OCR
RECOGNISING ACHIEVEMENT

ADVANCED SUBSIDIARY GCE **2823/03/TEST**

PHYSICS A

Practical Examination 1 (Part B – Practical Test)

WEDNESDAY 14 MAY 2008 Morning

Time: 1 hour 30 minutes

Candidates answer on the question paper
Additional materials (enclosed): None

Additional materials (required):
Candidate's Plan
(Part A of the Practical Examination)
Electronic calculator
Ruler (cm/mm)

CUP/T43716

Candidate Forename		Candidate Surname	
Centre Number		Candidate Number	

INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- 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**	

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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 an unknown mass *Q* can be balanced on a metre rule using a known mass *M*.

Some apparatus is laid out on the bench in front of you.

(a) Hang *Q* from the pivoted rule so that $x = 0.100\,\text{m}$. Hang *M* from the rule and adjust its position until the rule is balanced, roughly horizontal, as shown in Fig. 1.1.

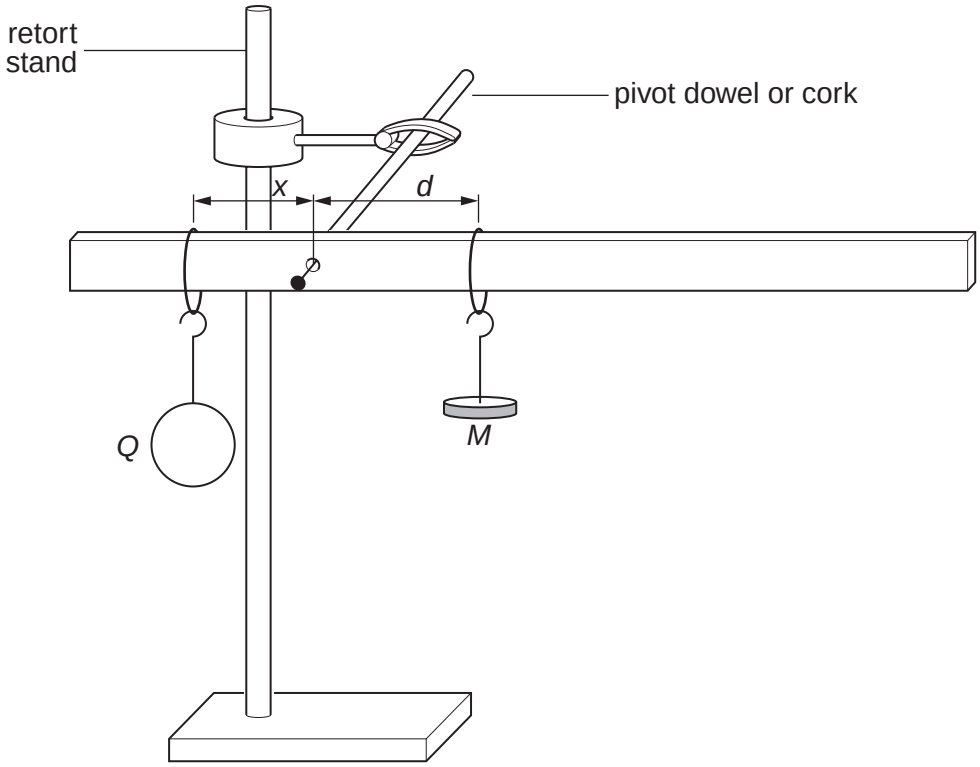


Fig. 1.1

(b) Record the distance *x* and the distance *d* in metres.

