SUBUKIA SUB-COUNTY JOINT EXAMINATIONS

JULY/AUGUST 2014

232/3 PHYSICS PRACTICAL CONFIDENTIALS

Each Candidate should be provided with the following apparatus:-

Question One

1. Two similar bar magnets labeled P and Q [Preferably made of powerful alloy *ALNICO* and approximate dimensions 7.7cm by 1.0cm by 0.5cm ($\pm$0.1cm)]
2. One retort stand.
3. One stopwatch
4. A piece of nylon threads about 80 cm long.
5. A metre rule and a 1 metre long wooden rod (or Two metre rules).
6. Complete retort stand.

Question Two

1. Water in a beaker
2. Complete retort stand
3. Glass Marble of mass 5.0 ($\pm$ 0.2) g
4. 100ml measuring cylinder
5. Boiling tube of mass 29.5 ($\pm$ 0.5) g
6. Approximately 50 cm long cotton thread
7. A Metre rule
8. Beam balance (can be shared)

NAME:…… **ADM NO:……**

DATE:…….

SIGN:……..

232/3
PHYSICS
PAPER 3
(PRACTICAL)
JUL/AUG – 2014
TIME: 2 ½ HOURS

SUBUKIA SUB-COUNTY JOINT EXAMINATIONS

Kenya Certificate of Secondary Education (K.C.S.E)

232/3
PHYSICS
PAPER 3
(PRACTICAL)
JUL/AUG - 2014
TIME: 2 ½ HOURS

INSTRUCTIONS TO CANDIDATES

1. Write your name admission number and in the spaces provided above.
2. Sign and write the date of examination in the spaces provided above.
3. Answer ALL the questions in the spaces provided in question paper.
4. You are supposed to spend the first 15 minutes of the 2 ½ hours allowed for this paper reading the whole paper carefully before commencing your work.
5. Marks are given for a clear record of the observation actually made, their suitability, accuracy, and the use made of them.
6. Candidates are advised to record their observations as soon as they are made.
7. Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1	20	
2	20	
TOTAL	40	

This paper consists of 7 printed pages.
Candidates should check the question paper to ensure that all pages are printed as indicated and that no questions are missing.

QUESTION 1

1. You are provided with the following apparatus:-

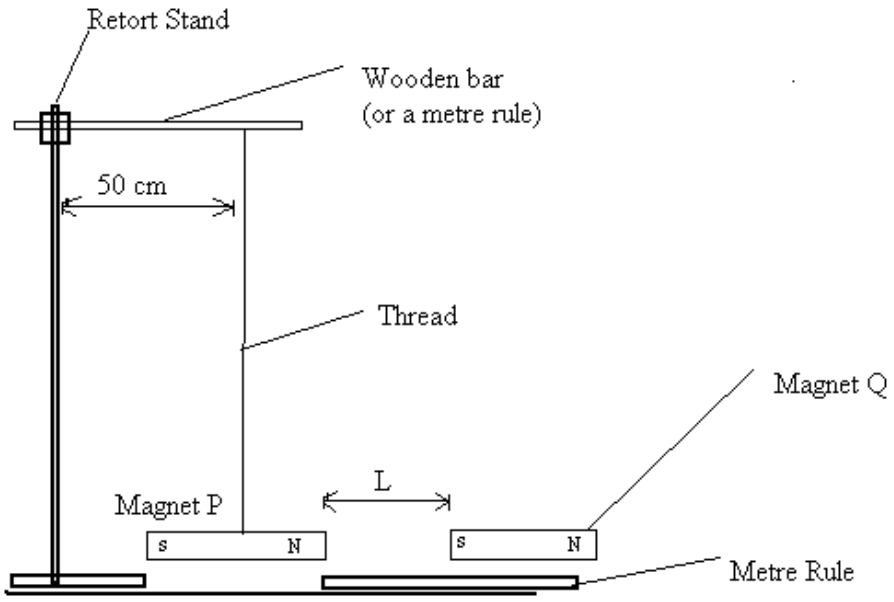
   - Two similar bar magnets labeled P and Q
   - One retort stand
   - One stop watch
   - One piece of nylon thread (about 80cm long)
   - A metre rule
   - A wooden bar (about 1 metre long)

   - **Proceed as follows**:-

   (a) Clamp the wooded bar on the retort stand.

