Tapping off a potential difference



A series circuit is connected as shown in the diagram.

1. What is the potential difference between A and B?

2. An additional resistor of 100  is connected between the 50 resistor and the cells.

Draw a circuit diagram.

What is the potential difference between A and B now?

3. The additional 100  resistor is now connected in parallel with the first 100  resistor.

Draw a circuit diagram.

What is the potential difference between A and B now?

4. A potential divider is made from a 4 k and a 6 k resistor connected in series with

a 20 V supply. Draw a diagram of the arrangement.

What four values of potential difference can be tapped off?

5. A student puts a 12  variable resistor in series with a 6 V battery, expecting to get

a variable potential difference.



The voltmeter is a high resistance digital multimeter. Explain why the circuit won't work. Draw a circuit which would work.

6. B is the wiper of a 100  rotary potentiometer.

What is the full range of the potential difference that

can be tapped off between A and B?

Hints

1. Resistors are in the ratio 50 :100 so the potential difference splits up 1 : 2.

3. Work out the equivalent resistance of the two 100  resistors in parallel first.

6. Find the pd set up across the potentiometer first by looking at the ratio of the resistors

Brightness of bulbs



When two identical lamps are connected in series to a battery of negligible resistance they light normally.

A variable resistor R is now connected across lamp L2. Explain what happens to the brightness of each bulb as the resistance of the variable resistor is:

1. Made low compared to the resistances of the lamps
2. Made high compared to the resistances of the lamps