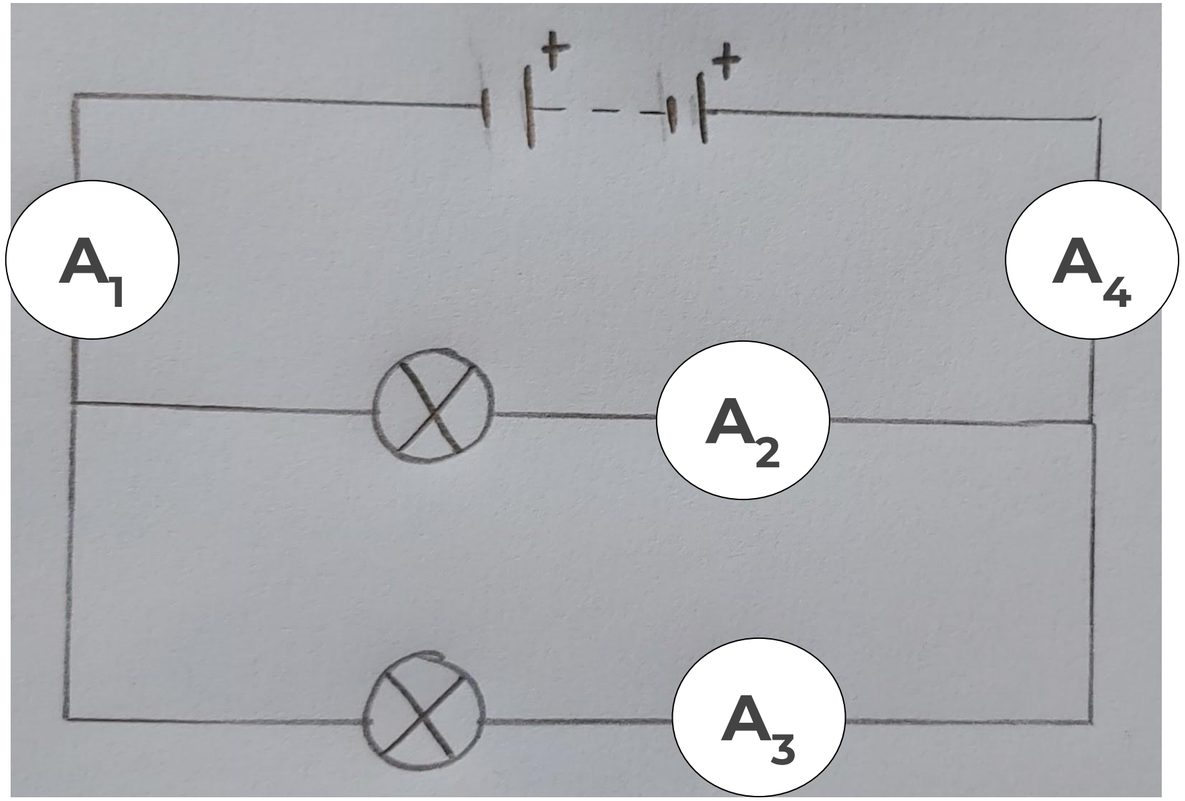
2. A1 = **1.5 A**
   A2 = 1.5 A
   A3 = **1.5 A**



