

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF DEFENCE AND NATIONAL SERVICE
MILITARY SCHOOLS ASSOCIATION
FORM FOUR PRE-NATIONAL EXAMINATION
031/2A PHYSICS 2A
(ACTUAL PRACTICAL)
MARKING SCHEME

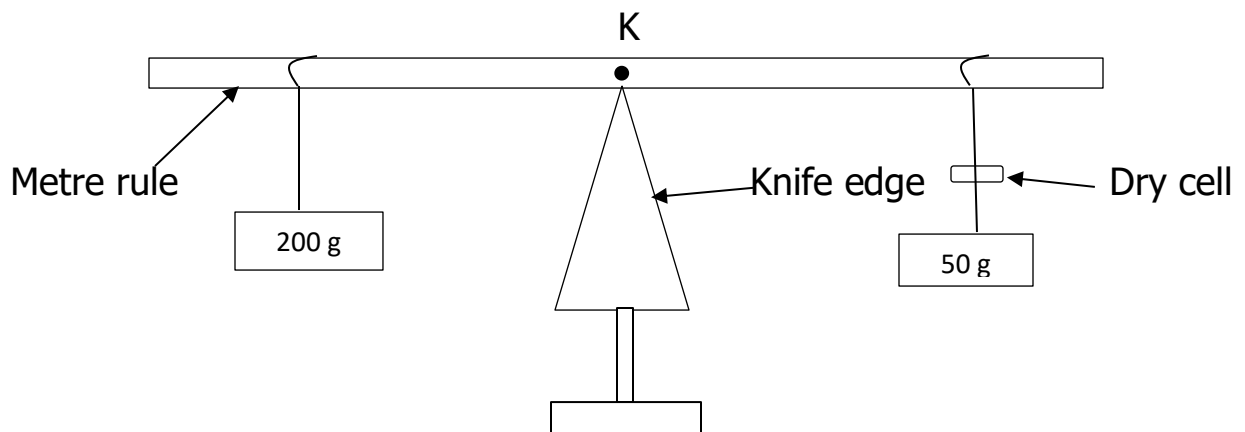
1. (c) The value of the balancing length is given as,
 $A_0 = (30 \pm 1) \text{ cm}$
 $B_0 = (44 \pm 1) \text{ cm}$ (01 mark)

Table of results

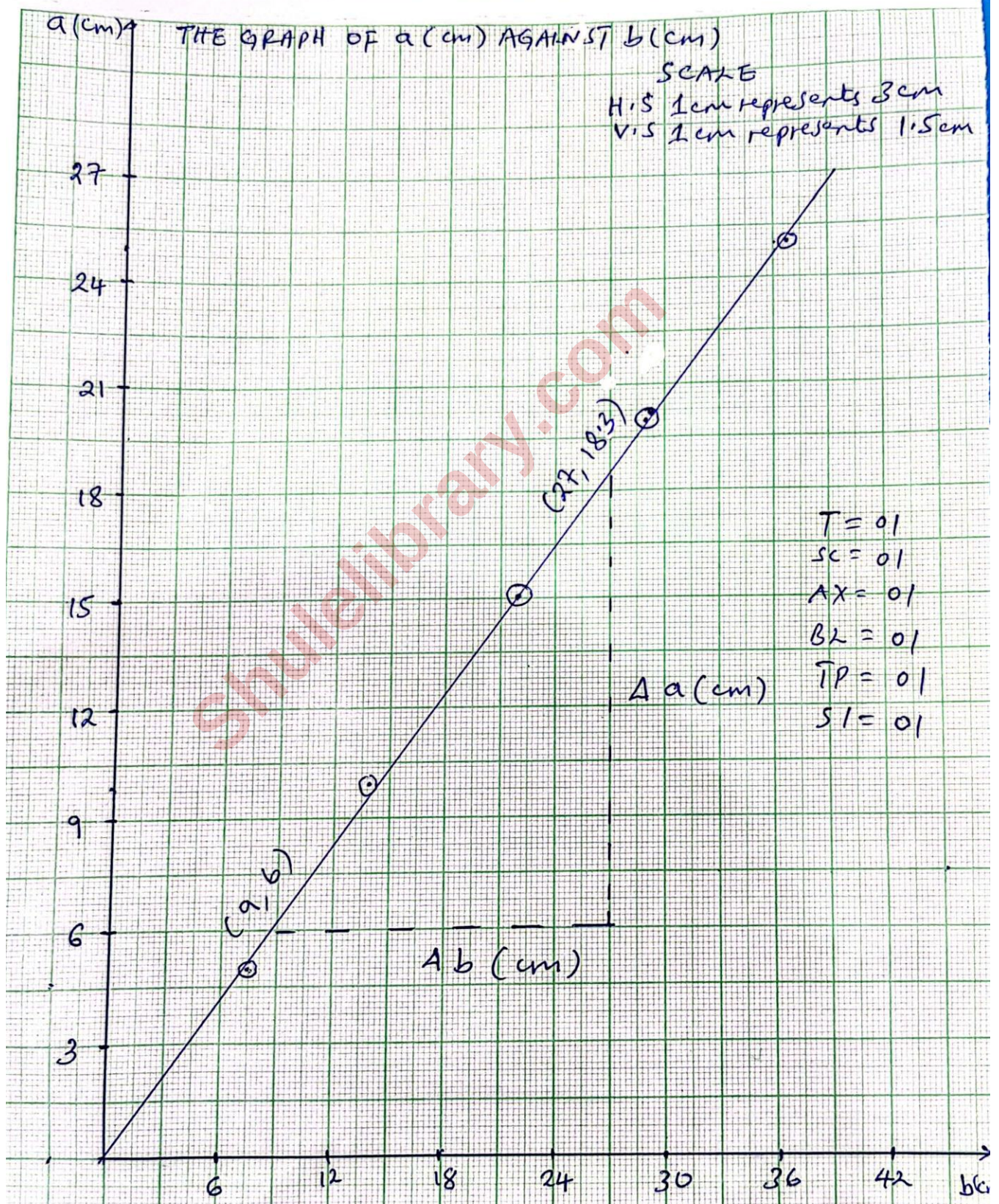
A(cm)	B(cm)
5	7.4
10	14.4
15	22.0
20	29.5
25	36.6

