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# KENYA NATIONAL EXAMINATION COUNCIL

## KCSE 2007

### PHYSICS PAPER 3

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23.5.3 Physics Paper 3(232/3)

Name.....Index Number...../.....

232/3  
**PHYSICS**  
**PRACTICAL**  
 Paper 3  
 Oct./Nov. 2007  
 2½ hours

Candidate's Signature.....

Date.....

**THE KENYA NATIONAL EXAMINATIONS COUNCIL**  
**Kenya Certificate of Secondary Education**  
**PHYSICS**  
**PRACTICAL**  
 Paper 3  
 2½ hours

*Write your name, index number and sign in the spaces provided above.  
 Sign and write the date of examination in the spaces provided above.  
 Answer ALL the questions in the spaces provided in the question paper.  
 You are supposed to spend the first 15 minutes of the 2½ hours allowed for this paper reading the whole paper carefully before commencing your work.  
 Marks are given for a clear record of the observations actually made, their suitability, accuracy, and the use made of them.  
 Candidates are advised to record their observations as soon as they are made.  
 Non-programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise.*

**For Examiner's Use Only**

**Question 1**

	c	d	e	f	g
<b>Maximum Score</b>	8	5	3	2	2
<b>Candidate's Score</b>					

**Total**

**Question 2**

	b(i)	c	d	e	f	g(i)	g(ii)	g(iii)
<b>Maximum Score</b>	1	6	5	3	2	1	1	1
<b>Candidate's Score</b>								

**Total**

**Grand total**

**This paper consists of 8 printed pages**

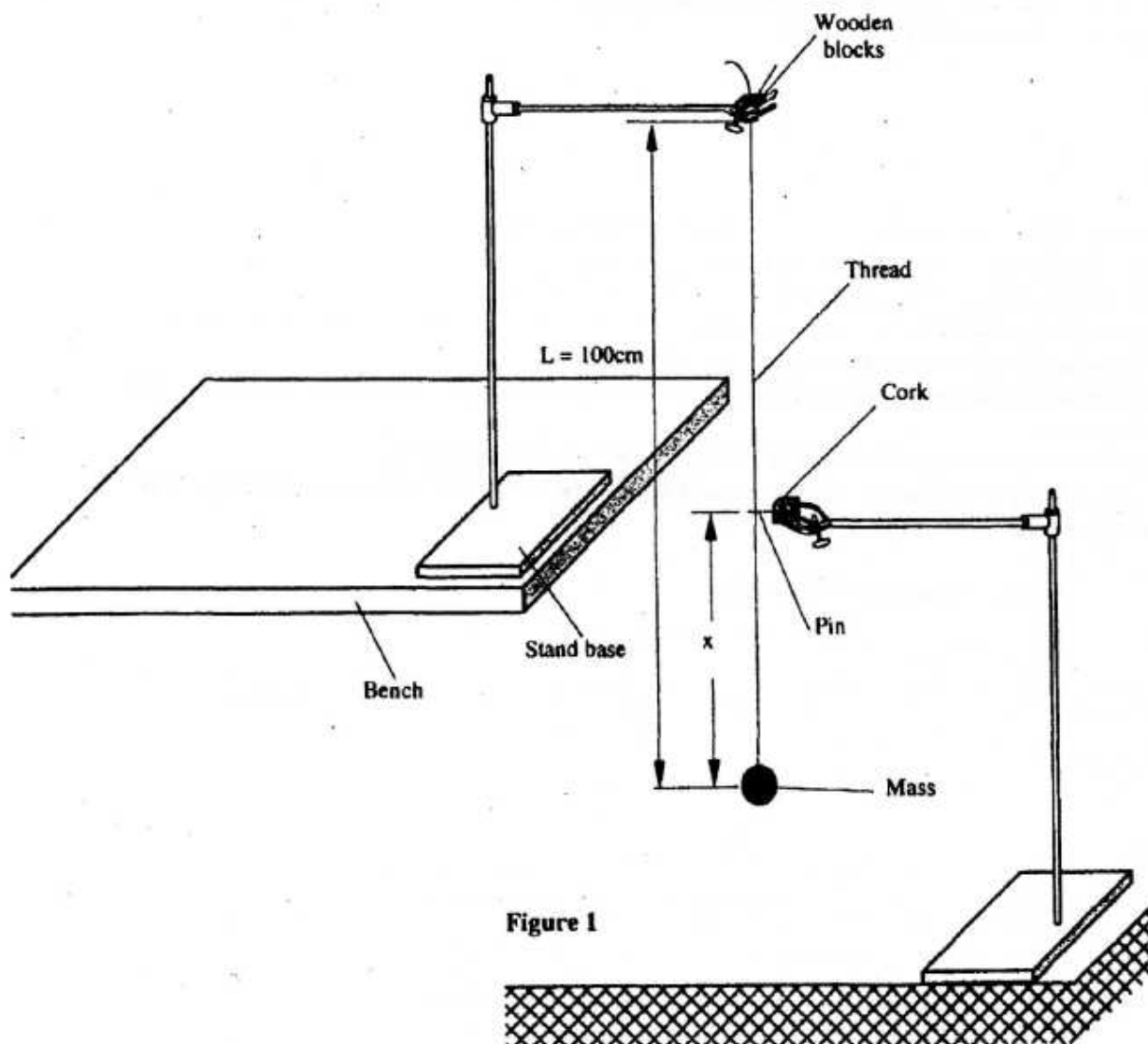
**Candidates should check the question paper to ascertain that all the pages are printed as indicated and no questions are missing.**

