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 **Tuesday, 17th November 2015 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. The following information may be useful:

   $\pi = 3.14$.

1. The aim of this experiment is to determine the spiral constant, K, by using a spiral spring.

(a) Clamp the given spring provided and a meter rule as shown in Figure 1.

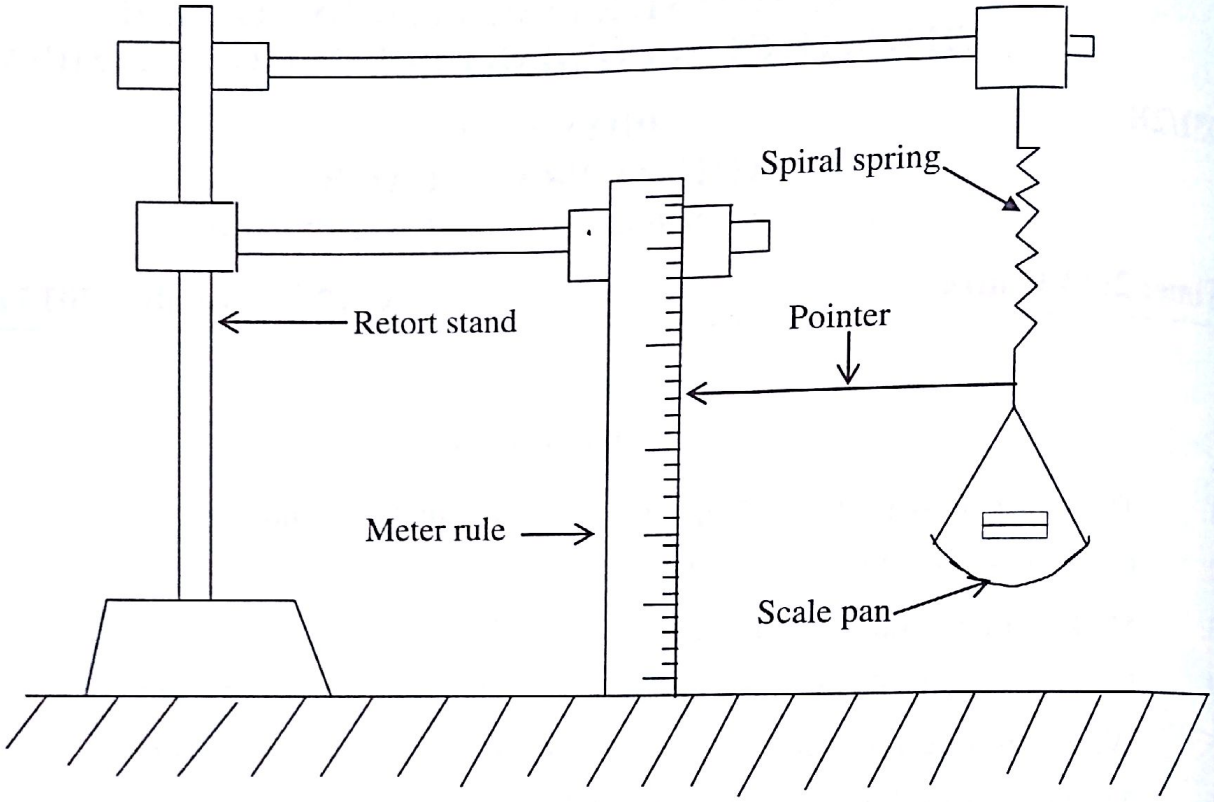


Figure 1

(b) Read and record the position of the pointer on the meter rule before placing the mass on the scale pan.

(c) Place a mass, m, equal to 100g on the scale pan and record the new position of the pointer on the meter rule.

(d) Find the extension of the spring, e, in meters.

(e) Remove the meter rule.

(f) Pull the scale pan downwards through a small distance and release it.

(g) Measure and record the time for twenty (20) oscillations. Find the time T, for one oscillation.

(h) Repeat the procedures 1 (f) and (g) for values of m equal to 200g, 300g, 400g and 500g.

(i) Tabulate your results.

(j) Plot a graph of T^2 against m.

(k) Find the slope S of the graph.

(l) Use the relation $T = 2\pi\sqrt{\frac{m}{K}}$ to calculate the value of the spring constant K.

(m) Suggest any two sources of errors and one precaution taken in the experiment.

(25 marks)

2. The aim of this experiment is to determine the internal resistance, r, of the cell provided.

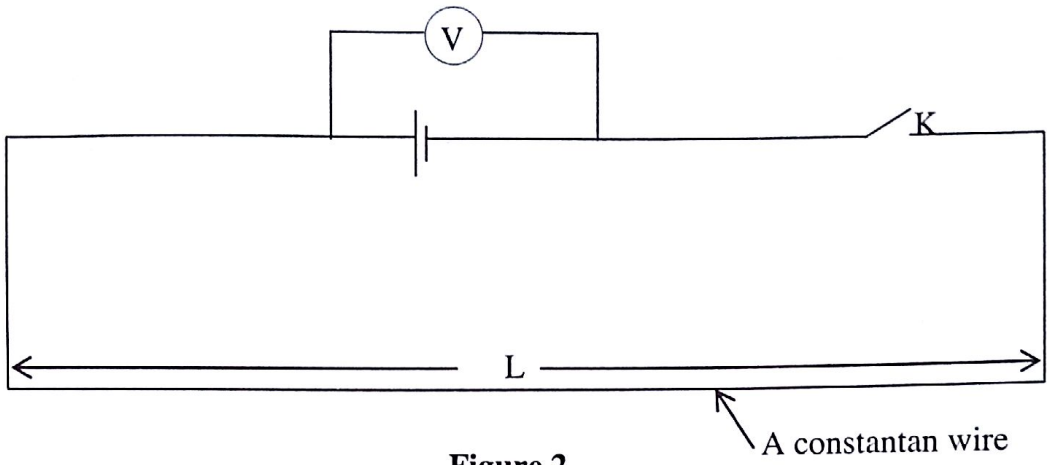


Figure 2

(a) Connect the circuit as shown in the Figure 2.
(b) Adjust the distance L to 20 cm.
(c) Close the switch K.
(d) Read and record the reading of the voltmeter V.
(e) Repeat the procedures (b) to (d) for L = 30 cm, 40cm, 50cm and 60cm.
(f) Tabulate your results including values of $\frac{1}{V}$ and $\frac{1}{L}$.
(g) Plot a graph of $\frac{1}{V}$ against $\frac{1}{L}$.
(h) Find the slope, s, of the graph.
(i) Read the intercept of $\frac{1}{V}$ axis.
(j) Calculate the value of the reciprocal of $\frac{1}{V}$ intercept.
(k) What does the value of the reciprocal of the intercept of $\frac{1}{V}$ physically represent?
(l) Calculate the internal resistance r of the cell from the relation
$r = 0.0795(V\Omega/cm) \times slope(s)$.
(m) List down two possible sources of errors and two precautions to be taken into account.

(25 marks)