(05 marks)

- (e) (i) The diagram for the experiment is given below, (02 marks)



(ii) A graph of a (cm) against b (cm)



(iii) The slope of the graph is given by;

$$\text{Slope, } G = \frac{\Delta a \text{ (cm)}}{\Delta b \text{ (cm)}} \quad (01 \text{ mark})$$

$$\text{Slope} = \frac{18.3 - 6.0}{27.0 - 9.0} \quad (01 \text{ mark})$$

$$\text{Slope} = \frac{12.3 \text{ (cm)}}{18 \text{ (cm)}}$$

$$\text{Slope} = (0.683 \pm 0.02) \quad (01 \text{ mark})$$

(iv) From the given relation, the numerical value of H can be calculated as,

$$200 = \frac{b_0}{a_0} (50 + H)$$

$$50 + H = \frac{200 \times a_0}{b_0}$$

$$H = \frac{200 \times a_0}{b_0} - 50$$

$$H = \frac{200 \times 30}{44} - 50$$

$$H = 136.36 - 50$$

$$H = (88 \pm 3) \text{ g} \quad (02 \text{ marks})$$

(v) The physical meaning of H is the mass of the dry cell size D. (02 marks)

(vi) The value of $\frac{b_0}{a_0}$

$$\frac{b_0}{a_0} = \frac{44}{30} = 1.47$$

Then,

$$\text{Slope, } G = \frac{b_0}{a_0}$$

$$2G = \frac{b_0}{a_0}$$

$$2 \times 0.683 = 1.47$$

$$1.36 = 1.46$$

The reciprocal of slope is equal to $\frac{b_0}{a_0}$

Twice the slope G of graph is approximately equal $\frac{b_0}{a_0}$ (02 marks)

(vii) The principle governing this experiment; state that "the sum of the clockwise moment is equal to sum of the anticlockwise moment". (02 marks)

2. a) Table of results (10 marks)

Number of images (n)	Angle between mirrors θ°	$\frac{1}{\theta} (\theta^{-1})$
3	90°	0.011
4	72°	0.014
5	60°	0.017
7	45°	0.022
11	30°	0.033

b) The graph of n (vertical axis) against $\frac{1}{\theta}$ (horizontal axis)

c) (i) calculate the slope of your graph $\text{Slope}(G) = \frac{\Delta n}{\Delta \theta^{-1}}$

$$= \frac{8-1}{0.025-0.0058}$$

$$G \approx 360 \quad 2 \text{ marks}$$

(ii) What is the value of y-intercept P of the graph?

$$\text{y-intercept } P = -1 \quad 1 \text{ mark}$$

(iii) Given that this experiment is governed by the

equation $n = \frac{G}{\theta} + P$

where G is the slope and P is the y-intercept, what will be the number of images when $\theta = G$?

