THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

031/2C **PHYSICS 2C**

ACTUAL PRACTICAL C

(For Both School and Private Candidates)

Time: 2:30 Hours **ANSWERS** **Year: 2014**

Instructions

1. This paper consists of two questions.

2. Answer all questions.

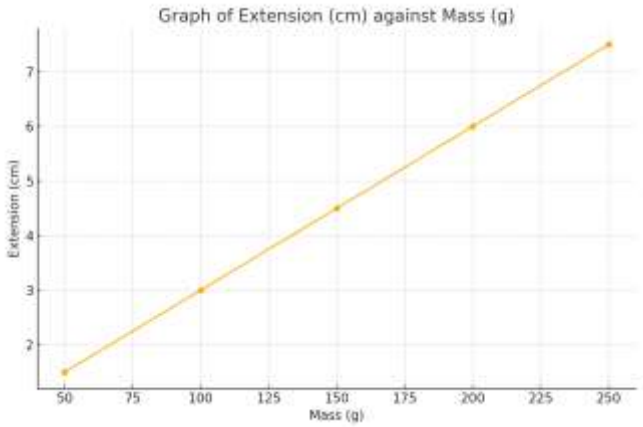
1. The aim of this experiment is to determine the spring constant K.

(b–e) The initial position x_0 of the pointer is noted. Each mass m causes an extension $e = x - x_0$. Assume $x_0 = 12.0$ cm.

Tabulated results:

Mass (g)	x (cm)	Extension e (cm)
50	13.5	1.5
100	15.0	3.0
150	16.5	4.5
200	18.0	6.0
250	19.5	7.5

(f) Plot a graph of e against m



(g) Nature: Straight line through origin, confirming Hooke's Law

(h) When mass = 237.5 g, interpolate from graph: $e \approx 7.1$ cm

(i) Slope = $\Delta e / \Delta m = (7.5 - 1.5) / (250 - 50) = 6.0 / 200 = 0.030$ cm/g

(j) Convert to m/N: 0.030 cm/g = 0.00030 m/g
K = 1 / slope = 1 / 0.00030 = 3333.33 g/cm
Convert to N/m: K = 333.3 N/m

(k) Law: Hooke's Law — Extension is proportional to applied force within elastic limit.

(l) Errors:

- Inaccurate pointer reading
- Mass pan swinging

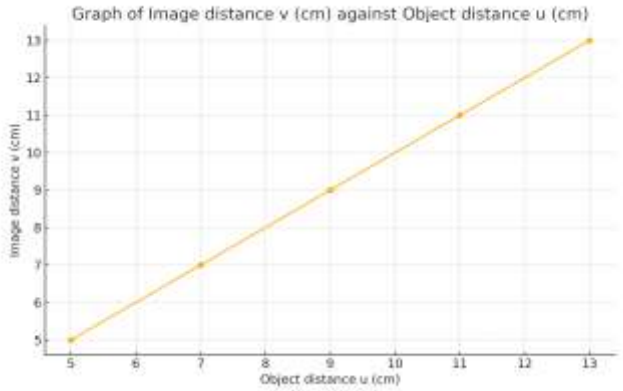
(m) Minimize errors by ensuring vertical alignment and taking steady readings.

2. The aim is to study the relationship between object distance u and image distance v for a plane mirror.

(a) Tabulated results:

u (cm)	v (cm)
5	5
7	7
9	9
11	11
13	13

(b) Plot graph of v against u



(c) Nature: Straight line through origin, confirming v = u

(d) Image is virtual, upright, same size, laterally inverted

(e) Slope = $\Delta v / \Delta u = (13 - 5) / (13 - 5) = 1$

(f) Significance: Confirms v = u (image as far behind mirror as object in front)

(g) If a screen is placed: Image won't form on screen since it's virtual

(h) Uses:
- Dressing mirrors
- Side mirrors in vehicles

(i) Errors:
- Parallax error while locating image
- Misalignment of ruler and mirror

(j) Precautions:
- View perpendicularly
- Keep ruler edge sharp and eyes level

(k) Suitable title: Verification of laws of reflection using a plane mirror