**Name Index No. …………………………**

**School Candidate’s sign…………………..**

**Date ……**

**232/3**

**Physics**

**Paper 3**

**PRACTICAL**

**November 2021**

**2 Hours**

**NAMBALE ACK SCHOOLS JOINT EXAMS**

**Kenya Certificate of Secondary Education (K.C.S.E)**

**232/3**

**PHYSICS**

**PAPER 3**

**PRACTICAL**

**2 Hours**

**Instructions to candidates**

1. Write your name, index number, school and date in the spaces provided above
2. Sign and write the date of the examination in the spaces provided above
3. Answer all the questions in the spaces provided
4. All writings **must** be shown in the spaces provided

**FOR EXAMINER’S USE ONLY**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Question 1** | **b (i)** | **b (ii)** | **d** | **e (i)** | **e (ii)** | **e (iii)** | **TOTAL** |
| **Maximum score** | 1 | 1 | 7 | 5 | 3 | 3 | 20 |
| **Candidate score** |  |  |  |  |  |  |  |

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| **Question 1** | **c** | **e (i)** | **e (ii)** | **e (iii)** | **h (i)** | **h (ii)** | **TOTAL** |
| **Maximum score** | 1 | 7 | 5 | 2 | 2 | 3 | 20 |
| **Candidate score** |  |  |  |  |  |  |  |

***This paper consists of 7 printed pages. Candidates should check the question paper to***

***Ensure that all the pages are printed as indicated and no questions are missing.***

**Question One**

You are provided with the following

* Two cells of 1.5V each
* Nichrome wire labeled W mounted on a metre rule
* An ammeter (0 – 1.5A) or (0 - 2.5A)
* A cell holder
* Voltmeter (0 – 5V)
* 8 connecting wires atleast 4 with crocodile clips (or a jockey)
* A switch
* A metre rule

**Proceed as follows:**

1. Connect the circuit as shown in the figure 1 below.

Figure 1

100cm long nichrome wire, W

S

A

B

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | |  | | | |  | | |  | | | |  | | | |  | | |  | | | |  | | |
|  |  |  | |  |  |  | |  |  | |  |  |  | |  |  |  | |  |  | |  |  |  | |  |  |

1. (i) Connect the end of A and point B when AB = 100cm across the terminals

as shown in the figure 1 above.

