

Electrons – Test A

INSPECTION COPY

1. A current of 240 mA flows in a wire for five minutes. Calculate the charge that passes through a given point in that time.
2. When sodium chloride is dissolved in water, it dissociates into sodium ions and chloride ions, Na^+ and Cl^- . Explain how the electrical conductivity of a sodium chloride solution varies with the concentration of the solution.
3. Discuss whether a piece of copper wire would be expected to behave as a good conductor in a school laboratory.
4. (a) A 1.50 m long piece of nichrome wire has a resistivity of $1.10 \times 10^{-8} \Omega \text{ m}$ and a resistance of 5.62Ω . Calculate the diameter of this wire.
(b) A student carried out an investigation to find the resistivity of a material. The results are shown in the table.

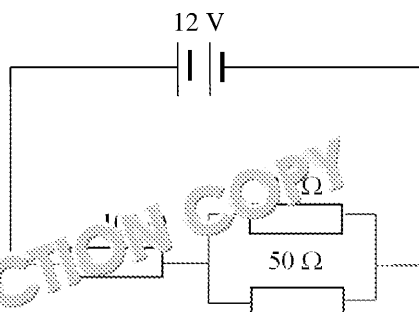
length of wire / m	mean resistance / Ω
0.10	0.44
0.20	0.81
0.30	1.35
0.40	1.83
0.50	2.22
0.60	2.64
0.70	3.02
0.80	3.55



Plot a graph of these results and draw a straight line of best fit through the points. The graph should have a horizontal axis.

- (ii) The wire had a cross-sectional area of $4.7 \times 10^{-7} \text{ m}^2$. Use your graph to determine the resistivity of this wire.

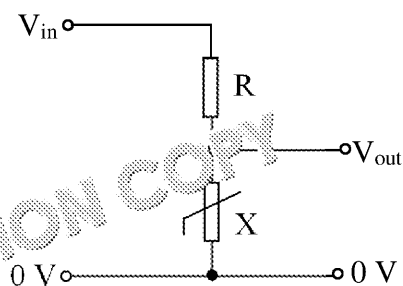
5. The diagram to the right shows a circuit containing three resistors. Calculate the current through the battery. Assume the battery has negligible internal resistance.



**COPYRIGHT
PROTECTED**

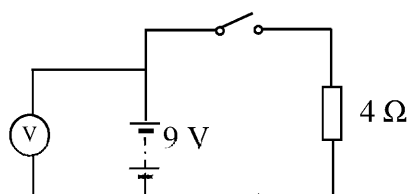


6. The circuit diagram below shows part of a sensor in a house. V_{in} is a variable voltage source. At a particular temperature the ratio of $R : X$ is 3 : 8.



- (a) Calculate V_{out} when the ratio of $R : X$ is 3 : 8.
 (b) Explain what happens to this ratio as the temperature decreases.

7. The circuit below can be used to determine the internal resistance of a battery. The battery has an e.m.f. of 9 V. When the switch is closed, the voltmeter reading is 8 V. Calculate the internal resistance of the battery.



**COPYRIGHT
PROTECTED**



Preview of Questions Ends Here

This is a limited inspection copy. Sample of questions ends here to avoid students previewing questions before they are set. See contents page for details of the rest of the resource.