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

School: ....Date: .... Candidate's Sign ....

232/2
PHYSICS
PAPER 2 (THEORY)
FORM 4
MARCH / APRIL 2013
TIME: 2 HOURS

ELDORET EAST INTER – SCHOOLS EXAMINATION – 2013

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

INSTRUCTIONS TO CANDIDATES
- This paper consists of Two section: A and B.
- Answer ALL questions in section A and B in the spaces provided.
- All working MUST be clearly shown.
- Mathematical tables and silent non programmable Electronic calculators may be used.
- Take g = 9.8N/KG

FOR EXAMINER'S USE ONLY

Section	Question	Maximum Score	Candidate's Score
A	1 - 11	25	
B	12	14	
	13	14	
	14	13	
	15	13	
	Total Score	**80**	

SECTION A: (25MARKS)
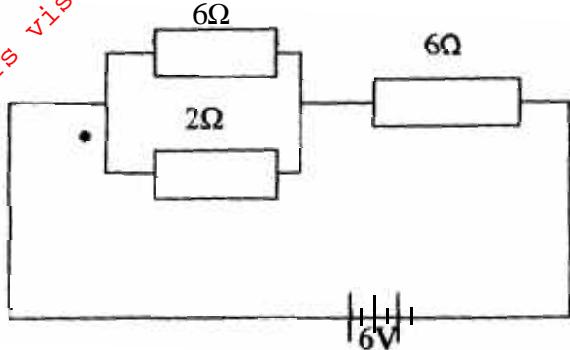
1. State any two ways of increasing the size of an image formed by a fixed pinhole camera. (2marks)

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2. State two advantages of an alkaline battery over a lead acid battery. (2marks)

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3.

The figure above shows a 6V battery connected to an arrangement of resistors. Determine the current flowing through the 2Ω resistor. (3marks)

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4. A negatively charged rod is brought near the cap of a lightly charged electroscope. The leaf divergence first reduces but as the rod comes nearer, it diverges more.
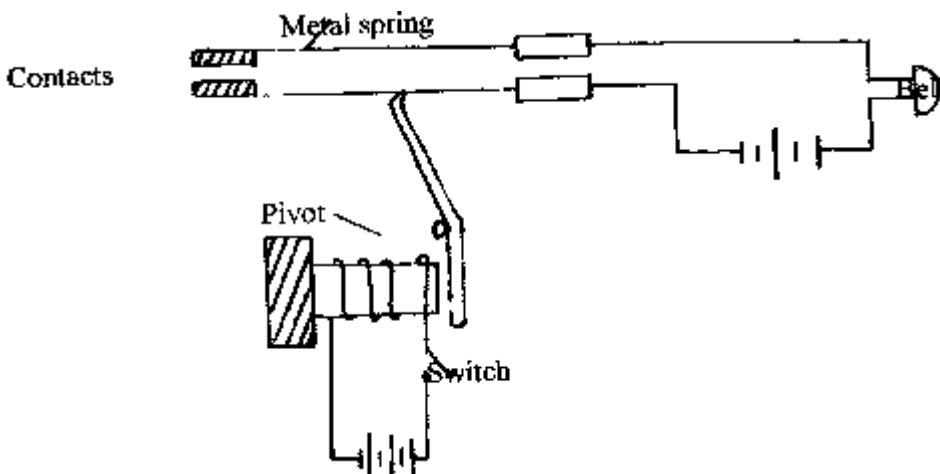
i) State the charge of the electroscope (1mark)

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ii) Explain the behavior of the leaf above. (1mark)

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5. The figure below shows an electromagnetic relay.

