

NAME.....

INDEX.....

SCHOOL.....

SIGN.....

DATE.....

232/2

PHYSICS

PAPER 2

FORM 4

MARCH/APRIL 2013

TIME: 2 HOURS

# BARINGO NORTH TRIAL EXAMINATIONS

The Kenya Certificate of Secondary Education (KCSE)

## INSTRUCTIONS

*Take:*

- Acceleration due to gravity  $g = 10\text{ms}^{-2}$
- Charge of electron =  $1.6 \times 10^{-19}\text{C}$
- Refractive index of glass = 1.5

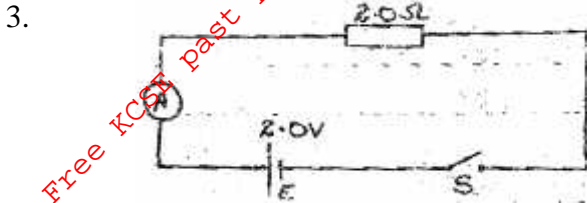
**For Examiner's Use Only**

SECTION	MAX SCORE	CANDIDATES SCORE
A	25	
B	55	
<b>TOTAL</b>	<b>80</b>	

**SECTION A**

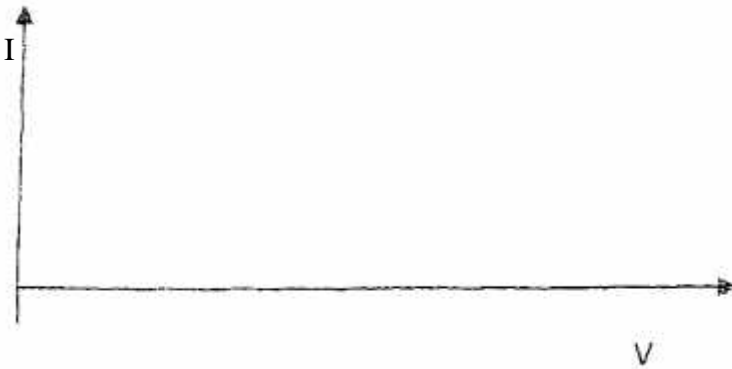
1. A current of  $0.70\text{A}$  flows through a wire when a p.d of  $0.35\text{V}$  is applied at the ends of the wire. If the wire is  $0.5\text{m}$  and has a cross sectional area of  $8.0 \times 10^{-6}\text{m}^2$ . Calculate its resistivity. (3marks)

2. Name two factors which determine the frequency of sound from a stretched wire at room temperature. (2marks)



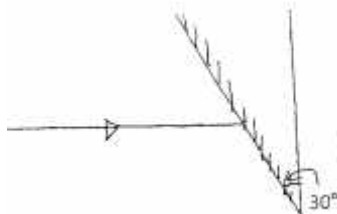
The internal resistance of the cell E in the figure above is  $0.5\Omega$ . Determine the ammeter reading when the switch S is closed. (3marks)

4. Use the axis below to draw the characteristic of a filament lamp. (1mark)



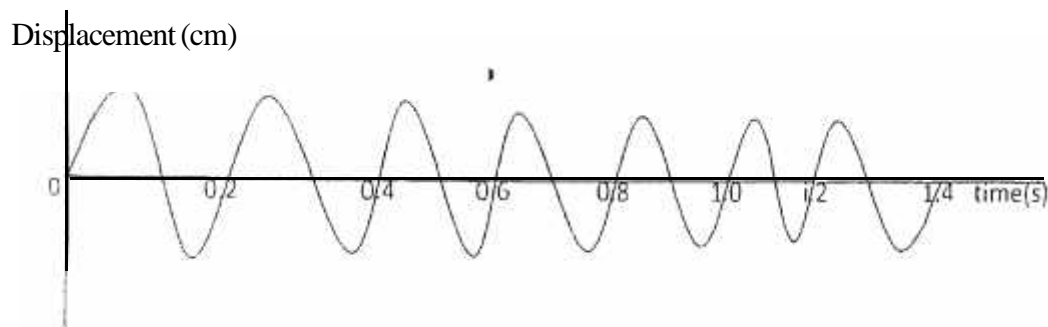
5. A form 4 student was listening to other students who were in another classroom. State a characteristic of sound that would enable him to distinguish boy's voice from girl's voice. (1mark)

6. The diagram below shows a plane mirror placed at  $30^\circ$  to the vertical. A horizontal ray is incident to the mirror. The mirror is rotated through  $20^\circ$  in the clockwise direction. Find the angle of reflection of the ray. (2marks)

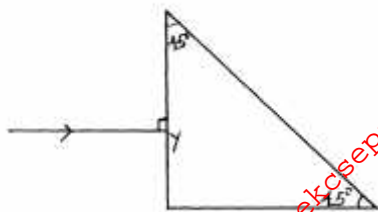


7. State two properties of magnets. (2marks)
8. A microscope is focused on a mark on a horizontal surface. A rectangular glass block 30mm in thickness is placed in the mark, the microscope is then adjusted 10mm upwards to bring the mark back to focus determine the refractive index of the glass. (3marks)
9. State one use of microwaves. (1mark)
10. Water waves are observed as they pass a fixed point at a rate of 30 crests per minute. A particular wave crest takes 2 second to travel between two fixed points 6m apart. Determine the frequency and the wave length of the wave. (4marks)

11. The figure below shows a wave profile. The distance between the 2<sup>nd</sup> and the 4<sup>th</sup> crest is 60cm. Determine the velocity of the wave in m/s. (3marks)



12. The diagram below is a right angle prism.



a) Sketch the rays' path until it leaves the prism. (3marks)

b) State one property of the light which changes at Y. How does the property change? (2marks)

c) If the refractive index of the prism is 1.4, determine its critical angle, C. (3marks)

13. A capacitor was connected in a circuit and charged until it was full. The potential difference (pd) across it was measured using a voltmeter. The corresponding values of the charge stored was calculated and tabulated in the table below.

