NAME:……ADM NO:……CLASS……
SCHOOL……. CANDIDATE'S SIGNATURE……
DATE:……

EMBU NORTH COMMON EVALUATION EXAMINATION 2ND TERM YEAR 2018

232/3
PHYSICS PAPER 3
(THEORY)
TIME: $2\frac{1}{2}$ HOURS

INSTRUCTIONS TO CANDIDATES:

- ***(a)*** Write your name and admission number in spaces provided above.
- ***(b)*** Sign and write the date of examination in spaces provided above
- ***(c)*** Answer all the questions in spaces provided in the question paper.
- ***(d)*** You are allowed to spend the first 15 minutes of $2\frac{1}{2}$ hours allowed for this paper reading the whole paper carefully before commencing the work.
- ***(e)*** Marks given for clear record of the observations actually made, their suitability accuracy and the use made of them.
- ***(f)*** Candidates are advised to record their observations as soon as they are made.
- ***(g)*** Non-programmable silent electronic calculators and KNEC Mathematical table may be used.

1. This question consists of two parts A and B; attempt both parts.

PART A (15 MARKS)

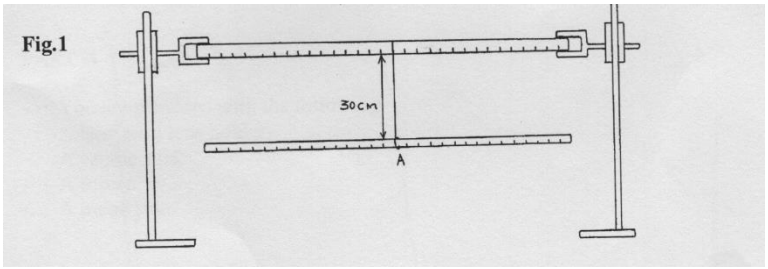
You are provided with the following.

- Two metre-rules
- A stop watch
- A half metre-rule
- Two resort stands, two bosses and two clamps.
- Some sewing thread.
- A pendulum bob.

Proceed as follows:

(a) Clamp one metre rule horizontally on the two stands so that it is on a vertical plane. Suspend the second metre rule so that it balances on one point as shown in figure 1 below. Note the balance point as the centre of gravity of the metre rule.
Let this be point A.

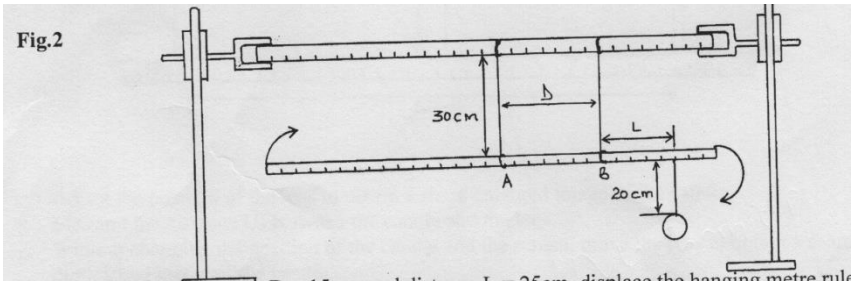
Fig.1



(b) Set the length of the string on which the metre rule is suspended to be 30cm.
Tie a second support to the metre rule a distance D from the first string.
Let the point of support be point B.

(c) Suspend the pendulum bob with a string a distance L from B and set the length of the string to 20cm. See figure 2 below.

Fig.2



Starting with a distance D=15cm, and distance L=25cm, displace the hanging metre rule on a horizontal plane and record the time taken for it to make 20 complete oscillations on table 1.

(d) Repeat part (c) above for other values of D and complete the table.

D(cm)	***Time for 20 oscillations (s)***	***Periodic time (T) (s)***	***T^2 (s^2)***
15			
20			
25			
30			
35			
40			

Table 1 (6mks)

(e) On the grid provided, plot a graph of D (cm) against $T^2(s^2)$ (5mks)

(f) Determine the slope of the graph. (2mks)

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(g) Use your graph to determine the periodic time when the length of distance D is 33cm. (2mks)

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PART B. 5 MARKS

(b) You are provided with the following apparatus:

- Candle
- Lens
- Lens holder
- Metre rule
- Screen with a crosswire
- Screen.

