Name ..... Index No. .....

232/3
PHYSICS
Paper 3
(Practical)
July/August 2014
Time: 2½ Hours

Candidate's Signature .....

Date .....

WESTLANDS FORM 4 JOINT EXAMINATION
Kenya Certificate of Secondary Education

PHYSICS
Paper 3
July/August 2014
Time: 2½ Hours

INSTRUCTIONS TO CANDIDATES

* Write your name and index number 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.
* 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 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.

For Examiner's Use Only

Question 1 : Part 1	c	d	e	f	Part II	b	c	Total
Maximum score	6	5	2	2		3	2	20
Candidates score								

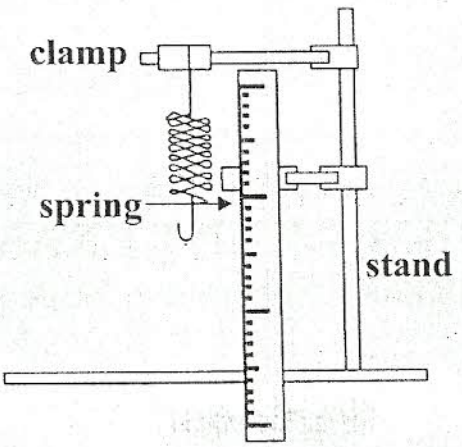
Question 2	a	b	c	d(i)	d(ii)	e(i)	e(ii)	Total
Maximum score	1	6	5	3	2	2	1	20
Candidates score								

GRAND TOTAL

1. You are provided with the following :
   - a spiral spring with pointer
   - two pieces of wood
   - a retort stand, two bosses and two clamps
   - a metre rule
   - a stop watch
   - two 20g masses, two 50g masses, a 100g mass

   Proceed as follows:

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



   Read the pointer position L_0 = ...cm

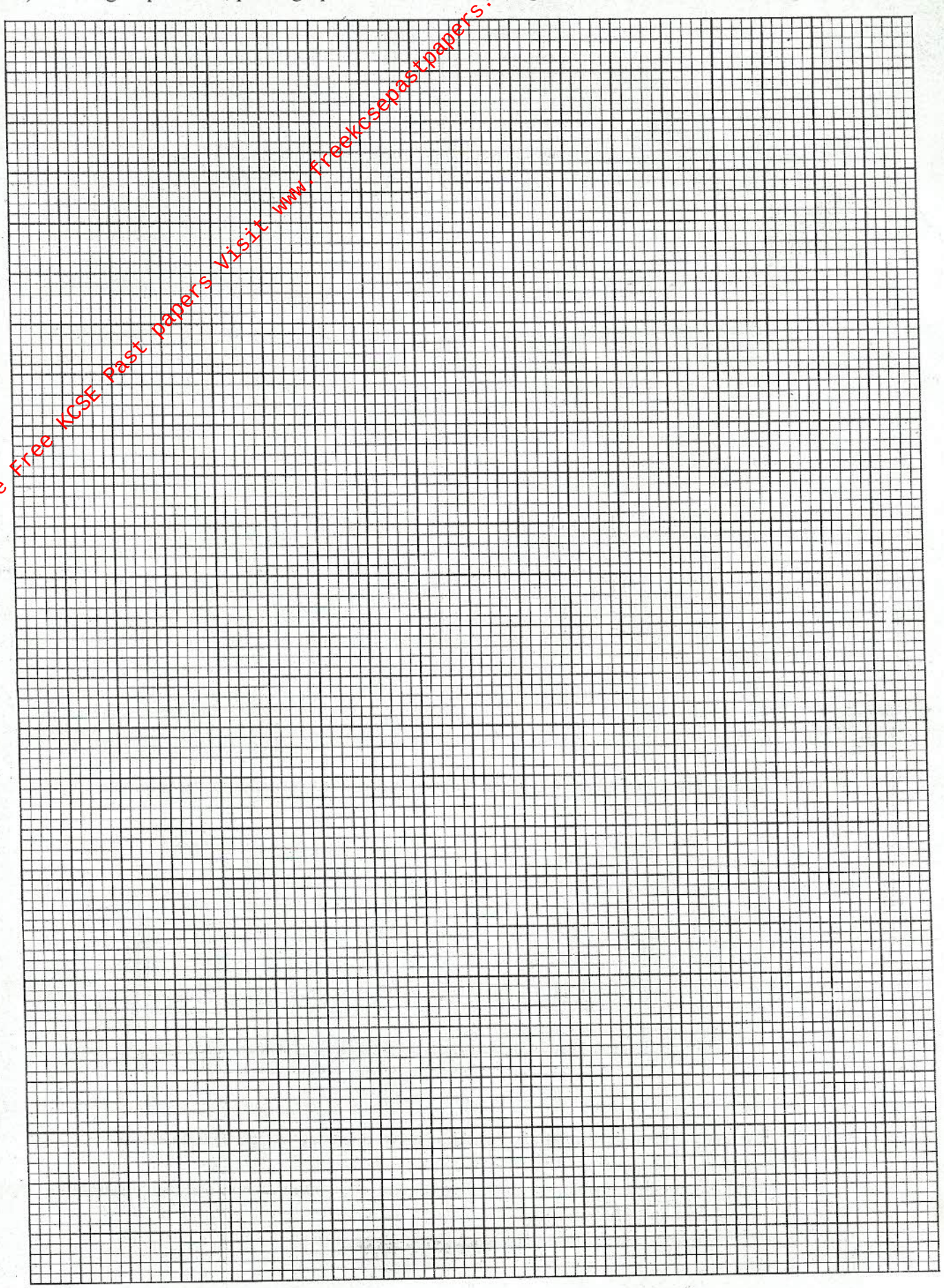
   b) i) Hang a 100g mass on the spring and record the new pointer reading in the table below.
   ii) Displace the mass slightly downwards and release it to oscillate. Take time for 20 oscillations and record in the table below.