3. V1 = 3 V
   V2 = 1 V
   V3 = 1 V
   V4 = **1 V**

4. V1 = 3 V
   V2 = 1.2 V
   V3 = **0.9 V**
   V4 = 0.9 V

5. V1 = **2.7 V**
   V2 = 0.9 V
   V3 = 0.9 V
   V4 = 0.9 V



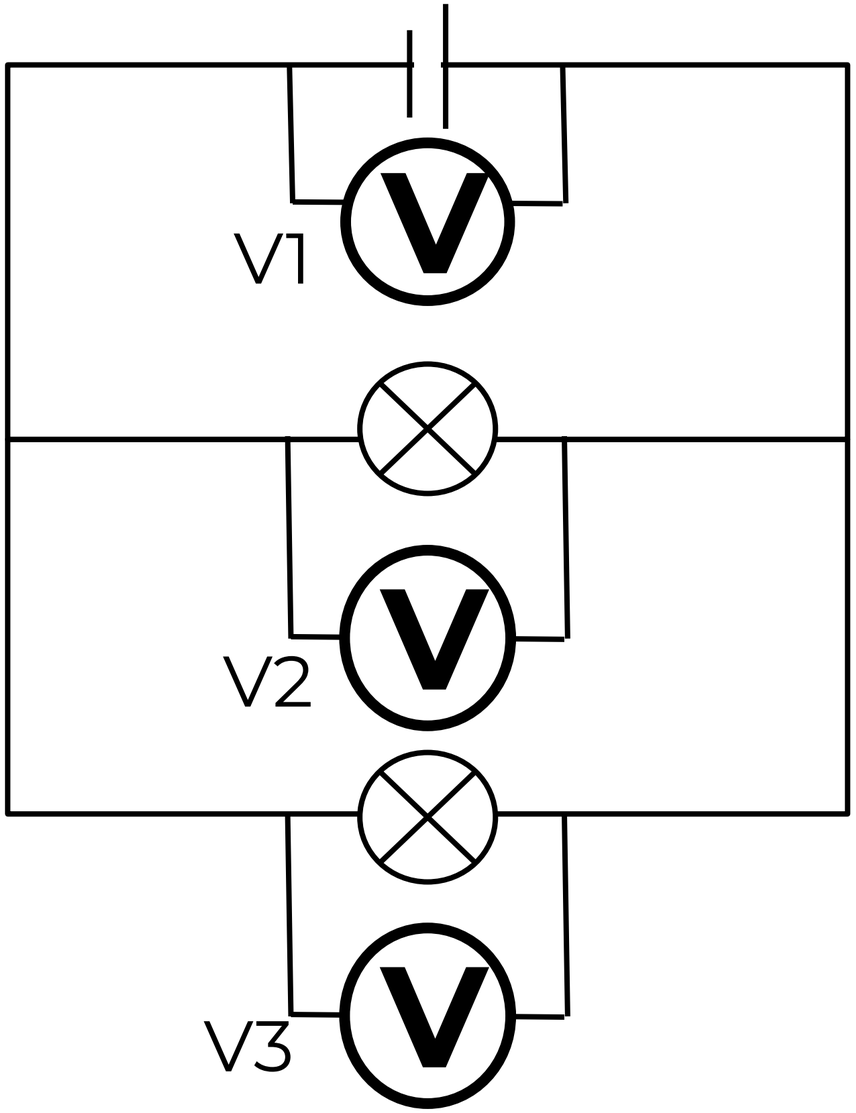
Find the missing values 2 - Answers:

1. A1 = 3 A
   A2 = 1.5 A
   A3 = 1.5 A
   A4 = **3 A**

2. A1 = 4.5 A
   A2 = 3 A
   A3 = **1.5 A**
   A4 = **4.5 A**

3. A1 = **3.7 A**
   A2 = 1.7 A
   A3 = 2 A
   A4 = **3.7 A**

3. A1 = 4.2 A
   A2 = **2.1 A**
   A3 = **2.1 A**
   A4 = **4.2 A**



Find the missing values

3 - Answers:

1. V1 = 6 V
   V2 = **6 V**
   V3 = **6 V**

2. V1 = **1.5 V**
   V2 = 1.5 V
   V3 = 1.5 V

2. V1 = **3.2 V**
   V2 = 3.2 V
   V3 = **3.2 V**

Independent task 2 - Answers

1. The resistance of a resistor is 34 Ω and the current through it is 0.3 A. What is the potential difference across the resistor?

   P.d = 0.3 x 34 = <u>10.2 V</u>

2. The resistance of an iPhone is 3 kΩ and the current through it is 4 mA.

   What is the potential difference of its power source?

   3kΩ = 3000 Ω **4mA = 0.004A**

   P.d = 0.004 x 3000 = <u>12 V</u>

3. The potential difference across a 50 Ω resistor is 6 V. What is the current through the resistor?

   6 = current x 50

   Current = 6 / 50 = <u>0.12 A</u>

Independent task 2 - Answers continued

4. The potential difference across a lamp is 10 V and the current through the lamp is 3 A. Calculate the resistance of the lamp

   10 = 3 x resistance

   Resistance = 10 / 3 = 3.333333… → <u>3.33 Ω</u> (3 significant figures)

5. The current through an ipad is 100mA and the potential difference of its power supply is 12V. Calculate the resistance of the ipad

   100mA = 0.1A

   12 = 0.1 x resistance

   Resistance = 12 / 0.1 = <u>120 Ω</u>

Measuring the resistance of a wire - put the method in the correct order - Answers

Connect the power pack and ammeter in series with the wire

Connect the voltmeter in parallel with the 1m wire using crocodile clips

Switch power pack on, adjust p.d. so that current through the wire is 0.50A then record current and p.d.

Switch off the power pack. Turn dial back to zero.

Repeat from step 3, decreasing the distance between the crocodile clips by 10cm each time until you have at least 5 readings

Independent Task 3 - Answers

Objects become charged due to **friction** (when rubbed together).

One of these materials must be an **insulator.**

Friction causes **electrons** to transfer from one material to the other.

Electrons have a **negative** charge

The material which loses electrons becomes **positively** charged, and the material which **gains** electrons becomes negatively charged.

Exam style question - Answers

Explain why the baby's hair stands on end when it is rubbed by a balloon (4 marks)

There is friction between the balloon and hair

These are both insulators

This causes a transfer of electrons

The hair and balloon become charged

The hair all has the same charge

Like charges repel, so the hairs all move away from each other, standing on end