The number of images will be zero (0) when $\theta = G$ 1 mark

d) i) What will be the number of images when $\theta = 0$?

The number of images when $\theta = 0$ is at infinity (Multiple images will be formed) 1 mark

ii) Suggest the aim of the experiment

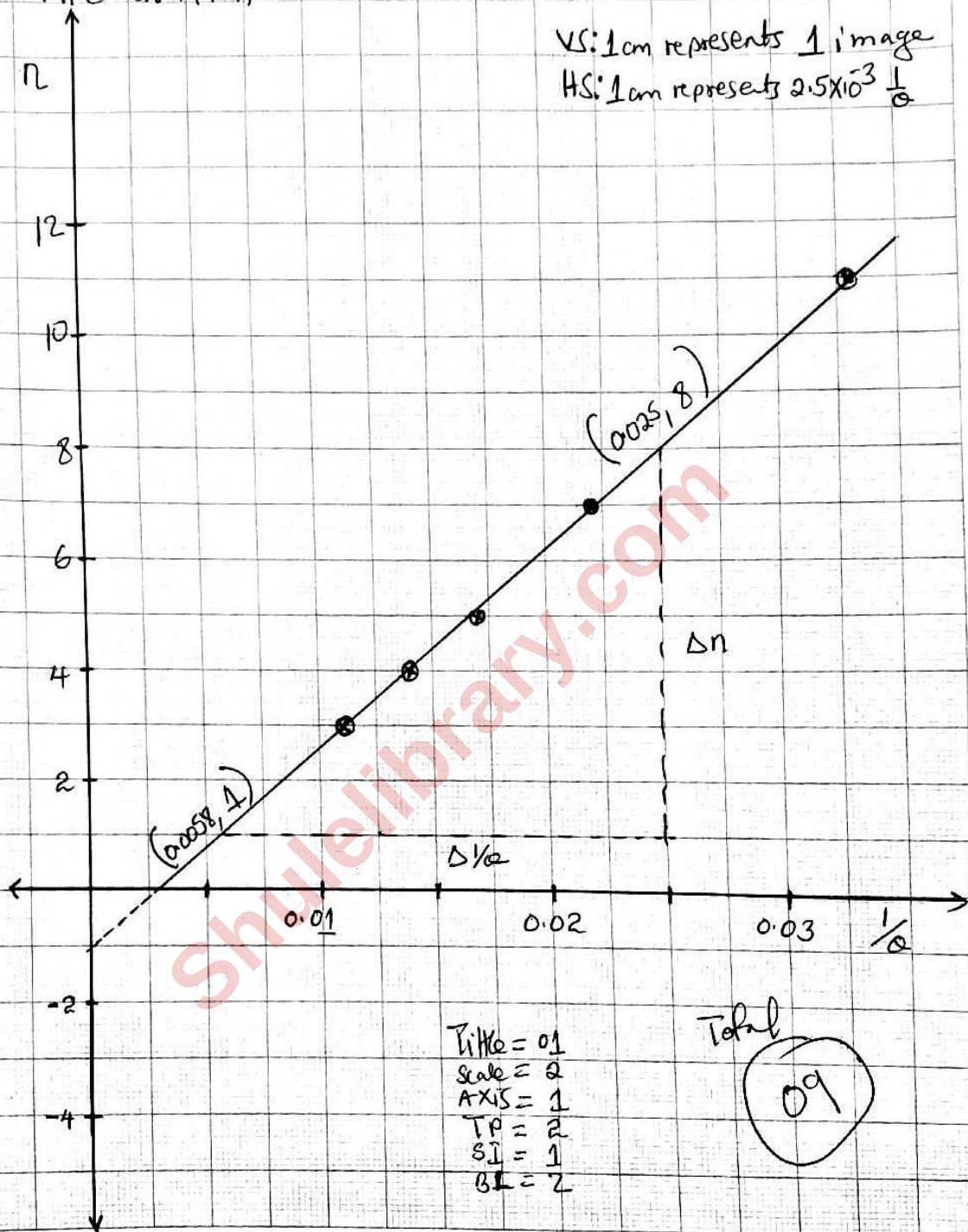
The aim of the experiment is to determine the number of images formed when two plane mirrors are placed at an angle θ 1 mark

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THE GRAPH OF n VS $\frac{1}{\alpha} (\alpha^{-1})$

VS: 1cm represents 1 image

HS: 1cm represents $2.5 \times 10^{-3} \frac{1}{\alpha}$



Title = 01
Scale = 2
Axis = 1
TP = 2
SI = 1
BL = 2

Total
09