

THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

031/2

PHYSICS 2
ALTERNATIVE TO PRACTICAL
(For Both School and Private Candidates)


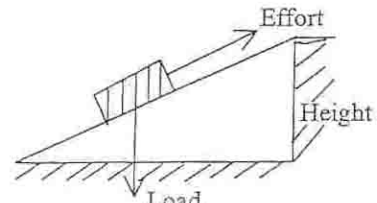
TIME: 2 Hours 30 Minutes

Monday November 10, 2003 a.m.

Instructions

1. This paper consists of FIVE (5) questions.
2. Answer ALL questions.
3. Whenever calculations are involved, show your work clearly.
4. Marks for each question or part thereof are indicated beside the question.
5. Cellular phones are not allowed in the examination room.
6. Electronic calculators are not allowed in the examination room.
7. Write your Examination Number on every page of your answer booklet(s).

1. Fill the gaps with the correct responses

Name of device	sketch	(i) Physical Effect/Principle (ii) Application (Uses)
(a) U-tube		(i) (ii)
(b)		(i) (ii)
(c)		(i) (ii)
(d) Clinical thermometer		(i) (ii)
(e) Inductor		(i) (ii)

(10 marks)

2. The results in the table below were obtained from an experiment of a freely falling body.

Height h (cm)	Time t (s)	(Time) ² t ² (s ²)
0.00	0.00	0.00
54.70	0.33	0.11
67.50	0.37	0.14
84.10	0.41	0.17
96.00	0.44	0.19
109.50	0.47	0.22

- (a) Plot a graph of height h (vertical axis) against t^2 (horizontal axis) (05 marks)
- (b) Find the gradient G of the graph (02 marks)
- (c) Using the relation $h = \frac{1}{2}gt^2$
- (i) determine the value of g in SI Units (01 mark)
- (ii) what is the physical significance of g ? (00 $\frac{1}{2}$ mark)
- (iii) suggest the aim of this experiment. (00 $\frac{1}{2}$ mark)
- (d) State two possible sources of errors in this experiment. (01 mark)

3. In an experiment to study the behaviour of a string, the tension of a vibrating string was kept constant, and its length was varied in order to tune the string to a series of tuning forks. The results obtained were as follows:

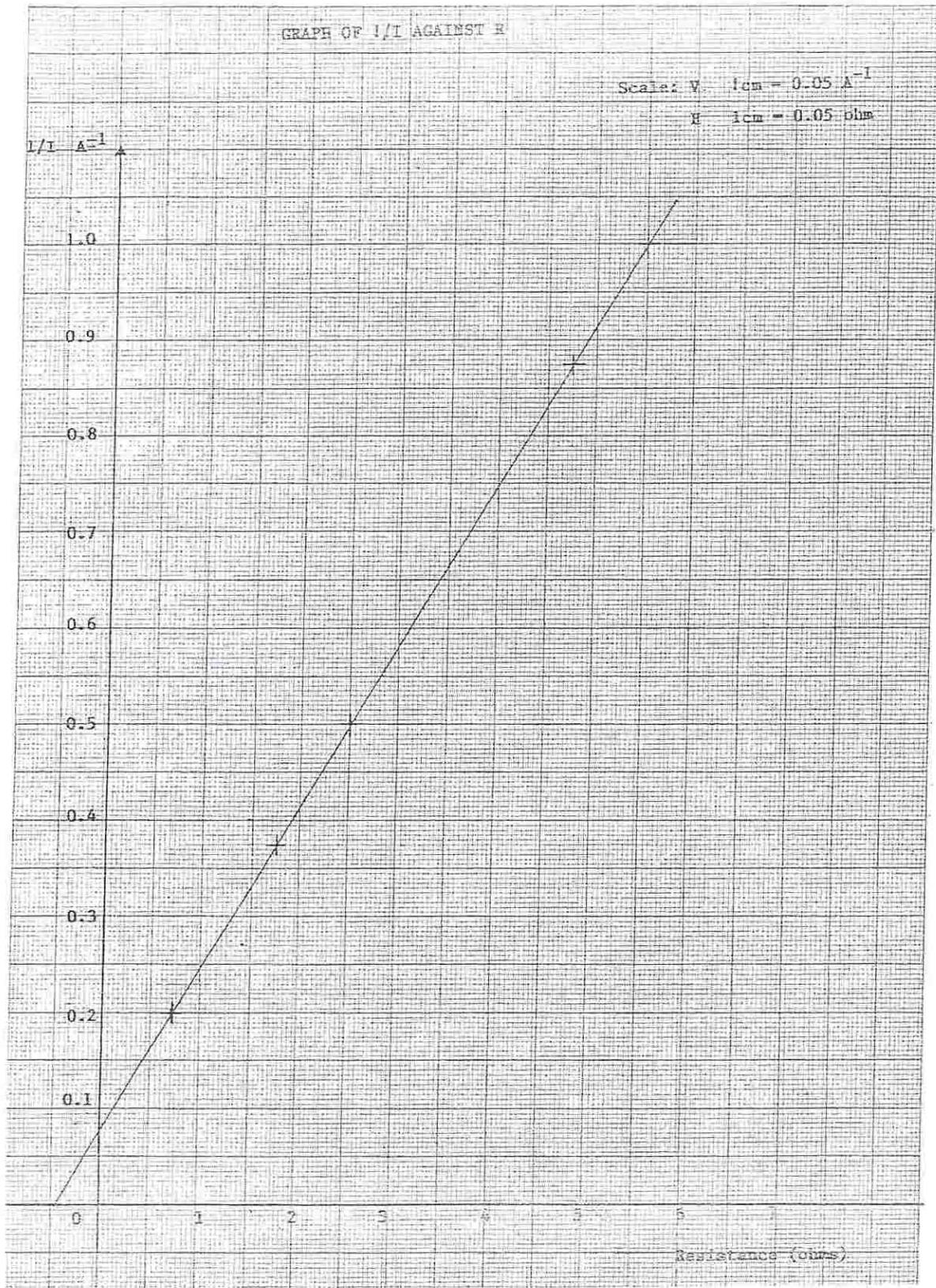
Frequency of fork (Hz)	256.0	288.0	320.0	384.0	512.0
Length of string (cm)	78.10	69.50	62.50	52.10	39.10
$\frac{1}{\ell}$ (cm $^{-1}$)					

(02 $\frac{1}{2}$ marks)

Using the data above

- (a) plot a graph of frequency (vertical axis) against $\frac{1}{\ell}$ (horizontal axis) (05 $\frac{1}{2}$ marks)
- (b) determine
- (i) the relationship between the frequency of vibration and length of the stretched string (01 mark)
- (ii) the frequency of an unmarked fork which was in tune with 41.70 cm of the string. (01 mark)
- (a) If an object is placed at a distance of 20.0 mm from a concave mirror of focal length 50.0 mm and if the height of the object is 20.0 mm, determine graphically
- (i) the position of the image from the mirror
- (ii) the linear magnification of the mirror
- (b) State the nature of the image formed in 4.(a) above (10 marks)

5.



The graph given above ($1/I$ against R) was obtained from an experiment to determine the e.m.f. E and internal resistance r , of a cell.

Use the graph to answer the following questions:

- (a) (i) What is the current when the resistance is 4Ω ? (02 marks)
- (ii) What value of the resistance gives an ammeter reading of 4 A ? (02 marks)
- (b) What is the Y -intercept of the graph? (01 mark)
- (c) Determine the slope, G , of the graph (01 mark)
- (d) If the graph is based on the equation $\frac{1}{I} = \frac{R}{E} + \frac{r}{E}$, determine the value of E and r . (04 marks)