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: 2½ Hours **8 November 2001 a.m.**

Instructions

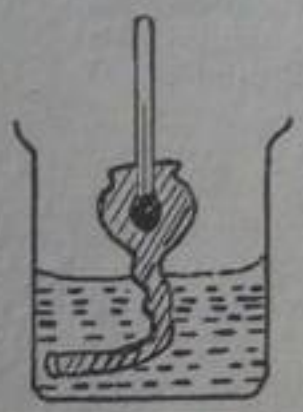
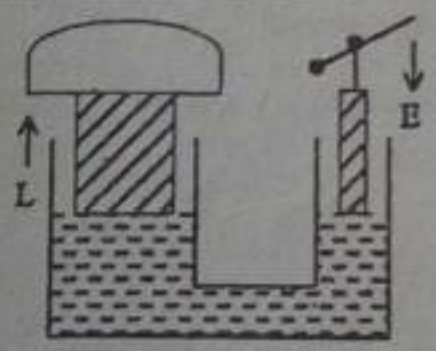
1. This paper consists of FIVE (5) questions.
2. Answer ALL questions.
3. Whenever calculations are involved, show your working clearly.
4. Marks for each question or part thereof are indicated beside the question.
5. Write your Examination Number on every page of your answer booklet(s).
6. You may use the following constants

Acceleration due to gravity $g = 9.8\ m/s^2$

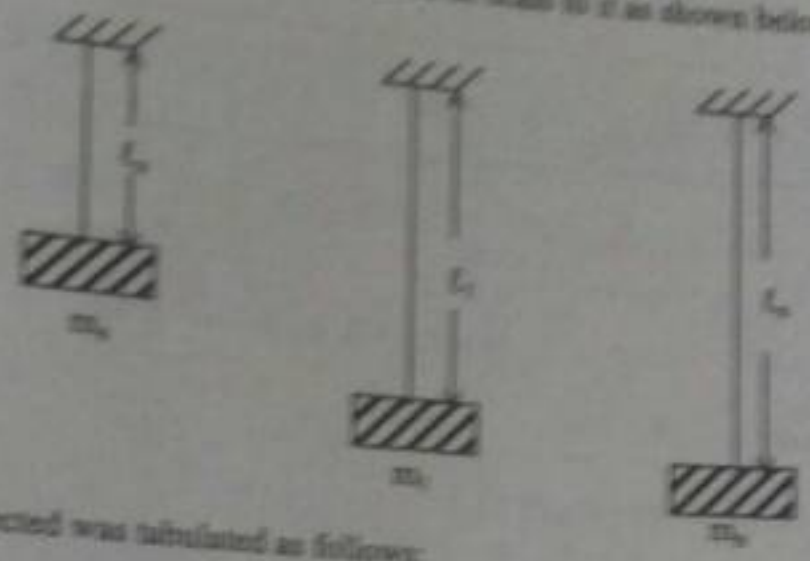
Pie $\pi = \frac{22}{7}$

This paper consists of 6 printed pages.

1. Fill in the gaps with the correct response.

Name of device	Sketch	(i) Physical effect/principle (ii) Application (uses)
(a) Simple pendulum		(i) (ii)
(b) ———		(i) (ii)
(c) ———		(i) (ii)
(d) Periscope		(i) (ii)
(e) Electromagnet		(i) (ii)

2. A cord was stretched by attaching known masses of brass to it as shown below:



The data collected was tabulated as follows:

Mass m extending the cord (kg)	0	0.5	1.0	1.5	2.5	3.0
Length l of cord (cm)	126.4	127.6	128.9	130.1	132.5	133.8

