Combined Science - Physics - Key Stage 4 - Electricity
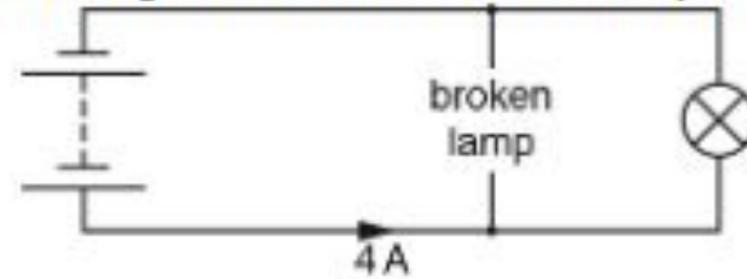
Parallel Circuits Worksheet

Miss Walrond

Q1.

A car's headlights are connected in parallel.

When one of the headlights is not working the current from the battery to the headlight circuit is 4A.

Noah says that when the broken lamp is replaced the 4A current will be shared between the two lamps, so each gets 2A. The total current from the battery will still be 4A. (You may assume that the lamps are alike.)

Do you agree with Noah?

Give reasons for your answer.

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[2]

OCR, Twenty First Century Physics, Paper A182/02 , June 2017.

Answers

Q1.

Mark scheme

Question			Answer/Indicative content	Marks	Guidance
1			Any **TWO** from: voltage across each lamp equals battery voltage / current from the battery will increase / resistance of the circuit will decrease; current through each lamp is 4A / the current from the battery is shared **equally**; total current from battery is 8A	2	no marks for no / yes, only reasons – ignore references to Noah 'current is shared' is **NOT** sufficient Do **NOT** allow '2A in each branch' as this is in the question m.p.3 also gains the first m.p.
			Total	**2**	

OCR, Twenty First Century Physics, Paper A182/02 , June 2017.
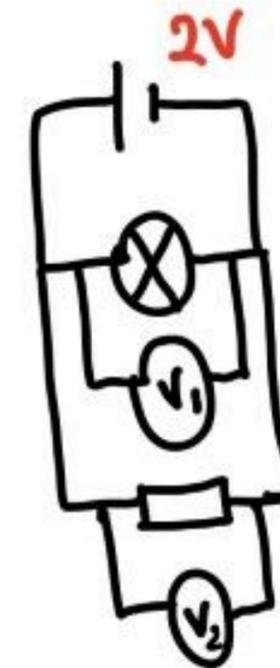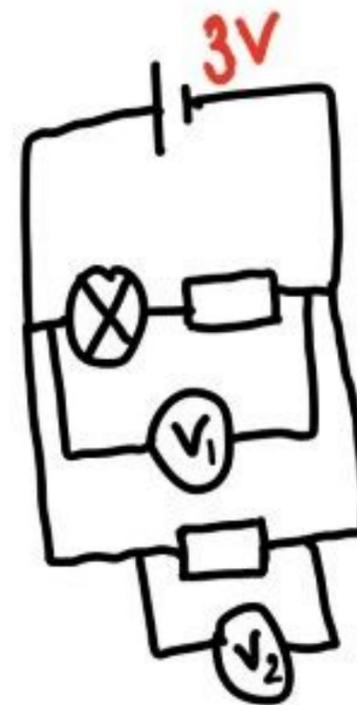
In lesson Questions

Independent Task: Potential Difference
Answer the questions below.

1) Fill in the gaps:

   In a parallel circuit the potential difference across each branch is the _____. The potential difference in each branch _____ the cell voltage.

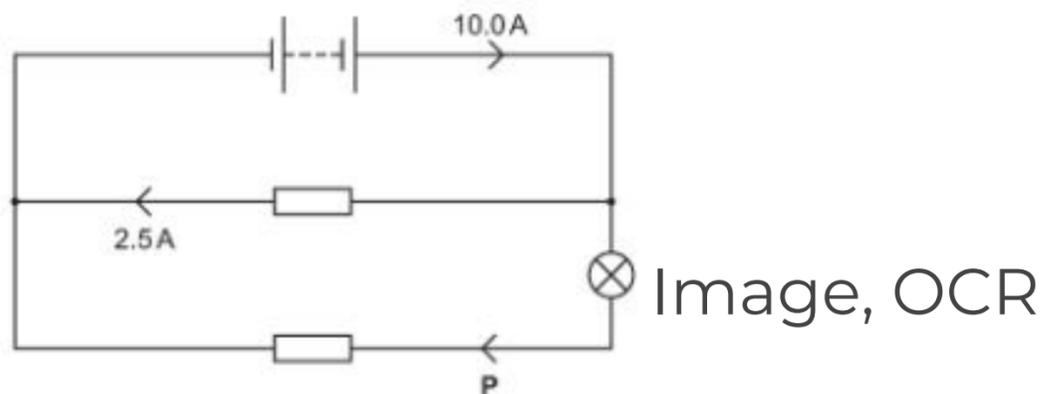2) Calculate the voltmeter readings for each of the circuits on the right.

