**NAME: …………………………………………. INDEX NO: ……………………………….**

**SIGNATURE: ………………………………… DATE : …………………………………..**

**SIGNATURE: ……………………………**

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**232 / 3**

**PHYSICS**

**PAPER 3**

**(PRACTICAL)**

**TIME: 2 ½ HOURS**

**INSTRUCTIONS TO CANDIDATES**

1. *Write your Name and Index Number in the spaces provided above.*
2. *Sign and write the date of Examination in the spaces provided above.*
3. *Answer all questions in the spaces provided.*
4. *You are supposed to spend the first 15 minutes of the 2½ hours allowed for this paper reading the whole paper carefully before commencing your work.*
5. *Marks will be given for clear records of observations actually made, their suitability, accuracy and the use made of them.*
6. *Candidates are advised to record their observations as soon as they are made.*
7. *All working must be clearly shown where necessary.*
8. *Mathematical tables and silent electronic calculators may be used in calculations.*

**FOR EXAMINER’S USE ONLY**

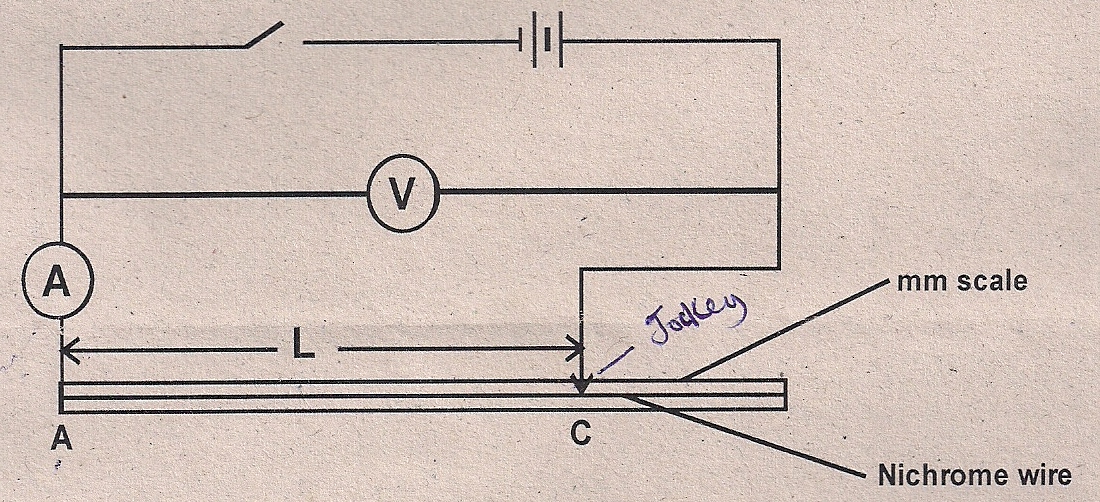
|  |  |  |
| --- | --- | --- |
| **Question** | **Maximum score** | **Candidate’s score** |
| 1 | 20 |  |
| 2 | 20 |  |
| **TOTAL** | **40** |  |

1. You are provided with the following:-

* Two dry cells.
* Nichrome wire 100cm on a mm scale.
* An ammeter.
* Cell holder.
* Voltmeter.
* Connecting wires with crocodile clips.
* Switch.

**Proceed as follows:**

* + 1. Connect the circuit as shown in the diagram.



* + 1. Connect the ends A and C where AC is the length L of the Nichrome wire across the terminals as shown. Close the switch and measure both current I and potential difference (p.d) across the wire AC when L = 100cm.

Current I = (1mk)

p.d. V = (1mk)