1. You are provided with the following:

- a metre rule.
- an optical pin fixed to a piece of cork.
- two retort stands, two bosses and two clamps.
- two wooden blocks.
- a stop watch.
- some thread tied to a mass.

Proceed as follows:

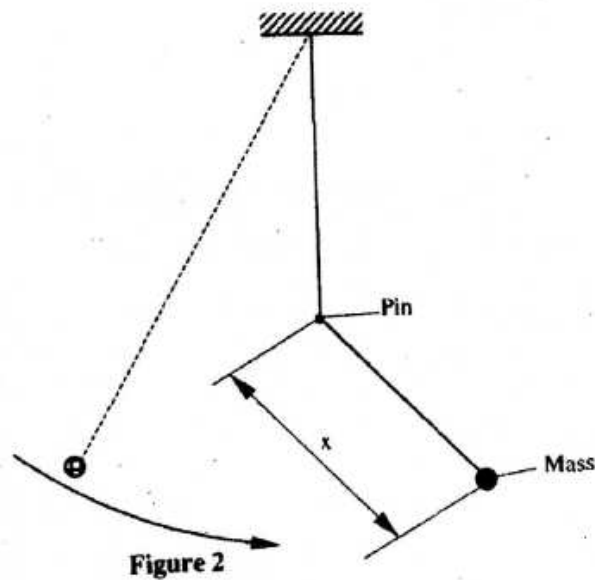
(a) Set up the apparatus as shown in figure 1.



The thread tied to the mass should be held firmly between the two blocks of wood and clamped to the upper end of the stand so that the mass hangs freely. The distance  $L$  between the point of support and the centre of the mass is 100 cm. Ensure that  $L$  remains constant throughout the experiment.

Adjust the lower clamp so that the optical pin just touches the thread when the hanging mass is at rest.

- (b) Adjust the position of the lower clamp so that the pin is at a distance  $X = 35$  cm above the centre of the mass. Displace the mass slightly to one side and release it so that it swings in a plane perpendicular to the pin and the thread hits the pin as shown in Figure 2.



Measure and record in table 1 the time  $t$  for 20 oscillations.

- (c) Repeat the procedure in (b) for other values of  $X$  shown in table 1. Complete the table.

