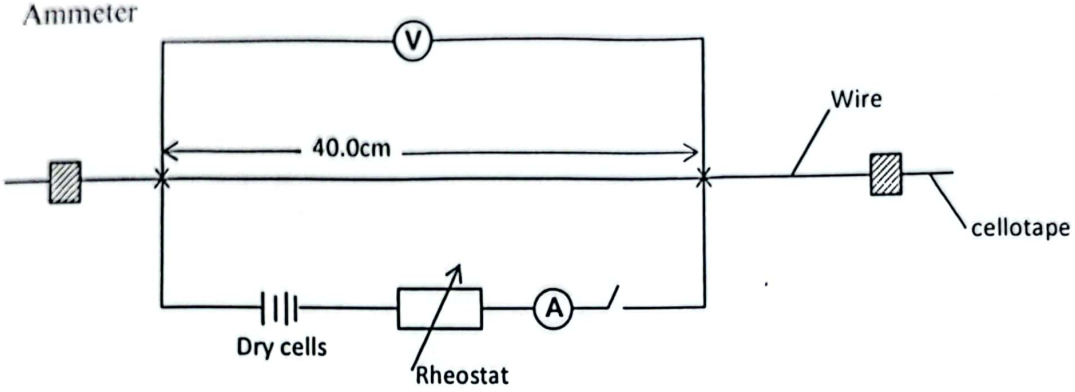
WAKISSHA JOINT MOCK EXAMINATIONS
SCORING GUIDE
Uganda Certificate of Education
PHYSICS 535/3
July/August 2024

Aim; determination of the resistance of the wire provided.

Hypothesis; the resistance of the wire was between 2.0 and 4.0Ω.

Apparatus
- Meter rule
- Constantin wire
- Rheostat
- Voltmeter
- Dry cells
- Ammeter



Procedure
(i) Arrange the apparatus as shown above.
(ii) Close switch K
(iii) Adjust the value of the rheostat such that the ammeter reads 0.10A.
(iv) Read and record the corresponding value of the voltmeter, V.
(v) Repeat iii and iv for ammeter readings 0.20A, 0.30A, 0.40A, 0.50A.

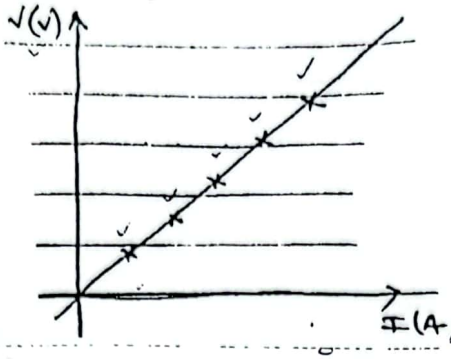
Variables: Independent; current flowing I.
Dependent, Pd a cross the wire, V.
Controlled; constant e.m.f of the cell.

Sources of error
- Increased resistance from the connecting wires.
- Errors due to parallax

Mitigations
- Using fewer wires.
- Reading the scale from directly above it.

I(A)	V(V)
0.10	0.95
0.20	0.90
0.30	1.35
0.40	1.70
0.50	2.10

A graph of V against I



Any student with more than half the marks scores 2.

Those with less than half score 1

Slope $= \frac{2.10-0.40}{0.50-0.10} = \frac{1.70}{0.40} = 4.3\Omega$ (2sf)

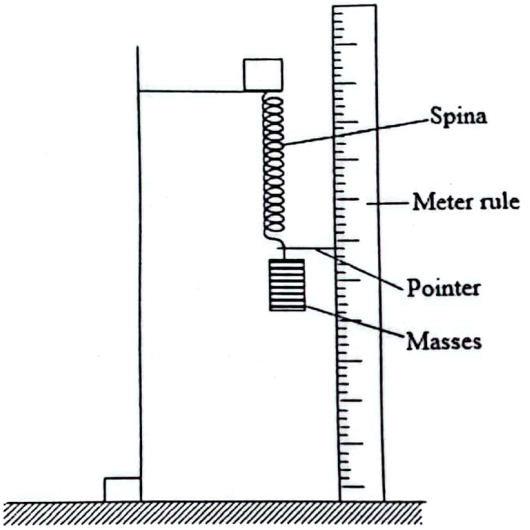
The res... ... ... 4.0 Ω so it will not work and the toy would not be repaired.

Aim: Determination of the force constant of the spring provided.

Hypothesis: the spring had a force constant in the range 17 – 23 Nm^{-1}

Apparatus

- Meter rule
- Spring
- Masses
- Stop clock



Procedure

(i) Arrange the apparatus as shown above.
(ii) Suspend a mass M of 0.200kg on the spring.
(iii) Give the mass a vertical displacement and determine the time taken, t for 20 oscillations.
(iv) Determine the time taken T for 1 oscillation.
(v) Repeat procedures ii o iv for M = 0.300kg, 0.400kg, 0.500g and 0.600 kg.

Variables; Independent – Mass M
Dependent - Time of oscillation, t
Controlled - Ensuring the spring doesn't stretch beyond its proportional limit.

Sources of error

(i) Parallax when reading the stop clock
(ii) Inaccurate readings due to wind.

Mitigations

(i) Taking readings from directly above.

(ii) Shielding the apparatus from wind.

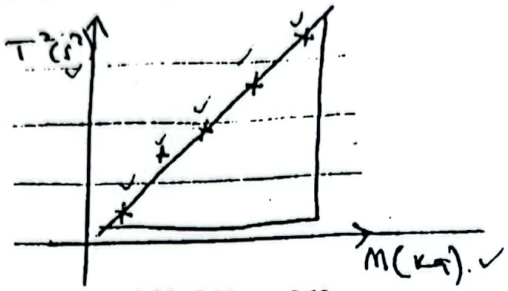
M(kg)	T(l)	T(s)	$T^2(s^2)$
0.200	12.5	0.63	0.40
0.300	15.5	0.75	0.61
0.400	18.0	0.90	0.81
0.500	20.0	1.00	1.00

02 ..... recording of quantities and units

03 More than 3 sets of data.

02 More than half the values in range.

A graph of T^2 against M



Slope $= \frac{1.00-0.40}{0.500-0.200} = \frac{0.60}{0.300}$ ⇨ S $= 2.0\ s^2\ kg^{-1}$ ⇨ K $= \frac{4 \times 3.14^2}{2.0} = 19.72\ Nm^{-1}$

The force of constant of the spring was within range so the spring could be used.

END