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

08 November 2002 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).

This paper consists of 4 printed pages

1. Fill in the gaps with the correct response.

Name of device	Sketch	(i) Physical effect/principle (ii) Application/uses
(a) _____		(i) (ii) (2 marks)
(b) Pulley system of V.R. 5		(i) (ii) (2 marks)
(c) *i* _____		(i) (ii) (2 marks)
(d) Pin-hole camera		(i) (ii) (2 marks)
(e) Junction diode		(i) (ii) (2 marks)

2. The velocity recorded at different times for a trolley in motion was as follows:

Table 2

Velocity, V (m/s)	0.5	1.0	1.5	2.0	2.5
Time, t (s)	1	2	3	4	5

(a) Plot a graph of Velocity (vertical axis) against Time (horizontal axis)   (05 marks)
(b) Find the slope G of the graph   (02 marks)
(c) What is the physical meaning of G   (0½ mark)
(d) Calculate the area A under the graph   (02 marks)
(e) What is the physical meaning of A.   (0½ mark)

3. In the experiment to determine the relationship between temperature rise and current applied, the following data were obtained:

Table 3

Current (A)	Temperature rise in every 2 minutes			$(Current)^2$ (A^2)
	Initial temperature θ_1 °C	Final temperature θ_2 °C	Temperature rise $\theta = \theta_2 - \theta_1$, (°C)	
1.0	26.0	27.5		
1.5	26.2	29.5		
2.0	26.2	32.0		
2.5	26.4	35.8		
3.0	26.2	39.2		

(a) Complete the table   (2½ marks)

(b) Draw a graph of temperature rise θ (°C) against $(current)^2$ $I^2 (A^2)$ (5 marks)

(c) Determine the slope of the graph   (1½ marks)

(d) What is the temperature rise if current is 5 A?   (1 mark)

4. Table 4 below shows corresponding values of potential difference across a torch bulb and the current passing through it.

Table 4

Potential difference (V)	0	0.02	0.1	0.5	1.0	1.65	2.3	3.1	4.0
Current (A)	0	0.04	0.08	0.12	0.16	0.20	0.24	0.28	0.32

(a) Draw a circuit diagram which was used to obtain the data   (1 mark)

(b) Plot a graph of current (y – axis) against p.d. (x – axis)   (7 marks)

(c) (i) Use the graph to find the potential difference (p.d.)across the bulb when the current through it was 0.25 A (1 mark)

(ii) Calculate the resistance of the bulb filament when the current through it was 0.25A. (1 mark)

5. Below are results collected in the study of the activity of a radioactive sample.

Table 5

Count rate, (counts per min)	450	350	280	240	200	160	130
Time (min)	0	1	2	3	4	5	6

(a) Draw a curve of count rate against time (05 marks)

(b) Use the curve to find the half life of the radioactive sample (03 marks)

(c) Explain the meaning of the following terms:

(i) Nuclear fission (01 mark)

(ii) Nuclear fusion. (01 mark)

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