   (b) Suspend the magnet P from the wooden bar so that it is at least 50cm from the retort stand and 70 cm from the wooden block.

   (c) With magnet P just off the bench, allow it to settle. Place magnet Q on the metre rule such that it can attract P as in the figure below.



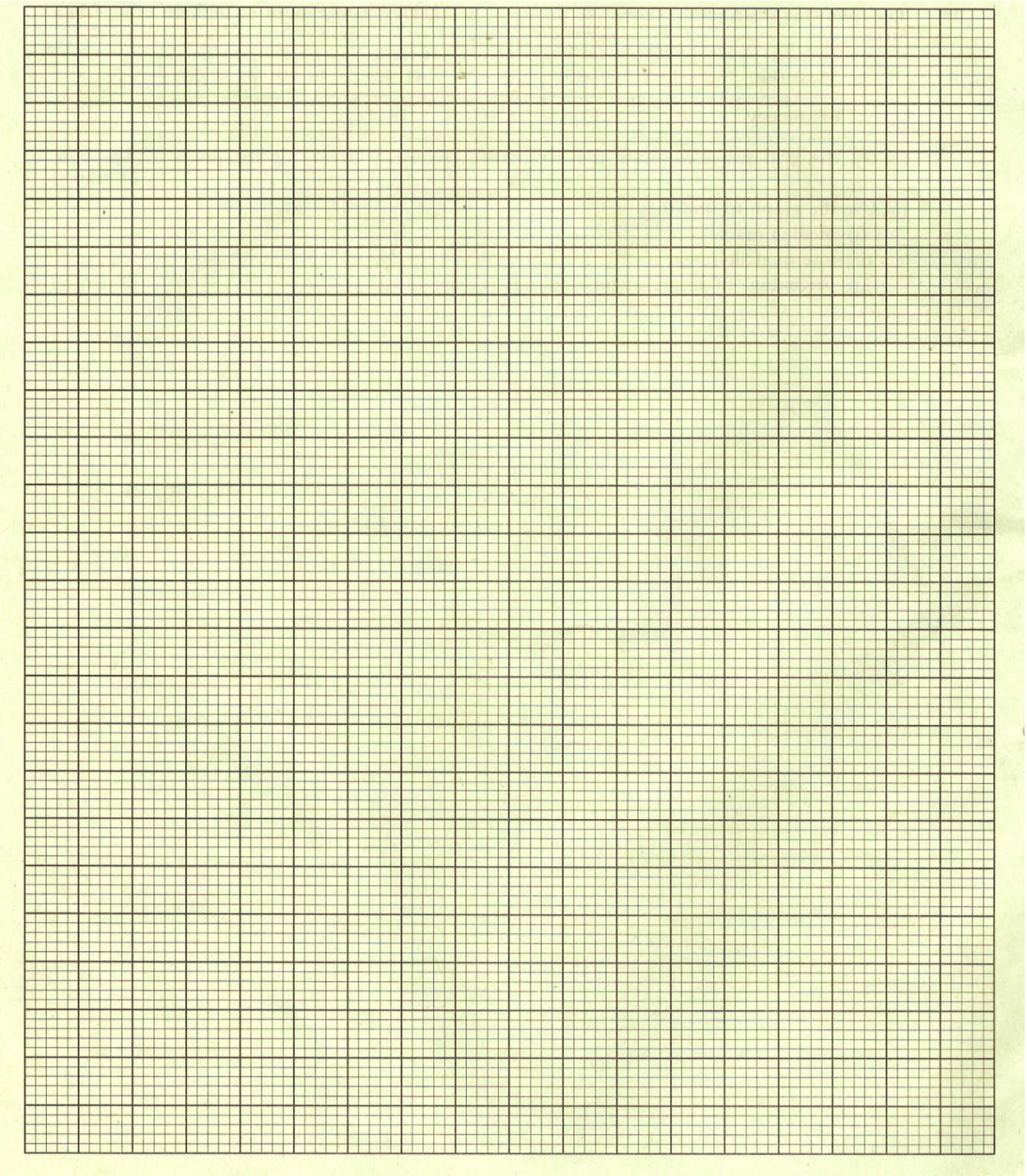
   (d) Move the magnet Q so that the distance, L, between the magnets is equal to 22 cm. Twist the magnet P a little in a horizontal plane and release so that it oscillates. Determine the time taken (t) to make 10 oscillations.

