OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
Advanced Subsidiary GCE

PHYSICS A

Practical Examination 1 (Part B – Practical Test) **2823/03/TEST**

Wednesday **17 MAY 2006** Morning 1 hour 30 minutes
Candidates answer on the question paper.
Additional materials:
Candidate's Plan (Part A of the Practical Examination)
Electronic calculator

Candidate Name	

Centre Number						Candidate Number				

TIME 1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

- Write your name, Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Read the instructions and questions carefully.
- Write your answers, in blue or black ink, in the spaces provided on the question paper.
- Pencil may be used for graphs and diagrams only.
- Do not write in the bar code. Do not write in the grey area between the pages.
- **DO NOT** WRITE IN THE AREA **OUTSIDE** THE BOX BORDERING EACH PAGE. ANY WRITING IN THIS AREA WILL NOT BE MARKED.

INFORMATION FOR CANDIDATES

- In this Practical Test, you will be assessed on the Experimental and Investigative Skills:
  Skill I: Implementing
  Skill A: Analysing evidence and drawing conclusions
  Skill E Evaluating evidence and procedures.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.
- You will be awarded marks for the quality of written communication where this is indicated in the question.

FOR EXAMINER'S USE		
Qu.	**Max.**	**Mark**
Planning	**16**	
1	**28**	
2	**16**	
TOTAL	**60**	

This question paper consists of 10 printed pages and 2 blank pages.

SP (KN) S97876/7

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Answer **all** the questions.

It is recommended that you spend about 1 hour on this question.

1 In this question, you will investigate how the current in a circuit depends on the length of a piece of resistance wire included in the circuit. You will then determine the resistivity of the material of the wire.

(a) Using the equipment provided, set up the circuit shown in Fig. 1.1.

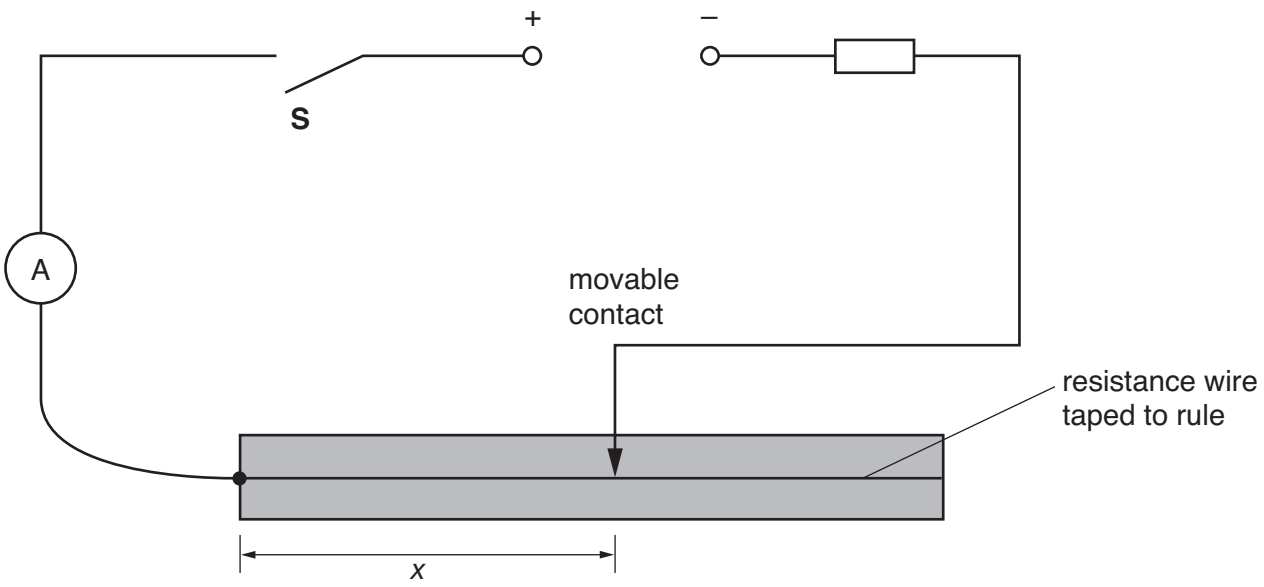


Fig. 1.1

(b) Close switch **S**.
Adjust the movable contact so that x is equal to 0.200 m.

(i) Measure and record the current I.

I = ...

Open switch **S**.

(ii) Calculate a value for $1/I$.

$1/I$ = ...

(c) Justify the number of significant figures that you have used for $1/I$.

.....

.....

