

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

1/2C

PHYSICS 2C
ALTERNATIVE C PRACTICAL
(For both School and Private Candidates)

Time: 2:30 Hours

Friday, 22nd October 2010 a.m.

Instructions

1. This paper consists of **three (3)** questions.
2. Answer **two (2)** questions including question **number 1**.
3. Whenever calculations are involved show your work clearly.
3. Marks for questions are indicated at the end of each question.
4. Calculators and cellular phones are **not** allowed in the examination room.
6. Write your **Examination number** on every page of your answer booklet(s).

Take $\pi = 3.14$

This paper consists of 4 printed pages.

- The aim of the experiment in Figure 1 is to verify Hooke's Law using a spring. Proceed as follows.

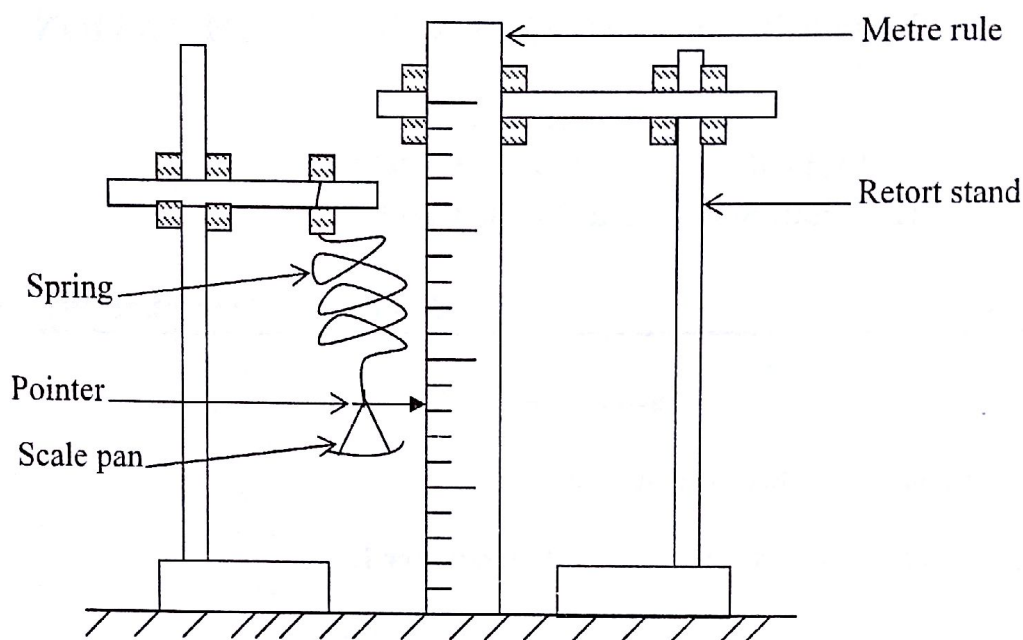


Figure 1

Set up the apparatus as shown in Figure 1. Record the length L_0 indicated by the pointer with no mass on the scale pan. Place a 50g mass on the pan and record the new length L .

Repeat this procedure for $M = 100\text{g}$, 150g , 200g and 250 each time measuring the corresponding length L .

Tabulate your results as follows:

Initial length $L_0 = \dots\dots\dots$

Mass m (g)	Force F (N)	Length L (cm)	Extension $e = L - L_0$ (cm)
20			
40			
60			
80			
100			

- Complete the table.
 - Plot a graph of force against extension e .
 - What are the values of the intercepts?
 - What is the nature of the graph? Explain the relationship between force and extension.
 - Mention the sources of errors.
- (25 marks)**

The aim of the experiment is to determine the critical angle A of a given glass block. Proceed as follows:

