

Past-paper walk-through

Resistance, Resistivity, and Ohm's Law ■ 11.3

eXercise

Questions in this set

- 2019 Q2
- 2018 Q2
- 2017 Q2

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 2

2019 ■ Q2

[Figure: Two circuit diagrams side by side. "Circuit 1": An ideal variable power supply V_{PS} (circle with battery symbol) connects in a loop to an ammeter A (circle) in series with the top branch, a resistor R in series with a voltmeter V_R on the right branch, all in parallel with V_{PS} . "Circuit 2": Same layout as Circuit 1, except the ammeter A is drawn inside a dashed box together with a zigzag resistor symbol labeled (representing internal resistance), indicating the ammeter has significant internal resistance.]

The two circuits shown above contain an ideal variable power supply, an ohmic resistor of resistance R , an ammeter A, and two voltmeters V_{PS} and V_R . In circuit 1 the ammeter has negligible resistance, and in circuit 2 the ammeter has significant internal ohmic resistance r . The potential difference of the power supply is varied, and measurements of current and potential difference are recorded.

Question 2

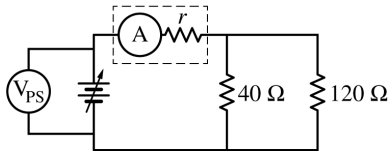
(a) The axes below can be used to graph the current measured by the ammeter as a function of the potential difference measured across the power supply. On the axes, do the following.

- Sketch a possible graph for circuit 1 and label it 1.
- Sketch a possible graph for circuit 2 and label it 2.

[Graph: y-axis labeled "Current", x-axis labeled "Power Supply Potential Difference", origin labeled O ; blank axes with no data plotted, to be filled in by the student.]

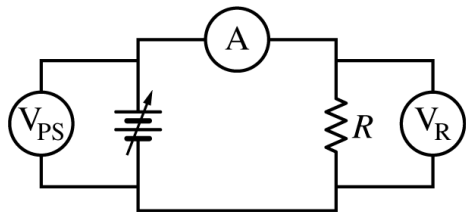
Question 2

- (e) Voltmeter V_R in circuit 2 is replaced by a resistor with resistance $120\ \Omega$ to create circuit 3 shown below. Voltmeter V_{PS} still reads 3.0 V .

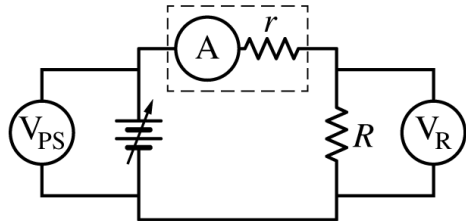


Circuit 3

Question 2



Circuit 1



Circuit 2

Question 2

