THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

731/2C **PHYSICS 2C**

(ACTUAL PRACTICAL 2C)

Time: 3 Hours **Year: 2022**

Instructions

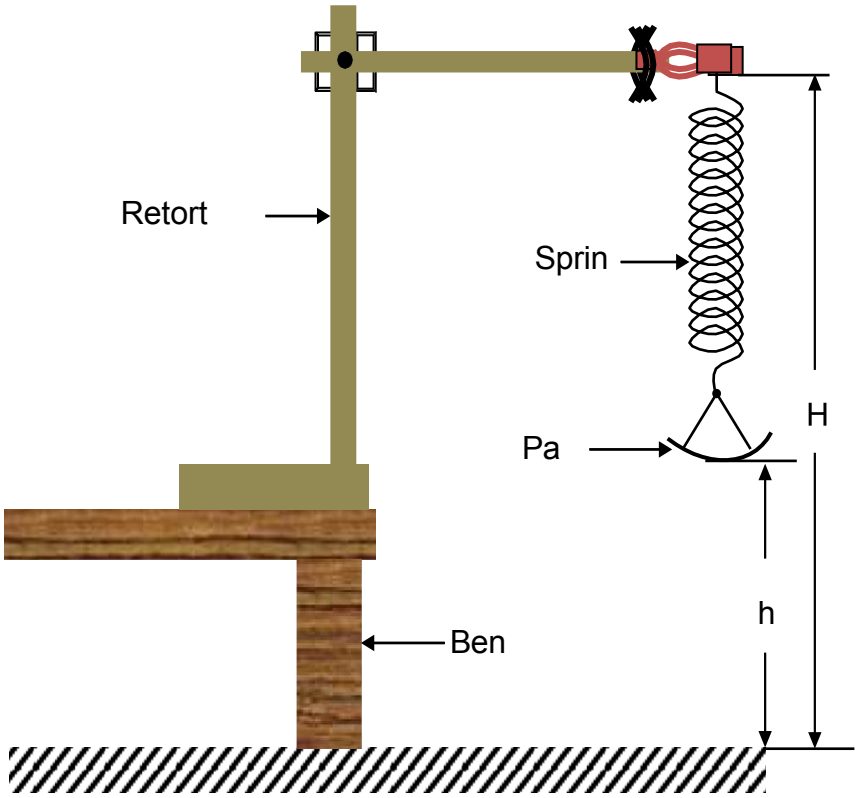
1. This paper consists of **three (3)** questions.
2. Answer **all** questions.
3. Question number **one (1)** carries **twenty (20)** marks and the rest carry **fifteen (15)** marks each.
4. Cellular phones and any unauthorized materials are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet (s)

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1. Carry out an experiment to determine the impact of acceleration due to gravity, when provided with the following apparatuses: spiral spring, retort stand, stopwatch, scale pan, six masses (150 g, 200 g, 250 g, 300 g, 350 g and 400 g) and two wooden pads. Conduct an experiment as per procedures given and then answer the questions that followe:

Procedures:

(a) Set up the experiment as shown in Figure 1.



(b) Measure and record the height H from the point of suspension of the spring to the ground. This should be kept constant throughout the experiment.

(c) Place 150 g mass in the scale pan attached at the lower end of the fixed spring and measure the height h from the lower end of the scale pan to the ground.

(d) Slightly displace the spring and record the time for 20 complete oscillations.

(e) Repeat procedures in 1(c) and (d) for masses of 200 g, 250 g, 300 g, 350 g and 400 g.

Questions

(i) Tabulate your results to include corresponding values of h, time, periodic time T and the square of the periodic time, T^2 for each mass.

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

(iii) Find the slope and intercept of the graph.

(iv) From the graph, deduce the relationship between h and T^2 .

(v) Find the ratio of H and intercept of the graph.

(vi) Mention two possible sources of error in doing this experiment.

2. Perform an experiment to investigate the hotness of the porridge in cup A as compared to that in cup B. Use the procedures provided and then answer the questions that followed.

Procedures:

(a) Fill the metal cup A with hot water whose temperature should initially be about 80 oC, put it on the wooden base.

(b) Constantly stir the hot water in the cup A and record the temperature of the water for every 1 minute.

(c) Continue reading the temperature $\theta^{\circ}C$ for 15 minutes.

(d) Empty cup A and put it into a measuring cylinder. Record its volume as V.

(e) Repeat procedures in 2 (a) – (c) for metal cup B. Measure the same volume V as obtained in (c).

Questions

(i) Tabulate your reslts.

(ii) Using the same axis, plot a cooling curve for cup A together with its content and another cooling curve for the cup B together with its content.

(iii) If RA represent the rate at which the cup A and its content loose heat, and RB represent the rate at which the cup B and its content loose heat, determine the ratio $\frac{R_A}{R_B}$ at the temperatures 75°C and 65°C.

(iv) Which calorimeter is represented by cup A? Explain by giving a reason.

(v) Why does the student drink the porridge comfortably without complaining about its hotness in one cup rather than in the other cup?

(vi) State the two sources of errors in this experiment.

3. Conduct an experiment to determine the approximate value of the internal resistance of the dry cell.

Procedures**:**

(a) Connect a dry cell, an ammeter, a voltmeter, a key K and rheostat in series.

(b) Join a voltmeter across the battery terminal.

(c) With the Key K open, record the voltmeter reading.

(d) With the Key K closed, adjust the rheostat so that the ammeter pointer is at exactly 0.2 A, and record its corresponding voltmeter reading in volts.

(e) Repeat procedure 3 (d) with ammeter readings of 0.4, 0.6, 0.8 and 1.0 A.

Questions:

(i) Tabulate your results including the values of I and V.

(ii) Draw a well labeled diagram for the experimental set-up.

(iii) Plot a graph of V and I.

(iv) Use your graph to determine the internal resistance and e.m.f of that dry cell and comment on your answer comparing to the value given by the factory.

(v) If the dry cell used in 3 (iv) is replaced by another dry cell with twice internal resistance of the first one, what will be the magnitude of the

current flowing in the circuit?