



CHRISTIAN SOCIAL SERVICES COMMISSION

An Ecumenical Body of Tanzania Episcopal Conference and Christian Council of Tanzania

P.O. Box 9433, Dar es Salaam, Tanzania

CSSC-SOUTHERN ZONE FORM FOUR JOINT EXAMINATION 2024

(ACTUAL PRACTICAL A)

PHYSICS 2A MARKING GUIDE 2024

1. (d) Table of results

	X(cm)	t(s)	$T = \frac{t}{10}$ (s)	T ² (s ²)
=	70	19.50	1.95	3.80
	60	18.45	1.85	3.42
	50	17.33	1.73	2.99
	40	16.33	1.63	2.66
	30	14.84	1.48	2.19

(02 Marks@)
=10 marks

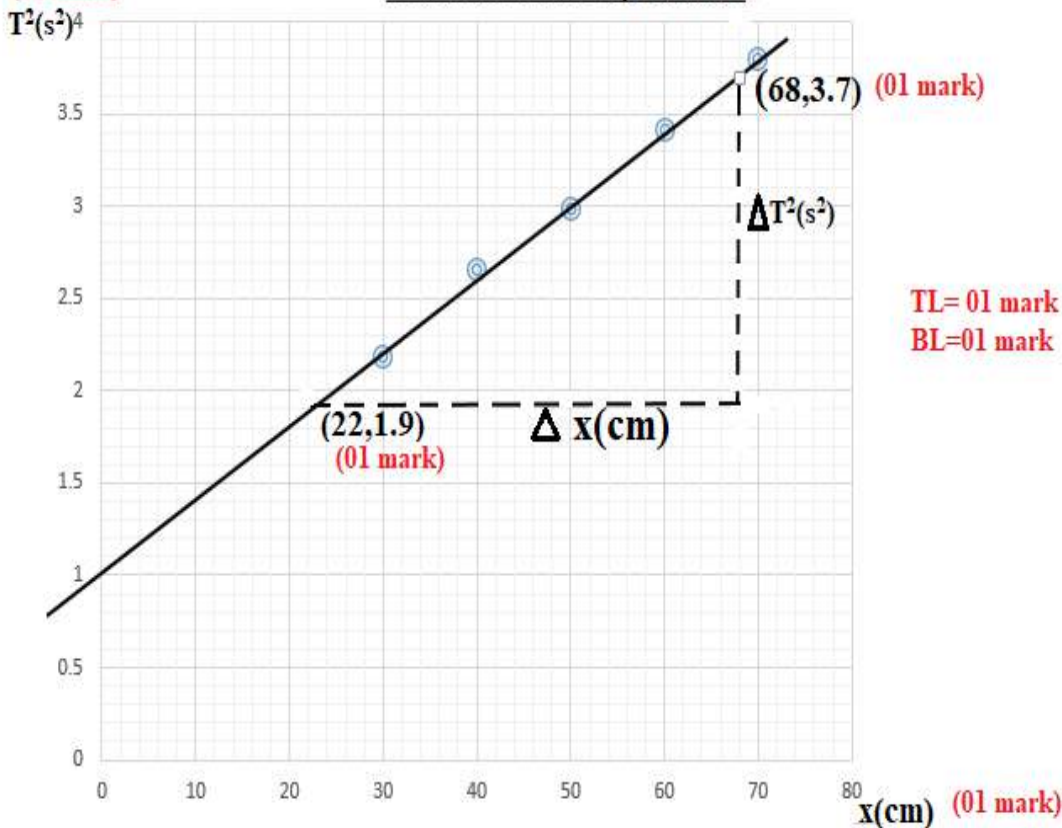
(e) **THE GRAPH OF T²(s²) AGAINST x(cm)**(01 mark)

SCALE:

Horizontal scale: 1cm represent 10cm(01 mark)

vertical scale: 1cm represent 0.5s²

(01 mark)



(f) (i) From the graph,

$$\begin{aligned} \text{Slope (m)} &= \frac{\Delta T^2}{\Delta x} \\ &= \frac{(3.7-1.9)}{(68-22)} \\ &= \frac{1.8s^2}{46cm} \\ &= 0.039s^2/cm \approx 0.04 \frac{s^2}{cm} \quad (01 \text{ mark}) \\ &= 0.04s^2/cm \end{aligned}$$

From the graph, T²- intercept of the graph is 1s² (01Mark)

(ii) Given that $T=2\pi\sqrt{\frac{(x+y)}{g}}$,

Squaring both sides of the equation becomes;

$$T^2 = \frac{4\pi^2x}{g} + \frac{4\pi^2y}{g} \dots\dots\dots (i)$$

Compare equation (i) with the equation of a straight line;

$$\begin{array}{ccc} T^2 & = & \frac{4\pi^2x}{g} + \frac{4\pi^2y}{g} \\ \downarrow & & \downarrow \downarrow \downarrow \downarrow \\ y & = & m x + C \end{array} \quad (01 \text{ mark})$$

