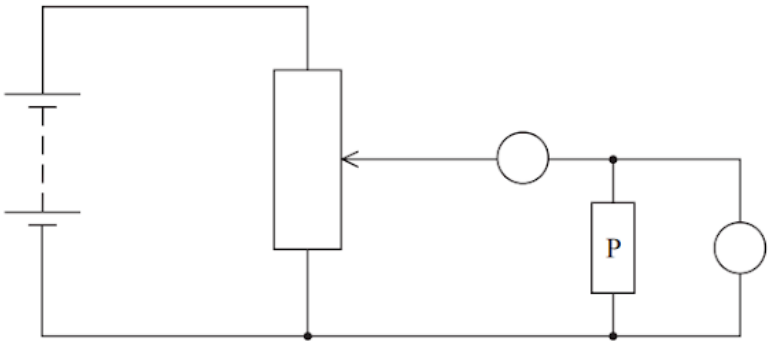
Potential Dividers 1

Have a go at the following exam questions.

EDEXCEL, 6PH02/01, JUNE 2011

15 (a) The diagram shows the circuit used to investigate how the current varies with potential difference for an electrical component P. The circuit contains an ammeter and a voltmeter.



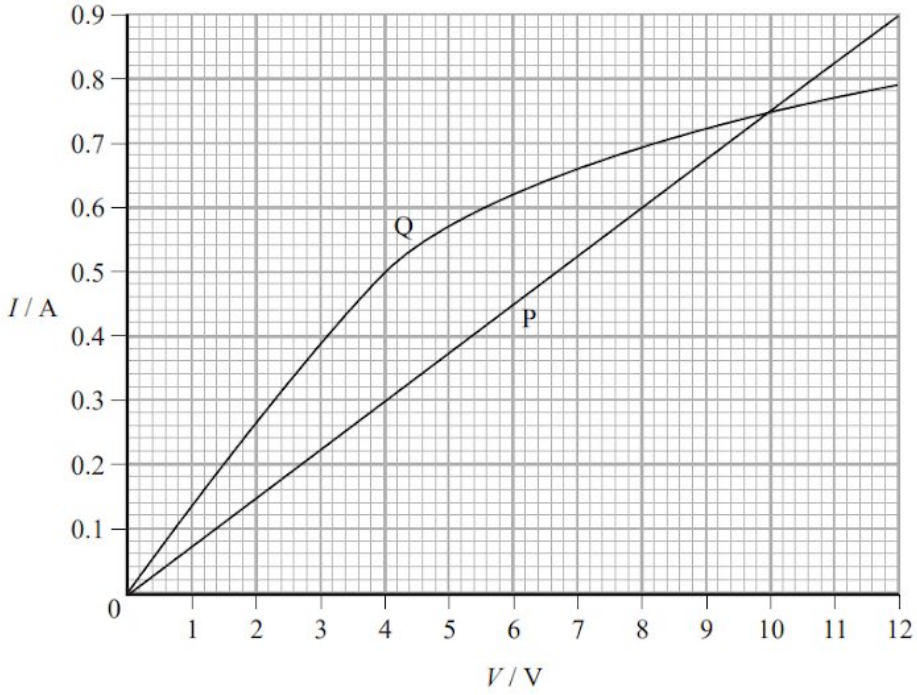
(i) On the diagram, label the ammeter A and the voltmeter V.

(1)

(ii) The position of the contact of the potential divider is moved so that the reading on the voltmeter becomes zero. Label this position Z.

(1)

(b) The graph shows how the current I varies with potential difference V for two electrical components P and Q.



(i) State the value of the current for which the resistance of P is the same as the resistance of Q and determine this value of resistance.

(3)

Current = ...

.....

.....

Resistance = ...

*(ii) Component Q is a filament lamp. Explain the shape of its graph.

(3)

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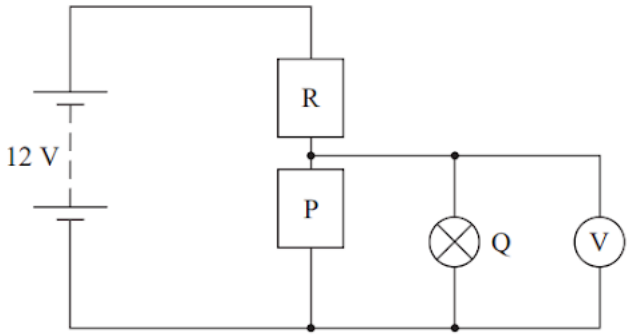
(c) A potential divider consisting of component P and a resistor R is connected to a 12 V supply. The lamp Q and a voltmeter are connected to the circuit as shown.



The supply has a negligible internal resistance. The reading on the voltmeter is 4.0 V.

(i) Use the graph in part (b) to determine the current in the resistor R.

(2)

Current = ...

(ii) Calculate the resistance of the resistor R.

(2)

Resistance = ...

(iii) The lamp Q is removed.

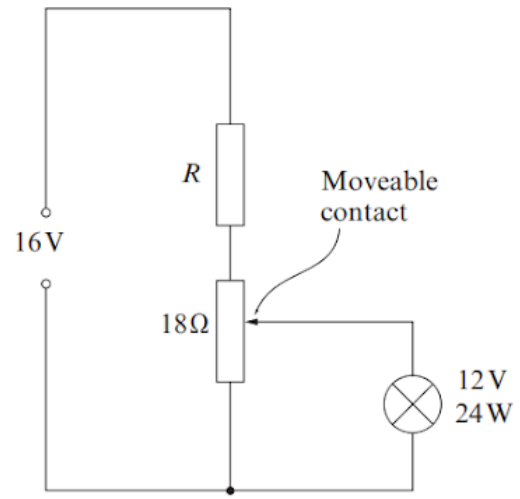
Explain, without further calculation, how the voltmeter reading would change.

(3)

(Total for Question 15 = 15 marks)

WJEC, 1321/01, JUNE 2011

2. A student uses the circuit below to produce a current-voltage graph for a 12 V, 24 W filament lamp.



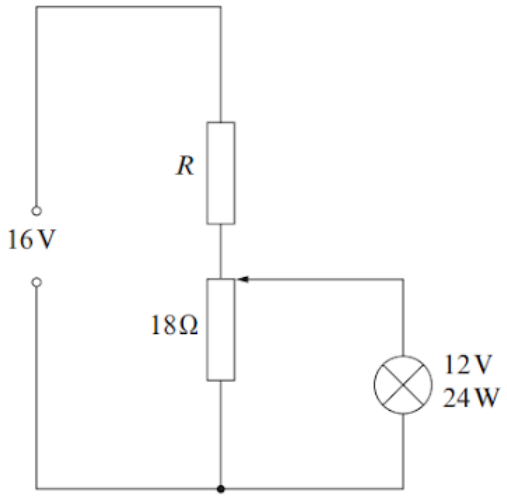
(a) Show clearly on the diagram the correct positions for the voltmeter and ammeter. [2]

(b) When the lamp is working normally, calculate

(i) the current flowing through it; [1]

(ii) its resistance. [1]

(c) The value of R is chosen so that the voltage across the lamp can be varied between 0 V and 12 V. The circuit below shows the position of the moveable contact when the lamp is operating normally (i.e. at 12 V).



Calculate the required value of R. [4]

(d) Sketch on the axes below the current-voltage graph expected for the filament lamp. [2]