2.2 Series & Parallel Circuits

Question Paper

Course	AQA GCSE Physics
Section	2. Electricity
Topic	2.2 Series & Parallel Circuits
Difficulty	Medium

Time allowed: 50

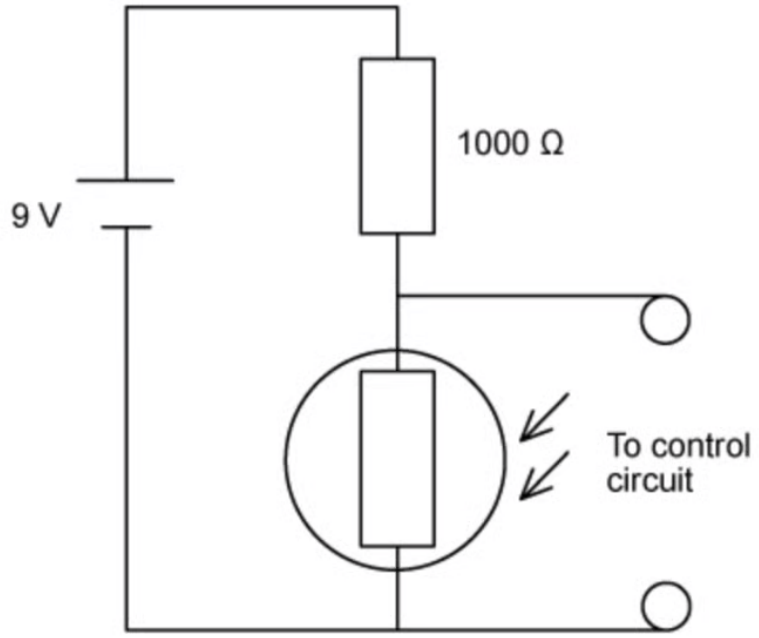
Score: /38

Percentage: /100

Question 1a

(a) The circuit in **Figure 1** shows how an LDR can be used to turn on a circuit when it gets dark.

Figure 1



If the light intensity decreases, what happens to the current and the potential difference across the LDR?

[2 marks]

[2 marks]

Question 1b

(b) When the potential difference across the LDR is 3 V, what is its resistance?

Explain your answer.

[2 marks]

[2 marks]

Question 1c

(c) When the light gets dimmer, the resistance of the LDR becomes 1000 Ω.

Calculate the current through the LDR when its resistance is 1000 Ω.

Give your answer to **3 significant figures.**

[4 marks]

[4 marks]

Question 2a

A student has four resistors.

Each resistor has a resistance of 100 Ω.

(a) Explain how the resistors should be connected so that the total resistance is as low as possible.

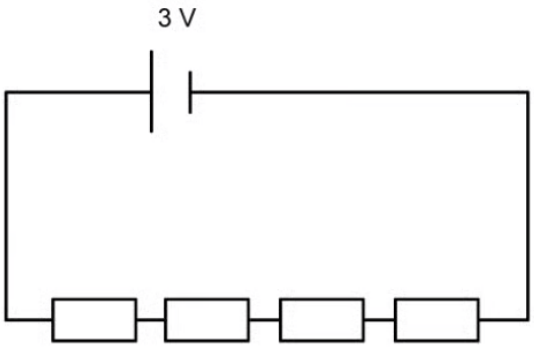
[2 marks]

[2 marks]

Question 2b

(b) The four resistors are connected in series with a 3 V cell, as shown in **Figure 2** below.

Figure 2



Calculate the current that flows through the cell.

Give your answer to **3 significant figures.**

[3 marks]

[3 marks]

Question 2c

(c) Add an ammeter to **Figure 2** which would allow the current through the cell to be measured.

