OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
Advanced GCE

PHYSICS A 2826/03/TEST

Practical Examination 2 (Part B – Practical Test)

Friday **21 MAY 2004** Morning 1 hour 30 minutes

Candidates answer on the question paper.
Additional materials:
Electronic calculator
Candidate's Plan (Part A of the Practical Test)

Candidate Name	Centre Number	Candidate Number

TIME 1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your Centre number and Candidate number in the boxes above.
- Answer **all** questions.
- Write your answers in the spaces on the question paper.
- Read the instructions and questions carefully.

INFORMATION FOR CANDIDATES

- In the 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 11 printed pages and 1 blank page.

Registered Charity Number: 1066969
[Turn over

BLANK PAGE

Answer **all** the questions.

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

1 In this experiment, you will investigate the variation of current with potential difference for a filament lamp with a power rating of 24 W. You will use the results of your experiment to find a theoretical value for the current when a particular potential difference is applied across the lamp.

(a) Construct the circuit shown in Fig. 1.1.

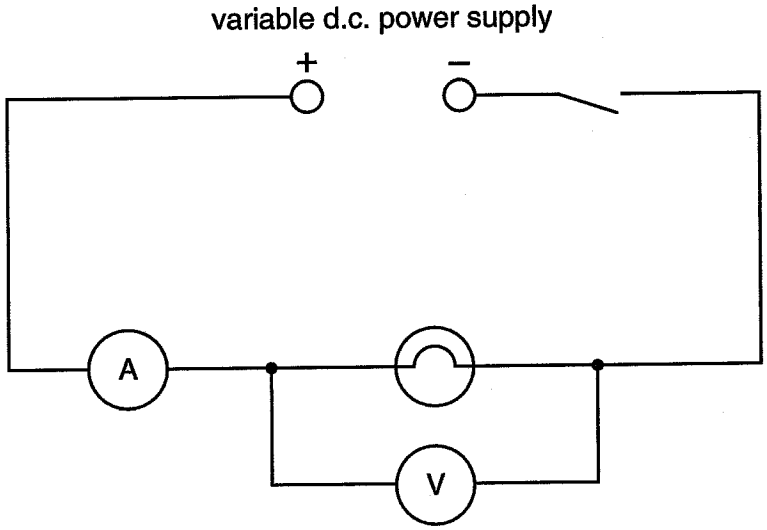


Fig. 1.1

[Turn over

(b) (i) Close the switch. Measure and record six sets of readings of current I and potential difference V for values of I in the range $1.0\,A \leq I \leq 2.0\,A$.
Include in your table of results values for lg (I/A) and lg (V/V).

(ii) Estimate the **largest** percentage uncertainty in your measurements of I.

largest percentage uncertainty in I =.....