Close the switch and measure both current I and p.d, V across the wire AB

Current I A

P.d, V V

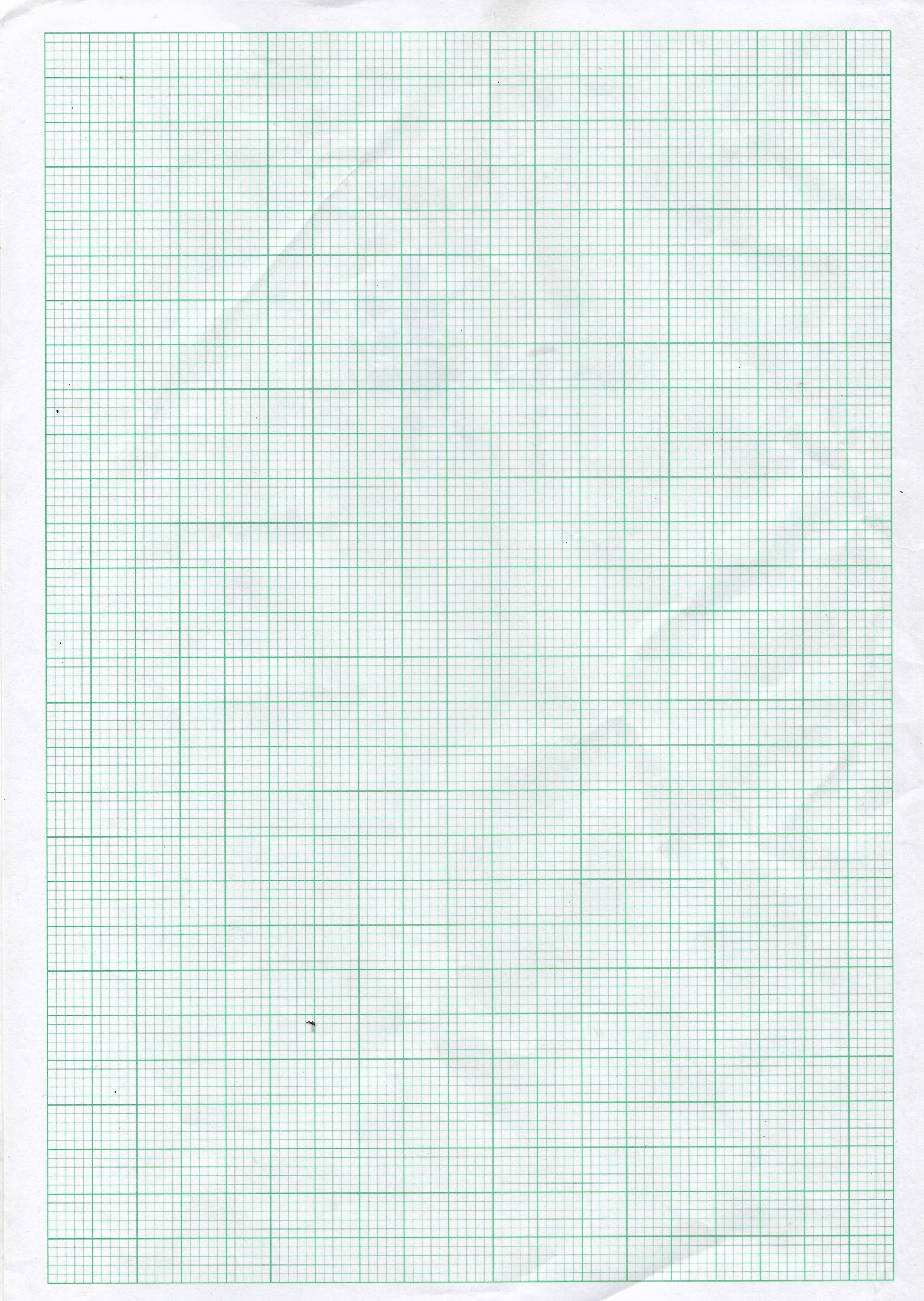
(ii) Measure the emf of the cell, E = V

1. Reduce the length AB as shown, 100cm, 70cm, 60cm, 50cm, 40cm, 30cm and 20cm. In each case record the current (I) and the corresponding values of p.d (V)
2. Enter the length as shown in the table 1 below:

Table 1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Length AB (cm)** | 100 | 70 | 60 | 50 | 40 | 30 | 20 |
| **Current I (A)** |  |  |  |  |  |  |  |
| **p.d (V)** |  |  |  |  |  |  |  |
| **E – V (V)** |  |  |  |  |  |  |  |

1. Complete the table
   1. Plot a graph of (E – V) against I (A)
   2. Determine the gradients of the graph



Given the equation, E = V =Ir, determine the internal resistance of each cell (3mks)