Explain what happened when the switch is closed. (3marks)

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6. A current 12A flows through a circuit for 2.5 minutes. How much charge passes through the circuit? (2marks)

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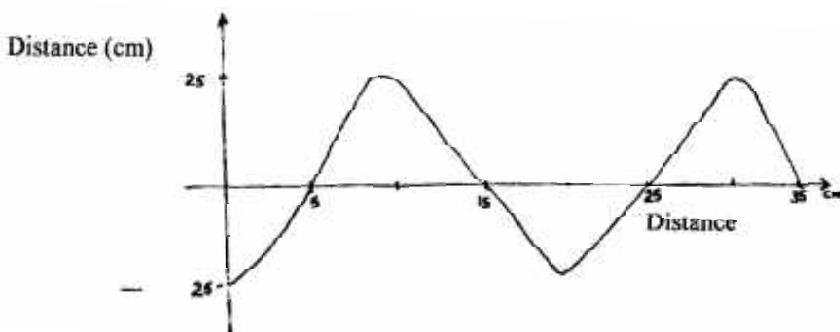
7. The diagram below shows part of a wave form. The numbers on the diagram show scales in centimeters. The speed of the wave is 16ms⁻¹

From the graph of the wave shown, determine;

a) The wavelength (1mark)

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b) The frequency (1mark)

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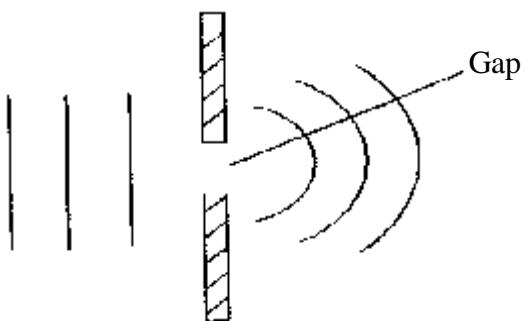
8. Figure below shows wavefront before and after passing through an opening as shown in fig.5.

State what would be observed on the pattern after passing the opening if:

i) Wave length is increased. (1mark)

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ii)   Gap is increased.   (1mark)

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9.   State two ways by which the frequency of a note produced by a sonometer wire may be
       increased.   (2marks)

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10.   An electric kettle rated at 2.0kw, 240v is filled with water. If the water requires 7.0×10^5 Joules
       of heat to boil from the initial temperature, determine the resistance of the element. (3marks)

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11.   A certain glass material has a refractive index of 2.5. What is its critical angle?   (2marks)

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SECTION B: (55MARKS)