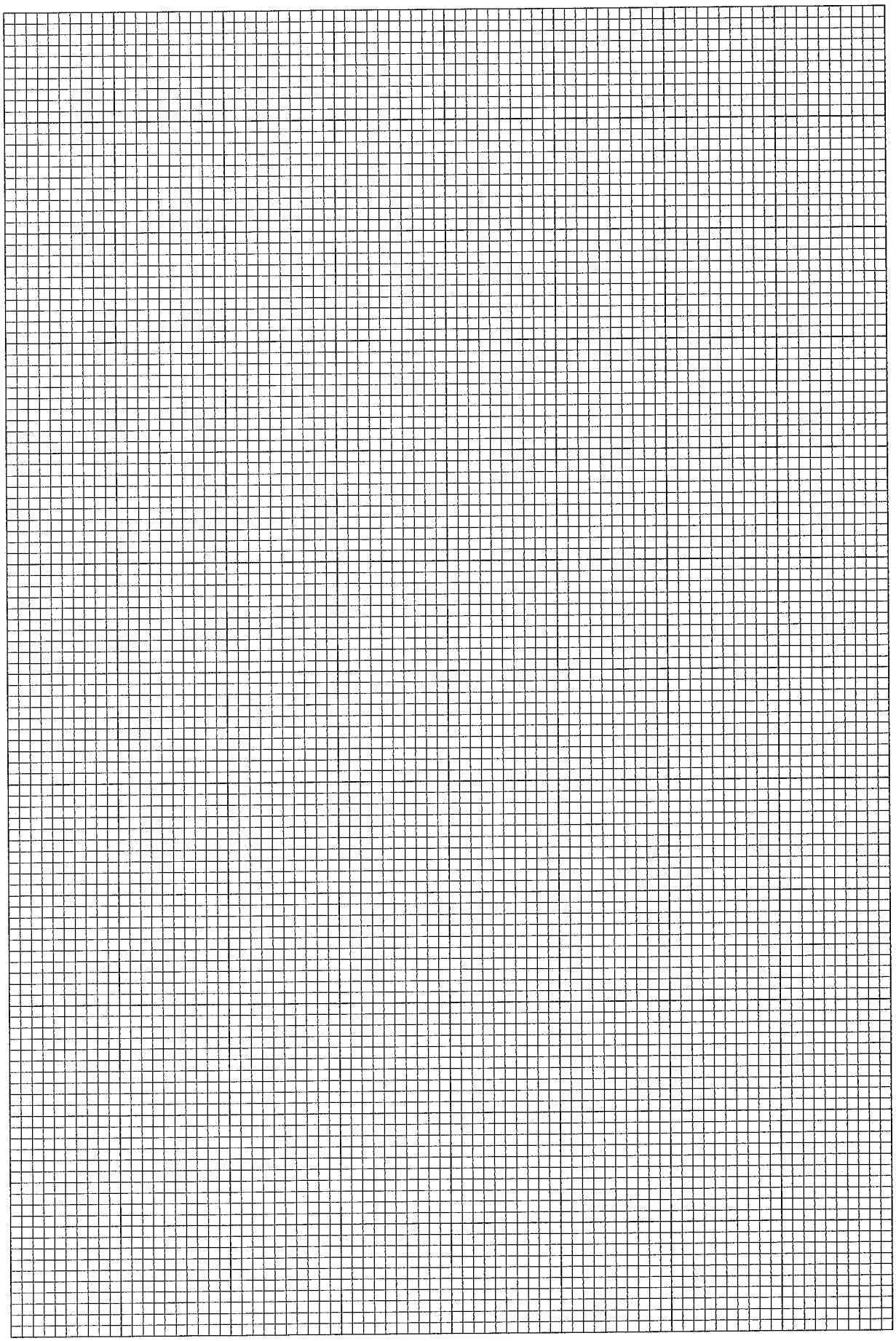
(c) (i) Plot a graph of lg (I/A) (y-axis) against lg (V/V) (x-axis).

(ii) Determine the gradient and y-intercept of the line of best fit.

gradient =.....

y-intercept =.....

For Examiner's Use



(d) It is suggested that the formula which relates I and V is

$$I = kV^n$$

where n and k are constants.

Use your answers from **(c)(ii)** to determine values for n and k. You need **not** be concerned with the units of these quantities.

$n =$ .....

$k =$ .....

(e) Comment on the extent to which the results of your experiment would support the suggested relationship given in **(d)**.

.....

.....

.....

.....

For Examiner's Use

(f) **(i)** Use the results obtained in **(d)** to calculate the electrical power that would be supplied to the lamp if the potential difference was 25 V.

power = ...W

(ii) Suggest why it may be impossible to measure this power experimentally.

.....

.....

.....

.....

For Examiner's Use

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

2 In this question, you will investigate how the period of oscillation of a mass on a spring varies as the number of springs suspending the mass changes.

(a) Clamp a spring above the bench and suspend a mass from the lower end of the spring as shown in Fig. 2.1.