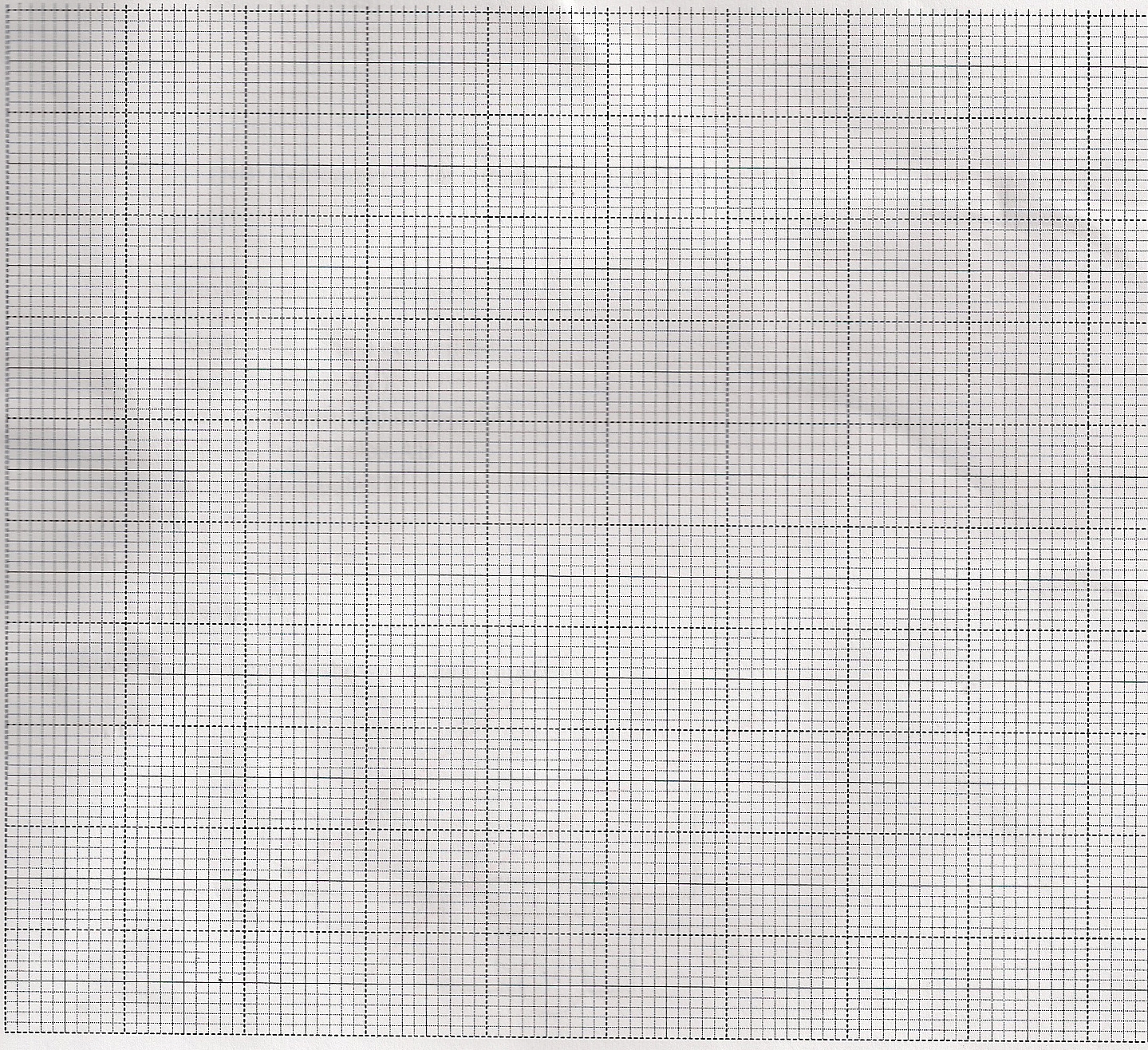
* + 1. Measure the E.m.f. of the cells, E.

E = (1mk)

* + 1. Reduce the length L (AC) to the lengths shown in the table below. In each case record the current, I, and the corresponding p.d. (7mks)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Length L (cm) | 100 | 70 | 60 | 50 | 40 | 20 |
| I (A) |  |  |  |  |  |  |
| P.d (V) |  |  |  |  |  |  |
| E – V (v) |  |  |  |  |  |  |

* + 1. Plot a graph of E – V against (A) on x-axis in the grid provided. (5mks)



* + 1. Determine the slope of the graph. (3mks)
    2. Given that E = V + Ir, determine the internal resistance, r, of each cell. (2mks)

1. You are provided with the following apparatus:-

* A metre rule.
* One stop watch. one stand, clamp and boss.
* One spring.
* Two pieces of wood.
* A beam balance or electronic balance (to be shared)
* One mass labeled M.

**Proceed as follows:**

* + - * 1. Hang the spring vertically by clamping one end as shown in figure 1. (The small pieces of wood to clamp the spring).



* + - * 1. Measure the length, Lo, of the unloaded spring, and record below.

Lo \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_mm (½ mk)

* + - * 1. Hang the mass M given from the lower end of the spring. Measure the length, L1 of the loaded spring.

L1 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mm (½ mk)

* + - * 1. Find the value of L1 – Lo in centimeters

L = L1 – Lo \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm (1mk)

* + - * 1. Using the balance given, find the mass of the object M.

Mass of M = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ g (1mk)

* + - * 1. Hang the mass M from the lower end of the spring. Displace it by a small vertical distance and release so that the spring makes vertical oscillations.

