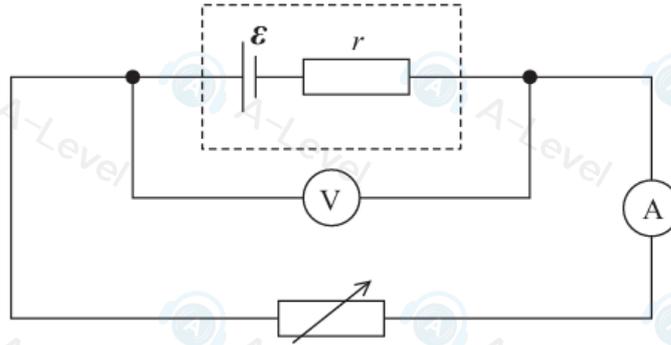


Questions 5 and 6 refer to the following information.

The diagram shows a circuit used to determine the internal resistance r and e.m.f. \mathcal{E} of a cell.



- 5 Corresponding values of potential difference V and current I were taken after adjusting the variable resistor. A graph of V on the y -axis against I on the x -axis was plotted.

Which of the following is correct?

- A The area underneath the graph is the total energy dissipated in the cell.
- B The gradient of the graph is r .
- C The graph shows that V and I are directly proportional.
- D The y -intercept of the graph is \mathcal{E} .

(Total for Question 5 = 1 mark)

- 6 The resistance of the variable resistor is R .

Which of the following gives the current in the cell?

- A $\frac{\mathcal{E}}{R}$
- B $\frac{\mathcal{E}}{r}$
- C $\frac{\mathcal{E}}{(R+r)}$
- D $\frac{\mathcal{E}}{(R-r)}$

(Total for Question 6 = 1 mark)

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1 The temperature of a thermistor and the temperature of a metal wire are increased.

Which row of the table gives the changes in resistance of the thermistor and the metal wire as the temperature is increased?

	Resistance of thermistor	Resistance of metal wire
<input type="checkbox"/> A	decreases	decreases
<input type="checkbox"/> B	decreases	increases
<input type="checkbox"/> C	increases	decreases
<input type="checkbox"/> D	increases	increases

(Total for Question 1 = 1 mark)

2 There is an increase in the intensity of light incident on a light dependent resistor (LDR). This causes a change in the number of conduction electrons and a change in the resistance of the LDR.

Which row of the table describes these changes?

	Number of conduction electrons	Resistance of LDR
<input type="checkbox"/> A	decreases	decreases
<input type="checkbox"/> B	decreases	increases
<input type="checkbox"/> C	increases	decreases
<input type="checkbox"/> D	increases	increases

(Total for Question 2 = 1 mark)

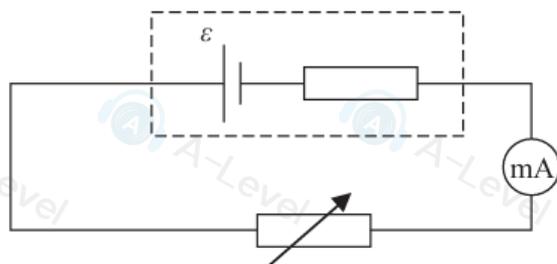
7 Two waves are coherent.

Which of the following **must** be true for the two waves?

- A They are in antiphase with each other.
- B They are in phase with each other.
- C They have the same amplitude.
- D They have the same frequency.

(Total for Question 7 = 1 mark)

- 17 A cell of e.m.f. ε is connected in series with a variable resistor with resistance R as shown. The internal resistance of the cell is r .



When R is 12Ω , the reading on the ammeter is 107mA . The circuit is switched on for 300 seconds. In this time, 50J of energy is transferred by the cell.

- (a) Calculate r .

(5)

$r = \dots\dots\dots$



- (b) Increasing R would make the terminal potential difference value closer to ε .

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12 A circuit contains a filament bulb. When the potential difference across the filament is 8.9 V, the resistance of the filament is 7.5Ω .

Calculate the time taken for a charge of 5.0 C to flow past a point in the filament.

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Time taken =

(Total for Question 12 = 3 marks)

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11: A wire has a resistance of $65 \text{ m}\Omega$. The length of the wire is 0.25 m.

The wire has a circular cross-sectional area.

Calculate the diameter of the wire.

resistivity of the metal of the wire = $5.6 \times 10^{-8} \Omega \text{ m}$

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Diameter =

(Total for Question 11 = 3 marks)

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