   c) Repeat the procedure in (c) above for the other values of mass shown in the table and complete the table below.

Mass, m (g)	100	120	140	150	170	190	200
L (cm)							
Extension, L - L_0 (cm)							
Extension, e (m)							
Time for 20 oscillations (s)							
Period time, T(s)							
T^2 (S^2)							

(6 marks)

d) On the grid provided, plot a graph of extension, e (m) against T^2 (5 marks)



e) Determine the slope of the graph, S (2 marks)

f) i) Determine the constant, h given that $S = \frac{h}{4\pi^2}$ (1 mark)

ii) What is the significance of h. (1 mark)

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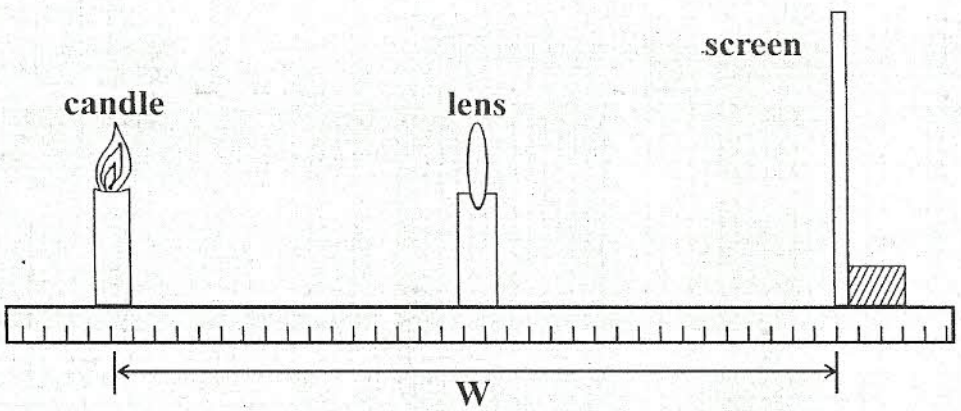
PART II

You are provided with the following apparatus
- a lens and a lens holder
- a candle
- a screen
- a metre rule

a) Set up the apparatus as shown in the figure below (Fig. 3) such that W = 55cm.



