

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

031/2C

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

Time: 2:30 Hours

Thursday, 25th October 2012 a.m.

Instructions

1. This paper consists of **two (2)** questions. Answer **all** the questions.
2. Where 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.
5. Write your **Examination Number** on every page of your answer booklet(s).

1. You are provided with a metre rule with a hole drilled at 50cm mark, steel knitting needle, unknown mass M of a dry cell size D , known mass W (100g) two weighing pans or two pieces of threads, retort stand and clamp. Proceed as follows:
 - (a) Locate and record the centre of gravity, C of the metre rule by balancing the ruler on the clamped knitting needle and ensure that the ruler balances in a horizontal position.
 - (b) Suspend unknown weight M at 10cm mark and adjust the position of W on the other side of O so that the ruler balances in a horizontal position.
 - (c) Measure the distances of M and W from O as x and y respectively.
 - (d) Draw the diagram for this experiment.
 - (e) Repeat procedures (b) and (c) above with M suspended from 15cm, 20cm, 25cm and 30cm marks.
 - (f) Tabulate your results.
 - (g) Plot a graph of y against x .
 - (h) State the nature of the graph.
 - (i) Read and record the value of y when $x = 17.5\text{cm}$.
 - (j) Calculate the slope G of the graph.
 - (k) Find the value of M given that the equation representing the graph is $M = GW$, where W is given.
 - (l) Mention and state the principle governing this experiment.
 - (m) State a possible source of error in this experiment.
 - (n) What is the aim of the experiment?

2. You are provided with Beaker, Retort stand and Clamp, two optical pins, liquid (water), small sheet of white paper, plasticine, a rectangular block of wood, a metre rule and 30cm transparent ruler. Proceed as follows:

- (a) Put an optical pin O with a very small bob of plasticine to the bottom of a clean beaker and stand the beaker on a sheet of white paper as shown in Figure 1.

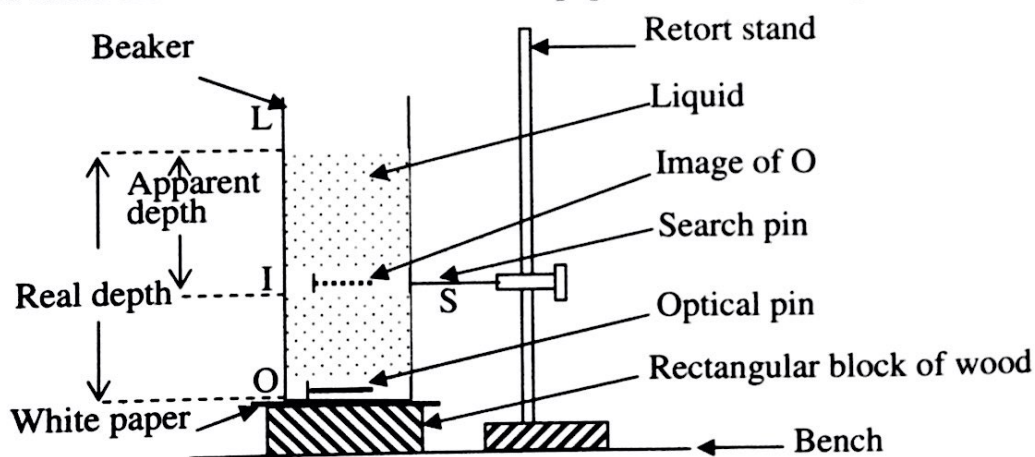


Figure 1

- (b) Pour in a liquid carefully to about 11cm depth and view the optical pin O through this liquid. Adjust the position of the clamped search pin S so as to eliminate parallax between its point and that of the image I of O .
- (c) Make ink marks on the beaker corresponding to the position of the surface and the position of image I .
- (d) Taking care not to remove the ink marks, measure the real depth OL and the apparent depth IL of the pin.
- (e) Remove ink marks and repeat for the depth of liquid of 9cm, 8cm, 6cm and 4cm.

- (f) Tabulate your results.
- (g) Plot a graph of OL against IL.
- (h) Using graph, find the real depth when apparent depth is 3cm.
- (i) Why an object O looks less deep when looking down into it?
- (j) From the graph find its slope.
- (k) What does the slope of the graph indicates?
- (l) Find the reciprocal of the slope.
- (m) Comment on the answer obtained in 2 (l).
- (n) Identify three possible sources of error in this experiment.
- (o) State ways to minimize the errors in 2 (n).
- (p) Identify the principle governing this experiment.