Pd across the Capacitor (v)	1.2	1.5	1.8	2.0	2.2
Charge stored	2.88	3.60	4.32	4.80	5.28

a) Define capacitance and state its SI unit. (2marks)

b) Plot a graph of the charge stored against the Pd. (5marks)

c) Using the graph, determine:

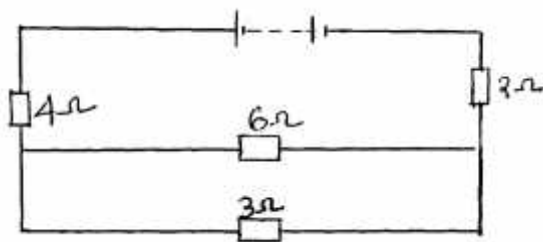
i) The capacitance of the capacitor. (3marks)

ii) The energy stored by the capacitor (2marks)

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14. a) State the difference between insulators and conductors of electricity. (2marks)

b) In the circuit shown below the battery has an internal resistance of  $2\Omega$ . The current through the  $6\Omega$  resistor is  $1.5\text{A}$ .



Determine;

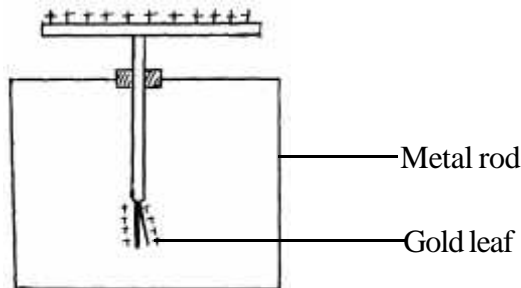
i) The effective resistance in the circuit. (3marks)

ii) The p.d across the  $3\Omega$  resistor. (1mark)

iii) The lost volts. (2marks)

iv) The current through the  $4\Omega$  resistor. (2marks)

15. The diagram below shows a gold leaf electroscope which is positively charged. A charged polythene rod is brought near the top plate.



a) i) Explain briefly how the electroscope was charged using negatively charged rod. (3marks)

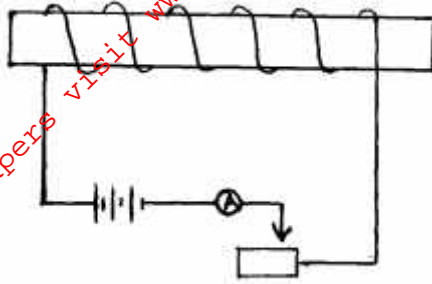
ii) Suggest a suitable material of the part labeled A. (1mark)

iii) Why does the electroscope fall when the polythene rod is brought near it. (1mark)

iv) How could you make the leaf fall and stay down.

(1mark)

b) The figure below shows a solenoid with a ferromagnetic core connected to a battery, ammeter and a rheostat.



On the diagram indicate.

i) The current direction in the external circuit and around the solenoid.. (1mark)

ii) The polarity of the resulting electromagnet. (1mark)

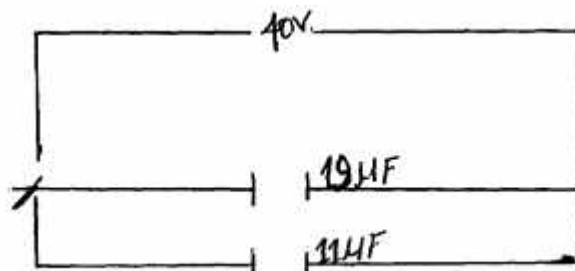
c) A conductor through which an electric current is flowing is placed in a magnetic field as shown below.



On the same diagram sketch the resultant magnetic field pattern and show the direction of the resulting mechanical force on the conductor. (3marks)

16. a) State one difference between a capacitor and a cell. (2marks)

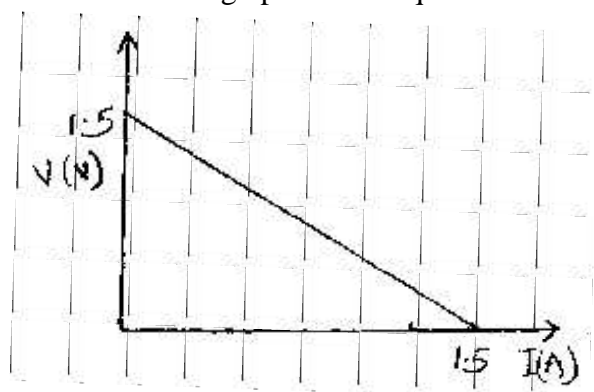
b) The circuit diagram shows two uncharged capacitors connected to a battery. The switch is connected to end R briefly it is disconnect and then connected to end S.



i) Determine the change in the  $19\mu\text{F}$  capacitors when the switch is connected to R. (3marks)

ii) Calculate the p.d across the  $11\mu\text{F}$  capacitor when the switch is connected to S. (2marks)

iii) The results of such experiment were used to draw the graph below. The equation of the graph is  $V = rI + E$ . Use the graph and the equation to find the value of E and r. (3marks)



c) A cell can supply a current of  $1.2\text{A}$  through two  $2\Omega$  resistors in parallel when they are connected in series, the value of the current is  $0.4\text{A}$ . Calculate the internal resistance and emf of the cell.

(3marks)