..... [2]

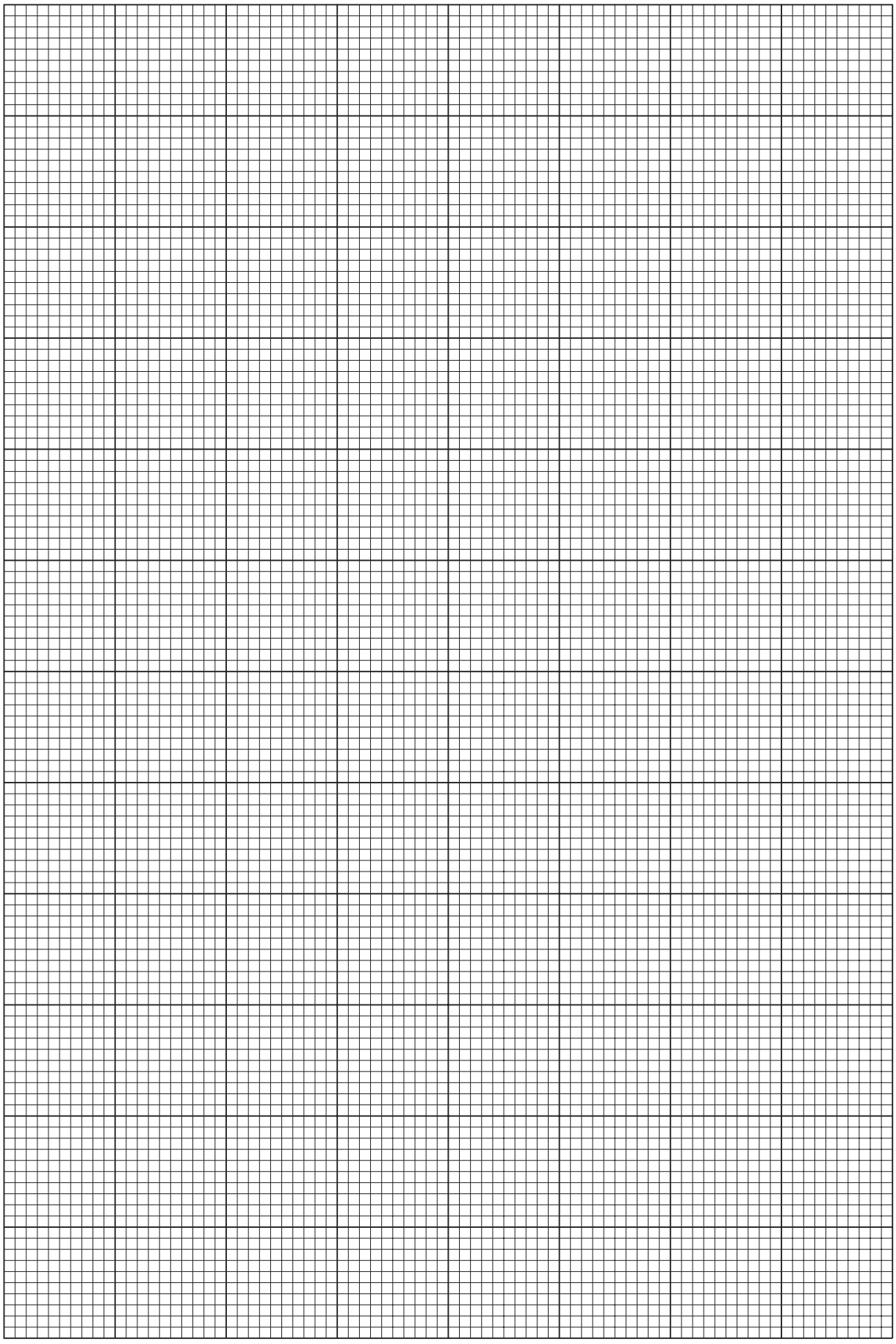
(d) Change the value of x so that it is in the range $0.200\,\text{m} \leqslant x \leqslant 0.500\,\text{m}$ and repeat **(b)** until you have six sets of readings for x and I. Include in your table of results values for $1/I$.

[8]

(e) Plot a graph of $1/I$ (y-axis) against x (x-axis) and draw the best straight line through the points. [6]

(f) **(i)** Determine a value for the gradient.

gradient = ... [2]



(ii) Determine a value for the *y*-intercept of the line.

y-intercept = ... [1]

(g) It is suggested that the relationship between $1/I$ and x is

$$\frac{1}{I} = \left(\frac{\rho}{AE}\right)x + \frac{R}{E}$$

where ρ is the resistivity of the wire, A is the cross-sectional area of the wire, E is the e.m.f. of the power supply and R is a constant for the circuit.