Independent Task: Current
Answer the questions below.

1) Fill in the gaps:

   In a parallel circuit the current _____ at a junction. This means that the _____ of the currents through each branch _____ the total current.
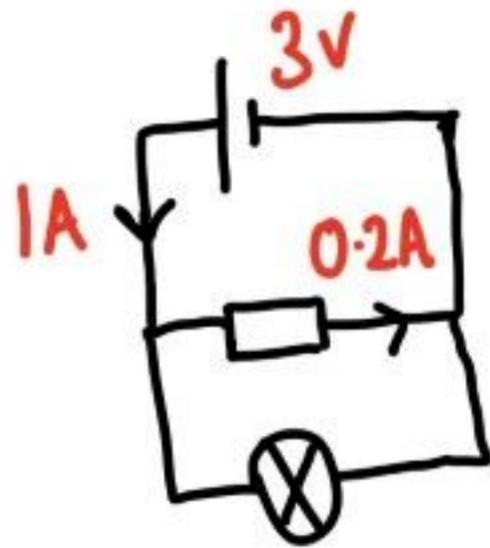
2) Calculate the current through point P.

Image, OCR

Independent task - problem solving
Answer the questions below

Calculate the resistance of the lamp.
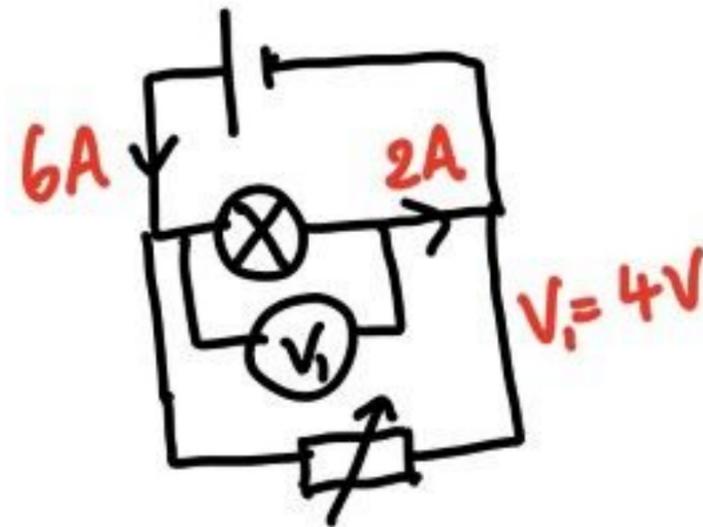
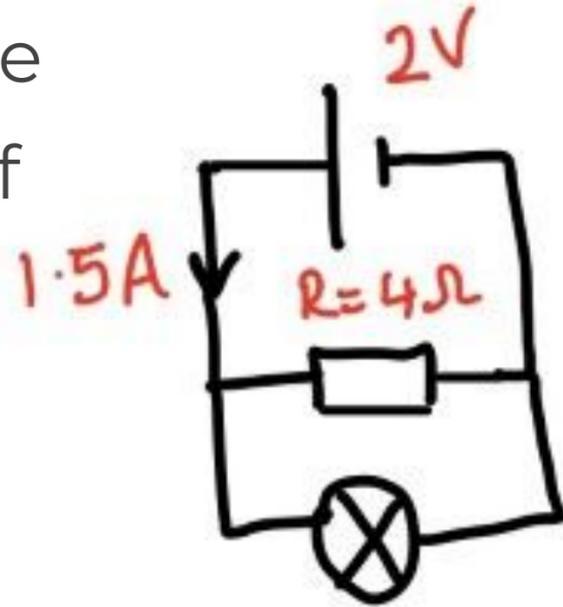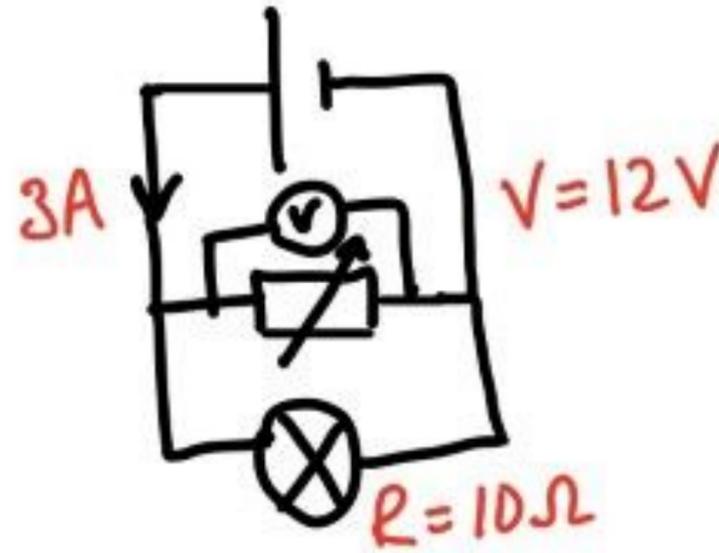Calculate the resistance of the variable resistor.