**Table 1**

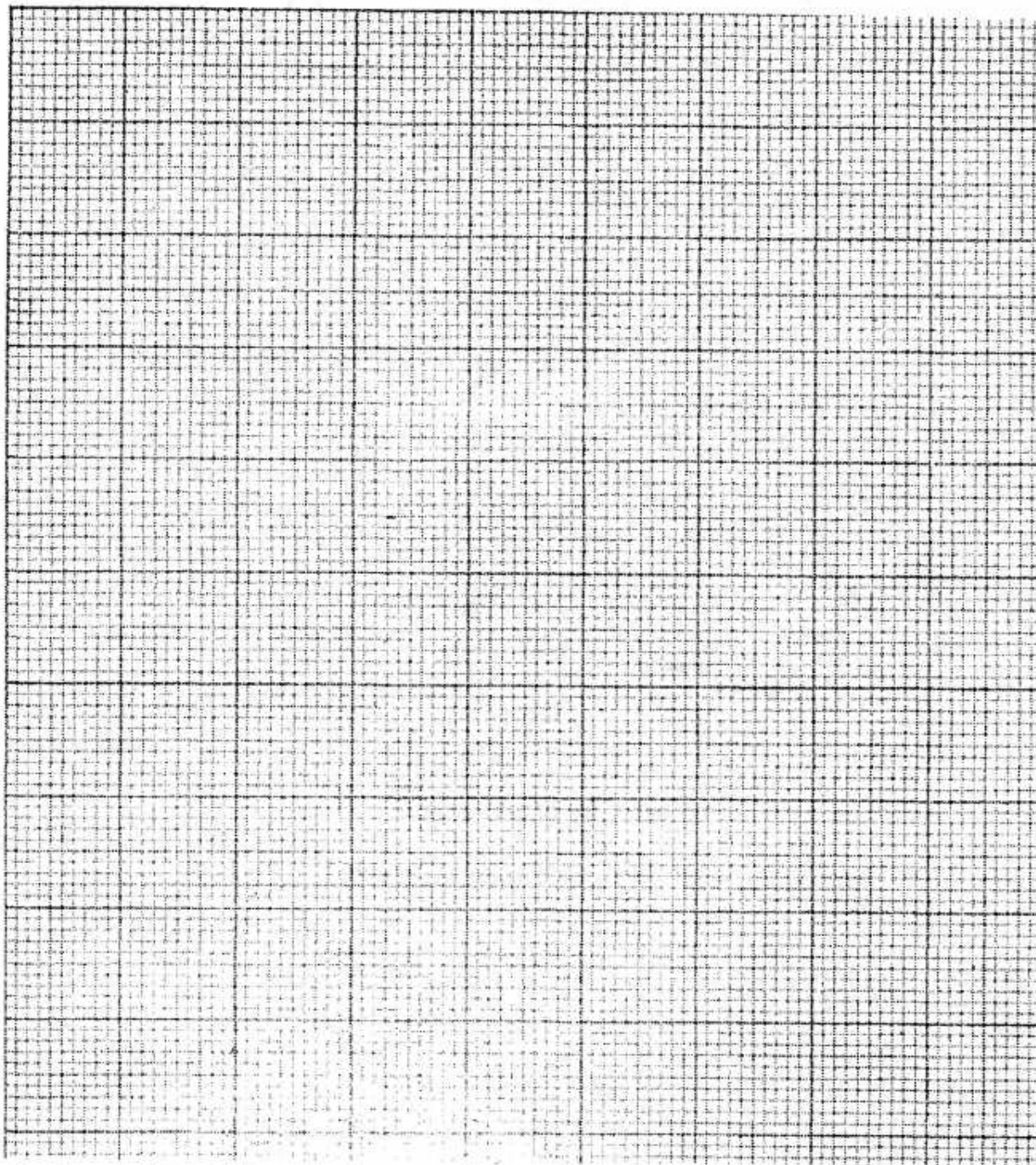
Distance $X$ (cm)	35	40	45	50	55	60
Time $t$ for 20 osc (s)						
$T = \frac{t}{20}$ (s)						

(8 marks)

On the grid provided

(d) Plot the graph of T(y-axis) against X.

(5 marks)



(e) Determine the slope S of the graph at a point X = 52 cm.

