EXAMINATIONS COUNCIL OF ZAMBIA

Examination for School Certificate Ordinary Level

Physics   5054/3
Paper 3 Practical Test

Wednesday   **23 NOVEMBER 2016**

Time   2 hours 15 minutes

Instructions to Candidates

Write your name, centre number and candidate number in the spaces provided on the

Answer Booklet.

Answer all questions.

Write your answers in the spaces provided in the Answer Booklet.

For each of the questions in Section A, you will be allowed to work with the apparatus for a

maximum of 20 minutes. For the question in Section B, you will be allowed to work with

the apparatus for a maximum of 1 hour.

You should record all your observations as soon as these observations are made.

All of your answers should be written in the Answer Booklet, scrap paper should not be

used.

An account of the method of carrying out the experiments is not required.

At the end of the examination, hand in only the Answer Booklet and the card.

Information for Candidates

Graph paper is provided.

The sheets of graph paper should be attached securely to the Answer Booklet.

Cell phones are not allowed in the examination room.

Section A

Answer all questions.

1   In this experiment you will determine the mass **M**, of a wooden block using the principle of moments. You are provided with two wooden blocks **X** and **Y**, a metre rule and a pivot.
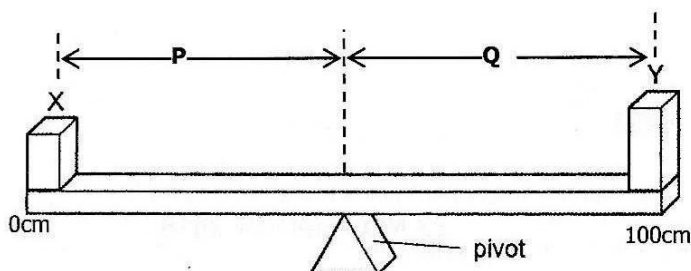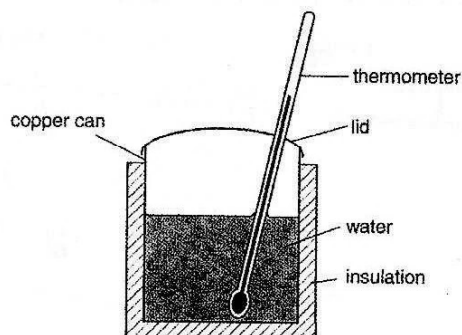

Figure 1.1

(a)   Move **Y** on the metre rule while maintaining the position of **X** at the 0 mark of the rule until the rule balances horizontally.

(b)   Record the mark on the rule at which **Y** balances.

(c)   Draw the arrangement with the masses on the metre rule.

(d)   Using the expression, M = $\dfrac{50m}{Q}$, where m = mass of **X** as given on the card, calculate the value of **M**.

(e)   Compare the masses of **X** and **Y**.

(f)   Give a reason for your answer in part **(e)** above.

2 In this experiment you will examine the insulating properties of cotton wool.
You are provided with hot water, a thermometer, a stop clock, cotton wool and
a metallic can with a lid.

Figure 2.1

(a) Pour 50cm^3 of hot water into the metallic can and arrange the apparatus as
shown above.

(b) Measure and record the temperature of the hot water (hw).

(c) Measure and record the temperature readings for 8 minutes at intervals of 1
minute.

(d) Record your readings in a table form in the Answer Booklet.

(e) Using your information in the table, state the relationship between temperature
and time readings.

(f) Justify your answer for **(e)**.

(g) Give a conclusion to your experiment.

3 In this experiment you will compare the voltage and current in a circuit as the length
of the wire increases. The circuit has been set up for you.

(a) Draw the circuit before using standard symbols.

(b) Place the crocodile clip at point B. Record the readings of the voltmeter, V_B, and
the ammeter, I_B.

(c) Repeat measurements of voltage and current at point C, V_C and I_C and at point
D, V_D and I_D.

(d) Record the readings in a table and include readings of $= \dfrac{V_B}{I_B}$, $\dfrac{V_C}{I_C}$ and $\dfrac{V_D}{I_D}$

(e) Compare the voltage and current readings above.

(f) Give a reason for your answer in part (e) above.

[Turnover

Section B

4   In this experiment you will determine the apparent magnification of an object when placed at different positions in a cylinder of water.
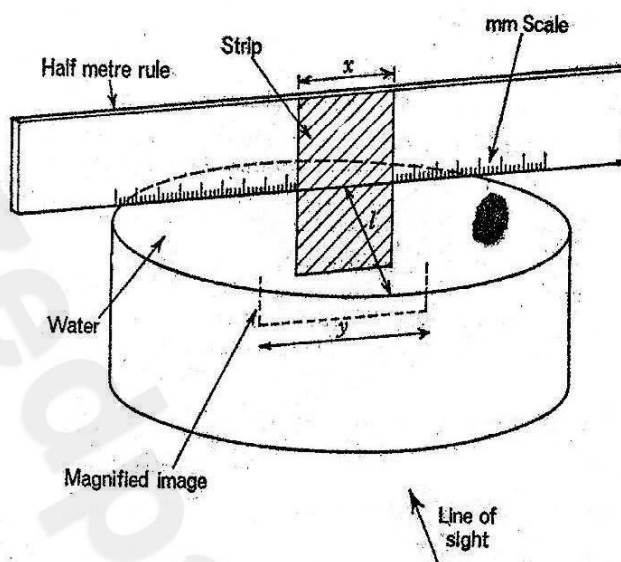

Figure 4.1

(a)   Measure and record the width x, of the given rectangular strip.

(b)   Attach the strip to the half metre rule and place the rule across the cylindrical container as shown in **figure 4.1**.

(c)   View the strip through water in a direction perpendicular to the strip, such that the strip appears magnified and measure its apparent width y, against the scale.

(d)   Repeat measurements of y for at least six different values of ℓ, the distance from the centre of the strip to the front of the cylinder. Record the measurements.

(e)   Take the readings of y with the eye always at approximately the same distance from the cylinder.

(f)   Calculate the apparent magnification, of the strip, where $m = \dfrac{y}{x}$

(g)   Record your results in a table with columns headed ℓ, y and m.

(h)   Determine and record the average external diameter D of the cylinder.

(i)   Plot a graph of m against ℓ.

(j)   From the graph, find the value of m, when $l = \dfrac{D}{2}$

(k)   Mention one precaution which you took during the experiment.

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