12.   A student carried out an experiment to investigate how current varies with potential difference
       applied across a filament lamp. The following readings were obtained.
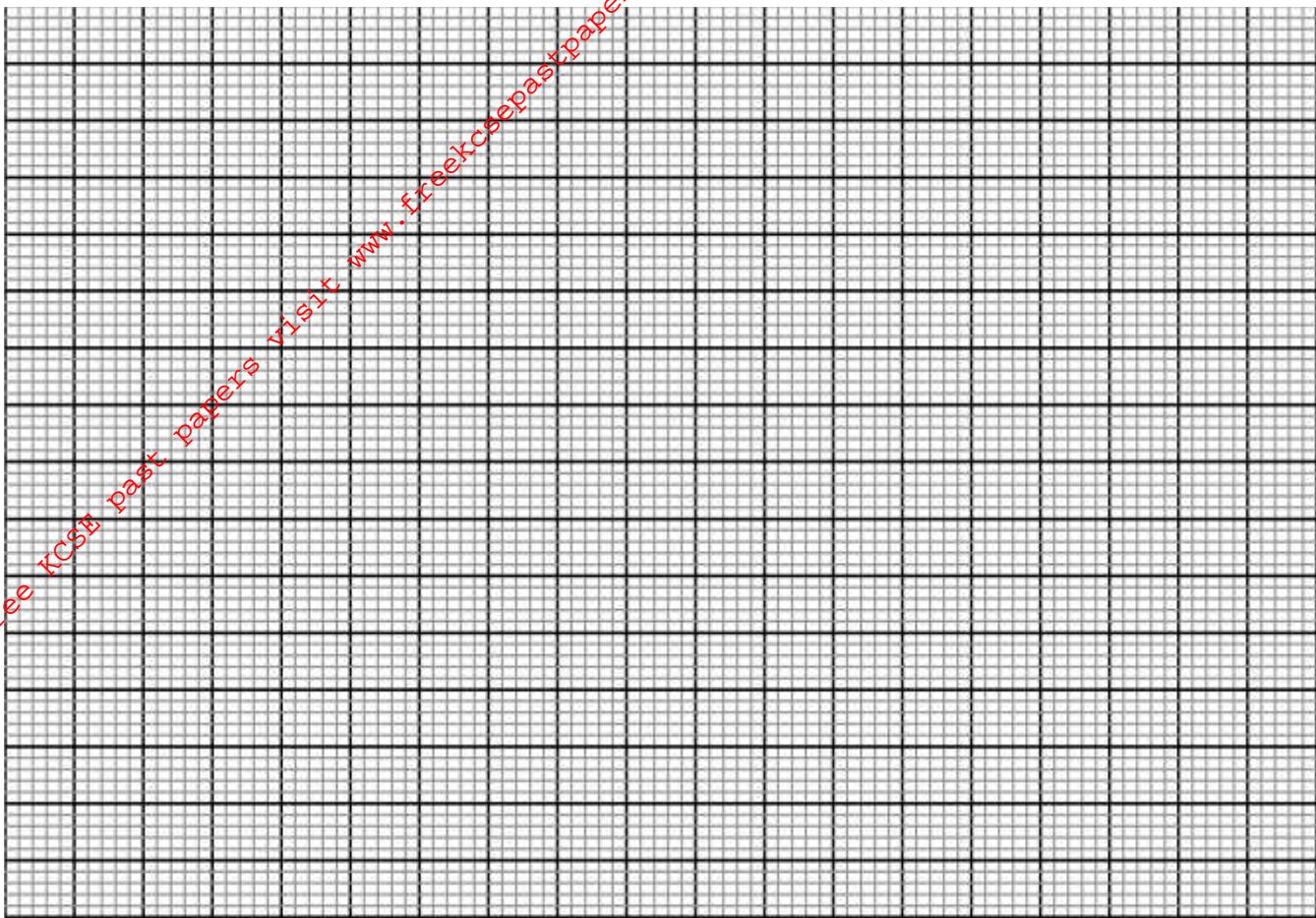
p.d (V)	0	0.20	0.40	0.60	0.80	1.20	1.60	2.40
I (A)	0.0	0.11	0.20	0.28	0.34	0.43	0.50	0.58

a)   Draw a diagram for the circuit used to obtain the values.   (2marks)

b)   Describe briefly how the experiment was carried out.   (2marks)

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c) Plot a graph of V against I for the values presented in the table. (5marks)

d) Determine the resistance of the lamp when a current of 0.4A flows through it. (3marks)

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e) Explain why a filament lamp does not obey Ohm's law. (2marks)

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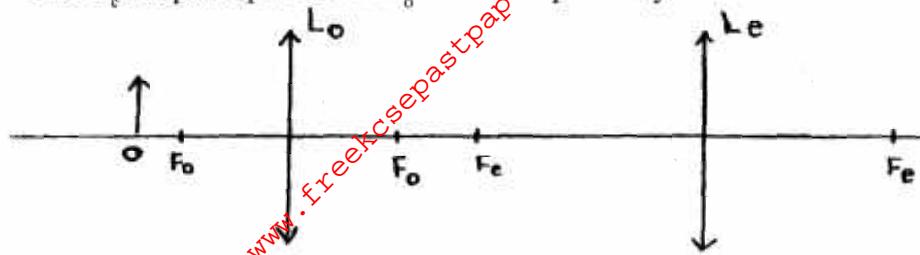
13. a) Define the term principal focus in relation to a thin convex lens (1mark)

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b) Distinguish between a real and virtual image. (2marks)