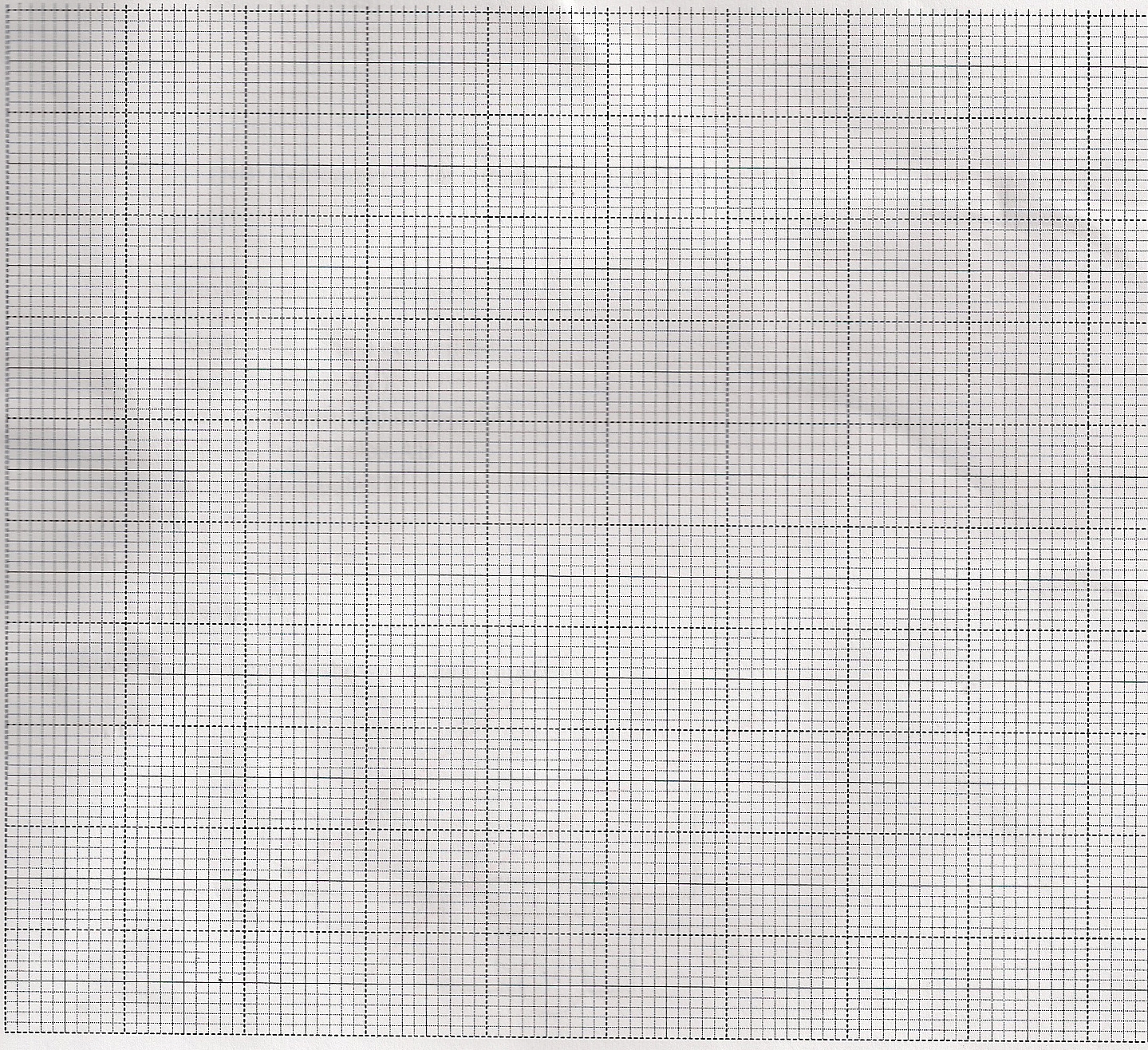
Measure and record, time for the number of oscillations given in the table below.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Oscillations, N | 5 | 7 | 10 | 13 | 15 | 18 | 20 |
| Time in seconds, t (s) |  |  |  |  |  |  |  |
| (N + 10t) (s)  10 |  |  |  |  |  |  |  |
| (N + 10t)2 (s2)  19 |  |  |  |  |  |  |  |

Complete the table above. (7mks)

* + - * 1. On the grid provided, plot a graph of N + 10t 2 (y-axis) against N. (5mks)

10



* + - * 1. (i) Determine the slope S, of the graph at N = 16. (3mks)

(ii) Find the constant k, given that:

K = MS (2mks)

13L