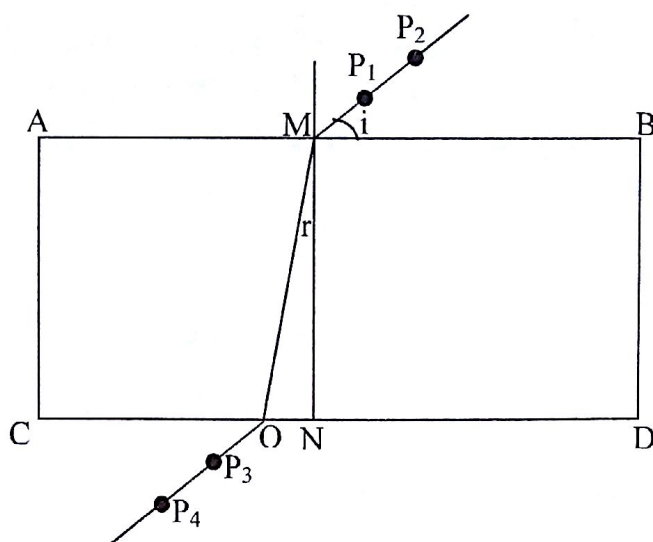


Figure 2

- (a) Place the glass block on a white sheet of paper and trace its figure ABCD (Figure 2). Remove the block. Mark the centre M of face AB and draw a normal through M to a point N on the line CD .
- (b) Draw lines to M at angles of 30° , 40° , 60° , 70° and 80° which acts as incident rays.

Erect two pins P_1 and P_2 on the 30° line. Return the block to its original position and stick pins P_3 and P_4 on the opposite side such that they appear to be in a straight line with P_1 and P_2 when viewed through side CD . Remove the glass block and trace the straight path taken by ray OP_3P_4 . Using a ruler join O and M . Measure the angle of refraction r and calculate the values $\cos i$ and $\sin r$.

- (c) Repeat the procedure in (b) above for $i = 40^\circ$, 50° , 60° , 70° and 80° each time measure the corresponding angle of refraction r .
- (d) Tabulate your results for i , r , $\cos i$ and $\sin r$.
 - (i) Plot a graph of $\sin r$ (vertical axis) against $\cos i$ (horizontal axis).
 - (ii) Determine the slope M of your graph.
 - (iii) Calculate the value of A when $\text{slope} = \sin A$.
 - (iv) State the sources of errors. **(25 marks)**

3. You are required to determine the resistance P of a wire using the metre bridge. Proceed as follows.

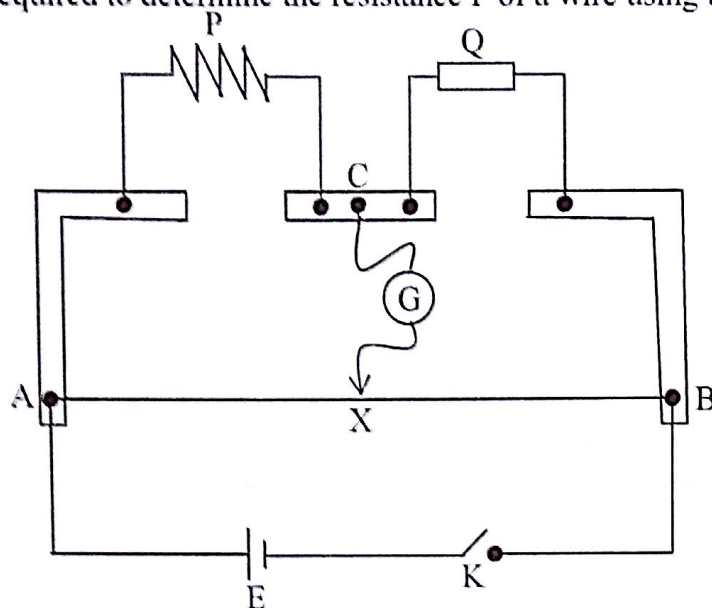


Figure 3

Connect the circuit as shown in Figure 3. Q is a standard resistor of resistance 2Ω . Close the switch K and find the balance point. Read and record lengths L_1 and L_2 of AX and XB respectively.

Open the switch and interchange the resistors P and Q. Repeat the above experiment.

Tabulate your values as shown below.

Before interchange Expt. 1	Resistance Q (Ω)	Length L_1 (cm)	Length L_2 (cm)	$\frac{L_1}{L_2}$	$R_1 = \frac{L_1}{L_2} Q$ (Ω)
After the interchange Expt. 2					$R_2 = \frac{L_1}{L_2} Q$ (Ω)

- Find the resistance R_1 of P.
- Find the resistance R_2 of P.
- Calculate the average value of resistances R_1 and R_2 of resistor P.
- What is the resistance of P? (25 marks)