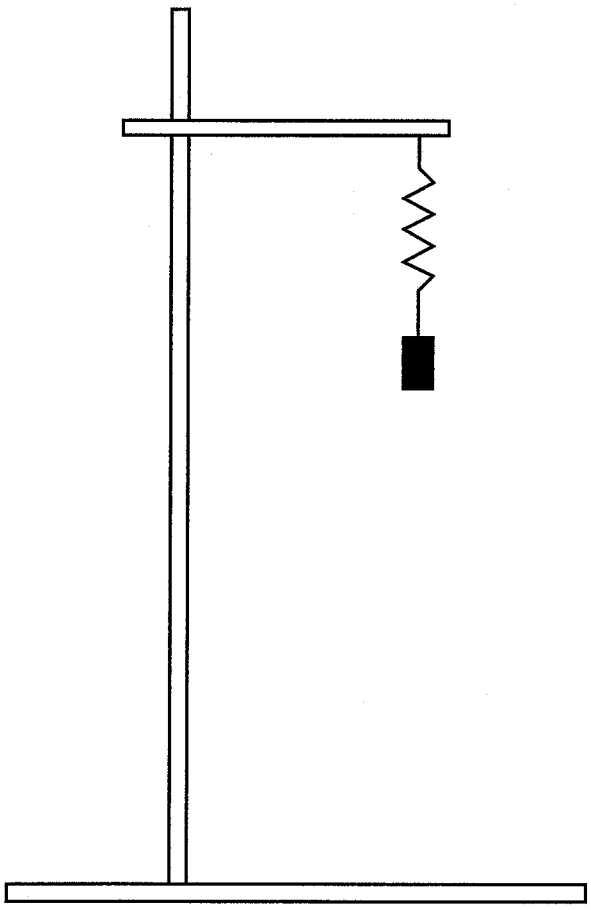


Fig. 2.1

(b) (i) Gently displace the mass from the rest position, and release it so that it performs **small** vertical oscillations.

(ii) Record the time taken for five oscillations of the mass, and hence determine the period T of these oscillations.

T =.....s

For Examiner's Use

(c) Justify the number of significant figures which you have given for *T*.

.....

.....

.....

.....

(d) Describe **two** effects on the oscillations of the mass when a larger amplitude is used.

1. .....

.....

.....

2. .....

.....

.....

(e) **(i)** Remove the mass from the spring.

(ii) Attach a second spring in series with the first one by using a link as shown in Fig.2.2.

Fig. 2.2

(iii) Suspend the mass on the end of the two springs. The arrangement should now be as shown in Fig. 2.3.

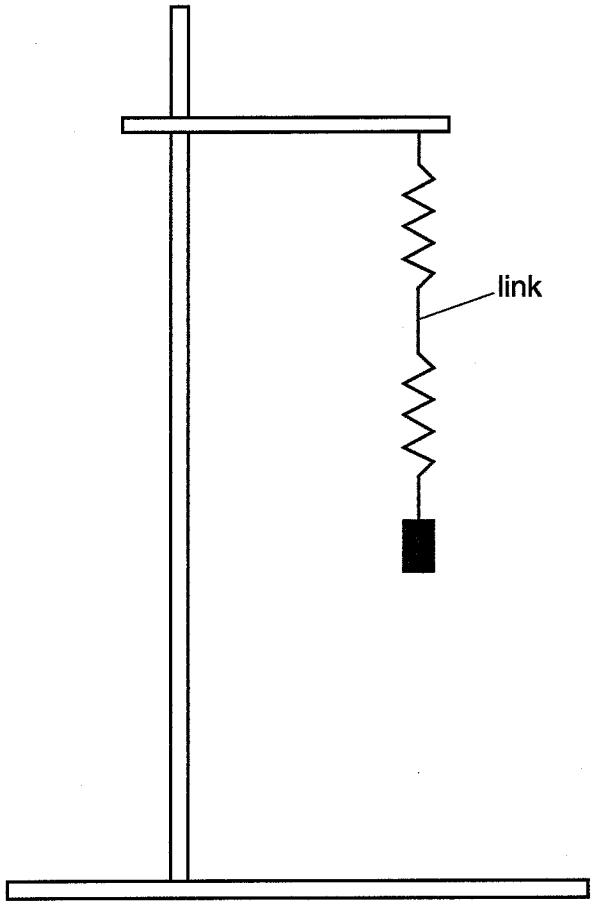


Fig. 2.3

(f) Repeat **(b)** for the two springs in series, recording your results in the space below.

T = ...s

For Examiner's Use

(g) It is suggested that the relation between T and the number of springs in series, n, is of the form $T \propto \sqrt{n}$. Do the results of your experiment support this suggestion? Justify your answer.

.....

.....

.....

.....

.....

.....

Question 2 continued over the page.

[Turn over

For Examiner's Use

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

Write an evaluation of the procedure that you have followed. 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.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Quality of Written Communication