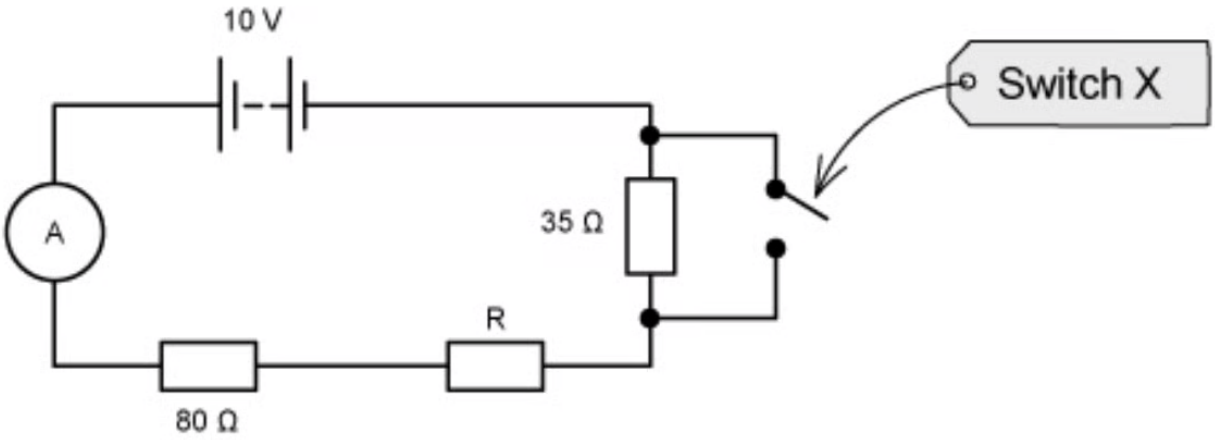
[2 marks]

[2 marks]

Question 3a

A student set up the circuit in **Figure 3** below.

Figure 3



(a) The ammeter displays a reading of 0.075 A.

Calculate the potential difference across the 80 Ω resistor.

[2 marks]

[2 marks]

Question 3b

(b) Calculate the resistance of resistor **R** in **Figure 3**.

[3 marks]

[3 marks]

Question 3c

(c) Switch **X** is closed.

State what will happen to the total resistance of the circuit **and** the current through the circuit.

[2 marks]

[2 marks]

Question 3d

(d) Calculate the new current through the circuit.

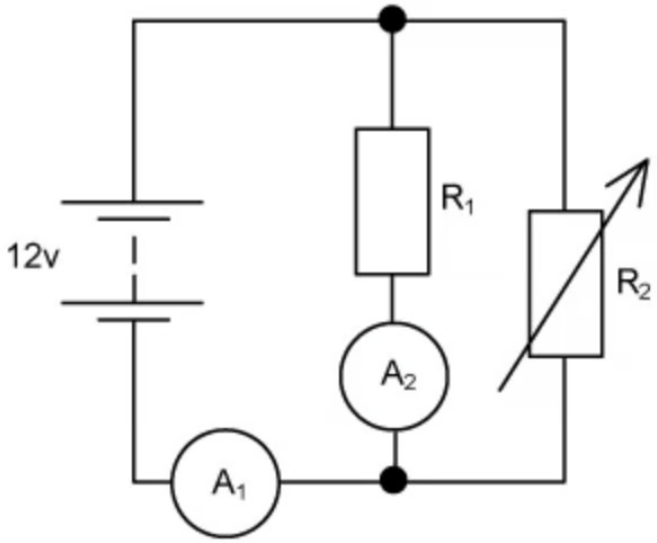
[3 marks]

[3 marks]

Question 4a

The circuit diagram in **Figure 8** shows two resistors connected in parallel.

Figure 8



Reading on ammeter $\mathbf{A_1}$ = 3 A

Reading on ammeter $\mathbf{A_2}$ = 1 A

Using the circuit diagram in **Figure 8**, answer the questions below:

(a) What is the potential difference across resistor $\mathbf{R_1}$?

[1 mark]

[1 mark]

Question 4b

(b) Calculate the resistance of resistor $\mathbf{R_1}$.

[2 marks]

[2 marks]

Question 4c

(c) What is the current flowing through the variable resistor $\mathbf{R_2}$?

[1 mark]

[1 mark]

Question 4d

(d) Calculate the resistance of the variable resistor $\mathbf{R_2}$.

[1 mark]

[1 mark]

Question 4e

(e) The resistance of the variable resistor $\mathbf{R_2}$ is increased.