x = ... m

d = ... m

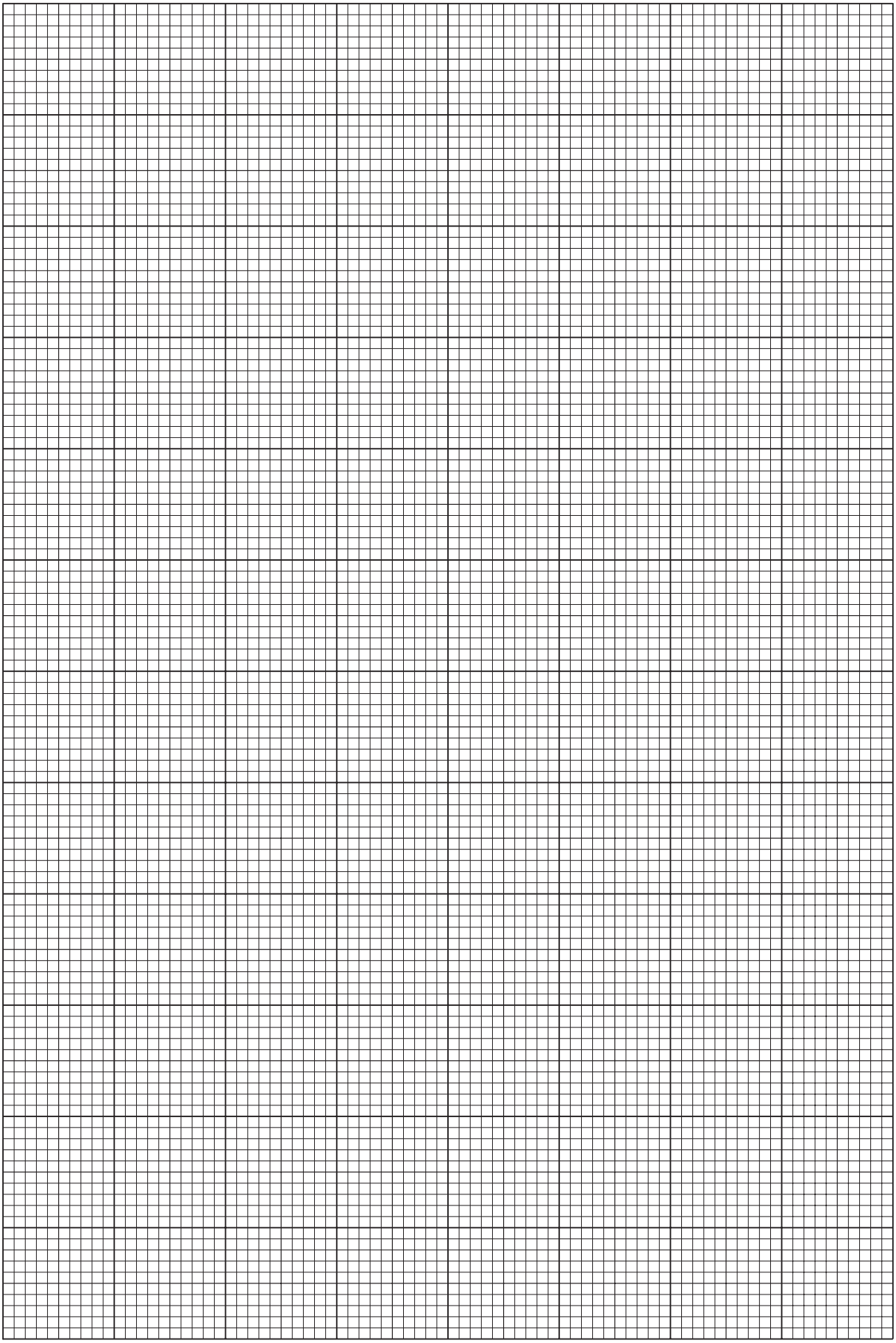
(c) Change the position of *Q* and adjust the position of *M* until the rule is balanced again. Carry out this procedure until you have six sets of readings for *x* and *d*. Repeat readings are not expected.

[6]

(d) Plot a graph of *d* (*y*-axis) against *x* (*x*-axis). Draw the best straight line through the points. [8]

(e) **(i)** Determine a value for the gradient of your graph.

gradient = ... [2]



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

y-intercept = ...[1]

(f) It is suggested that the relationship between *d* and *x* for this particular experiment is

$$d = \left(\frac{Q}{M}x\right) - \left(\frac{0.20R}{M}\right)$$

where *R* is the mass of the rule and *M* has the value 0.100 kg.

