

NAME _____
SCHOOL _____

INDEX NO. _____
SIGNATURE _____
DATE _____

232 / 3

PHYSICS

PAPER 3

(PRACTICAL)

TIME: 2½ HOURS

SUNRISE EXAMS FORM 4-2021

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

232 / 3

PHYSICS

PAPER 3

(PRACTICAL)

TIME: 2½ HOURS

INSTRUCTIONS TO CANDIDATES

- Write your name, school and index number in the spaces provided above.
- Sign and write the date of the examination in the spaces provided above.
- You are not allowed to start working with the apparatus for the first 15 minutes of the 2½ hours allowed for this paper. This time is to enable you read the question paper and make sure you have all the apparatus you may need.
- Marks are given for a clear record of the observations actually made, for their suitability and accuracy and the use made of them.
- Candidates are advised to record their observations as soon as they are made.
- Mathematical tables and electronic calculators **may be** used in calculations.

FOR OFFICIAL USE ONLY

Question 1	b	e	f(i)	f(ii)	f(iii)	f(iv)
Maximum Score	2	6	5	3	2	2
Candidate's Score						
Question 2	c(i)	c(ii)	d	e	f	g
Maximum Score	1	1	7	5	3	3
Candidate's Score						

TOTAL
TOTAL

GRAND TOTAL

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This paper consists of 7 printed pages.

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

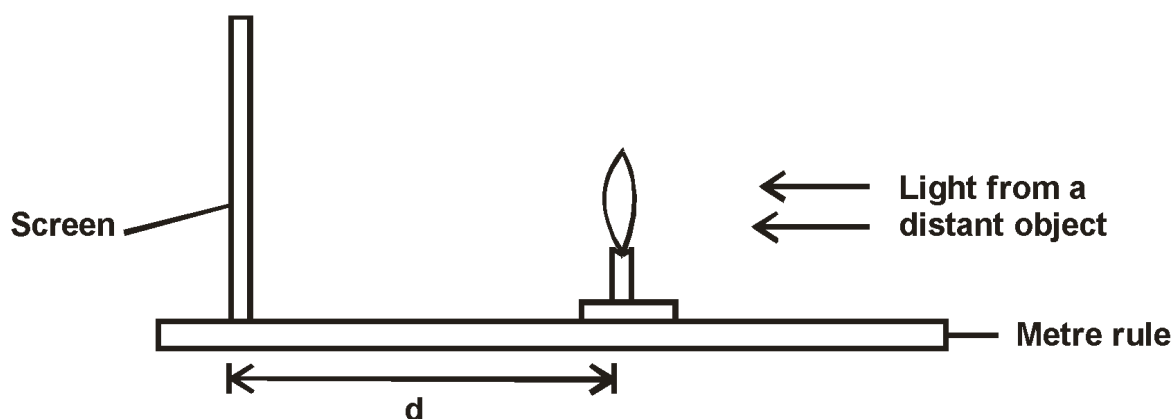
Turn Over

1. You are provided with the following;

- A candle
- A white screen
- A metre rule
- A lens
- A lens holder
- A piece of plasticine.

Proceed as follows:

a) Arrange the apparatus as shown below.



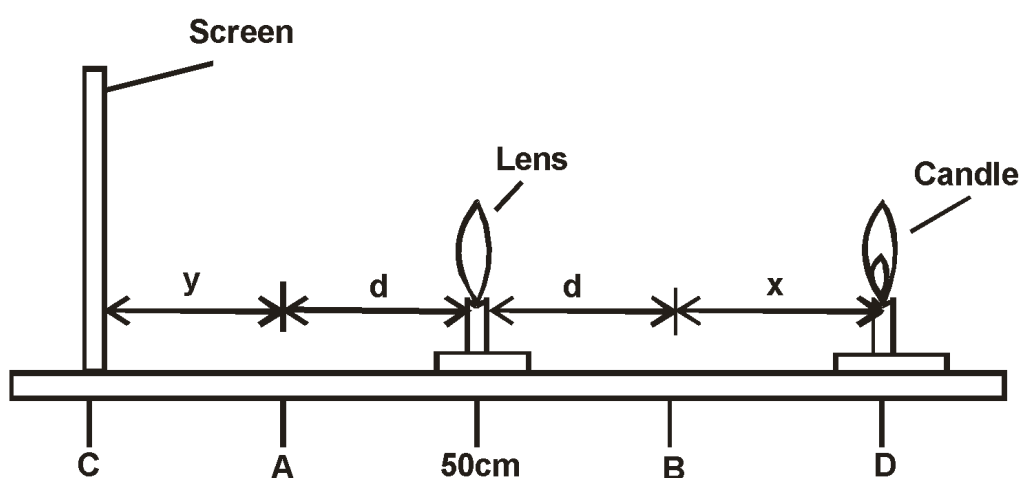
b) Adjust the distance of the lens from the screen until a well-focused image of a very distant object like a tree, is seen on the screen. Record the distance between the screen and the lens as d .

