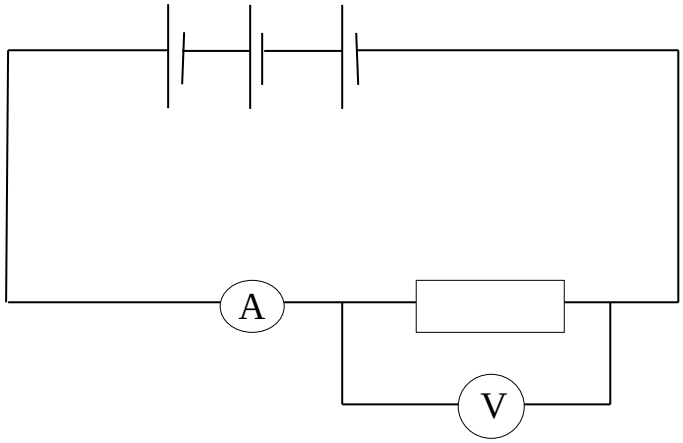
Physics Year 10

Revision on Mains Electricity

Q; 3, 4 and 7

3.

a) The circuit will be as follows:



The resistor represents the wire for which we want to investigate its resistance.

b) i. Complete the table by naming the key variables in this investigation.

independent variable	**length of wire**
dependent variable	**resistance**

ii. Describe the method the student should use for this investigation.

Any 5 of the following:

ANY FIVE APPROPRIATE, e.g.

Connect the circuit / connect (crocodile) clip to wire;

Read ammeter;

Read voltmeter;

Measure length with a ruler;

Repeat readings / average (in different places along the wire);

Take readings for different lengths;

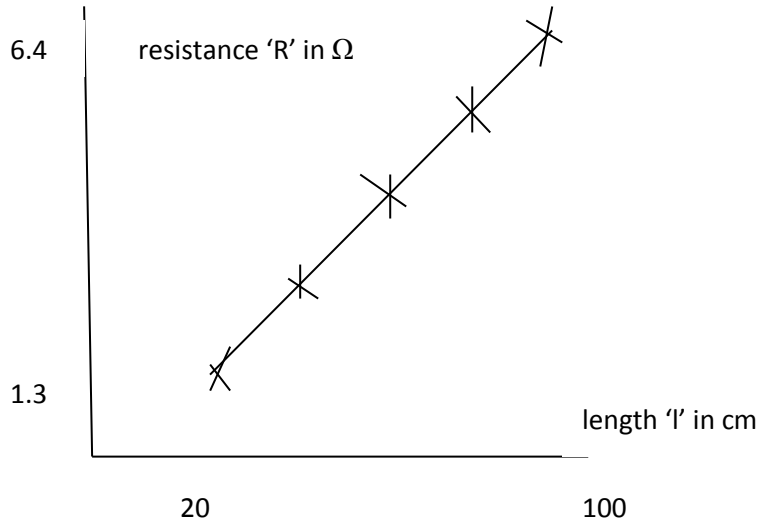
Check meters for zero errors;

Disconnect/switch off between readings

c) i. **voltage = resistance x current**

ii. $R = \frac{V}{I} = \frac{4.5\ V}{0.7\ A} =$ **6.43 Ω**.

d) i.



iii. We have a **straight line** which means that the resistance is directly proportional to the length of the wire. The more length, the more resistance.

Also that it passes **through the origin**, no wire, no resistance.

4. a) i.

1 **If one of the bulbs goes off, the rest will continue to operate**.

2 **All bulbs have the same brightness** (same voltage).

ii. The purpose of the 5 A fuse is to make sure that **no current ≥ 5 A will pass through**.

iii. ' It's a thin piece of wire designed to carry a limited electrical current. If you try to pass a higher current through the wire, it'll heat up so much that it burns or melts. When it melts, it breaks the circuit it's fitted to and stops the current flowing.'

b) i. **power = voltage x current**

ii. $I = \frac{P}{V} = \frac{0.25\ x\ 10^3\ W}{230\ V}$ = **1.09 A**.

iii. fuse value 3A

because any lower value than the operating current of the computer will hinder its operation.

iv. two advantages of the circuit breaker over the fuse are:

1 **There is no need to be replaced when its switch turns the circuit on**.

2 **It can sustain very high current flows**.

c) for a fixed resistor its graph **A**.

7. a) i. symbol **A**.

ii. symbol**B**.

b) i. **C**: 7 A

ii. **The correct fuse for a circuit is the one that allows the correct current but blows if the current is a little larger**.

iii. Because apart from the plastic casing, there is also plastic separation for each wire within the appliance. Hence the term **double insulation**.