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c) The diagram shows an arrangement of lenses; L_o and L_e used in a compound microscope F_o and F_e are principal foci of L_o and L_e respectively.
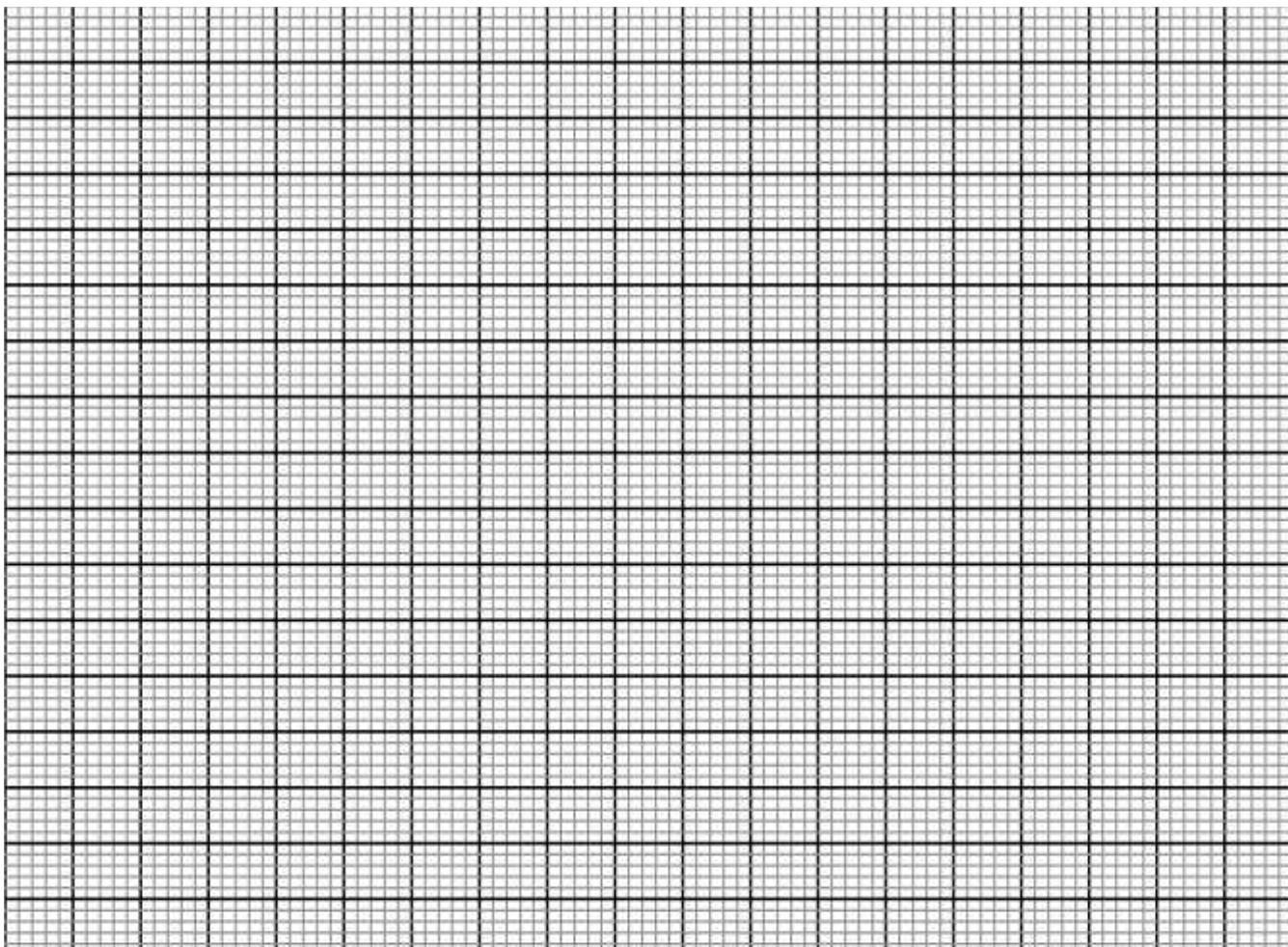

Draw the rays to show how the final image is formed in the microscope.   (2marks)

d) The table below shows the object distance, U is the corresponding image distance, V for an object placed.