Images, Miss Walrond

Independent task - problem solving 2
Answer the questions below

Calculate the resistance of the lamp.

Calculate the resistance of the variable resistor.

Images, Miss Walrond

Answers

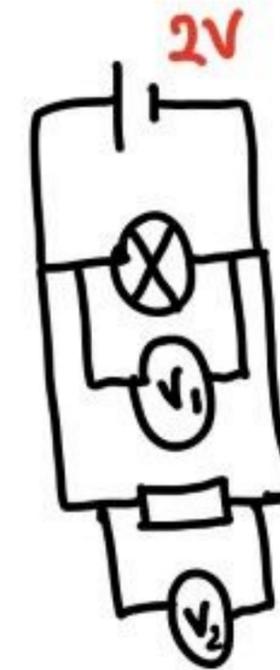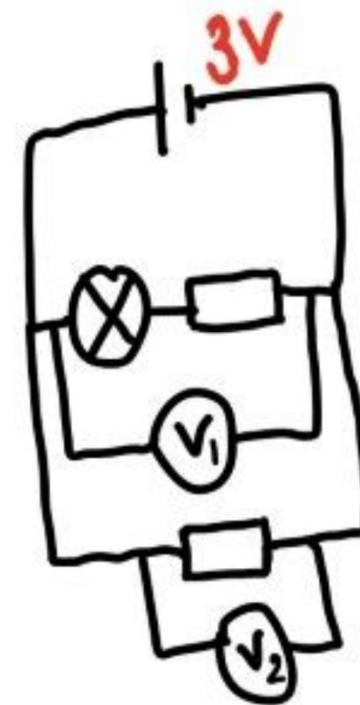# Independent Task: Potential Difference

1) Fill in the gaps:

In a parallel circuit the potential difference across each branch is the __**same**__. The potential difference in each branch __**equals**__ the cell voltage.

2) Calculate the voltmeter readings for each of the circuits on the right.

Circuit 1 : **V_1 = 3 V , V_2 = 3 V**
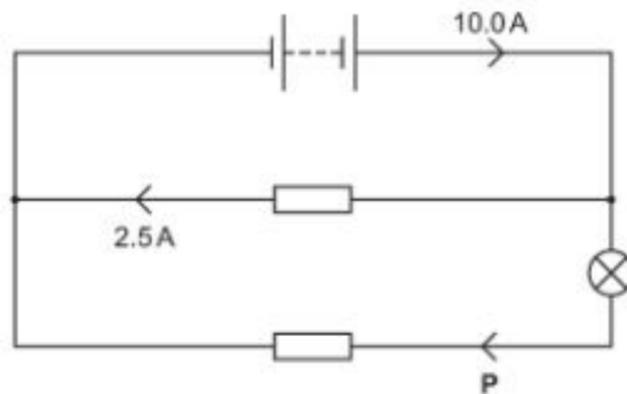
Circuit 2 : **V_1 = 2 V , V_2 = 2 V**

Review: Independent Task: Current

1) Fill in the gaps:

In a parallel circuit the current __**splits**__ at a junction. This means that the __**sum**__ of the currents through each branch __**equals**__ the total current.

