Name.....

Index Number.....

Candidate's
Signature.....

Date.....

ALLIANCE HIGH SCHOOL

KENYA CERTIFICATE OF SECONDARY EDUCATION

PHYSICS PAPER 3

TIME: 2½ Hours

Instructions to the candidates

a) Write your name and index number in the spaces provided above
b) Sign and write the date of examination in the spaces provided above
c) Answer ALL the questions in the spaces provided in the question paper
d) You are supposed to spend the first 15 minutes of the 2½ hours allowed for this paper reading through the whole paper carefully before commencing your work
e) Marks will be given for a clear record of the observations actually made, their suitability , accuracy and use made of them
f) Candidates are advised to record their results as soon as they are made
g) Non programmatic silent electronic calculators may be used
h) This paper consists of 9 printed pages
i) Candidates should check the question paper to ascertain that all the pages are printed as indicated and no question is missing,

For Examiner's use only

QUESTION 1	
QUESTION 2	
TOTAL	

QUESTION 1(This question consists of two parts A and B; attempt both parts)

PART A

You are provided with the following

— a steel rod
— a bare copper wire attached on a crocodile clip
— a stop watch
— a metre rule
— a mass balance
— a verner caliper

Proceed as follows

a) Using a metre rule measure and record the length of the steel rod

l=.....m (1 mark)

b) Using a vernier calipers measure and record the average diameter, *d* of the steel rod *d*=.....m (1 mark)

c) Using a mass balance, measure and record the mass, *m* of the steel rod

m.....kg (1 mark)

d) calculate the quantity *y*, given (2 marks)

$$y=\frac{4m}{\pi d^2 l}$$

.....

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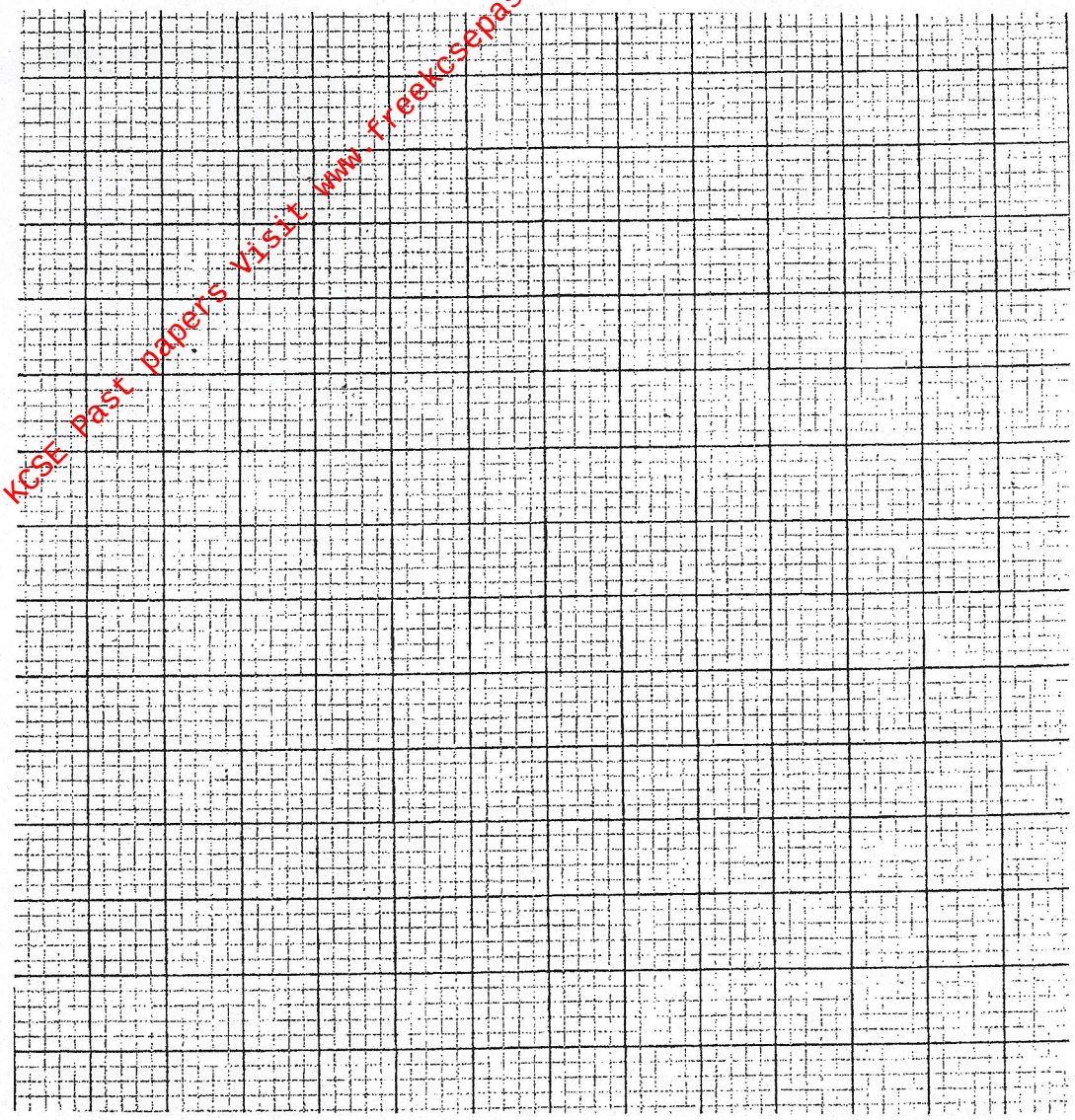
PART B