(3 marks)

(f) Determine the constant n given that  $n = 52S^2$

(2 marks)

(g) Determine the constant P given that  $P = \frac{\pi^2}{4n}$

(2 marks)

2. You are provided with the following:

- a voltmeter.
- two cells and a cell holder.
- a switch.
- a set of six resistors each of resistance  $1000\Omega$ .
- connecting wires.

Proceed as follows:

(a) Set up the apparatus as shown in the circuit diagram in Figure 3.

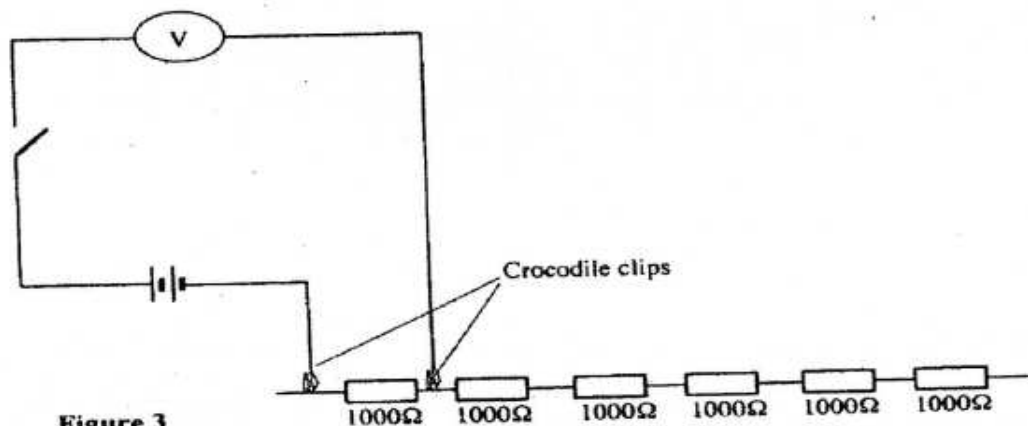


Figure 3

(b) (i) Record the voltmeter reading  $E$ , when the crocodile clips are connected together ( $R = 0$ ).

$E =$  \_\_\_\_\_ volts. (1 mark)

Open the switch and separate the crocodile clips.

Indicate by ticking below, the range of the voltmeter used

0 – 3V       0 – 5V       0 – 15V

(ii) Now connect the crocodile clips across resistance  $R = 1000\Omega$ . Close the switch and record in **table 2** the voltmeter reading  $V$ . Open the switch.

(c) Repeat the procedure in (b)(ii) for other values of resistance  $R$  shown in the table. Complete the table.

