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

031/2B

PHYSICS 2B
ACTUAL PRACTICAL B
(For Both School and Private Candidates)

Time: 2:30 Hours ***Wednesday, 19th October 2011 a.m.***

Instructions

1. This paper consists of **two (2)** questions. Answer **all** the questions.
2. Whenever calculations are involved, show your work clearly.
3. Marks for each question are indicated at the end of each question.
4. Calculators and cellular phones are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).
6. Use acceleration due to gravity, g, = 10 ms^{-2}.

1. The aim of this experiment is to verify Hook's Law using a rubber band. Proceed as follows:

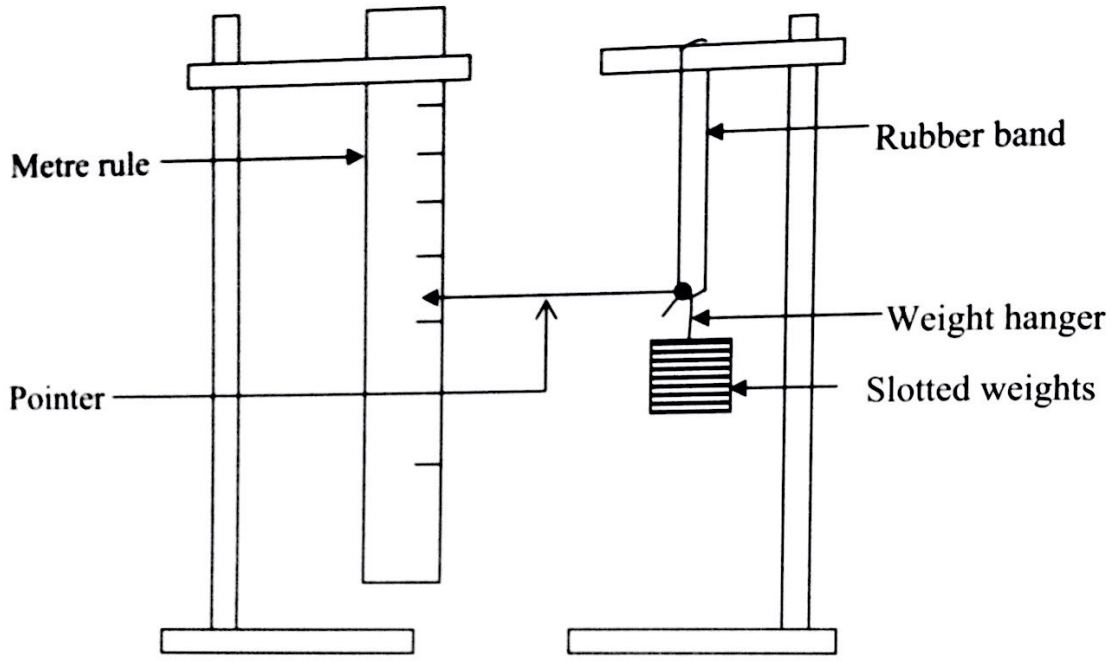


Figure 1

(a) Set the apparatus as shown in Figure 1.

(b) Read and record the initial length (l_o) indicated by the pointer when the hanger is hung on the lower end of the rubber band.

(c) Add a 100g mass on the hanger. Read and record the new length (l). Repeat the experiment by adding weights of 200g each time up to 700g. In each time record the corresponding length (l). Tabulate your result as shown in Table 1.

Table 1

Weights (g)	Force (N)	Length, l (cm)	Extension ($l-l_o$)		Average extension
			Loading	Unloading	

(d) (i) Plot the graph of force against average extension.
(ii) Determine the slope of your graph.
(iii) From the graph what is the relationship between force and extension?
(iv) State the law governing this experiment.
(v) State two sources of error in this experiment.

(25 marks)

2. You are provided with a Rectangular block, Soft board, Optical pins, Protractor and a White sheet of paper. Proceed as follows:

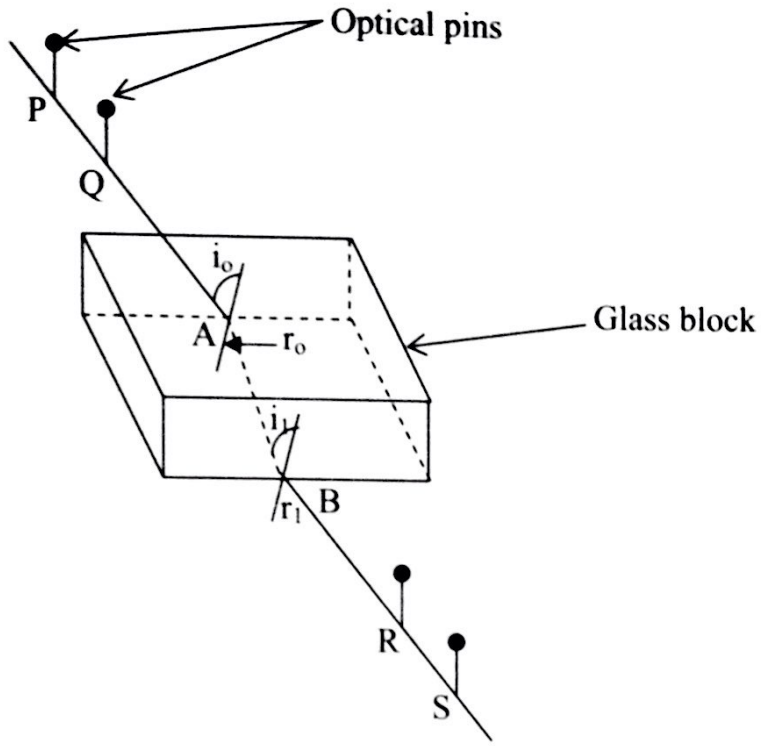


Figure 2

(a) Place a white sheet of paper on a bench. Put a rectangular glass block on the white sheet. Trace an outline using a pencil. Erect two pins P and Q on one side of the glass block. Observe pins P and Q from the opposite side of the glass block (Figure 2). Locate pins R and S along the apparent line of sight of P and Q.

(b) Remove the glass block. Draw lines PQ and SR. Prolong the lines to meet the trace for block at A and B respectively. Join A and B with a line. Draw the normal line at A and B.

(c) Measure the angle of incidence i_o and refraction r_o at A, and the angles of incidence i_1 and refraction r_1 at B. Repeat the experiment for angles of incidence i_o at A as 30^o, 40^o, 50^o and 60^o.

(d) (i) Tabulate your result as in the Table 2.

Table 2

i_o	i_1	r_o	r_1	Sin i_o	Sin i_1	Sin r_o	Sin r_1

(ii) Plot the graphs of Sin i_o versus Sin r_o and Sin i_1 versus Sin r_1.

(iii) Find the slopes of the two graphs.

(iv) What is the physical meaning of each slope?

(v) What is the aim of this experiment?

(25 marks)