**Question Two**

**Part A**

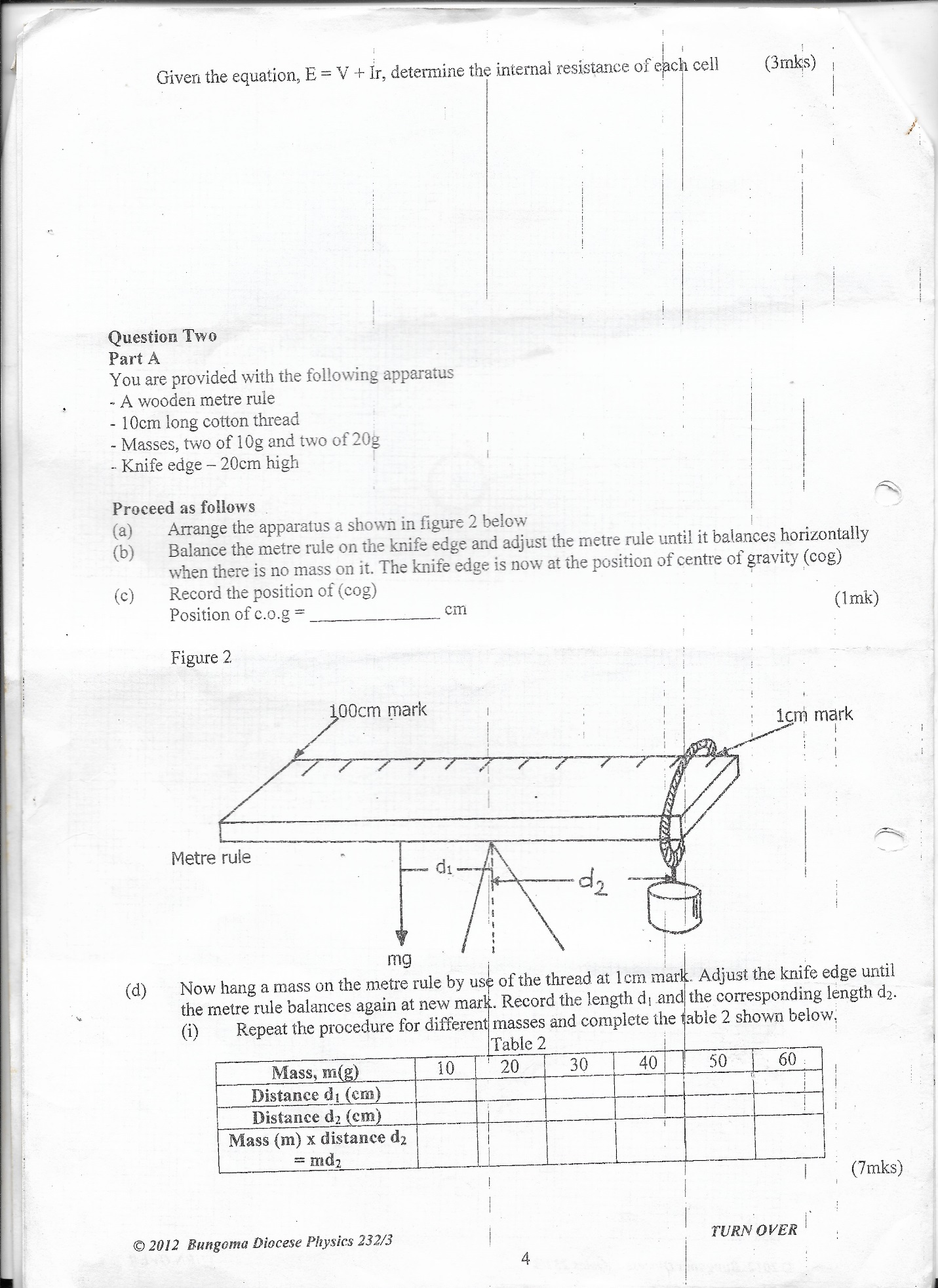
You are provided with the following apparatus

* A wooden metre rule
* 10cm long cotton thread
* Masses, two of 10g and two of 20g
* Knife edge – 20cm high

**Proceed as follows**

1. Arrange the apparatus as shown in figure 2 below
2. Balance the metre rule on the edge and adjust the metre rule until it balances horizontally when there is no mass on it. The knife edge is now at the position of (cog)
3. Record the position of (cog)

