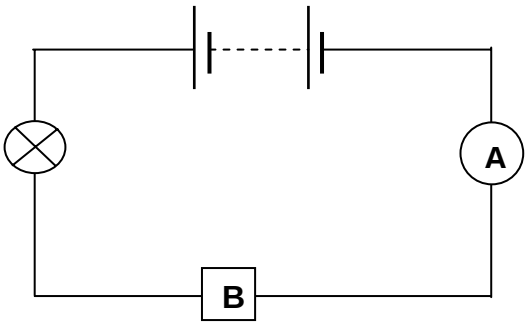
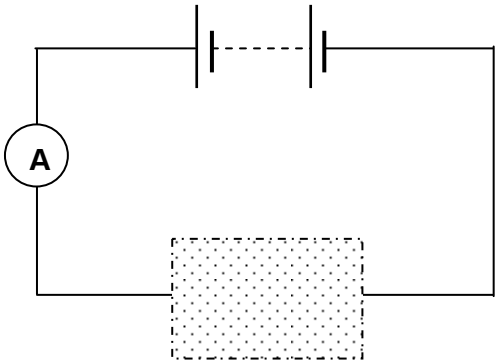
ELECTRICITY - TEST YOURSELF 2

Question One

The circuit diagram shows a component "B" in series with a lamp. The potential difference (voltage) across the power supply is 6V. The current flowing through the ammeter is 3A. The voltage across the bulb is 3V.



1. What current is flowing through B?
2. What is the voltage across B?
3. What is the power of the bulb?



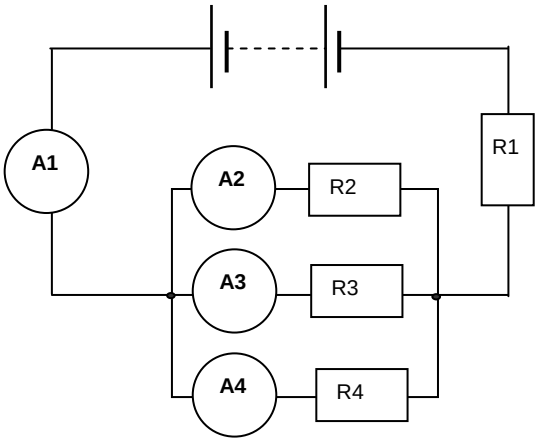
Question Two.

The voltage of the battery is 4V. Which arrangements of resistors could be placed in the dotted box, so that a current of 0.5A flows in the circuit?

1. a 2Ω and a 4Ω resistor in series
2. a 5Ω and a 3Ω resistor in series
3. A 1Ω and a 7Ω resistor in parallel

Question 3

The diagram shows a circuit with four resistors and four ammeters. The current flowing through *A1* is *1.6A.* The current flowing through *A2* is *0.4A.*



1. What could ammeters A3 and A4 read? Tick the correct answer(s).
   a. 0.4A & 0.4A
   b. 0.8A & 0.4A
   c. 0.8A & 1.6A
   d. 0.8A & 0.8A

2. Which resistors have the same voltage are the same voltage across them? Tick the correct answer(s).
   a. R1 & R4
   b. R1 & R3
   c. R2 & R4
   d. R2 & R3
   e. All 4 resistors

ANSWERS

Question One

1. 3A (current is the same all around a series circuit).
2. 3V (supply voltage = 6V, voltage across bulb is 3V so voltage across B must be 6 – 3 = 3V)
3. P = V.I P = 3 x 3 = 9 W

Question Two

Since V = 4 V and I = 0.5 A, calculate R. R = V / I R = 4 / 0.5 = 8Ω. So the combination of resistors in the dotted box must equal 8Ω.

1. a 2Ω and a 4Ω resistor in series × 2Ω + 4Ω = 6Ω
2. a 5Ω and a 3Ω resistor in series ✓ 5Ω + 3Ω = 8Ω
3. A 1Ω and a 7Ω resistor in parallel × in parallel the total resistance of resistors in parallel is less than the resistance of the smallest one, ie *smaller* than 1Ω. Don't ADD resistors in parallel together – this is only true for resistors in series.

Question Three

1. The sum of the currents in the parallel part of the circuit equals the current before the current splits, so A1(1.6) = A2 (0.4) + A3 + A4. So A3 + a4 must equal 1.2A
   a. 0.4A & 0.4A × These add up to 0.8A
   b. 0.8A & 0.4A ✓ 0.8 + 0.4 = 1.2A
   c. 0.8A & 1.6A × They don't add up to 1.2A
   d. 0.8A & 0.8A × They don't add up to 1.2A
2. The voltages are equal across R2, R3 and R4 as they are in parallel strands of the circuit.
   a. R1 & R4 ×
   b. R1 & R3 ×
   c. R2 & R4 ✓ They are in parallel
   d. R2 & R3 ✓ They are in parallel
   e. All 4 resistors ×