**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Index No. \_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Candidate’s signature \_\_\_\_\_\_**

**Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**232/3**

**PHYSICS**

**PAPER 3**

**PRACTICAL**

**2 ½ HOURS**

**INSTRUCTIONS TO CANDIDATES**

- Answer all the questions in the spaces provided in the question paper

- You are supposed to spend the first **15** minutes of the **2 ½ hours** allowed for this paper reading the whole paper carefully before commencing your work.

- Marks are awarded for a clear record of the observations made, their suitability then accuracy and for the use made of them

- Candidates are advised to record their readings as soon as they are made

- Mathematical tables and electronic calculators may be used.

**FOR EXAMINER’S USE ONLY**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Question** | | **Question 2** | | **Total** |
| Max score |  | Max score |  |  |
| Candidate score |  | Candidate score |  |  |

1. You are provided with the following

- A spiral spring

- A retort stand, boss and clamp

- 6 masses of 100g each

- A stop watch

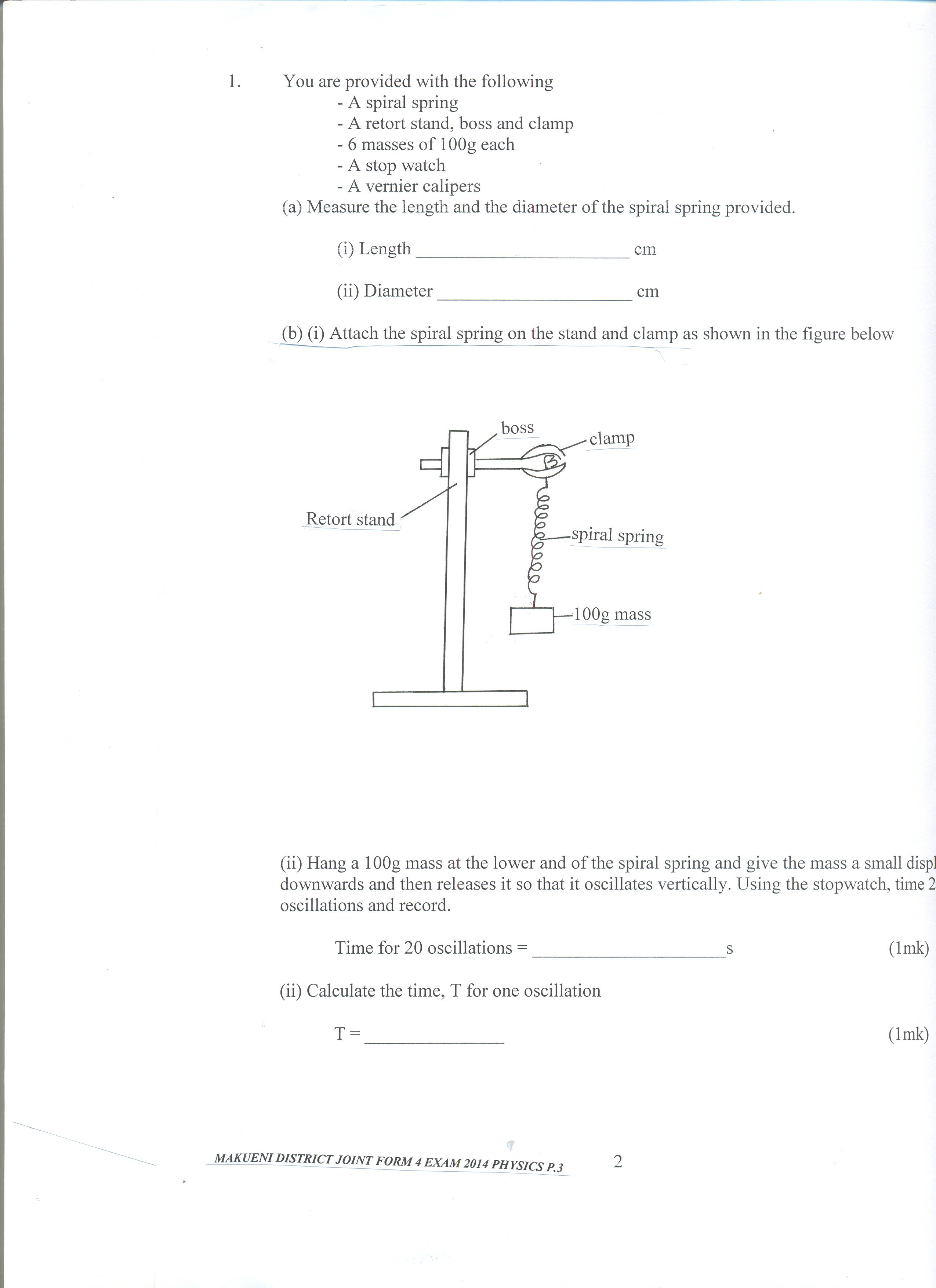
- A vernier calipers

(a) Measure the length and the diameter of the spiral spring provided.

(i) Length \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm (1mk)

(ii) Diameter \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm (1mk)

(b) (i) Attach the spiral spring on the stand and clamp as shown in the figure below



(ii) Hang a 100g mass at the lower and of the spiral spring and give the mass a small displacement downwards and then releases it so that it oscillates vertically. Using the stopwatch, time 20 oscillations and record.