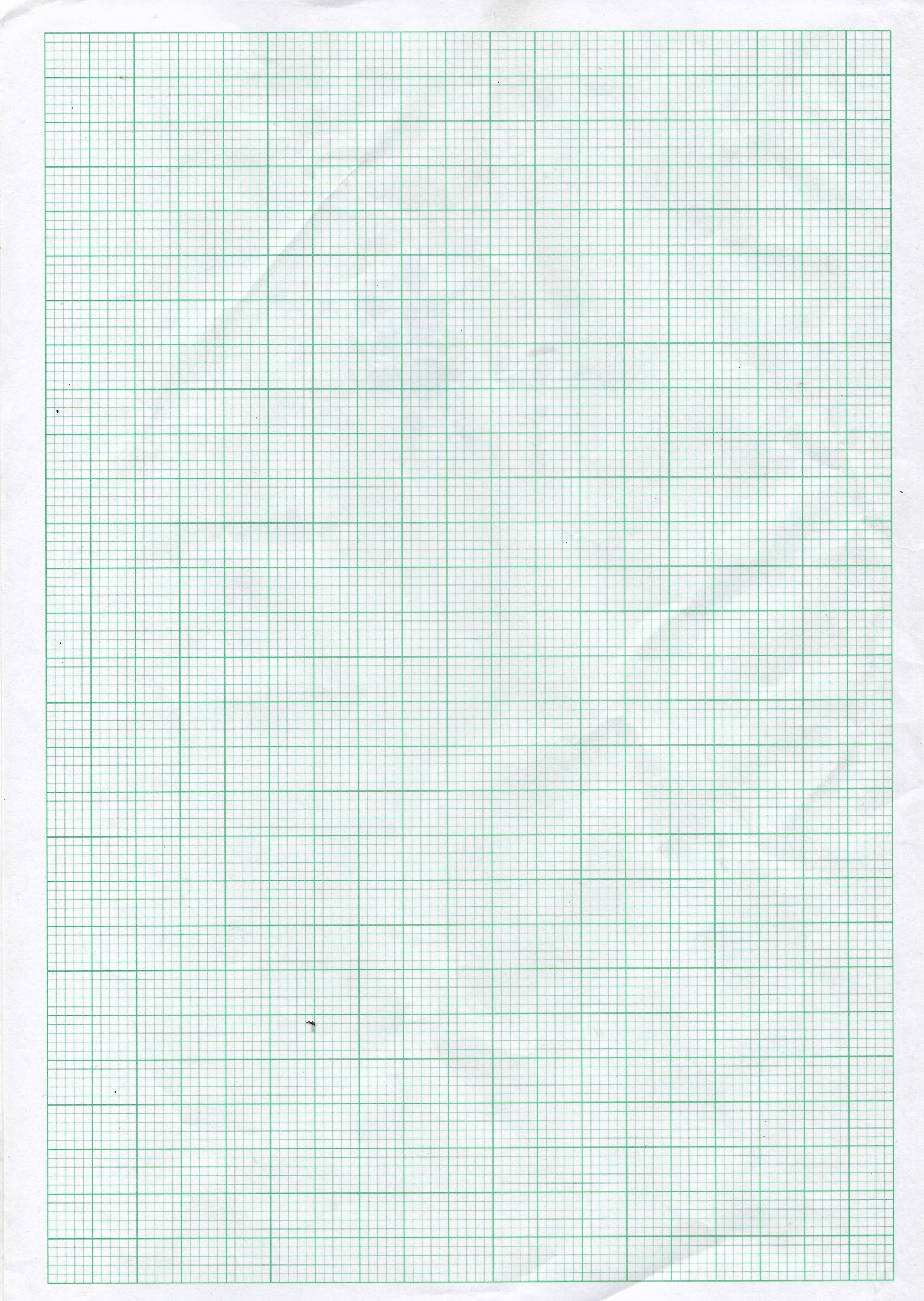
Position of c.o.g = cm

 Figure 2

1. Now hang a mass on the metre rule by use of the thread at 1cm mark. Adjust the knife edge until the metre rule balances again at new mark. Record the length d1 and the corresponding length d2.
2. Repeat the procedure for different masses and complete the table 2 shown below.

Table 2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Mass, m(g)** | 10 | 20 | 30 | 40 | 50 | 60 |
| **Distance d1 (cm)** |  |  |  |  |  |  |
| **Distance d2 (cm)** |  |  |  |  |  |  |
| **Mass (m) x distance d2**  **=md2** |  |  |  |  |  |  |