U(cm)	20	25	30	35	40	45
V (cm)	60.0	37.5	30.0	26.3	24.0	22.5
$\frac{1}{u}(cm^{-1})$						
$\frac{1}{v}(cm^{-1})$						

i) Complete the table and plot a graph of $\frac{1}{v}$ against $\frac{1}{u}$ (7marks)
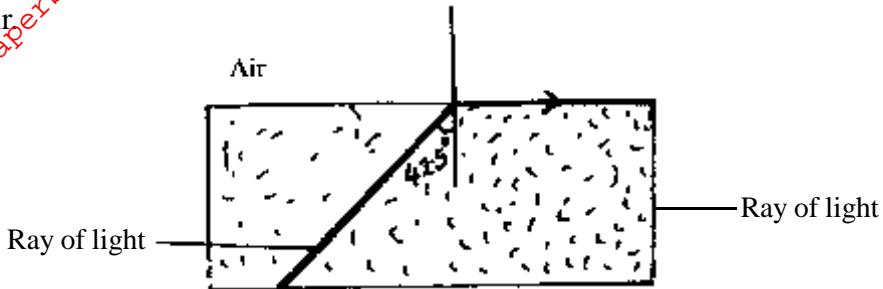
ii) Determine the focal length of the lens. (2marks)

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14. a) Give the conditions necessary for total internal reflection to occur. (2marks)

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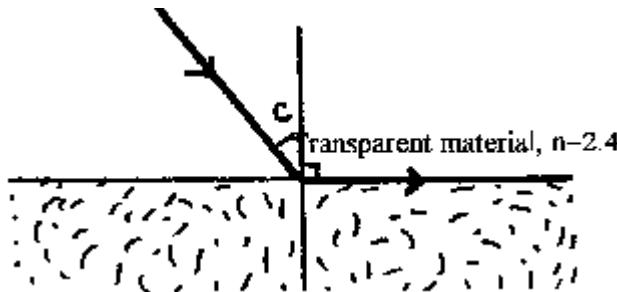
b) i) Figure below shows the path of a ray of light passing through a rectangular block of Perspex in air.

Calculate the refractive index of Perspex. (3marks)

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ii) A ray of light now travels from a transparent medium into the Perspex as shown in figure below.
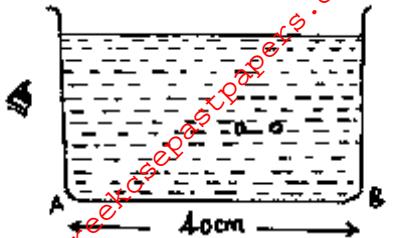
Calculate the critical angle C (2marks)

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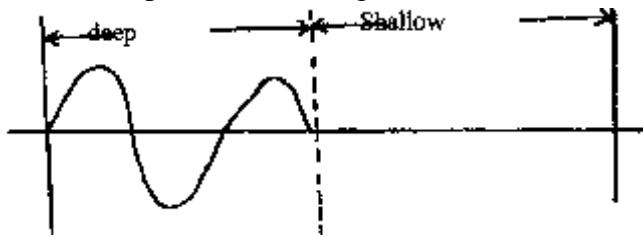
c) Give one use of an optical fibre (2marks)

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d) In a transparent liquid container, an air bubbles appears to be 18cm when viewed form end A and 12cm when viewed from end B as shown in figure below. Where exactly is the air bubble. If the length of the tank is 40cm? (4marks)

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15.   a)   i) Distinguish between longitudinal and transverse waves.   (2marks)

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ii) State one distinction between the way sound waves and electromagnetic waves are transmitted.   (1mark)

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b) A mine worker stands between two vertical cliffs 400m from the nearest cliff. The cliffs are Xm apart, every time he strikes the rock once, he hears two echoes, the first one in 2.5s while the second follows 2s later. From this information calculate:

i) The speed of sound in air.   (3marks)

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ii) The value of X.   (3marks)

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c) Figure 12 below shows the displacement of a particle in progressive wave incident on a boundary between deep and shallow regions.

i) Complete the diagram to show what is observed beyond the boundary. (Assume no loss of energy)   (2marks)

ii) Explain the observation in C (i) above.   (2marks)

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