Time for 20 oscillations = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_s (1mk)

(ii) Calculate the time, T for one oscillation

T = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1mk)

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(v) Repeat the same procedure using different masses as in the table below. Fill the table.

|  |  |  |  |
| --- | --- | --- | --- |
| Maas, M(kg) | Time for 20 oscillations (s) | Periodic time T (s) | T2(S2) |
| 0.1 |  |  |  |
| 0.2 |  |  |  |
| 0.3 |  |  |  |
| 0.4 |  |  |  |
| 0.5 |  |  |  |
| 0.6 |  |  |  |

(6mks)

I (i) On the grid provided plot a graph of T2 against M. (5mks)

(ii) Determine the slope of the graph (2mks)

(d) Given that T2 = 4π2Mn and that n = 0.3m/kg. Find the value of g. (3mks)

g

2. **PART 1**

You are provided with the following

- Two dry cells

- One ammeter

- One voltmeter

- A variable resistor

- A switch

- 6 connecting wires

Proceed as follows:

(a) Set up the apparatus provided as in the diagram below.

A

S

V

3

(b) Close the switch and adjust the variable resistor until the voltmeter reads 2.9V. Record this value of voltage V and the corresponding value of current I in the table below.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| V (V) | 2.9 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.2 |
| I A |  |  |  |  |  |  |  |

(c) Repeat the procedure (b) above for the other values of V and complete the table.

(d) Plot a graph of V(axis) against I. (5mks)

(e) From the graph determine the emf, E and internal resistance, r of the battery given that

E = V + rI

E (1mk)

r (3mks)

