THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

ADVANCED CERTIFICATE OF SECONDARY EDUCATION

EXAMINATION

131/3C **PHYSICS 3C**

(ACTUAL PRACTICAL C)

(For Both School and Private candidates)

Time: 3:20 Hours **Year: 2021**

Instructions

1. This paper consists of **three (3)** questions**.** Answer **all** questions.
2. Question **one (1)** carries **20** marks, and the other **two(2)** carry **15** marks each.
3. Mathematical tables and non-programmable calculators may be used.
4. All writing must be in **blue** or **black** ink **except** drawing which must be in pencil
5. Cellular phones and any unauthorized materials are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet (s).

The folowing information may be useful:

Pie, $\pi = 3.14$.

Acceleration due to gravity, $g = 981 cms^{-2}$

Specific heat capacity of Water $C_w = 4.2 J/gK$

Specific heat capacity of copper $C_{cu} = 0.4 J/gK$

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1. You are provided with a pendulum bob, a thread, a stop watch, a metre rule, a retort stand and a pair of corks.

Proceed as follows:

(a) Attach a piece of thread of 110 cm long to the pendulum bob. Make a knot at a distance of about 8 cm from the point of attachment of the bob. Set up the apparatus as shown in Figure 1.

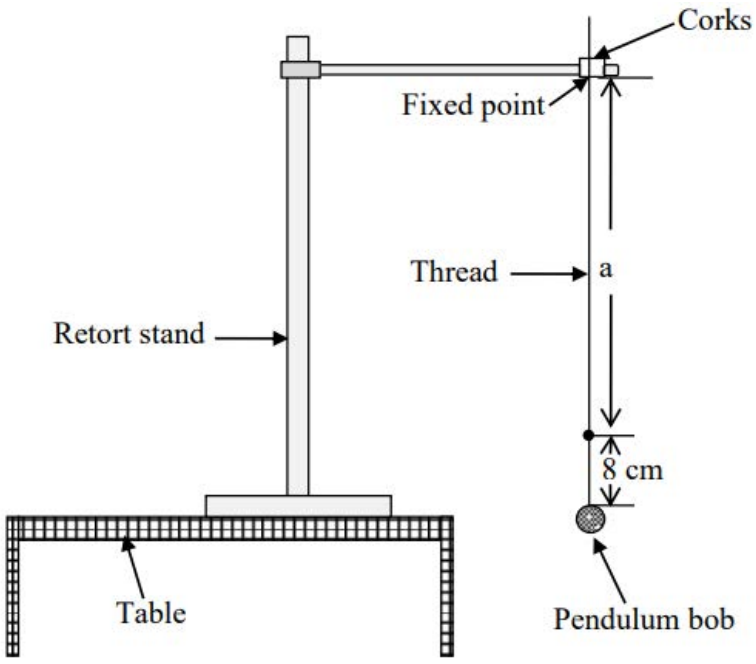

Figure 1

(b) Adjust the length, a = 92 cm from the knot to the fixed point. Set the bob to oscillate through a small angle and determine time, t for 10 complete oscillations and its periodic time, T.

(c) Repeat the procedure in 1 (b) for values of length, a = 82 cm, 72 cm, 62 cm, 52 cm, 42 cm and 32 cm.

Questions

(i) Tabulate the results including the values of T^2 .

(ii) Plot a graph of T^2 against a.

(iii) Use your graph in 1 (ii) to compute the value of the acceleration due to

gravity.

(iv) Suggest the aim of the experiment.

2. Perform an experiment to investigate the rate of heat loss of water at 70^0C.

Proceed as follows:

(a) Weigh an empty beaker and record its value.

(b) Pour 150 ml of hot water heated to 85^0C in a beaker provided and weigh the beaker with its contents.

(c) Set up the apparatus as shown in Figure 2.

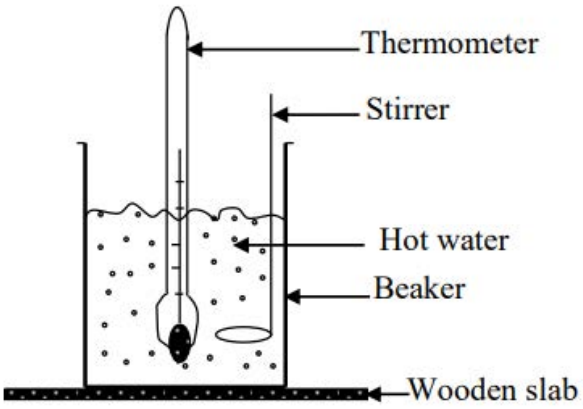

Figure 2

(d) While stirring gently, record the temperature θ^0C of water for every two minutes until it falls to 60^0 C.

Questions

(i) Tabulate your results.

(ii) Plot a graph of temperature θ^0C against time t (minutes).

(iii) Determine the slope of the graph at the temperature of 70^0C.

(iv) Compute the rate of heat loss of water at 70^0 C from the equation:

$\frac{Qdt}{m} = C_w td\theta$, where m is the mass of 150 ml of boiled water and C_w is the specific heat capacity of water.

3. You ar provided with dry cells, wire **Y,** voltmeter, masking tape, jockey, metre rule a switch and connecting wires.

Proceed as follows:

(a) Connect the circuit as shown in Figure 3. Tape a given wire Y on a given metre rule and make sure that l_0 = 50 cm.

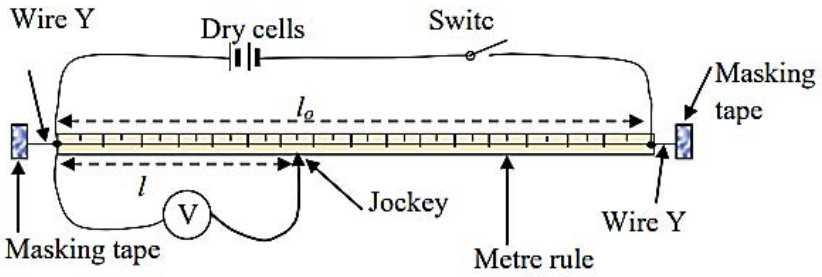

Figure 3

(b) Measure a length l = 10 cm, close the switch and record the voltage, V of the voltmeter.

(c) Repeat the procedure in 3 (b) for the values of l = 20 cm, 30 cm, 40 cm and 50 cm.

Questions

(i) Record your readings in a tabular form.

(ii) Plot a graph of V against l .

(iii) Determine the slope from your graph.

(iv) What does the slope obtained in 3 (iii) represent?

(v) Use the graph to find the length of a given wire when the voltmeter reading is 2 V.