Proceed as follows:

i. Arrange the apparatus as shown in the figure 2 below.

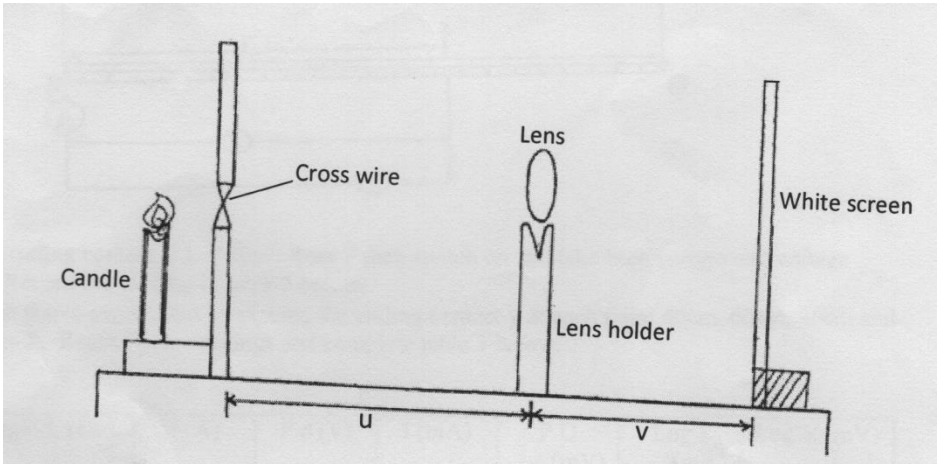

Fig 2

ii. Place the cross-wire before the lens so that U=28cm. The lit candle should be placed close to the cross-wire.

iii. Adjust the position of the screen until a sharp image is cast on the screen.

iv. Measure and record the value distance, V, in the table

v. Repeat the same procedure for the other values in the table.

U(cm)	**V(cm)**	$\boldsymbol{M=\frac{V}{U}}$
30		
36		

(3 mks)

Table 2

vi. Given that the focal length f of the lens satisfies the equation $f=\frac{V}{1+M}$, determine the average value of the focal length, f. (2 mks)

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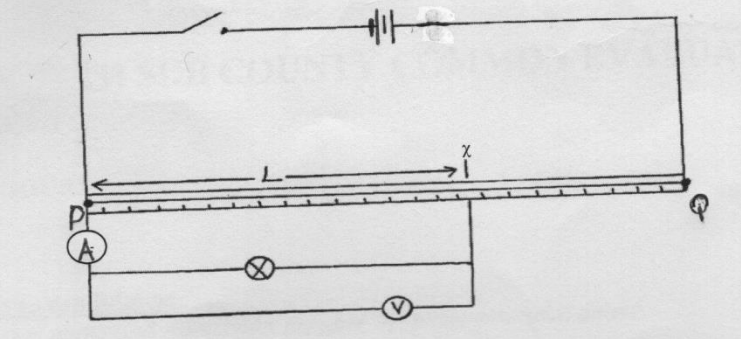
2. You are provided with the following.
    - A switch
    - A 100cm nichrome wire mounted on a metre rule.
    - An ammeter
    - 2 dry cells
    - A cell holder
    - A bulb of 2.5V mounted on a holder.
    - Eight connecting wires (four with crocodile clips at one end)
    - Voltmeter (0-3 or 0-5V)

PROCEED AS FOLLOWS.

(a) Connect the apparatus provided as shown in the circuit in ***figure 3*** below.
Fig 3



(b) Place the sliding contact x at L=20cm from P then switch on and take both current and voltage reading. Record the reading in ***table 3*** above.

(c) Repeat the above experiment by placing the sliding contact x at each point 40cm, 60cm, 70cm and 80cm from P. Record your readings and complete table 3.

Length L (cm)	***I (A)***	***P.d (V)***	***1(mA)***	***P.D (mV)***	***Log I (mA)***	***LogV(mV)***
20						
40						
60						
70						
80						

Table 3 (8mks)

(d) Plot a graph of Log ***I*** against Log ***V***. (5mks)

(e) Determine the slope of the graph. (3mks)

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(f) The relationship between I and P.D is given by the equation.
Log I= n Log V+ Log K where K and n are constants. Determine using the graph the value of:

i) K (2mks)

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ii) n (2mks)

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