   (e) Repeat the procedure (d) for values of L=20cm, 18cm, 16cm, 14cm, 12cm and 10cm. Enter the values in the table 1.

   (f) I. Complete the table (7 Marks)

Distance L (cm)	22	20	18	16	14	12	10
Time (t) for 10 Oscillations							
Periodic Time T = 1/t							
$1/L\ cm^{-1}$							
$1/L^2\ cm^{-2}$							
Frequency f = 1/T Hz							

II. On the grid provided, plot a graph of frequency (f) along y axis against $1/L^2$ (5 Marks)



III. Determine the gradient of the graph (3 Marks)

IV. Find the distance L when the frequency is 0.5HZ (3 marks)

V. State **TWO** factors affecting the frequency of the swinging magnet. (2 marks)

2. You are provided with the following:

- Water in beaker
- Complete retort stand
- Marble
- 100ml measuring cylinder
- Boiling tube
- Cotton thread, 50cm
- Metre ruler
- Beam balance (can be shared)

Proceed as follows:-

(a) (i) Record the mass M_o of the marble using the electronic balance

M_o=…….g (½ Mark)

(ii) Now half fill the boiling tube with water. Using the meter rule, measure the height, h_1 of the water column.

h_1=……..cm (½ Mark)

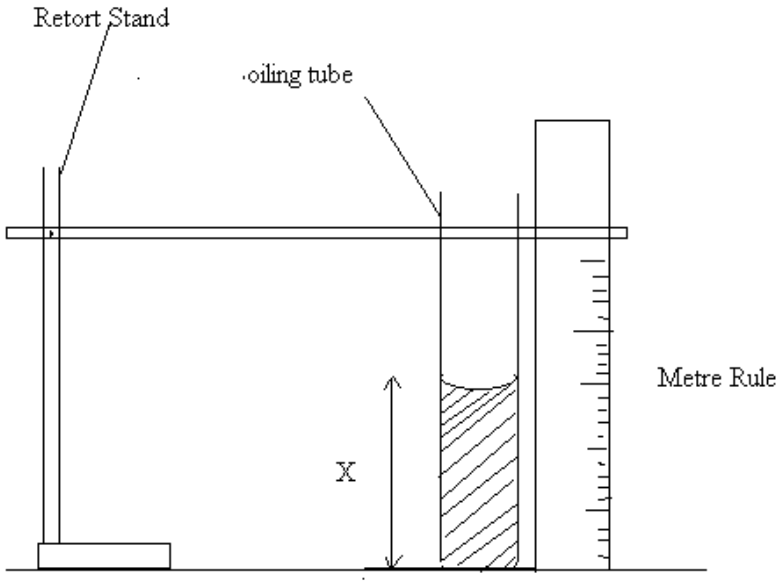
(b) (i)Carefully drop the Marble into the water in the tube and measure, h_2, of the water column.

h_2=……cm (½ Marks)

(ii) Record the mass m, of the boiling tube.

M=…….g (½ mark)

Fill a measuring cylinder with water up to 100ml mark; clamp the boiling tube vertically with its base resting on a flat surface as shown below.



