THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

031/2

PHYSICS 2
ALTERNATIVE TO PRACTICAL
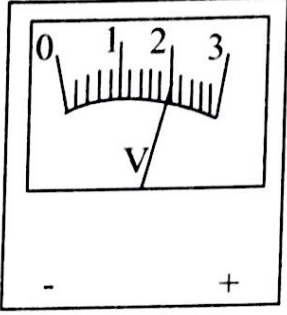(For Both School and Private Candidates)

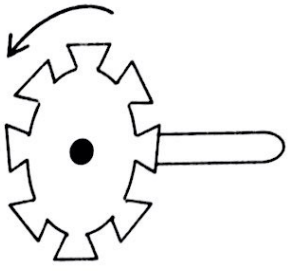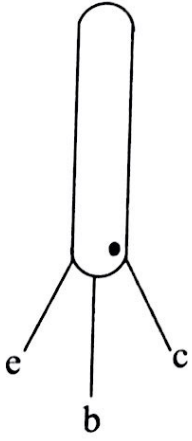Time: 2:30 Hours   Wednesday, 13th November 2013 a.m.
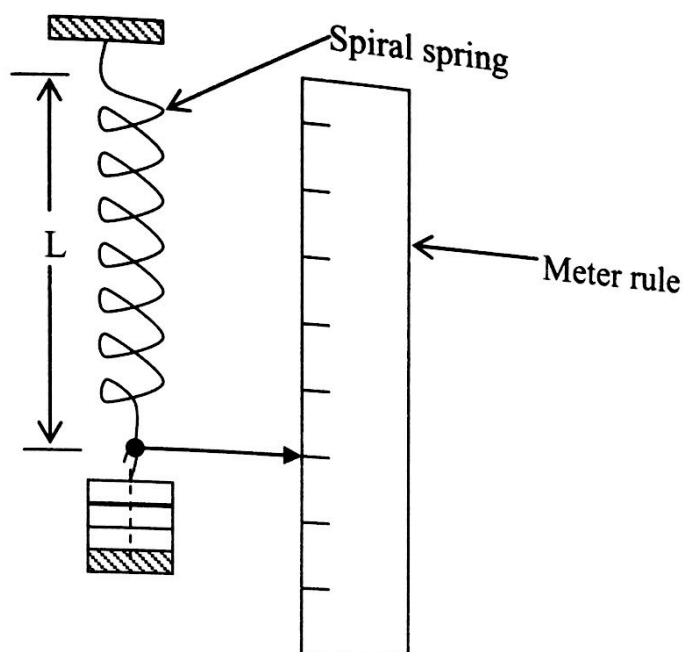
Instructions

1. This paper consists of **five (5)** questions. Answer **all** questions.

2. Marks for each question or part thereof are indicated beside the question.

3. Calculators and cellular phones are **not** allowed in the examination room.

4. Write your **Examination Number** on every page of your answer booklet(s).

5. Use $\pi = 3.14$.

1. Fill in the gaps with correct responses.

Name of Device	Sketch	Physical Effect/Principle	Application/Uses
(a) Vernier calliper			
(b)			
(c)			
(d) Gap and bar			
(e)			

(10 marks)

The following figure shows a spiral spring hung from one end and to the other end various loads are attached.

The table below shows the length of the spring for various loads:

F (load in N)	1.2	1.6	2.0	2.4
L (length in cm)	37	45	52	60

(a) Plot a graph of F against L. **(3 marks)**

(b) Find the slope of the graph. **(1 mark)**

(c) What is the physical meaning of the slope obtained in (b) above? **(1 mark)**

(d) If F and L are connected by the law, $L = KF + C$, find the values of K and C. **(2 marks)**

(e) Name and state the law governing this experiment. **(2 marks)**

(f) Does the graph pass through the origin? Give reason for your answer. **(1 mark)**

3. The following readings were from an experiment to determine the acceleration due to gravity, g.

Height of fall from rest, h (cm)	200	180	160	140	120	100
Time of fall, t (sec)	0.64	0.61	0.54	0.53	0.50	0.45
Twice the height of fall (cm)						
t^2 (sec^2)						

(a) Complete the table for the values of 2h in centimeters and t^2 corrected to two significant figures. **(3 marks)**

(b) Plot a graph of '2h' against t^2 (horizontal axis). **(3 marks)**

(c) Find the gradient of the graph and estimate the approximate value of g using the equation $2h = gt^2$. **(4 marks)**

4. In investigating the relationship between the frequency of a stretched string and its length, several different tuning forks were used together with a sonometer fitted with a length of thin steel wire. While the tension of the vibrating string was kept constant, its length was varied in order to tune the string to a series of tuning forks (sonometer wire adjusted in unison with the forks).

The results for frequency, length of string and reciprocal length were recorded as follows:

Frequency of fork, f (Hz)	224	256	288	320
Length of string, L (cm)	0.91	0.78	0.68	0.63
Reciprocal length, $^1/_L$ (cm^{-1})	1.10	1.28	1.46	1.60

(a) Plot the graph of frequency, f, against $\dfrac{1}{L}$ (3 marks)

(b) Find the slope k of the graph. (1 mark)

(c) Deduce from the graph the frequency of an unmarked fork, X, which was in unison with a sonometer wire whose length is 0.80cm. (3 marks)

(d) Draw a sketch diagram for the set-up of the apparatus for this experiment. (3 marks)

5. In a certain experiment, the following apparatus were connected; an ammeter, a voltmeter, rheostat, a torch – bulb, a dry cell, a key and some connecting wires. The results obtained were as follows:

Potential difference, V (V)	0	0.10	0.50	1.80	3.10
Current, I (A)	0	0.08	0.12	0.20	0.28

(a) Draw a circuit diagram that could have been used to obtain these data. (4 marks)

(b) Plot a graph of potential difference V against current I. (3 marks)

(c) Find the slope of the graph when the current is 0.10A. (1 mark)

(d) What is the resistance of the bulb filament when the current is 0.10A? (1 mark)

(e) What was the aim of the experiment? (1 mark)