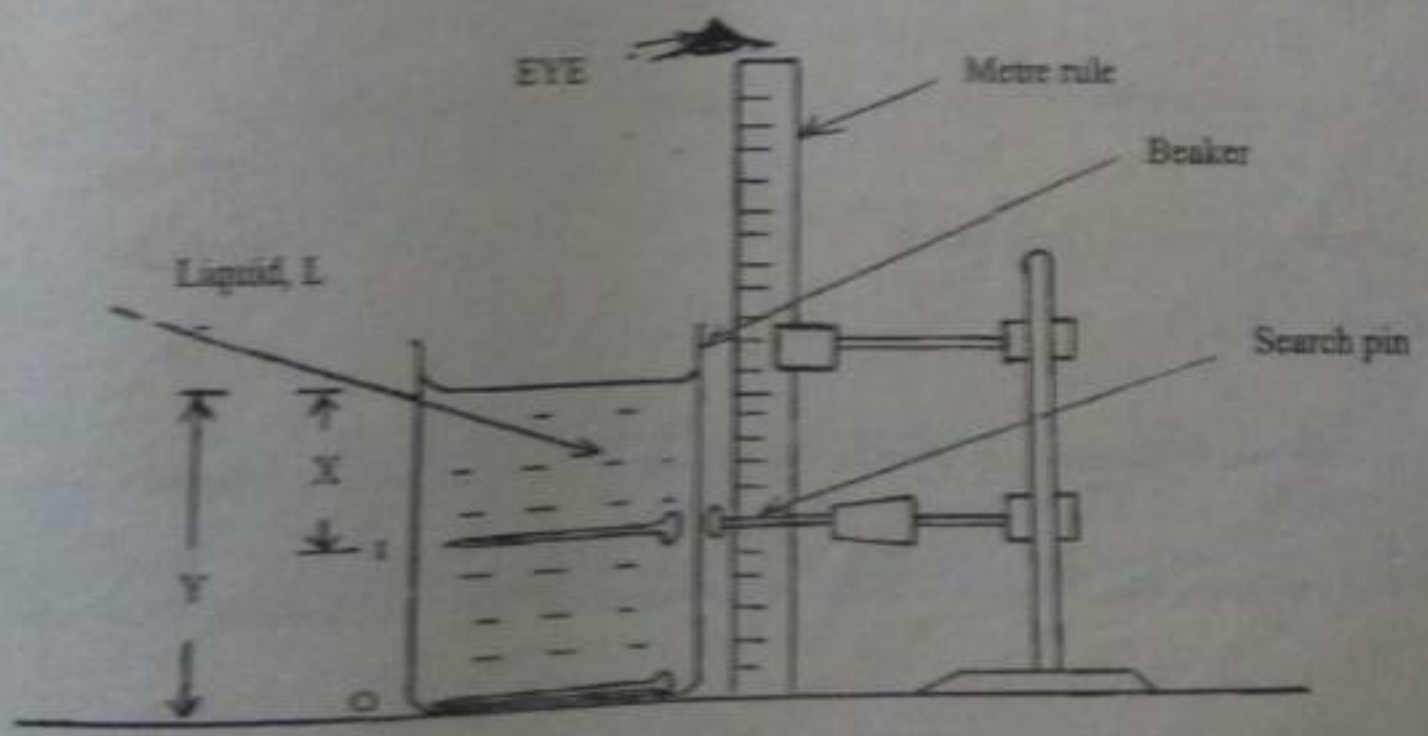
(a) Complete the table for extension e (cm) (03 marks)

(b) Draw a graph of mass m (kg) against extension e (cm) (05 marks)

(c) Use the graph to find the extension for a mass of 2.0 kg (01 mark)

(d) Find from the graph the extension for a force of 12.5 N. (01 mark)

3. The following figure shows the diagram for an experiment in which a clear liquid L was placed in a tall beaker and pin O was sighted by an eye using a search pin.



Different values of Y and the corresponding values of X were obtained and tabulated as follows:

Y (cm)	5.0	6.5	8.0	9.2	10.5
X (cm)	3.7	5.0	6.0	7.0	8.0

(a) Plot the graph of Y (vertical axis) against X (horizontal axis). (05 marks)

(b) Find the slope m of the graph. (02 marks)

(c) What is the physical meaning of m? (01 mark)

(d) Suggest the aim of this experiment. (01 mark)

(e) Mention one source of error in this experiment. (01 mark)

4. The heat developed by a heater in different times due to the flow of current was recorded as follows:

Current I (A)	7.6	6.0	5.0	4.3	3.5
Heat Q (J)	416	432	420	434	441
Time t (s)	30	50	70	100	150
I^2 (A^2)	57.76	36.00	25	18.49	13.25

(a) Complete the table by adding rows for the respective values of $\frac{Q}{t}$ (W) and I^2 (A^2). (04 marks)