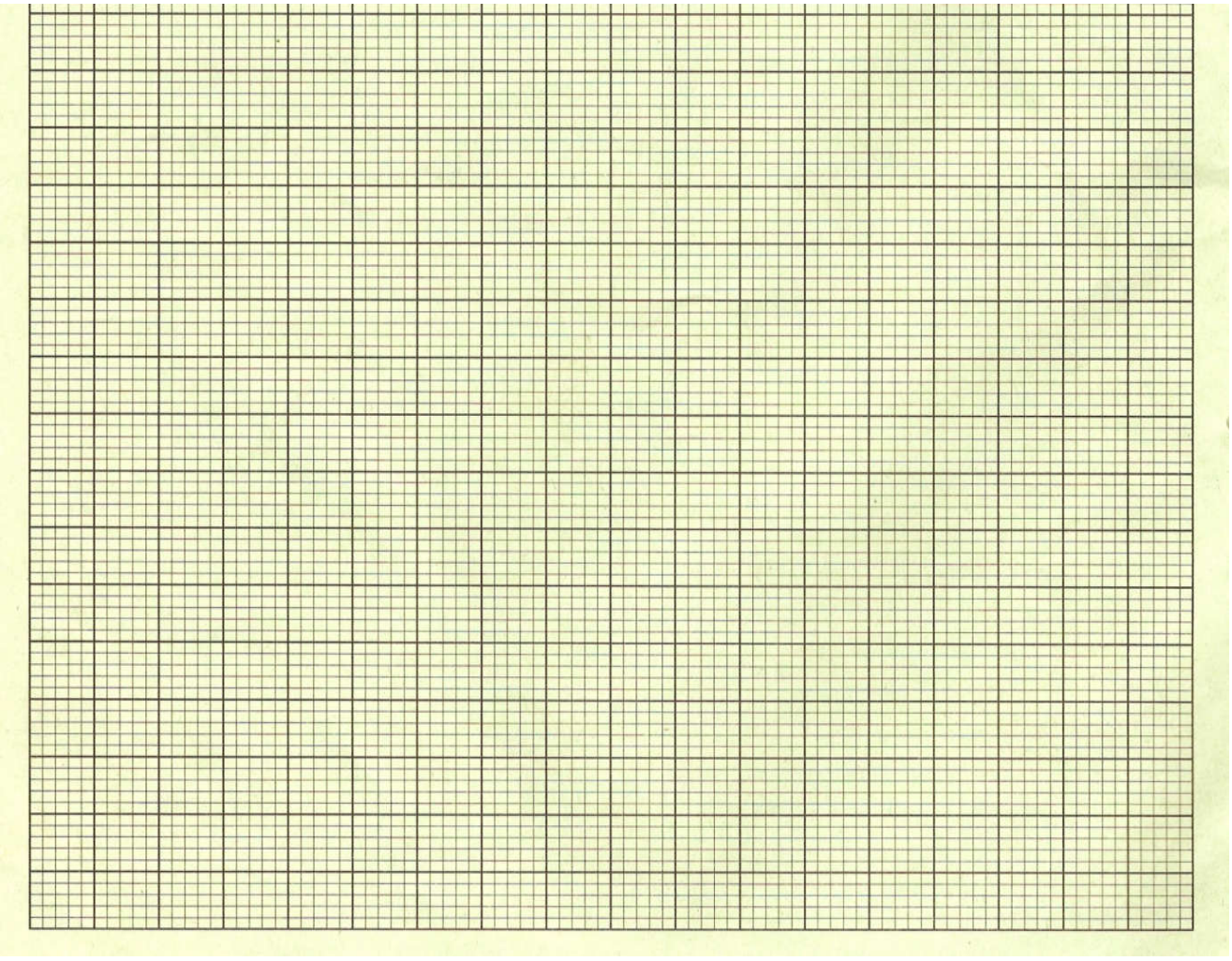
The meter rule should be clamped beside the boiling tube.

(c) Pour 10ml (cm^3) of the water from the measuring cylinder. Measuring the height x, of Water.
Keep adding water in small amounts of $10cm^3$, into the boiling tube until you obtain six sets of reading.
Complete the table below:-

Volume in (cm^3) measuring cylinder	Height (cm)
10	
20	
35	
45	
50	
65	

(3 Marks)

(d) On the grid provided, plot a graph of volume V of water (y-axis) against height h, of the water column. (5 Marks).