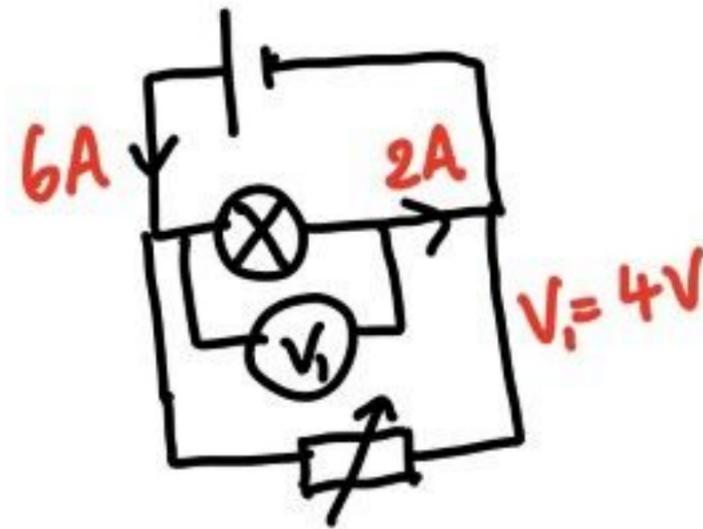2) Calculate the current through point P. **7.5 A**

Review: Independent task - problem solving

Calculate the resistance of the lamp.

3.75 Ω
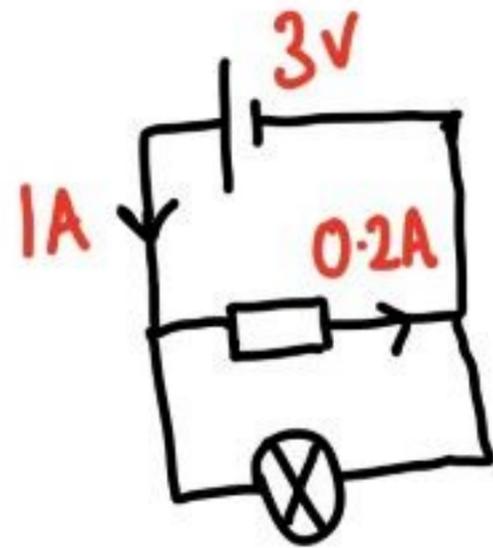
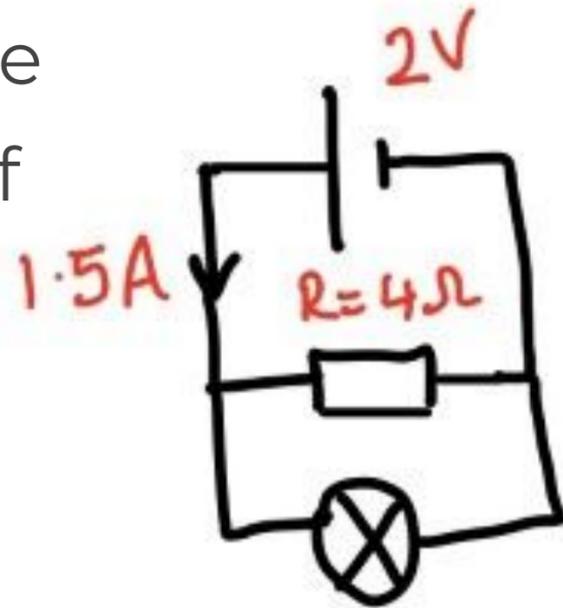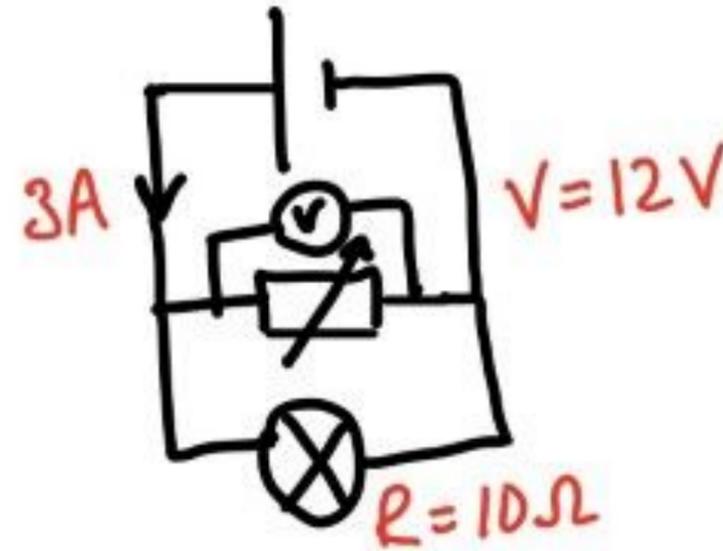Calculate the resistance of the variable resistor.

1 Ω

Images, Miss Walrond

Review: Independent task - problem solving 2

Calculate the resistance of the lamp.

2 Ω

2V

1·5A

$R = 4\,\Omega$

Calculate the resistance of the variable resistor.

6.67 Ω

3A

$V = 12V$

$R = 10\,\Omega$