Adjust the position of the lens to obtain a sharp enlarged image of the candle
Measure the distance U_1 between the candle and the lens
Without changing the position of the candle and the screen, move the lens to obtain a sharp diminished image of the candle
Measure the distance U_2 between the candle and the lens
Record the values of U_1 and U_2 in the table below.

b) Repeat the procedure in (a) above for S = 45cm. Complete the table below.

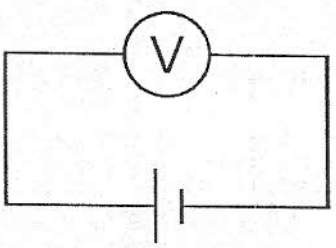
W (cm)	U_1 (cm)	U_2 (cm)	$D = U_2 - U_1$ (cm)
55			
45			

c) Given that $f = \frac{w^2 - d^2}{4w}$ where f is the focal length of the screen, determine the average value of the focal length, f.

(2 marks)

2. You are provided with the following :
- a voltmeter
- an ammeter
- a dry cell
- a cell holder
- a switch
- 7 connecting wires (4 wires with crocodile clips at one end)
- a mounted resistance wire

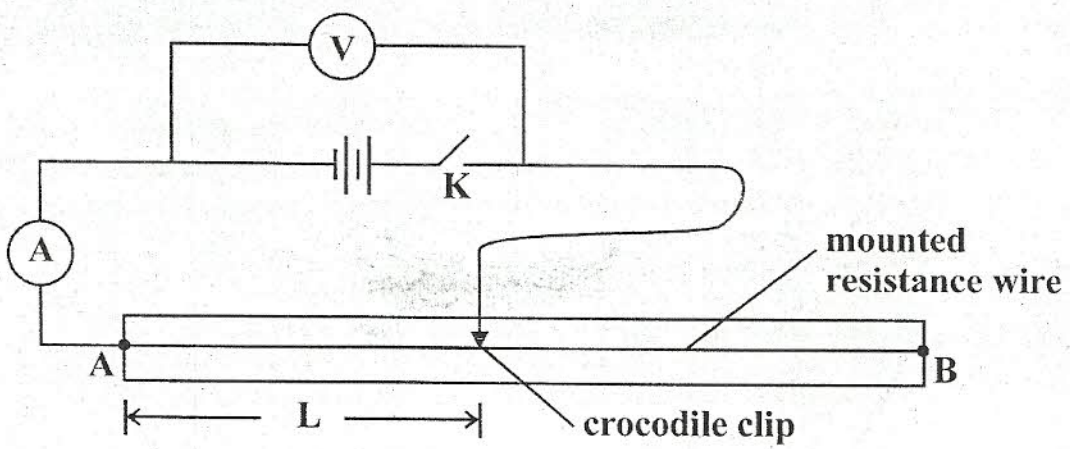
a) Connect voltmeter across the dry cell on an open circuit. Measure its e.m.f.



E = ...

(1 mark)

b) Now connect the apparatus provided as shown below.



Place the crocodile clip/jockey on the wire AB starting with L = 20cm. Close the switch K. Record the terminal p.d, V and the corresponding current I in the table 1. Repeat for other values of L shown and complete the table.

Table 1

Length L (cm)	Terminal p.d V (V)	Current I (A)	$\frac{1}{R} = \frac{I}{V} (\Omega^{-1})$	$\frac{I}{V} (V^{-1}) \times 10^{-2}$
20				
30				
40				
50				
60				
70				

(6 marks)

c) Plot a graph of $\frac{I}{V} \times 10^{-2}$ (y-axis) against $\frac{1}{R}$ (5 marks)

(Graph paper provided on page 7)

d) Given that the equation of graph is; $\frac{1}{V} = \frac{r}{E} \cdot \frac{1}{R} + \frac{1}{E}$