You are provided with the following

— a stand, clamp and boss
— a metre rule or half metre rule
— a stop watch
— two wooden pieces
— a bare copper wire with one end attached to a crocodile clip



e) Determine

i. the slope (3 marks)

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ii. the y intercept (1 mark)

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f) Express the relationship between the Period, T and the Length l of the rigid pendulum

.....(1 mark)

QUESTION 2 PART A

(This question consist of two parts A and B; attempt both parts)

You are provided with the following:

— a beaker filled with water
— a beaker filled with kerosene
— a candle
— a screen
— a metre rule

a) Set up the arrangement as shown in Figure 2 with a candle flame vertical above the zero end of the metre rule.

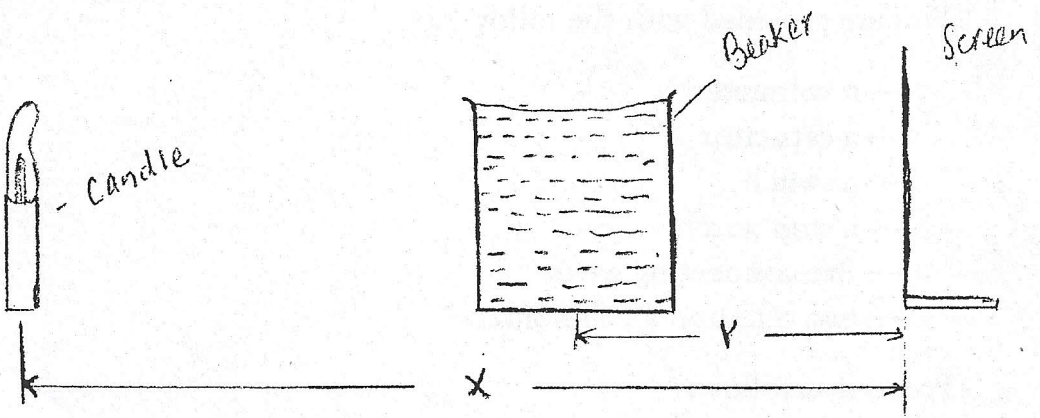

Figure 2

b) Place the beaker filled with water on the metre rule and find the external diameter *D*.

D=..... (cm) (1 mark)

c) Put a screen at a distance x (about 8 times the value of *D*) from the candle and find the position of the beaker near the screen at which it gives a focused image of the candle light on the screen.(*The image should appear as a narrow vertical line).*

d) Measure and record the distance v, between the centre of the beaker and the screen.

v_1..... cm (1 mark)

e) Repeat the experiment with a beaker filled with kerosene, measure and the distance v_2 between the centre of the beaker and the screen.

v_2.....cm (1 mark)

Comment on the values of v_1 and v_2 (1 mark)

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.....

Determine α given that $\gamma\alpha = \frac{3}{4} - \frac{D}{4}\left(\frac{1}{V2} - \frac{1}{V1}\right)$ (2 marks)

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QUESTION 2 PART B

You are provided with the following:

— a voltmeter
— a capacitor
— a switch
— a stop watch
— five connecting wires
— two cells and a cell holder

Proceed as follows

a) Connect the circuit as shown in Figure 3

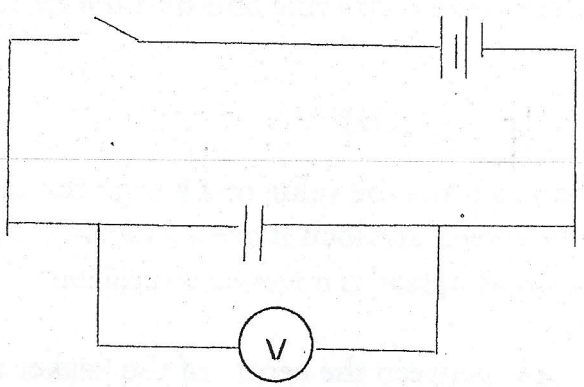


Figure 3

b) Close the switch, read and record the maximum voltage V_o across the capacitor.