(i) Use your answer from **(e)(i)** to determine a value for *Q.* Include an appropriate unit.

Q = ... unit .....[4]

(ii) Use your answer from **(e)(ii)** to determine a value for *R*.

R = ... kg [3]

(g) **(i)** From the card on the bench write down the value of *R*, as measured on a top pan balance.

R = ... kg

Determine the percentage difference between the value of *R* from the experiment and the value measured by the top pan balance.

percentage difference = ...% [2]

(ii) Discuss whether your graph and the values of *R* obtained indicate random and/or systematic errors.

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.....[2]

[Total: 28]

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 (g).

2 In this experiment you will investigate how cross-sectional area affects how quickly the amplitude of an oscillating system decreases.

(a) (i) You are provided with a piece of card. Measure the length l and width w of the card.

l = ... cm

w = ... cm

(ii) Determine the area A of one side of the card.

A = ... cm^2 [1]

(b) (i) Calculate the percentage uncertainties in l and w.

percentage uncertainty in l = ...

percentage uncertainty in w = ...[2]

(ii) Hence calculate the percentage uncertainty in the value of A.

percentage uncertainty = ...[1]

(c) Place the card carefully between the cotton loops as shown in Fig. 2.1. It may be necessary to add a small amount of blu-tack to hold the card in place.

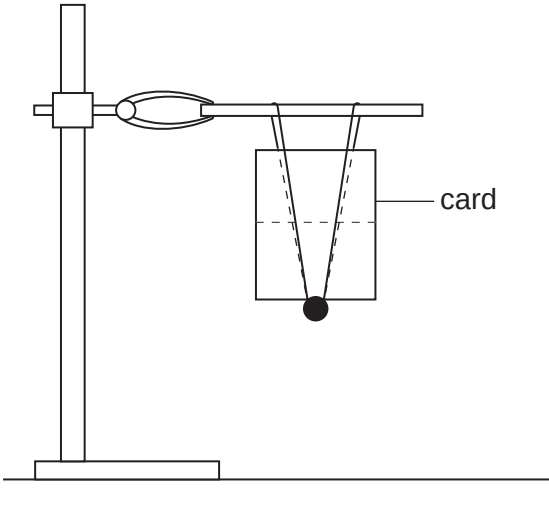

Fig. 2.1

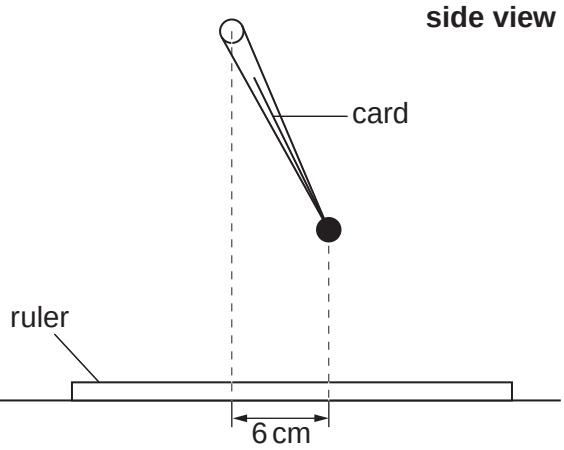

Fig. 2.2

(d) Gently displace the pendulum bob until the amplitude is 6.0 cm. See Fig. 2.2. Release the bob and start the stopwatch.
Record the time *t* it takes for the amplitude of oscillation to decrease to 2.0 cm.

t = ... s

(e) Cut the piece of card in half across its longer side. Remove the top half. Repeat parts **(a)**, **(c)** and **(d)**.

Record the new values of *l*, *w*, *A* and *t.*

l = ... cm

w = ... cm

A = ... cm^2

t = ... s [1]

(f) It is suggested that *t* is inversely proportional to *A*. Show whether or not the results of your experiment support this suggestion.

.....

.....[2]

(g) In this question two marks are available for the quality of written communication.

Write an evaluation of the procedure that you have followed to investigate the relationship between *t* and *A*. 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]

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