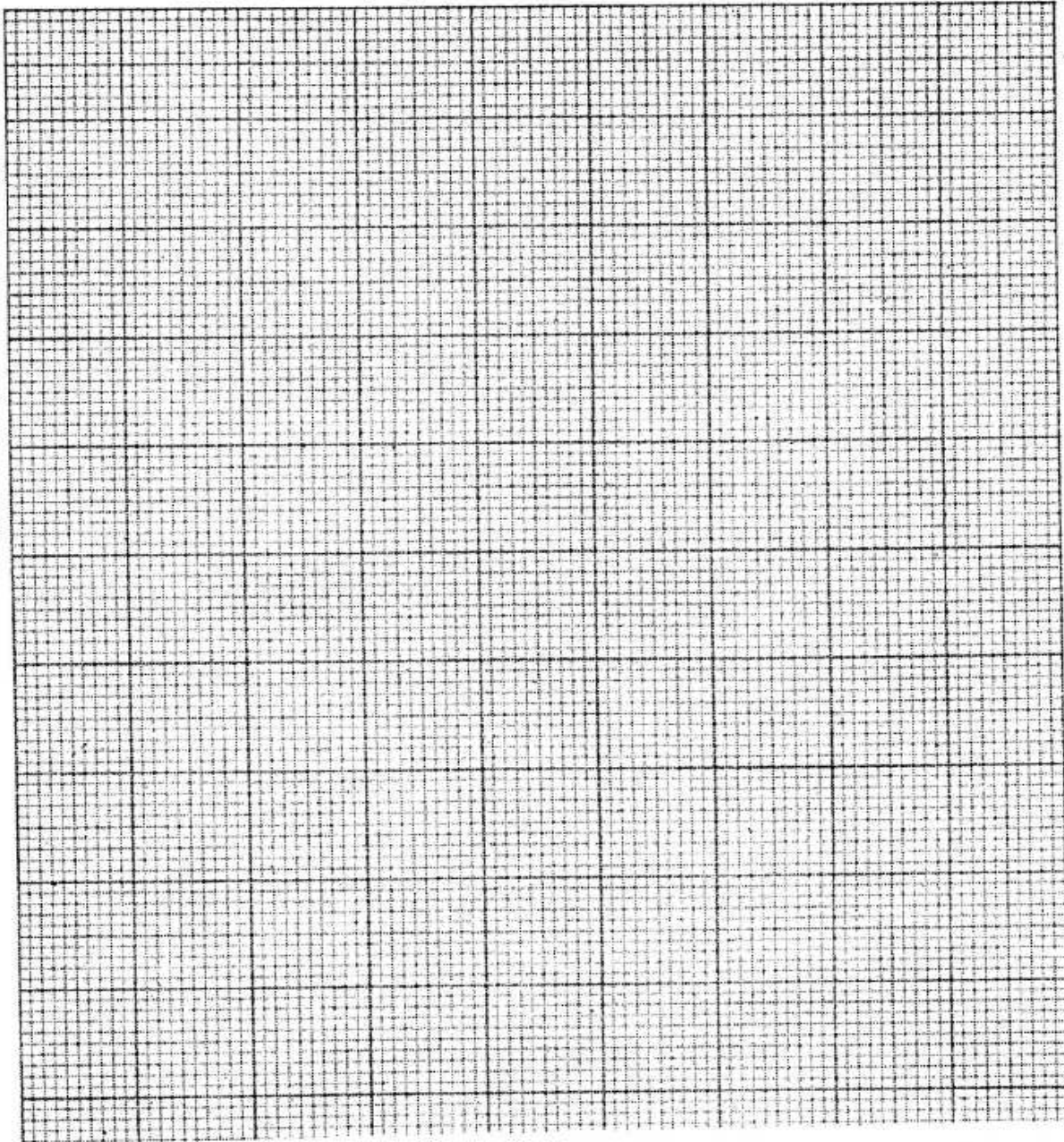
Table 2

Resistance $R$ ( $\Omega$ )	1000	2000	3000	4000	5000	6000
$V(v)$						
$\frac{1}{V}(v^{-1})$						

(6 marks)

- (d) On the grid provided plot the graph of R (y axis) against  $\frac{1}{V}$  (5 marks)

**Hint:** Draw your axes to include point (0, 0) half way up the page i.e. the  $\frac{1}{V}$  axis to run across the middle of the page.



- (e) Determine the slope S of the graph. (3 marks)

- (f) Determine the constant G given that  $G = \frac{S}{E}$  (2 marks)

- (g) From the graph determine

- (i)  $V_0$ , the value of V when R = 0 (1 mark)

- (ii)  $R_g$  the value of R when  $\frac{1}{V} = 0$  (1 mark)
- (iii) Determine  $\frac{G}{R_s}$  (1 mark)
- (e) Determine the slope S of the graph at a point X = 52 cm. (3 marks)
- (f) Determine the constant n given that  $n = 52S^2$  (2 marks)
- (g) Determine the constant P given that  $P = \frac{\pi^2}{4n}$  (2 marks)

2. You are provided with the following:

- a voltmeter.
- two cells and a cell holder.
- a switch.
- a set of six resistors each of resistance  $1000\Omega$ .
- connecting wires.

- (e) Determine the slope S of the graph. (3 marks)
- (f) Determine the constant G given that  $G = \frac{S}{E}$  (2 marks)
- (g) From the graph determine
- (i)  $V_o$ , the value of V when R = 0 (1 mark)
- (ii)  $R_g$  the value of R when  $\frac{1}{V} = 0$  (1 mark)