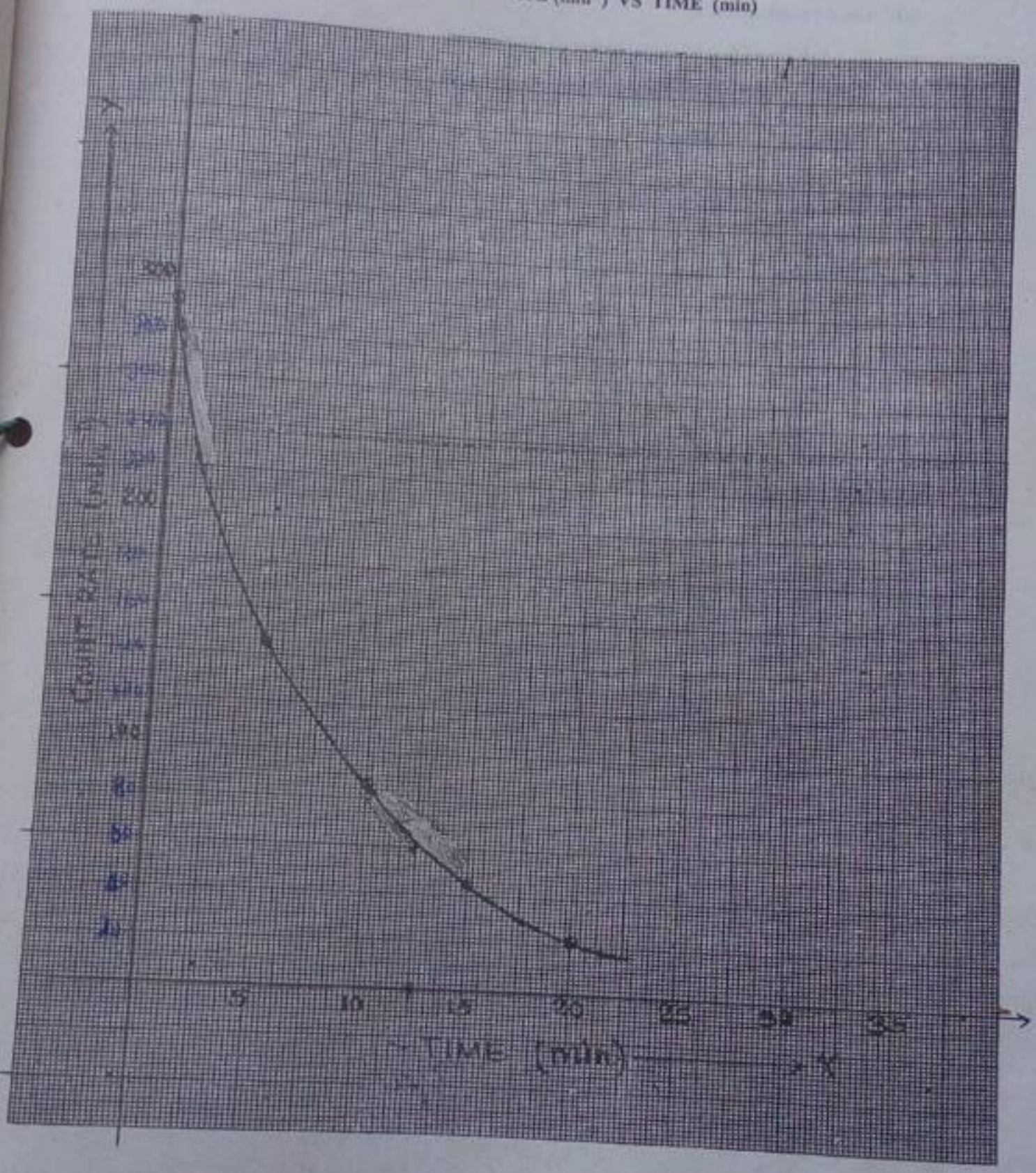
(b) Draw a graph of heat developed per second $\frac{Q}{t}$ against the square of the current, I^2. (03 marks)

(c) Determine the slope S of the graph. (02 marks)

(d) What does S represent? (01 mark)

The graph below was obtained from an experiment to investigate the count rate of a radioactive source of beta β-particles.

GRAPH OF COUNT RATE (min^{-1}) VS TIME (min)



(a) Use the graph to find the

(i) half-life of the radioactive source of β – particles

(ii) count rate of the radioactive source when the time (t) was 12.5 min.

(b) What would be the effect of

(i) placing the rate counter far away from the source?

(ii) placing a thin sheet of paper between the rate counter and the radioactive source?

(c) Briefly explain what would be the effect on the β - particles when a pole of a strong bar magnet is placed in the path of the β - particles.