$d =$ _____ cm (1 mark)

$d =$ _____ m (1 mark)

c) Now place the lens at the midpoint of the metre rule.

(It will remain at this point throughout the entire experiment) Arrange the screen and lit candle as shown below.



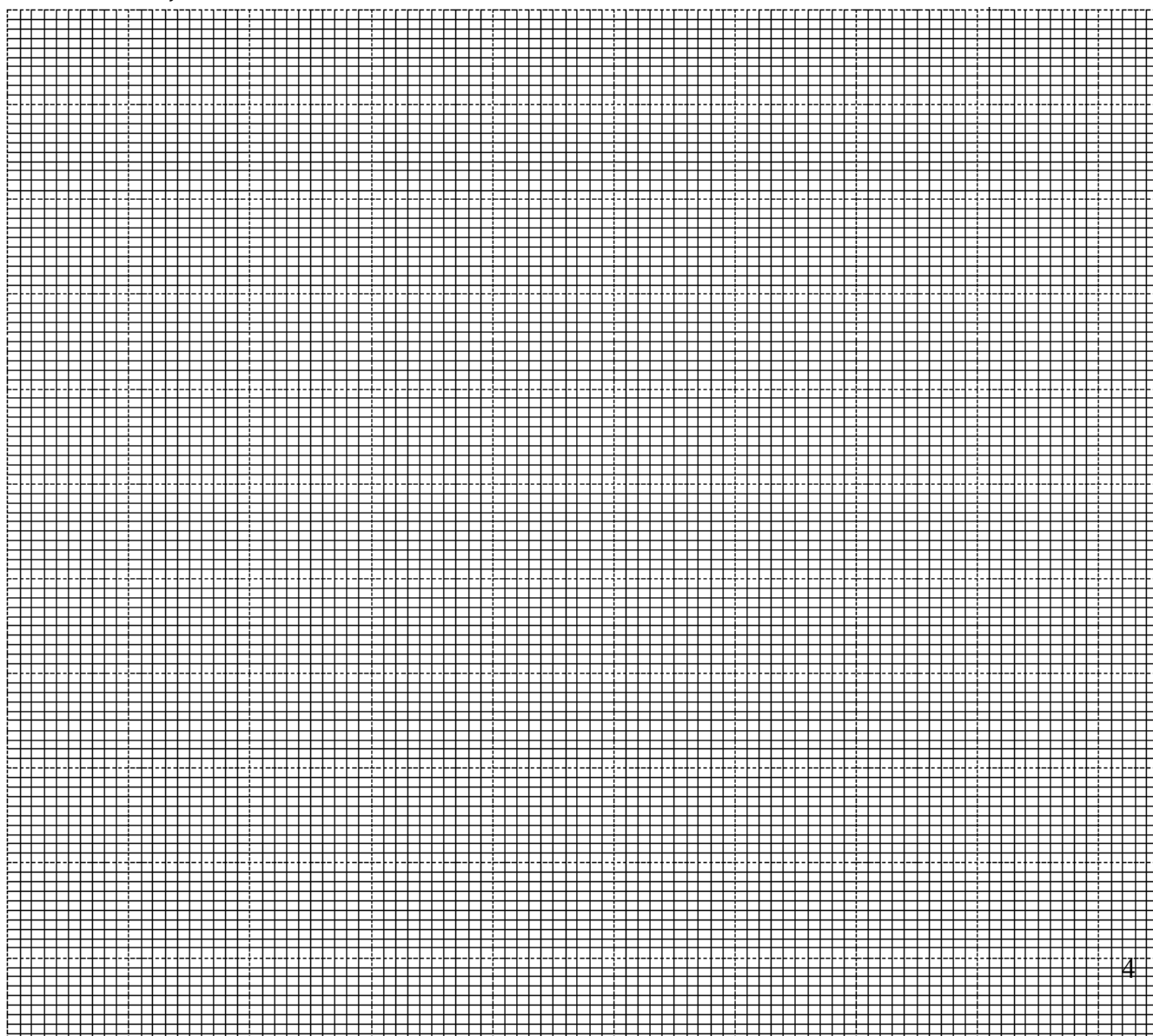
Mark the point A and B each of which a distance ' d ' from the lens.