Therefore;

$$\begin{aligned} m &= \frac{4\pi^2}{g} \\ g &= \frac{4\pi^2}{m} \\ g &= \frac{4 \times (3.14)^2}{0.04 \frac{s^2}{cm}} \\ g &= 985.96 \frac{cm}{s^2} \end{aligned}$$

∴ The acceleration due to gravity is 9.86m/s² (01 mark)

Also T²- intercept= $\frac{4\pi^2y}{g}$

T²= my

$y = \frac{T^2}{m}$

$$y = \frac{1s^2}{0.04 \frac{s^2}{cm}}$$

$$y = 25cm$$

∴ The value y is of 25cm (01 mark)

(iii) The physical significance of y is that, it is the value of length of the cotton thread fixed on a simple pendulum system. (001/2 mark)

(g) Three sources of error are;

(i) Air resistance

(ii) Large angle of displacement of the bob (001/2 mark@)

(iii) Time reaction

2. (d) Table of results;

A	r	sinr	Sin(90 ⁰ - α)
30 ⁰	35 ⁰	0.574	0.866
40 ⁰	31 ⁰	0.515	0.766
50 ⁰	25 ⁰	0.423	0.643
60 ⁰	19 ⁰	0.326	0.500
70 ⁰	13 ⁰	0.225	0.342

(02 marks @)

(e)

THE GRAPH OF sinr AGAINST sin(90⁰-α)(01 mark)

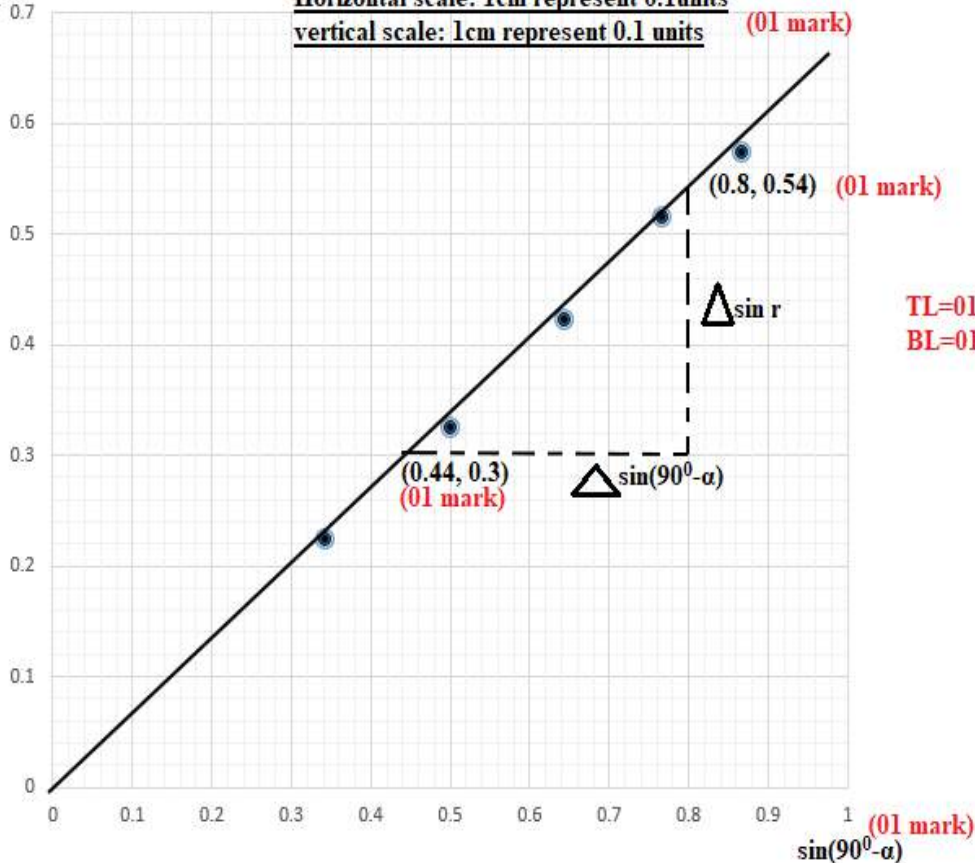
SCALE;

Horizontal scale: 1cm represent 0.1units

vertical scale: 1cm represent 0.1 units

(01 mark)

sin r



(f) From the graph slope (m) is given by;

$$m = \frac{\Delta \sin r}{\Delta \sin(90^\circ - \alpha)}$$

$$m = \frac{(0.54 - 0.3)}{(0.8 - 0.44)}$$

$$m = \frac{0.24}{0.36}$$

$$m = 0.67$$

\therefore The slope (m) of the graph is 0.67 (01 $\frac{1}{2}$ marks)

NB: the value of slope ranges from 0.65 to 0.68

(g) From;

$$m = \sin C$$

$$C = \sin^{-1}(m)$$

$$C = \sin^{-1}(0.67)$$

$$C = 42.07^\circ$$

\therefore The value of C is 42.07° (02 mark)

NB: the value of C ranges from 41° to 43°

(h) C is the critical angle of the rectangular glass prism (01 mark)