From the card on the bench write down the values of A and E.

A = ... m^2

E = ... V

(i) Use your answer from **(f)(i)** to determine a value for ρ with an appropriate unit.

ρ = ... unit ..... [5]

(ii) Use your answer from **(f)(ii)** to determine a value for R with an appropriate unit.

R = ... unit ..... [4]

[Total: 28]

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It is recommended that you spend about 30 minutes on this question.

Approximately half of this time should be spent on the evaluation exercise in part (e).

2 In this experiment, you will investigate how the period of oscillation of an equilateral triangular structure depends on its side length.

(a) (i) Bend the longer wire into an equilateral triangle. Use the blu-tack to hold the open ends of the wire together.

(ii) Measure and record the length, L, of one of the sides of the wire structure.

L = ... cm

(iii) Suspend the wire structure from a pin as shown in Fig. 2.1.

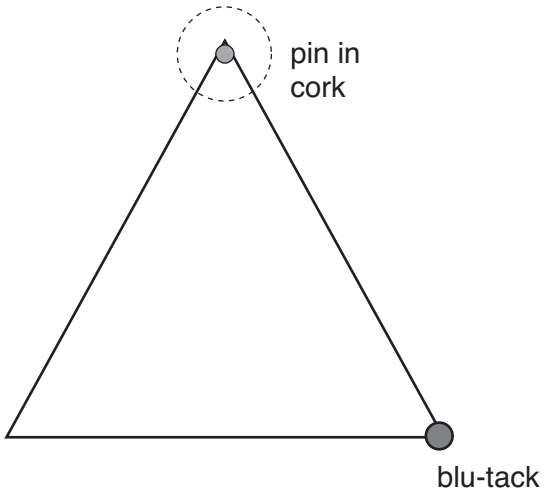

Fig. 2.1

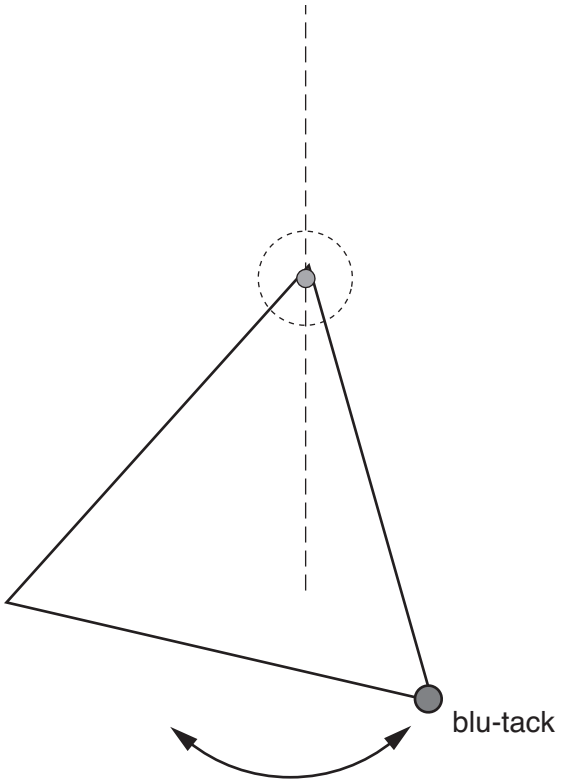

Fig. 2.2

(iv) Gently displace the wire structure through a small angle and release it so that it performs small oscillations in the vertical plane of the triangle as shown in Fig. 2.2.

(v) Record the time t for 10 oscillations.

t = ... s

(vi) Determine the time T for one oscillation.

T = ... s [1]

(b) Calculate the percentage uncertainty in your value of L.

percentage uncertainty = ... [2]

(c) Remove the wire from the pin. Repeat part **(a)** using the shorter wire.

Record the new values of L, t and T.

L = ...

t = ...

T = ... [1]

(d) It is suggested that T^2 is directly proportional to L. Do the results of your experiment support this idea? You should explain your reasoning clearly.

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..... [2]

QUESTION 2 CONTINUED OVER THE PAGE

In this question, two marks are available for the quality of written communication.

(e) Write an evaluation of the procedure that you have followed to investigate the relationship between the time T for one oscillation and the length L. You should include some of the limitations of the procedure and suggest ways in which the experiment may be improved, giving reasons for your suggestions.

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Quality of Written Communication [2]

[Total: 16]

END OF QUESTION PAPER

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