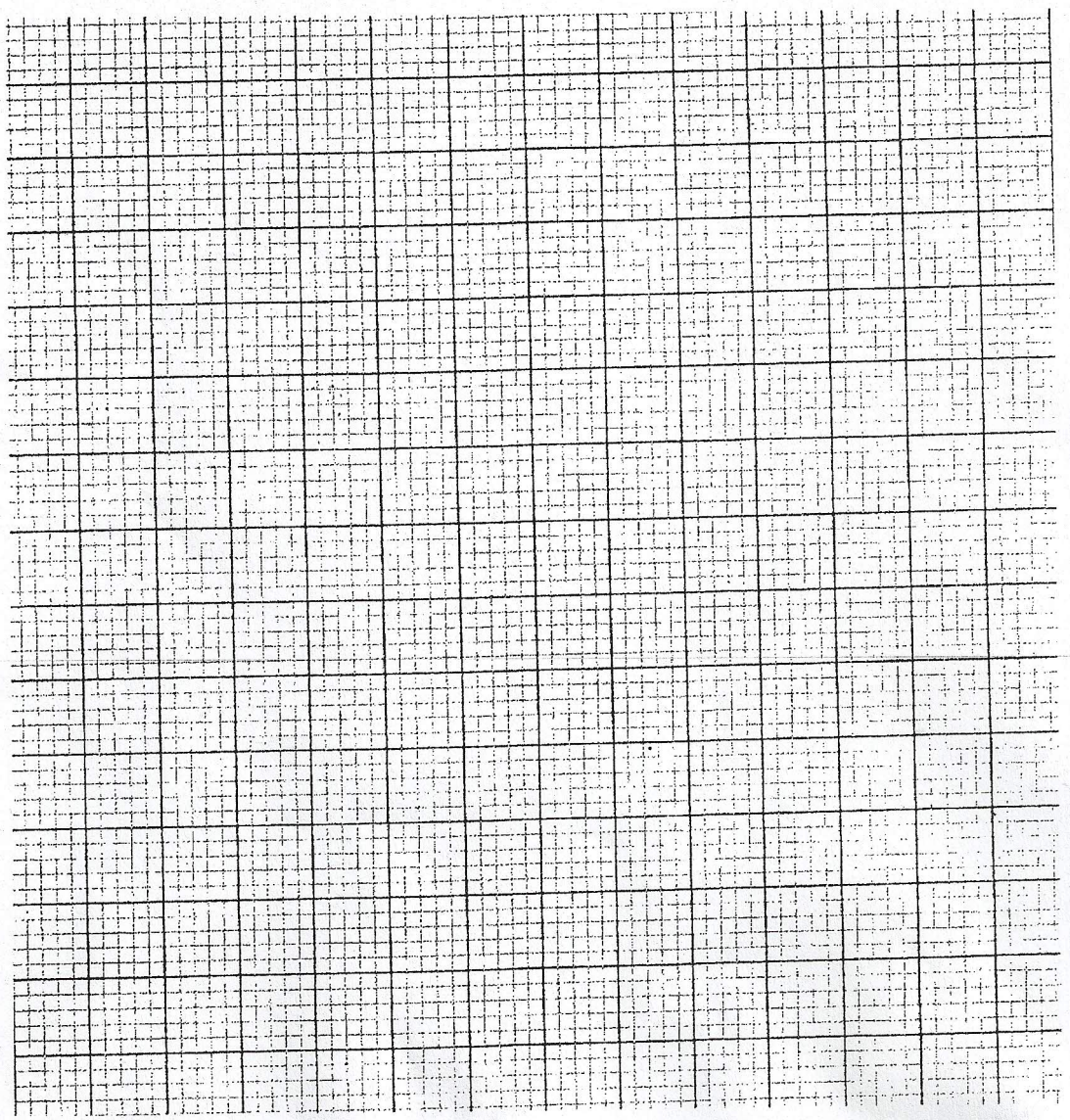
V_o =..... volts (1 mark)

c) While the voltmeter shows the maximum voltage V_o, open the switch and start the stop watch simultaneously. Stop when the voltage ha s dropped from V_o to 2.5 V. Read and record in table 2 the time taken.

d) Reset the stopwatch and close the switch .Repeat the procedure in (c) to measure and record the time taken for the voltage to drop from V_o, to each of the other values shown in the Table. Complete the table.

Voltage (V)	2.5	2.25	2.0	1.75	1.50	1.25	1.00
Time, t (s)							
Q=CV(μC)							

e) Plot a graph of quantity of charge, Q against time, t. (5 marks)



f) Use the graph to determine the

ii) Half life, t (1 mark)

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ii) Resistance **R** of the voltmeter given that $t=0.693\ CR$ where C is the capacitance of the capacitor. (1 mark)

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iii) Current flowing in the circuit at the first half life (3 marks)

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