28 A student has two resistors.

One resistor has a resistance of 2.0 Ω and the other has a resistance of 40 kΩ.

Which statement is correct?

A When connected in parallel, the combined resistance is 1.9 Ω.

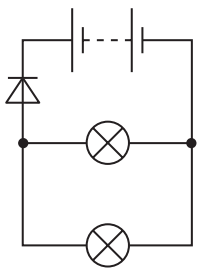
B When connected in parallel, the combined resistance is 2.0 Ω.

C When connected in series, the combined resistance is 1.9 Ω.

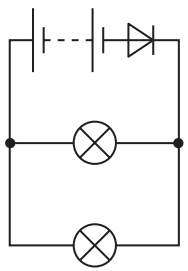
D When connected in series, the combined resistance is 42 Ω.

29 In which circuit do both lamps light?

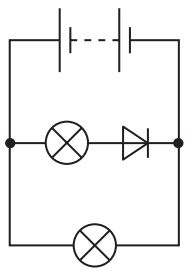
A



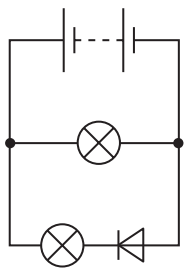
B



C



D



7 **(a)** Draw the circuit symbol for a potential divider.

[1]

(b) Fig. 7.1 shows a circuit.

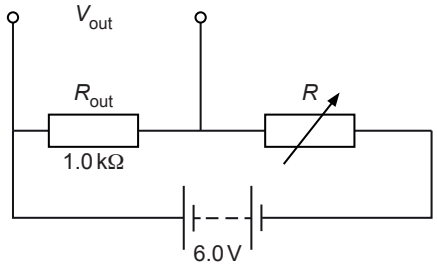


Fig. 7.1

(i) Calculate the value of V_{out} when the value of R is 3.0 kΩ.

V_{out} = ... [2]

(ii) The value of R is adjusted until the current in the circuit is 1.7 mA.

Calculate the charge that flows through the circuit in 300 s.

charge = ... [2]

[Total: 5]

7 **(a)** Define potential difference (p.d.).

.....

..... [2]

(b) **(i)** State the equation which defines electromotive force (e.m.f.) *E*.

[1]

(ii) The e.m.f. of a battery is 9.0 V. The battery is in a circuit.

Calculate the work done by the battery when it moves a charge of 30 C around a complete circuit.

work done = ... [2]

(c) A circuit consists of a d.c. power supply, a lamp and a thermistor.

(i) Draw a circuit diagram of these components connected in series.

[2]

(ii) Explain what happens in the circuit you have drawn in **(c)(i)** when the temperature of the thermistor is increased.

.....

.....

..... [2]

[Total: 9]

7 Fig. 7.1 shows a circuit including a 12 V battery and two identical lamps.

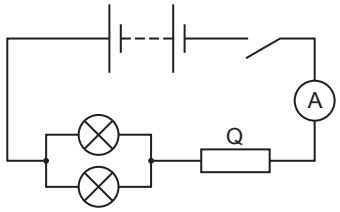


Fig. 7.1

(a) The 12 V battery consists of cells connected in series. Each cell in the battery has an electromotive force (e.m.f.) of 1.5 V.

Determine how many cells are in the battery.

number of cells = ... [1]

(b) (i) When the switch is closed, the ammeter reading is 2.4 A.

Calculate the total resistance of the circuit.

resistance = ... [2]

(ii) Each lamp has a resistance of 3.0 Ω.

Calculate the resistance of Q.

resistance of Q = ... [2]

(c) (i) On Fig. 7.1, draw the symbol for a voltmeter that measures the potential difference (p.d.) across the two lamps. [1]

(ii) Calculate the power supplied to **one** lamp.

power = ... [3]

5