

**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: 2:30 Hours

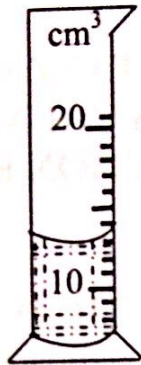
Wednesday, 17th October 2012 a.m.

Instructions

1. This paper consists of **five (5)** questions. Answer **all** questions.
2. Marks for each question or part thereof are indicated beside the question.
3. Calculators are **not** allowed in the examination room.
4. Cellular phones are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).
6. Use $\pi = 3.14$.

1. (a) Study the following instruments and provide in the space provided the name, application and the correct reading from the scale.

(i)



Name.....

(0.5 mark)

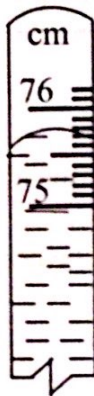
Application.....

(1 mark)

Reading.....

(0.5 mark)

(ii)



Name.....

(0.5 mark)

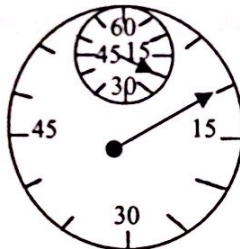
Application.....

(1 mark)

Reading.....

(0.5 mark)

(iii)



Name.....

(0.5 mark)

Application.....

(1 mark)

Reading.....

(0.5 mark)

- (b) Is there any difference in terms of taking readings for instruments in (a) (i) and (ii) above? Give reason for your answer. (1 mark)
- (c) Explain a possible source of error when taking reading of the above instruments. (1 mark)
- (d) Mention any four safety rules for physics laboratory. (2 marks)

2. Table 1 contains data of an experiment carried out with the aim of determining acceleration due to gravity g , and the height H of the Physics laboratory room from the floor to the ceiling board using a simple pendulum.

Table 1

Height from the floor to the pendulum bob, d (cm)	Time for 10 oscillations t (s)	Periodic time, T (s)	T^2 (s ²)
10	34.0	3.40	
20	33.4		11.2
30	32.8	3.28	
40	32.2		10.4
50	31.6		

- Complete Table 1 by obtaining the values of T and T^2 . (3 marks)
 - Plot the graph of T^2 against d . (3 marks)
 - Determine the slope of the graph. (1 mark)
 - Determine T^2 intercept. (1 mark)
 - Given that $T = 2\pi\sqrt{\frac{H-d}{g}}$, determine the values of g and H . (2 marks)
3. A 180 watt heater and a thermometer were immersed in 0.5 Kg of water in a copper calorimeter. The data in Table 2 were collected in an experiment to determine the specific heat capacity of water.

Table 2

Temperature, T (°C)	30	36	40	45	49	54	57
Time, t (Minutes)	3	4	5	6	7	8	9

- Plot a graph of temperature against time. (3 marks)
- Determine the room temperature. (1 mark)
- Determine the slope of the graph. (1 mark)
- Find the specific heat capacity, c , of water. (2 marks)
- Give two reasons why the value obtained for the specific heat capacity is greater than the accepted value. (2 marks)
- State a precaution you would take in carrying out this experiment to ensure a more accurate value for the specific heat capacity. (1 mark)

4. In an experiment carried out with a rectangular block of Perspex, the data in Table 3 were obtained in order to verify Snell's law.

Table 3

Angle of incidence, i	30°	40°	50°	70°
Angle of refraction, r	19°	25°	30°	38°
$\sin i$	0.5		0.77	
$\sin r$	0.33	0.42		
$\frac{\sin i}{\sin r}$	1.52			1.52

- Complete Table 3. (3 marks)
 - Plot the graph of $\sin i$ against $\sin r$. (3 marks)
 - Determine the slope of the graph. (1 mark)
 - What is the physical meaning of the slope obtained in (c) above? (1 mark)
 - Find the average of all values of $\frac{\sin i}{\sin r}$ computed in Table 3. (1 mark)
 - Comment on the values obtained in 4 (c) and (e) above? (1 mark)
5. In a certain experiment, John connected the circuit as shown in Figure 1 and collected the data which he filled them in Table 4.

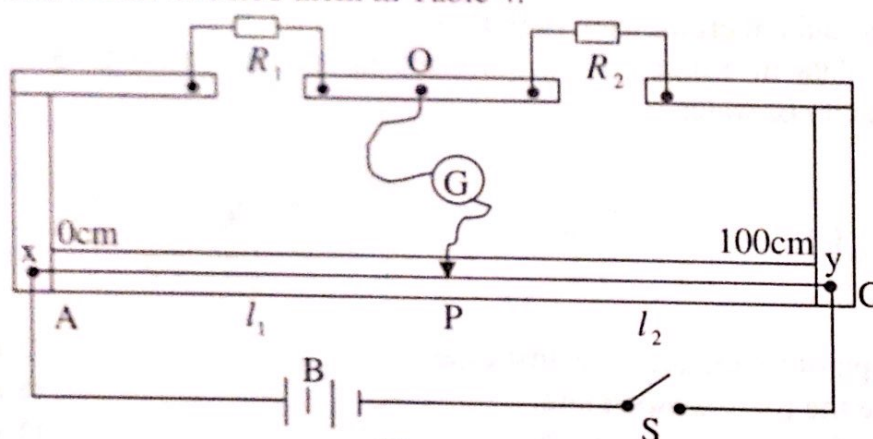


Figure 1

Table 4

R_1 (Ω)	R_2 (Ω)	l_1 (cm)	l_2 (cm)
	5.0	42.1	
	3.6		60.3

- Complete Table 4. (2 marks)
- Establish the formula used to find R_1 . (1 mark)
- Explain briefly how the current enters the bridge when the switch S is closed. (2 marks)
- Name the apparatus xy. (0.5 mark)
- Explain why the galvanometer G reads zero when the jockey is at point P. (2 marks)
- State a possible source of error in this experiment. (1 mark)
- How can you minimize the error in 5 (f) above? (1 mark)
- Suggest a title for the experiment. (0.5 mark)