What would happen to:

- The current through $\mathbf{R_2}$
- The potential difference across $\mathbf{R_2}$
- The current through the battery?

Tick (✓) **three** boxes

[3 marks]

	Increase	**Stay the same**	**Decrease**
Current through R_2			
potential difference across R_2			
current through the battery			

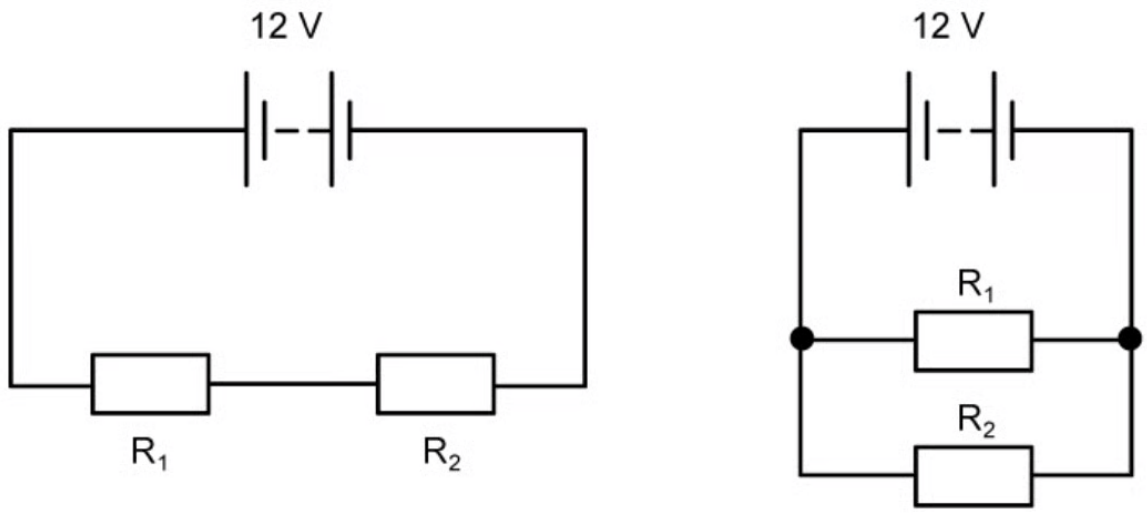
[3 marks]

Question 5a

Figure 4 below shows how two resistors can be connected in series or in parallel to a 12 V cell.

The resistors are identical.

Figure 4



(a) Calculate the potential difference across each resistor when the lamps are connected in series and in parallel.

[2 marks]

[2 marks]

Question 5b

(b) Give one disadvantage of connecting the lamps in series rather than in parallel.

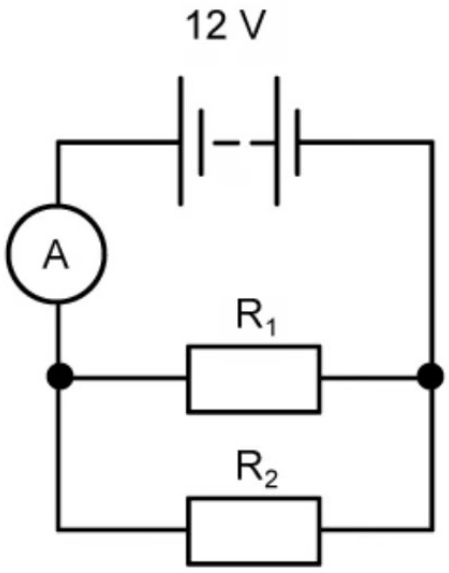
[1 mark]

[1 mark]

Question 5c

Figure 5 shows how an ammeter can be used to measure the current flowing through the battery for the same circuit.

Figure 5



The reading on the ammeter is 1.6 A.

(c) Add an ammeter to **Figure 5** to show how to measure the current through resistor $\mathbf{R_2}$.

[1 mark]

[1 mark]

Question 5d

(d) The resistors are identical.

State the current through resistor $\mathbf{R_2}$.

[1 mark]

[1 mark]