Circuits 4

Name & Set

1 Two identical lamps are connected in **series** with a battery of **three** cells each of 1.5 V and a switch.

(a) Complete the circuit diagram in figure 1. [2]

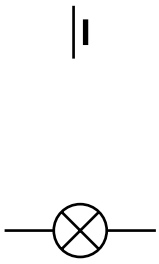

Fig. 1

(b) What is the total p.d. of the battery? _____ [1]

(c) What is the p.d. across each lamp? _____ [2]

(d) The current through one of the lamps is 0.25A. What is the current though the other lamp?

_____ [1]

(e) What is the total current drawn from the battery? _____ [1]

(f) What is the resistance of one of these lamps?

_____ [2]

(g) What is the total resistance of this circuit?

_____ [1]

3 Two identical lamps are connected in **parallel** with one another. They are both connected to the same battery of two cells each of 1.5 V.

(a) One of the lamps has been drawn for you. Draw the rest of the circuit. [3]

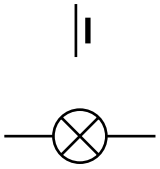

Fig. 2

(b) The current through one of the lamps is 0.8A. What is the current though the other lamp?

_____ [1]

(c) What is the total current drawn from the battery? _____ [1]

(d) What is the p.d. across each lamp? _____ [1]

(e) What is the resistance of one of these lamps?

_____ [2]

2 (a) Figure 1 shows a simple electrical circuit consisting a resistor R_1 and a battery *B*.

(i) Add an arrow to show which way around the circuit the current flows [1]

(ii) Add a circle to show where you would connect an ammeter to measure the current through the resistor. Label this *A*. [1]

(iii) Add a circle to show where you would connect a voltmeter to measure the current through the resistor. Label this *V*. [1]

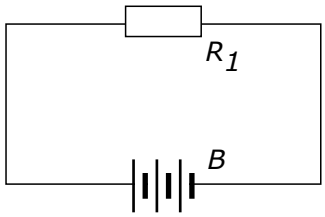

fig. 1

(b) (i) Write down in words the formula that links electrical resistance, potential difference and electric current [3]

(ii) What are the units for each of these quantities? Complete the table below.

Quantity	*Resistance*	*Potential difference*	*Current*
Unit			

(c) The resistance of the resistor is 3 Ohms and the p.d. of the battery is 12 volts.
Calculate the current flowing through the 3 Ohm resistor in figure 1.

_____

_____ [2]

(d) A second resistor, R_2, of resistance 12 Ohms is connected in series with the first one.

(i) Complete figure 2 to show the complete circuit.

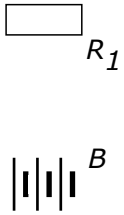

fig. 2

(ii) Write down *in symbols* the formula links the total resistance R_T , R_1 and R_2. [1]

(iii) What is the total electrical resistance in this new circuit?

_____ [1]

(iv) How does the current through the through the 12 Ohm resistor compare with the current through the 3 Ohm resistor in figure 2?

_____ [1]

(v) Calculate the current flowing through the 12 Ohm

_____ [2]