**PART 2**

You are provided with the following

- A candle

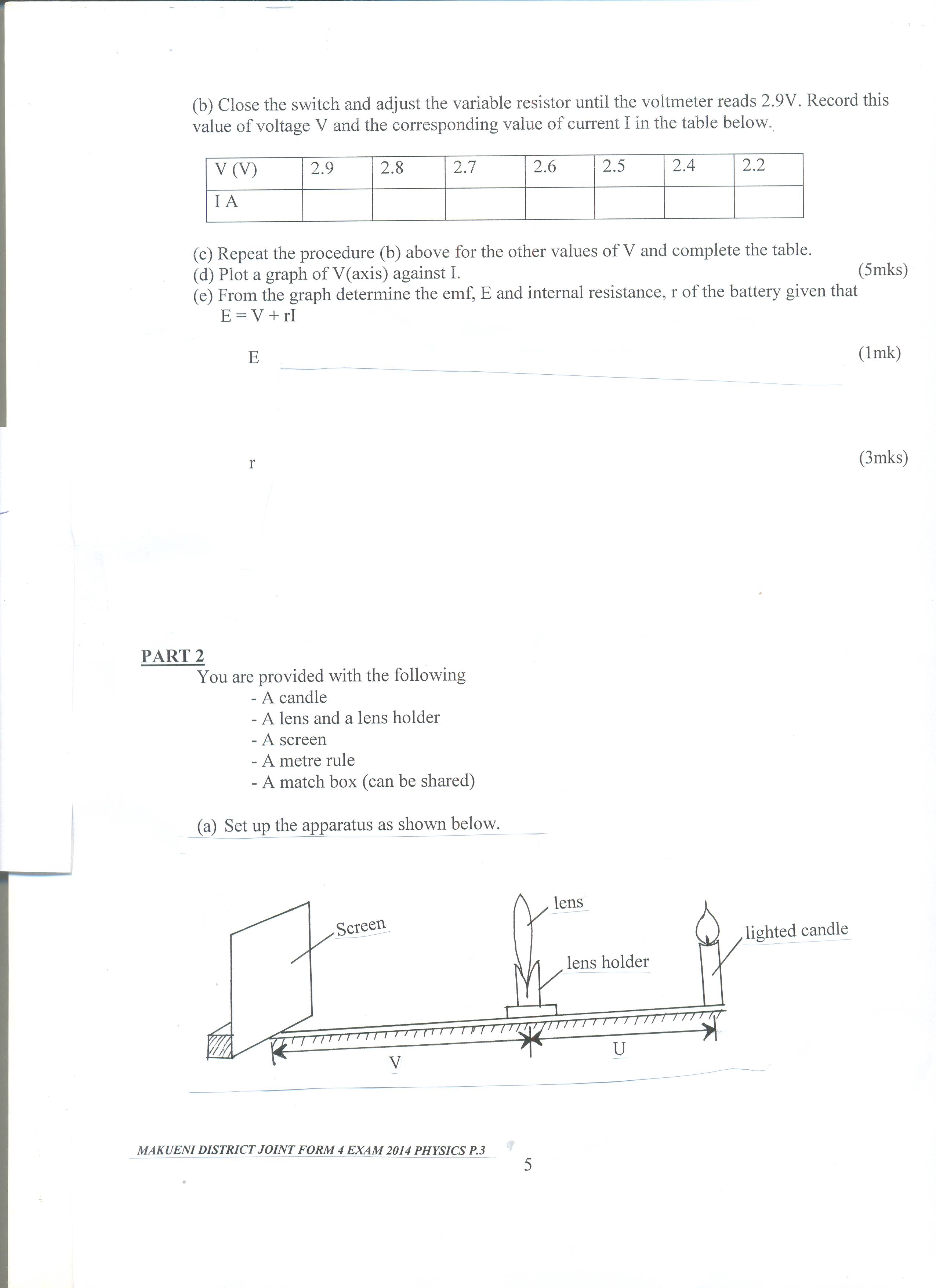
- A lens and a lens holder

- A screen

- A metre rule

- A match box (can be shared)

1. Set up the apparatus as shown below.



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Ensure that the candle flame and the centre of the lens lie in a horizontal straight line.

(b) Place the lens so that it is 40cm from the candle (u = 40cm). Adjust the position of the screen until a sharp image of the candle is obtained on the screen. Measure the distance V between the lens and the screen. Record in the table.

|  |  |  |  |
| --- | --- | --- | --- |
| U (cm) | 40 | 45 | 50 |
| V (cm) |  |  |  |
| M = V/U |  |  |  |

(c) Repeat (b) above the values of V in the table and record your results. (3mks)

(d) (i) Given that f = V

M + 1 , where f is the focal length of the lens, use the results in the table above to determine the average value of f . (3mks)

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