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, 16th November 2016 a.m.**

Instructions

1. This paper consists of **two (2)** questions. Answer **all** the questions.
2. Calculations should be clearly shown.
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).
6. Use $\pi = 3.14$.

1. You are provided with a knife edge, a meter rule whose mass m is about 70g and an unknown mass M of the solid.

(a) Balance the meter rule graduated face upwards on the knife edge with the solid of unknown mass M suspended at a distance d of 10cm from the zero end of the meter rule as shown in Figure 1.

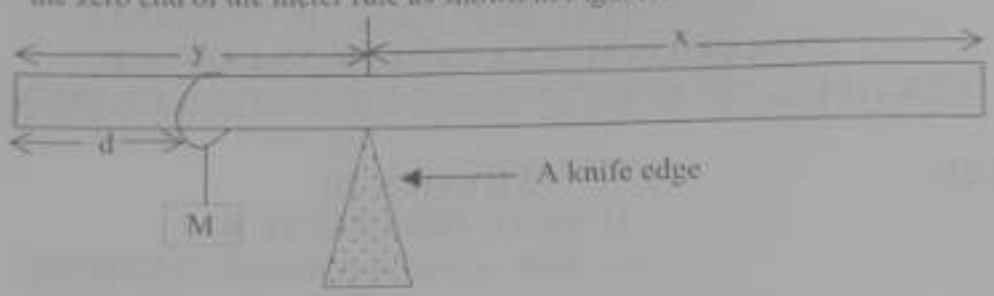

Figure 1

(b) Measure and record the distance x and y where y is the distance of the knife edge from the zero end of the meter rule.

(c) Repeat procedure (a) and (b) for values of d equal to 15cm, 20cm, 25cm, 30cm and 35cm.

(d) Tabulate your results including the values of (x-y) and (y-d).

(e) Plot a graph of (x-y) against (y-d).

(f) Determine the slope, s, of your graph.

(g) Calculate the mass M of the solid from the equation, $\frac{sm}{2} = M$, where m is the mass of the meter rule.

(h) What is the aim of this experiment?

(i) Use the mass of the solid obtained in 1 (g) to find the relative density of the solid assuming that when the solid is immersed in water its mass becomes 42.5g; and state the principle applied in this case.

(j) State any possible source of error. **(25 marks)**

2. The aim of this experiment is to determine the resistivity of a wire Z provided by using a meter bridge.

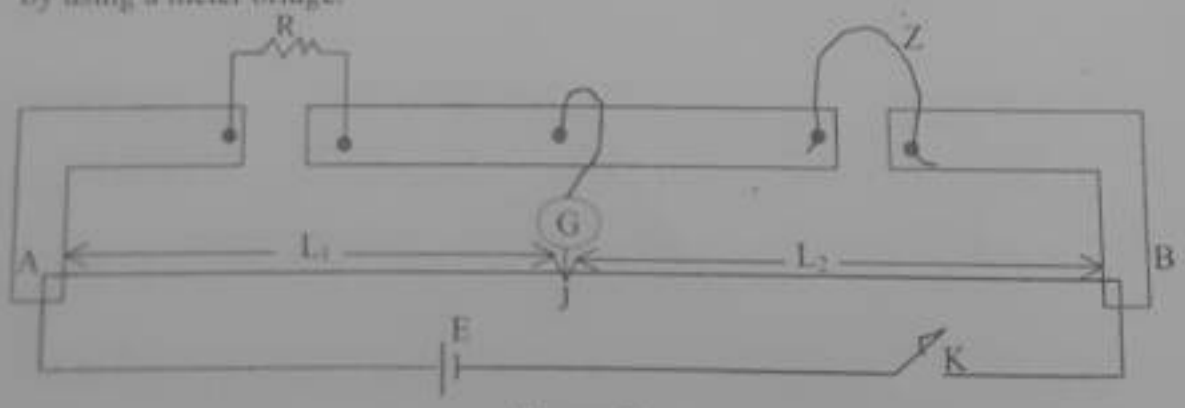

Figure 2

(a) Connect the given apparatus as shown in Figure 2 with ends of the wire Z connected at the right hand gap of the meter bridge.

(b) Find the balancing point of the meter bridge circuit with the jockey J when the value of the known resistance R is 1Ω.

(c) Read and record length L_1 and L_2 as indicated in the diagram in Figure 2.

(d) Repeat the procedures (a) to (c) for values of R = 2Ω, 3Ω, 5Ω and 8Ω. Record their corresponding length L_1 and L_2.

(e) Record your results in a suitable table including the values of $\frac{L_1}{L_2}$.

(f) Plot a graph of R against $\frac{L_1}{L_2}$.

(g) Determine the gradient G of your graph.

(h) Measure the length L of the wire Z given and its diameter D.

(i) Calculate the resistivity of the wire Z from the expression $L = \frac{\pi D^2 G}{4\rho}$.

(25 marks)