

Question Number	Answer	Mark
<b>11a</b>	<p>Use of <math>R = \rho l / A</math> (1)  <math>\rho = 1.1 \times 10^{-6} \Omega \text{m}</math> (1)</p> <p><u>Example of calculation</u></p> $\rho = \frac{RA}{l} = \frac{(2.0 \Omega)(2.5 \times 10^{-7} \text{m}^2)}{0.45 \text{m}} = 1.11 \times 10^{-6} \Omega \text{m}$	<b>2</b>
<b>11b</b>	<p>Use of <math>R = V / I</math> (1)          Use of <math>I = nqvA</math> (1)  <math>v = 4.2 \times 10^{-4} \text{ms}^{-1}</math> (1)</p> <p><u>Example of calculation</u></p> $I = V / R = (3.0 \text{V}) / 2.0 \Omega = 1.5 \text{A}$ $v = \frac{I}{nqA} = \frac{1.5 \text{A}}{(9.0 \times 10^{28} \text{m}^{-3})(1.60 \times 10^{-19} \text{C})(2.5 \times 10^{-7} \text{m}^2)}$ $= 4.17 \times 10^{-4} \text{ms}^{-1}$	<b>3</b>
<b>11c</b>	<p>Halving length halves resistance (1)          Which doubles the current (1)  <math>I = nqvA</math> related to drift velocity doubling (so suggestion is correct) (1)</p>	<b>3</b>
<b>Total for question 11</b>		<b>8</b>