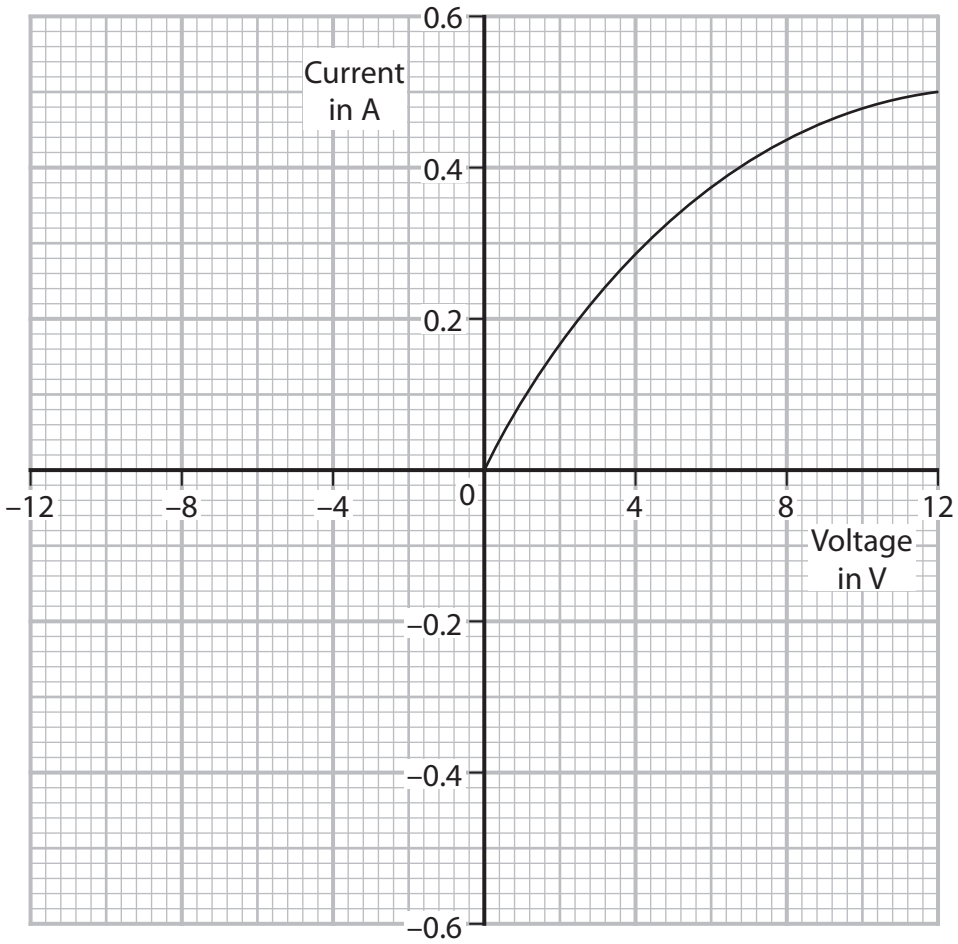
(b) The graph shows some of the student's results.



(i) State the formula linking charge, current and time.

(1)

(ii) Determine the current in the lamp when the voltage across the lamp is 10 V.

(1)

current = ... A

(iii) Calculate the charge transferred through the lamp in 30 s when the voltage across the lamp is 10 V.

Give the unit.

(3)

charge = ... unit .....

(iv) Calculate the time for the lamp to transfer 250 J of energy when the voltage across the lamp is 10 V.

(3)

time = ... s

(v) The student disconnects the cell and reconnects it with its terminals reversed.

Complete the graph to show how the current in the lamp varies with voltage across the lamp when the cell is connected with its terminals reversed.

(2)

(c) The student replaces the filament lamp with a light emitting diode (LED) and replaces the cell with an alternating current (a.c.) power supply, as shown in diagram 2.

The student also removes the ammeter and voltmeter from the circuit.

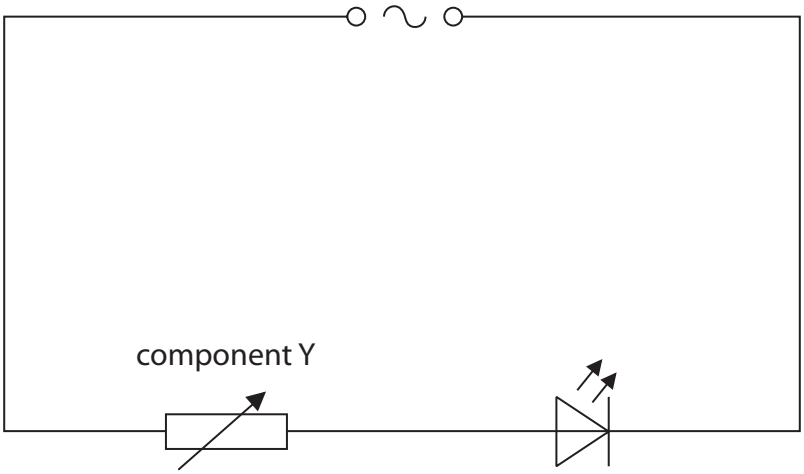


Diagram 2

Explain why the LED flashes on and off in this circuit.

(2)

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(Total for Question 7 = 14 marks)

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