THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

031/2A **PHYSICS 2A**

ACTUAL PRACTICAL A

(For Both School and Private Candidates)

Time: 2:30 Hours **ANSWERS** **Year: 2016**

Instructions

1. This paper consists of two questions.

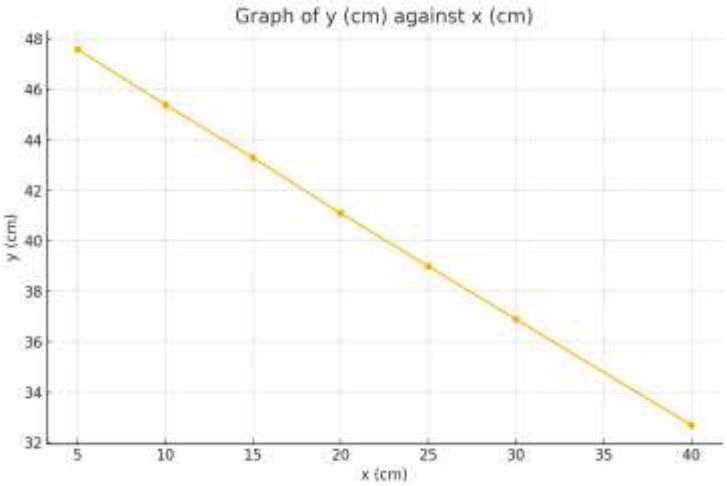
2. Answer all questions.

1. The aim of this experiment in Figure 1 is to determine the mass M_0 of the meter rule provided.

(a) Meter rule balanced on prism: $L_0 = 50.0$ cm
(b) Hang 50 g mass at x = 5.0 cm → y = 47.6 cm
(c) Vary x and measure corresponding y:

x (cm)	y (cm)
10	45.4
15	43.3
20	41.1
25	39.0
30	36.9
40	32.7

(d) Plot y against x



(e) Slope $s = (32.7 - 47.6) / (40 - 5) = -14.9 / 35 \approx -0.426$

$M_0 = 50 \times (1 - s) = 50 \times (1 + 0.426) = 50 \times 1.426 = 71.3$ g

(f) From graph, y_0 when $x = 0 \approx 49.9$ cm
$K = M_0 \times y_0 / (L_0 \times (x + 50)) = 71.3 \times 49.9 / (50 \times 55) \approx 71.3 \times 49.9 / 2750 \approx 1.29$

(g) Physical meaning of K:
K is a balancing factor constant for torque equilibrium.

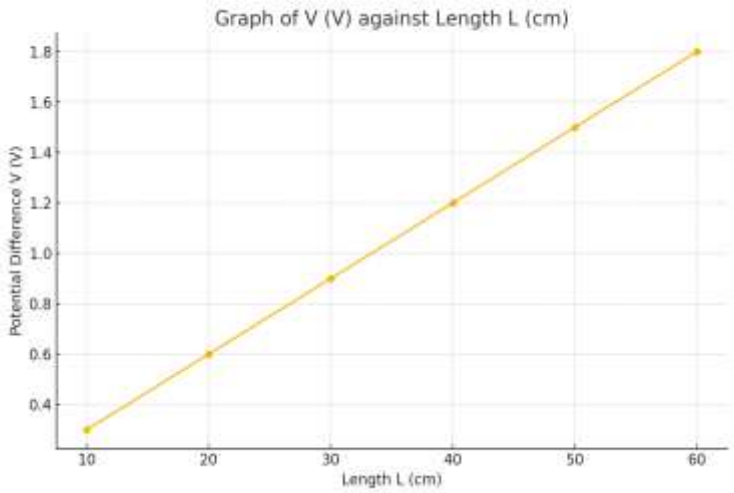
(h) Source of error:
- Friction at the prism contact point
Precaution:
- Avoid vibration and align mass carefully when balancing

2. The aim of this experiment is to determine the current through the circuit using a potentiometer.

(a–e) Potentiometer connected and V measured at varying L:

L (cm)	V (V)
10	0.30
20	0.60
30	0.90
40	1.20
50	1.50
60	1.80

(f) Plot V against L



(g) Slope = (1.80 − 0.30) / (60 − 10) = 1.50 / 50 = 0.030 V/cm

(h) The nature of the graph: straight line
(i) The slope represents the current through the circuit when voltage drop per unit length is known.
(j) Aim: To determine current using V-L relation on a potentiometer wire.
Method: Connect voltmeter across potentiometer wire; vary length and record V.

(k) Expected sources of error:
- Poor contact with the jockey
- Fluctuation of voltmeter reading
Precautions:
- Use clean wire
- Ensure good connection at all terminals