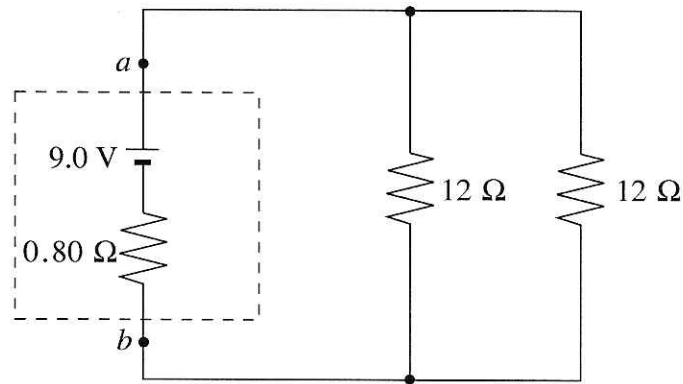
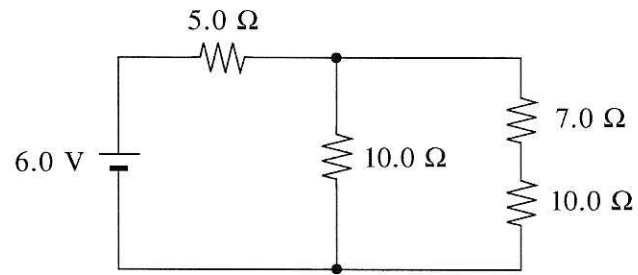


3. A 9.0 V battery with an internal resistance of  $0.80\ \Omega$  is connected to two resistors as shown below. Determine the terminal voltage  $V_{ab}$  of the battery. (7 marks)



4. Consider the circuit shown below.



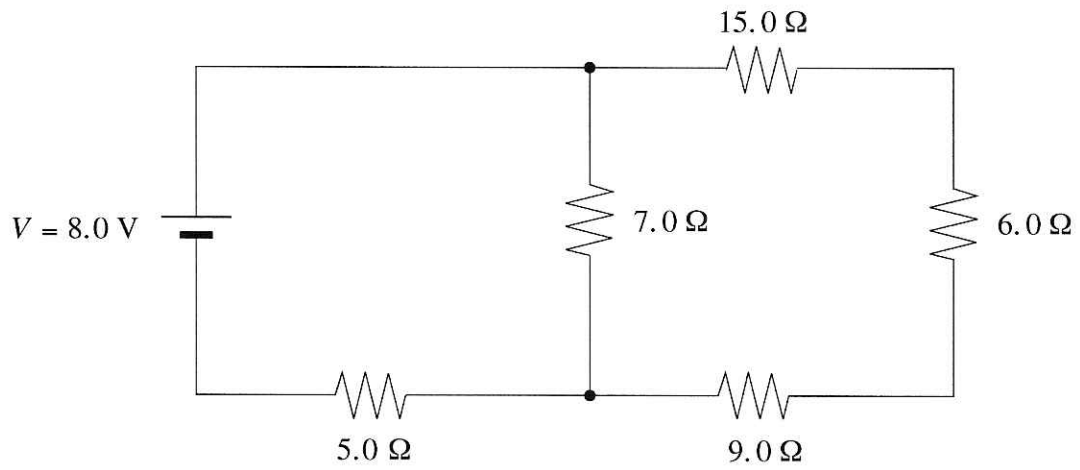
a) What is the current through the  $7.0 \Omega$  resistor?

**(5 marks)**

b) How much charge flows through the  $7.0 \Omega$  resistor in a 30 s interval?