- d) Place the lit candle at point d, 30cm from B. Adjust the position of the screen until a sharp image appears on it. The screen is at C. Measure BD and AC and record them as x and y respectively in the table below.

BD = x (cm)	AC = y (cm)	$\frac{1}{y}$ (cm ⁻¹)
30		
25		
20		
15		
10		

- e) Repeat the procedure in (d) above for other values of x in the table and complete it. (6 marks)

- f) i) Draw a graph $\frac{1}{y}$ (y-axis) against x. (5 marks)



ii) Determine the slope S of the graph.

(3 marks)

iii) Calculate the value of m given that

$$m = \sqrt{\frac{1}{s}}$$

(2 marks)

iv) Comment on values of m and d.

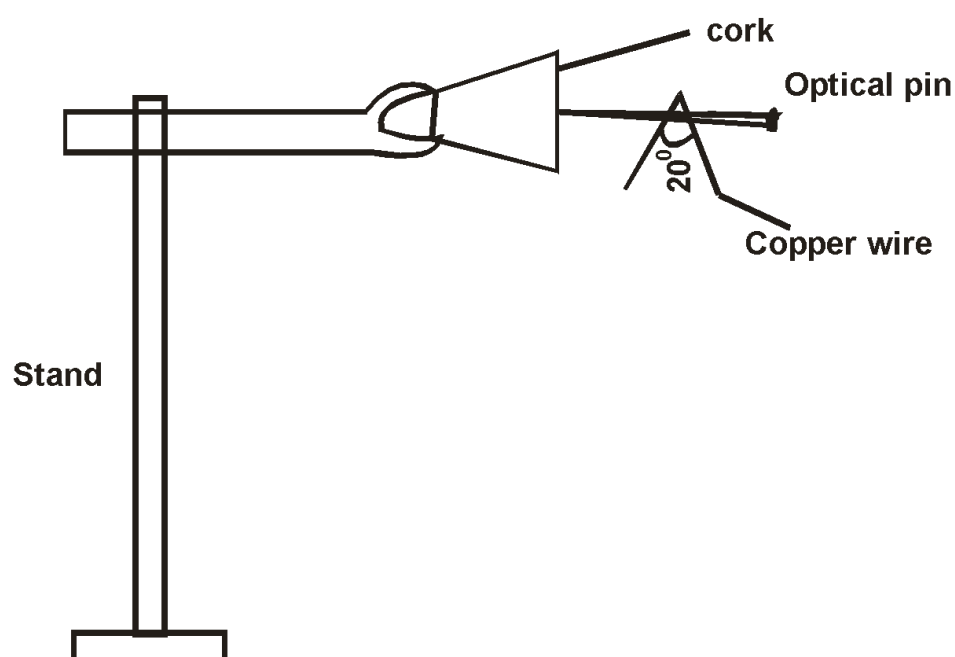
(2 marks)

2. You are provided with the following:

- Clamp, boss and stand
- Optical pin fixed on a piece of cork.
- Copper wire of length 15cm
- Protractor
- Stop watch

Proceed as follows:

- a) Bend the wire in the middle so that the angle formed is 20° .
- b) Set-up the apparatus as shown in the diagram below.



- c) i) Displace the wire horizontally and allow it to swing freely. Record time for 10 complete oscillations.