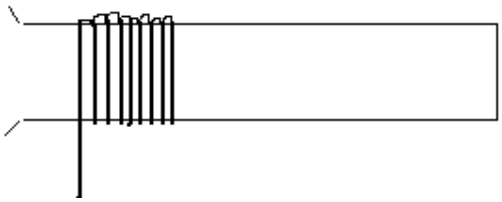
(e) From the graph determine the slope **S**, (3 Marks)

S =

(f) Measure the length **H**, of the boiling tube,
H=

(1 Mark)

(g) Wind the cotton thread ten times round the boiling tube, pushing the windings very close together, the turns should touch one another but not overlap as shown.



Unwind the thread and measure the length, L, of the thread
L =…… cm (1 Mark)

(h) (i) Calculate the volume V, of the glass material which the boiling tube is made of.
Given that $\boldsymbol{V = H\left[\frac{2L^2}{2500} - S\right]}$

V = …….. (1 Mark)

(ii) Calculate the density, d, of the glass material of the boiling tube
d = ……. (1 mark)

(iii) Using the graph determine the volume of the marble, V_0 given that $\mathbf{Vo = S\,(h_2 - h_1)}$

V_0= ……..... (2 Marks)

(iv) Hence calculate the density d_0, of the marble (1 Mark)

SUBUKIA DISTRICT JOINT EXAMINATIONS

JULY/AUGUST 2014

232/3 PHYSICS PRACTICALS - MARKING SCHEME

Question one

I.

Distance L (cm)	22	20	18	16	14	12	10	
Time (t) for 10 Oscillations	25.31	25.10	24.21	24.16	22.43	21.53	20.21	
	Alt 1							- ½ mark each correct 2dp -Max = 3 marks
	32.83	31.76	31.22	28.74	26.44	25.31	24.87	
	Alt 2							
Periodic Time, T								1 mark 2dp
$1/L\ cm^{-1}$								1 mark
$1/L^2\ cm^{-2}$								1 mark
Freq f = 1/T Hz								1 mark

II. Graph of frequency (y axis) against $1/L^2$

A1 - Well labeled axis with correct units indicated

S1 - Simple uniform scale on both axis

P2 - ½ mark each correctly plotted point. Maximum 4 points

S1 - Straight line with positive gradient and passing through at least 3 correctly plotted points

III. Slope: $= \frac{\Delta F}{\Delta 1/L^2}$;

- Correct Substitution;
- Correct evaluation;

IV. - From Students Work

- Value of $\Delta 1/L^2$;
- Make L the Subject of formula ;
- Correct Evaluation;

V. Factors –Strength of the magnet;

- Seperation distance;

Q.2

a)i) $M_o = 5.0\ (\pm\ 0.2)$ g;

ii) $h_1 = 7.5 (\pm 0.5)$ cm;

b)i) h_2 = Value of $h_1 + 0.5 (\pm 0.1)$ cm;

ii) Mass of the boiling tube, M = 29.5 ($\pm$ 0.5) g

C.

V (cm^3)	Height ($\pm$ 0.2) cm
10	2.8
20	5.2
35	8.8
45	11.2
50	12.4
65	16.0
	- At least 1 decimal place - ½ Mark each correct value - MAX = 3 MARKS

D. Graph

A1 - Well labeled axis with correct units indicated

S1 - Simple uniform scale on both axes

P2 - ½ mark each correctly plotted point. Maximum 4 points

S1 - Straight line with positive gradient and passing through at least 3 correctly plotted points

e. Slope = $\frac{\Delta V}{\Delta x}$

- correct substitution;(1mk)
- correct evaluation; (1mk)
- Accuracy s = 4.17 ($\pm$ 0.1); (1mk)

f. H = 15.0 ($\pm$ 0.1) cm (1mk)

g. L = 78.5 cm ($\pm$ 0.2) cm (1mk)

h. i. Correct Evaluation; (1mk)

ii. $\rho = M/V$ - correct substitution; (1/2 mk)

- Correct Evaluation; (1/2 mk)

iii. $V_o = S(h_2 - h_1)$ – correct evaluation; (1mk)

- Accuracy $V_o = 1.95 (\pm 0.1)\ cm^3$;(1mk)

iv. $d_o = M_o/V_o$ (1mk)