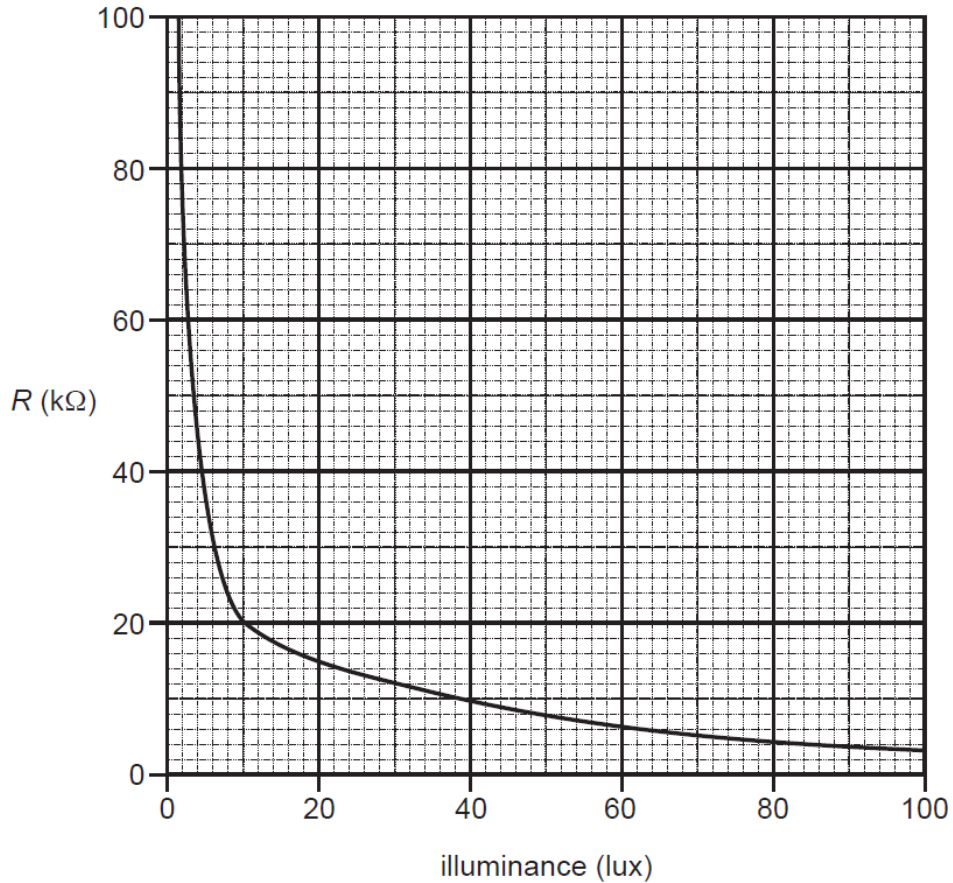


GCSE Physics B (Twenty First Century Science)
J259/02 Depth in physics (Foundation Tier)

Question Set 8

1 This question is about using an LDR (light-dependent resistor) to measure light intensity.

(a) The resistance R of an LDR varies with illuminance (the amount of light energy per unit area hitting a surface) as shown in the graph.



(i) Which of the following statements correctly describes this variation?

Tick (✓) **one** box.

The resistance is directly proportional to the illuminance.

The resistance and the illuminance have a positive correlation.

As the illuminance increases, the change in resistance becomes less and less.

The resistance is greater at 80 lux than at 20 lux.

[1]

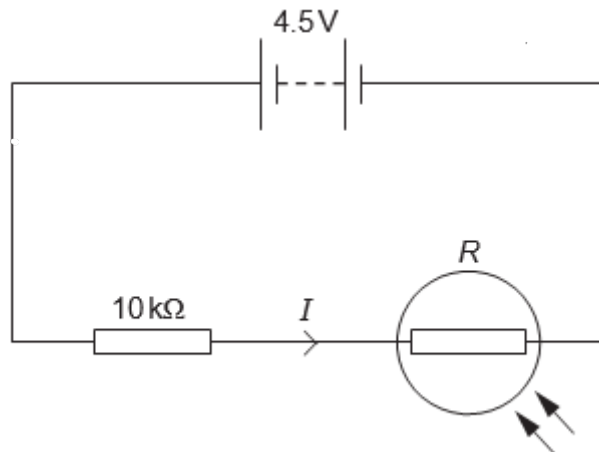
- (ii) Use the graph to estimate the change in resistance of the LDR when the illuminance increases from 10 lux to 70 lux.

$$20 - 5 = 15 \text{ k}\Omega$$

Change in resistance = 15 k Ω [2]

- (b) The LDR is connected in series with a fixed resistor of resistance 10 k Ω and a 4.5 V battery.

The **total** resistance at 30 lux is 22000 Ω .



- (i) Calculate the current in the circuit.

$$I = \frac{V}{R} = \frac{4.5}{22,000} = \underline{\underline{2.05 \times 10^{-4} \text{ A}}}$$

Current = .. 2.05×10^{-4} A [3]

- (ii) Calculate the potential difference across the fixed 10 k Ω resistor when the illuminance is 30 lux.

$$V = 4.5 \times \frac{10,000}{22,000} = 2.05 \text{ V}$$

Potential difference = .. 2.05 V [3]

- (iii) Describe, without any calculations, how the potential difference across the fixed resistor will change when the illuminance increases from 30 lux to 100 lux. [3]

As illuminance increases, resistance of the LDR decreases so potential difference across the fixed resistor increases.

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