1. Plot a graph of md2 against d1 (5mks)
2. Calculate the slopes of the graph (2mks)

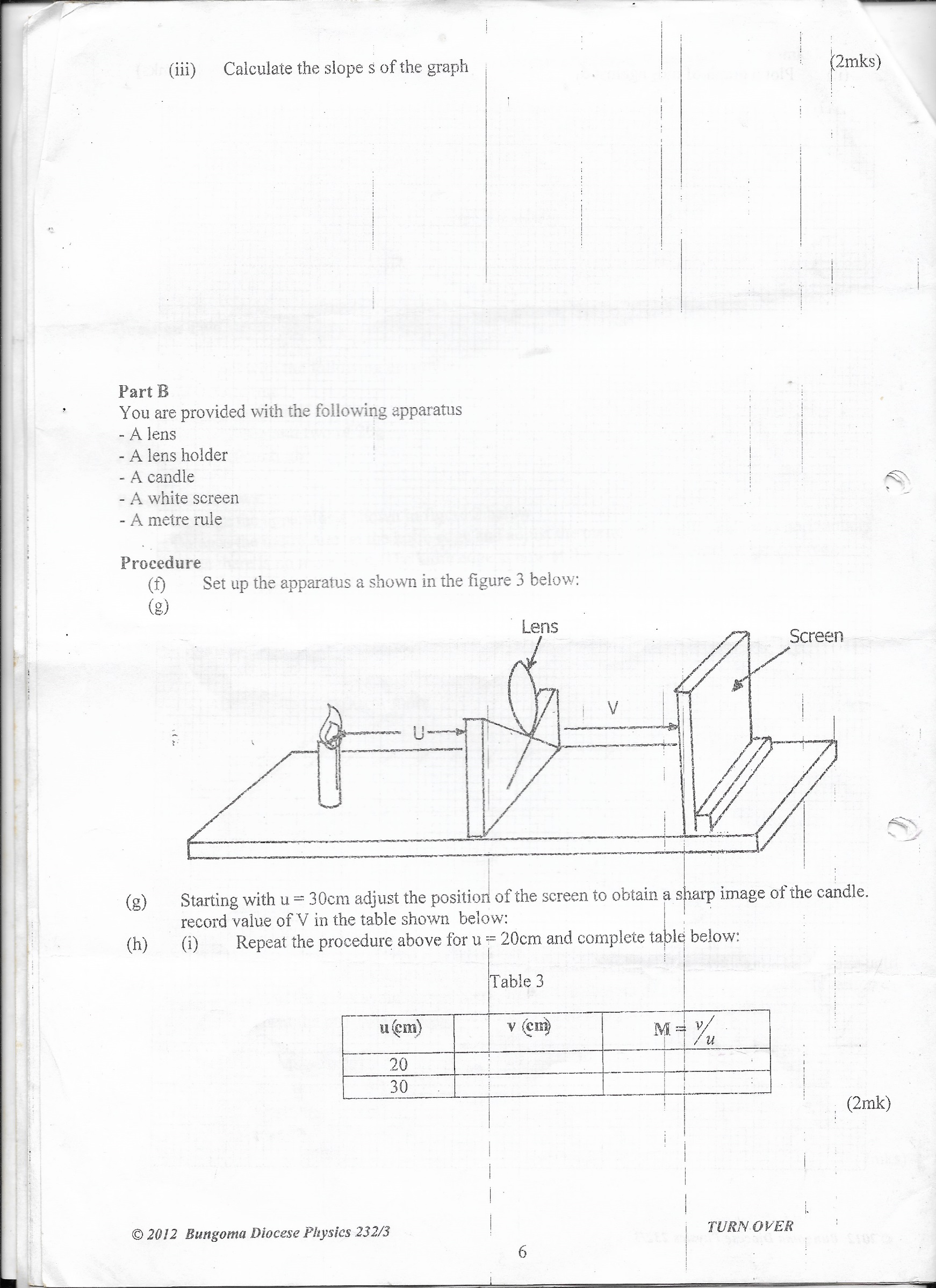
**Part B**

You are provided with the following apparatus

* A lens
* A lens holder
* A candle
* A white screen
* A metre rule

**Procedure**

1. Set up the apparatus as shown in the figure 3 below:

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1. Starting with u = 30cm adjust the position of the screen to obtain a sharp image of the candle. Record value of V in the table shown below:
2. (i) Repeat the procedure above for u = 20cm and complete table below:

Table 3

|  |  |  |
| --- | --- | --- |
| **u (cm)** | **v (cm)** | **M =** |
| 20 |  |  |
| 30 |  |  |

(2mks)

(ii) Given that the focal length of the lens satisfies the equation, determine the average value of the focal length