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

031/2

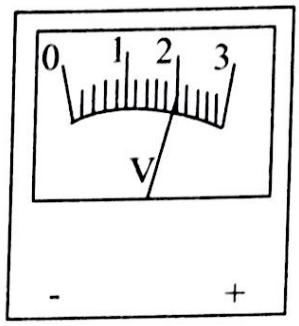
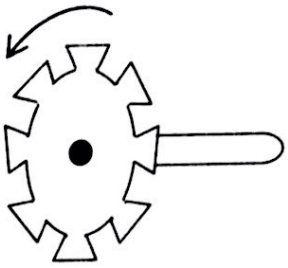
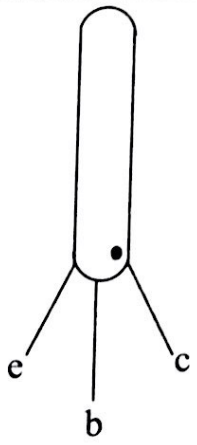
PHYSICS 2
ALTERNATIVE TO PRACTICAL
(For Both School and Private Candidates)

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

Instructions

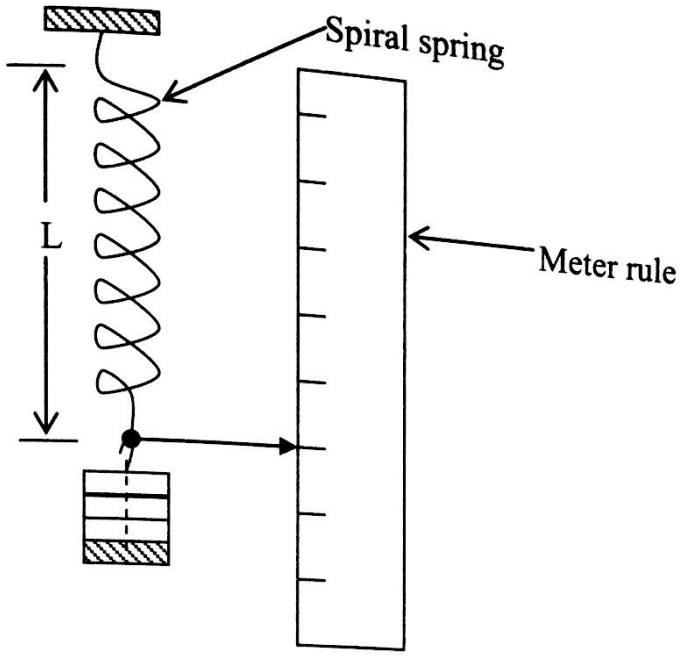
1. This paper consists of **five (5)** questions. Answer **all** questions.
2. Marks for each question or part thereof are indicated beside the question.
3. Calculators and cellular phones are **not** allowed in the examination room.
4. Write your **Examination Number** on every page of your answer booklet(s).
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)

2. 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 wa 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 $\frac{1}{L}$ **(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)**