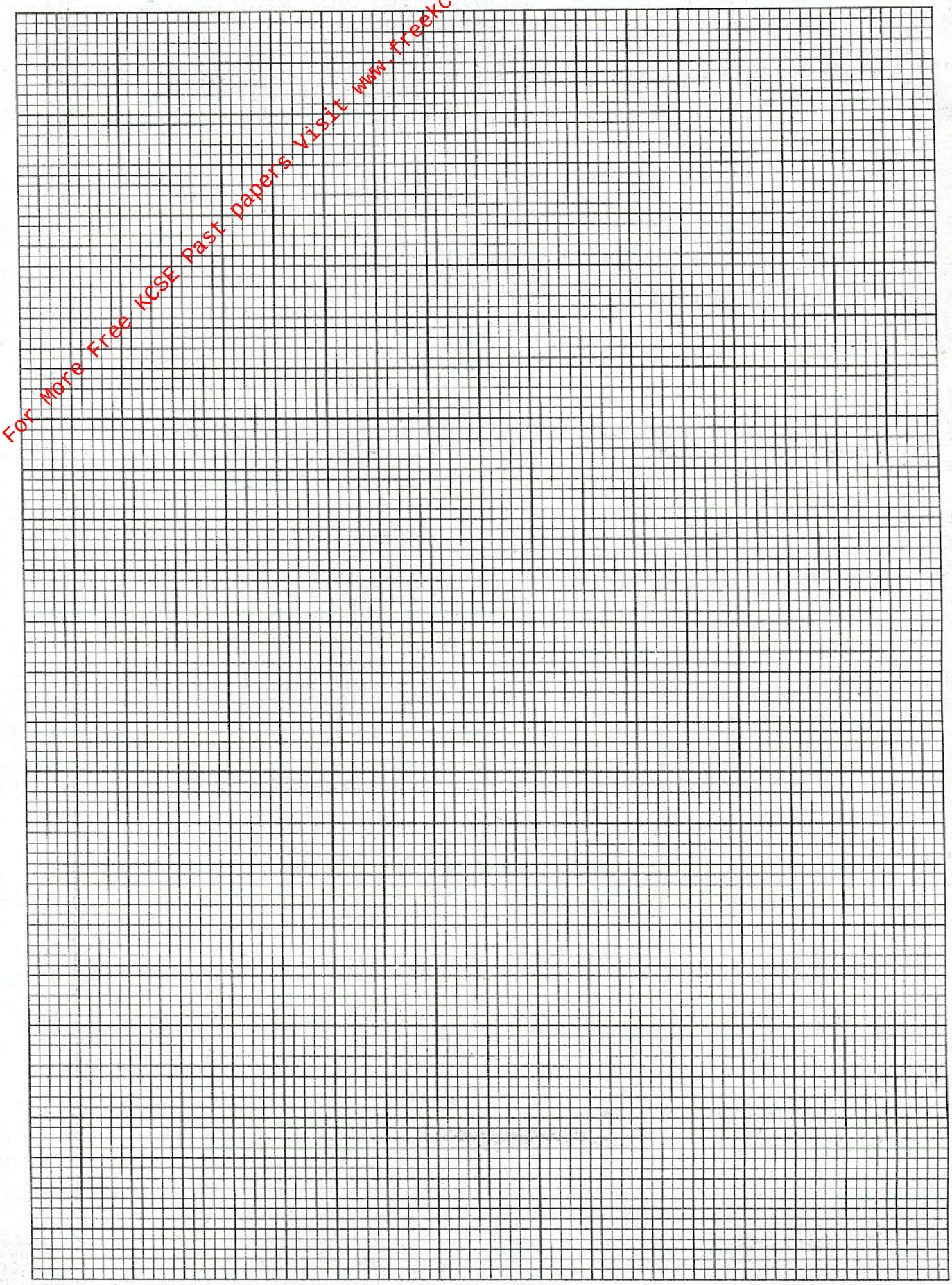
Determine from the graph :

i) the intercept C on $\frac{1}{V}$ axis

C = ... (1 mark)

and hence calculate the e.m.f, E of the cell. (2 marks)

ii) the slope S of the graph. (2 marks)



e) i) Use the values of C and S above to find W, given by $w = \frac{S}{C}$ (2 marks)

ii) What is the physical meaning of W (1 mark)