

CIE A-Level Physics 9702 Paper 3 Practice

Paper (AS Advanced Practical Skills)

Total: 40 marks · 2 h · 2 questions · 11 parts

Data and formulae

Quantity	Value
Acceleration of free fall g	9.81 m s^{-2}
Pi	3.1416
Resistivity of copper (reference)	$1.7 \times 10^{-8} \text{ ohm m}$
Resistivity of constantan (reference)	$4.9 \times 10^{-7} \text{ ohm m}$
Elementary charge e	$1.60 \times 10^{-19} \text{ C}$
Speed of light c	$3.00 \times 10^8 \text{ m s}^{-1}$

Q 1 · Simple pendulum: measuring g [20]

- (a) State the independent variable, the dependent variable and two control variables in this experiment, and say how each is measured. [4]
- (b) Write out the procedure and explain how the random error in the timing is reduced. [4]
- (c) Draw the table headings for the readings, including l and the values T and T^2 obtained from t , with units and consistent significant figures. [3]
- (d) State which two quantities should be plotted to give a straight line, and give the axis labels. [3]
- (e) Find the gradient of the graph, use it to calculate g , and give the unit. [4]
- (f) State the main sources of uncertainty in g and estimate its percentage uncertainty. [2]

Q 2 · Resistivity of a wire: R against l [20]

- (a)** Draw the circuit and describe the measurements, explaining how R is obtained from the readings. [4]
- (b)** Complete the table of V, I and R for the five lengths, with units. [3]
- (c)** State which straight-line graph should be plotted and what its gradient represents. [3]
- (d)** Read the gradient from the graph and give its unit. [2]
- (e)** Calculate the cross-sectional area and the resistivity, with units. [4]
- (f)** Estimate the percentage uncertainty in the resistivity and list the contributions. [3]
- (g)** Suggest one systematic effect that would make the resistivity too high, and a way to reduce it. [1]