$t =$ _____ seconds (1 mark)

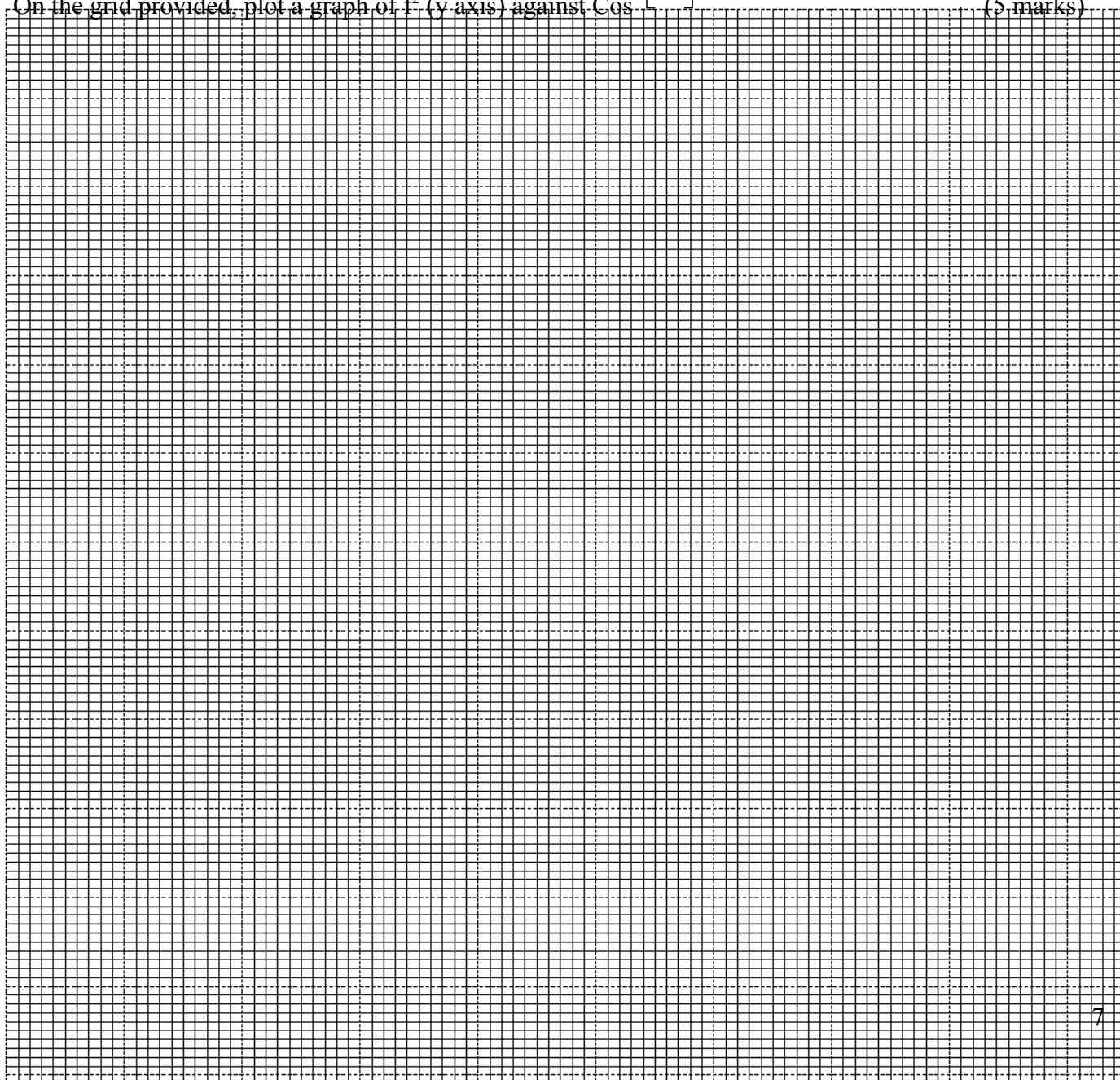
- ii) Calculate frequency, f at time in (i) above. (1 mark)

d) Repeat the procedure above (c) for other given angles on the table below.

Angle θ^0	Time for 10 oscillation t (s)	Frequency, $f = \frac{t}{10}$	$f^2(\text{Hz})^2$	$\text{Cos}\left(\frac{\theta}{2}\right)$
20 ⁰				
40 ⁰				
60 ⁰				
80 ⁰				
100 ⁰				
120 ⁰				

(7 marks)

e) On the grid provided, plot a graph of f^2 (y axis) against $\text{Cos}\left[\frac{\theta^0}{2}\right]$ (5 marks)



f) Find the gradient of the graph. (3 marks)

g) The equation of the graph is $f^2 = \frac{150K}{4\pi^2 L} \cos \frac{\theta}{2}$ determine the value of constant K if L is the total length of the wire in centimeters. (3 marks)