**(2 marks)**

5. What is the potential difference across the  $6.0\ \Omega$  resistor in the circuit shown? (7 marks)

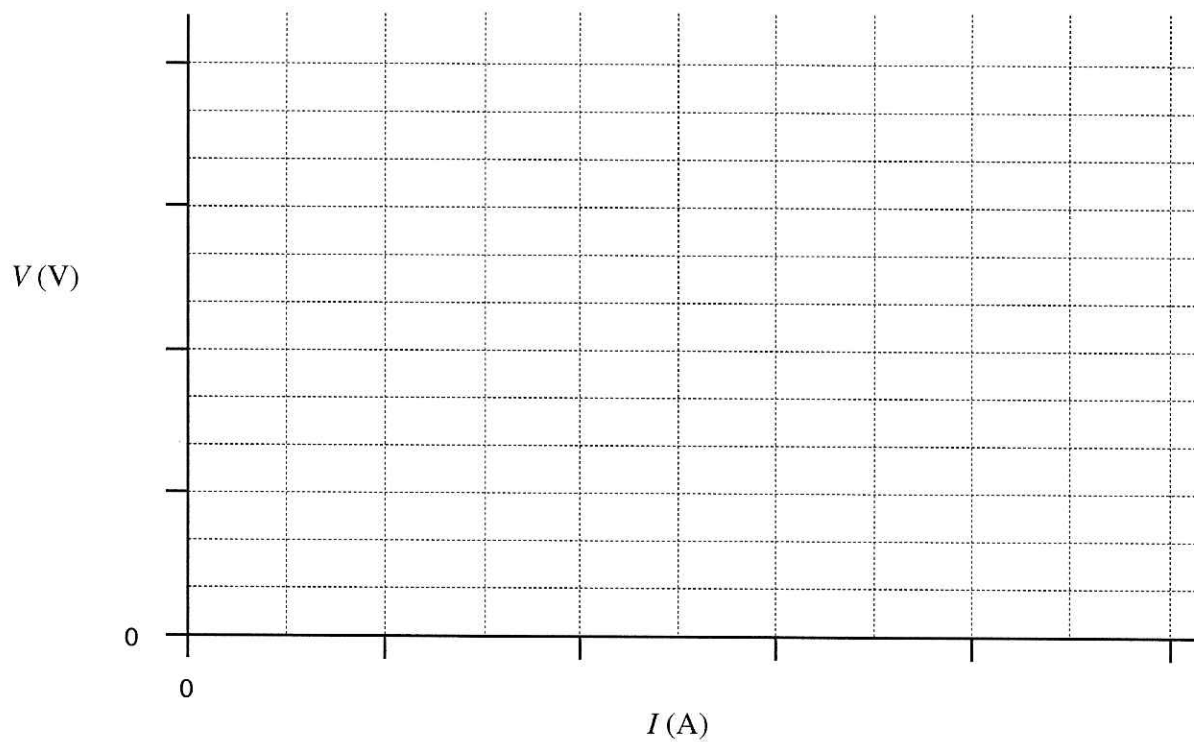


6. A student connects a power supply to a circuit and measures the potential difference  $V$  at its terminals and the current  $I$  delivered to the circuit.

$V$ (V)	0.0	3.0	6.0	9.0	12.0
$I$ (A)	0.00	0.25	0.50	0.75	1.00

a) Plot a graph of  $V$  versus  $I$  on the axes below.

(2 marks)



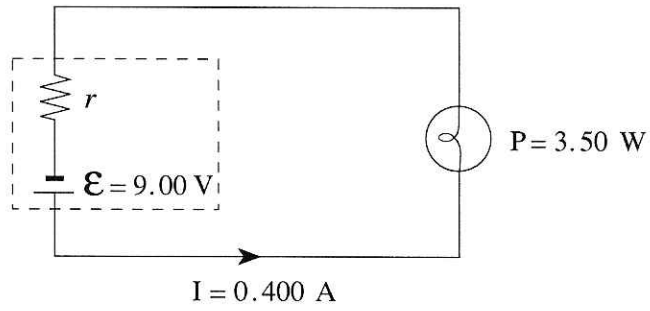
b) Calculate the slope of the line, expressing your answer in appropriate units. **(2 marks)**

c) What does the slope of the line represent? **(1 mark)**

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7. The circuit shown in the diagram below consists of a 9.00 V battery and a 3.50 W light bulb.



- a) If a current of 0.400 A leaves the battery, what is the internal resistance,  $r$ , of the battery? **(5 marks)**

b) The light bulb is now replaced by a lower resistance (brighter) light bulb. The terminal voltage will now be

- less than before.
- the same as before.
- greater than before.

(Check one response.)

**(1 mark)**

c) Using principles of physics, explain your answer to b).

**(3 marks)**

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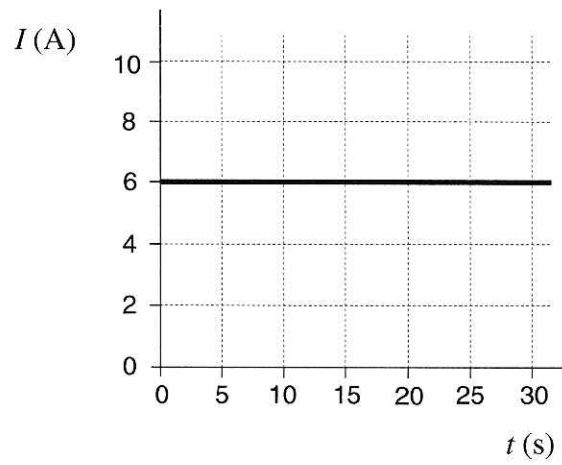
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8. A power supply was connected to a resistor and a student plotted the graph of current,  $I$ , flowing through the resistor versus time,  $t$ , as shown below.



- a) Calculate the area under the graph between  $t = 0$  s and  $t = 30$  s. **(2 marks)**

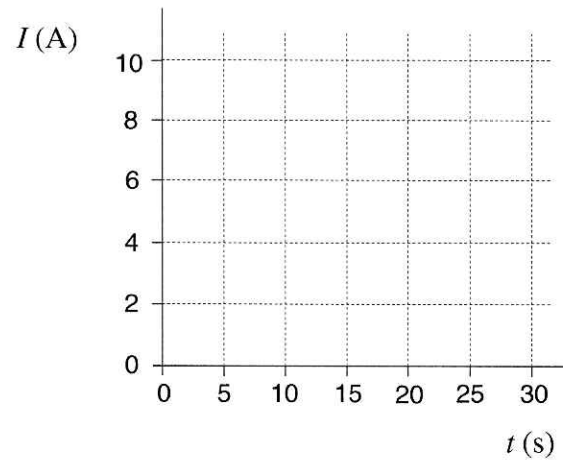
- b) What does this area represent? **(1 mark)**

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- c) The same power supply is connected to a resistor of greater resistance. For this new set-up, sketch a possible graph on the axes below and label it c). **(2 marks)**



9. A 12 V battery transfers 33 C of charge to an external circuit in 7.5 s.

a) What current flows through the circuit?

**(2 marks)**

b) What is the resistance of the circuit?

**(2 marks)**