

NAME ..... DATE .....

INDEX NO. .... SIGNATURE .....

232/2  
PHYSICS  
PAPER 2  
JULY/AUGUST, 2014  
TIME: 2 HOURS.

**MBOONI WEST SUB - COUNTY FORM FOUR JOINT EXAMINATION 2014**

*Kenya Certificate of Secondary Education.*

232/2  
PHYSICS  
PAPER 2  
TIME: 2 HOURS.

**INSTRUCTIONS TO CANDIDATES**

- Write your name and your index number in the spaces provided above.
- This paper consists of **two** sections **A** and **B**
- Answer **all** questions in section **A** and **B** in the space provided
- All working **must** be shown in the spaces provided in this booklet.
- Mathematical tables and silent electronic calculators may be used
- This paper consists of 8 printed pages. Candidates should check to ensure that all pages are printed as indicated and no questions are missing

**FOR OFFICIAL USE**

Section	Question	Max. score	Candidate's score
A	1-13	25	
B	14	12	
	15	14	
	16	09	
	17	10	
	18	10	
TOTAL SCORE		80	

**SECTION A(25 MARKS)**

**Answer all the questions in the spaces provided.**

1. State two factors that affect the capacitance of a parallel plate capacitor. (2marks)

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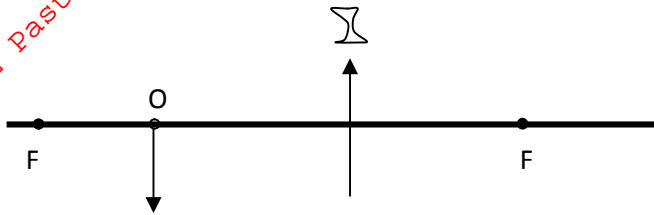
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2. The figure 1. Shows an object, O placed in front of a concave lens. By drawing appropriate rays, locate the image formed. (3marks)

Fig .1



3. Kenya power sells electricity at ksh. 10 per unit. What is the cost of using an electric heater rated 1500w for a total of 30 hours. (3marks)

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4. You are provided with resistors of  $2.0\Omega$ ,  $4.0\Omega$  and  $6.0\Omega$ . Draw a circuit diagram to show how the three resistors can be connected together to give an effective resistance of  $3\Omega$ . (2marks)

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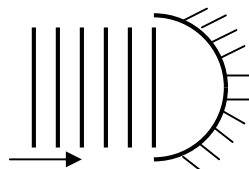
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5. Figure 2 shows wave fronts approaching a concave surface

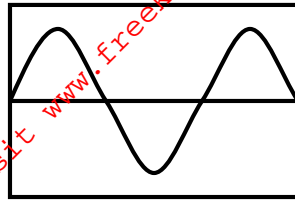
Fig. 2



Complete the diagram to show the wave fronts after striking the surface (2marks)

6. Figure 3. Shows the pattern produced by an a.c voltage on a cathode ray oscilloscope screen.

Fig .3



On the same diagram sketch the pattern produced by the same voltage when the time base is switched off. (1mark)

7. State one difference between electromagnetic and mechanical waves. (1mark)

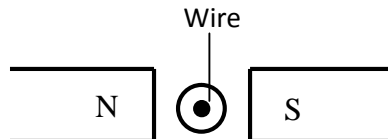
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8. A wire carrying current is placed in the direction shown is placed in a magnetic field. Indicate on the diagram the direction of the force. (1mark)

Fig . 4



9. When ultraviolet radiation is directed into a clean zinc plate connected to the cap of a negatively charged leaf electroscope, the leaf falls. Explain this observation. (2marks)

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10. An electric bulb is rated 75w, 240v, determine the resistance of the bulb. (3marks)

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11. A man standing 600m from a cliff claps his hands and hears an echo 3 seconds later. Determine the speed of the sound in air. (2marks)

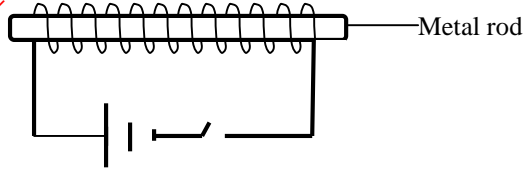
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12. A metal rod made up of iron and steel joined end to end is put in a circuit as shown in figure 5. Explain how you can identify the side which is iron. (2marks)

Fig. 5



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13. Explain how polarization reduces current in a simple cell. (1mark)

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**SECTION B (50 MARKS)**

**Answer all the question in this section**

14. a) State Lenz's law of electromagnetic induction. (1mark)

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b) The secondary coils of a step down transformer has 500 turns and primary has 15000turns

i) If the voltage in primary is 3600vfind the voltage in secondary. (2marks)

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ii) If the current in primary is 3.0A find the current in secondary. (2marks)

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c) A generator at kindaruma can supply 375MW of electric power. If the generator is 85% efficient. Find

i) The rate which falling water must supply energy to the turbine. (3marks)

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ii) If the water falls a height of 22m what is the mass of the water that passes through the turbine each second. (2marks)

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d) Explain how energy loss in a transformer is minimised. (2marks)

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15. a) What is photoelectric effect? (1mark)

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b) Name two factors that affect photoelectric effect. (2marks)

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c) The threshold frequency of sodium is  $5.6 \times 10^{14}$  Hz .Planks constant= $6.6 \times 10^{-34}$  Js.Find  
i) Work function of sodium (2marks)

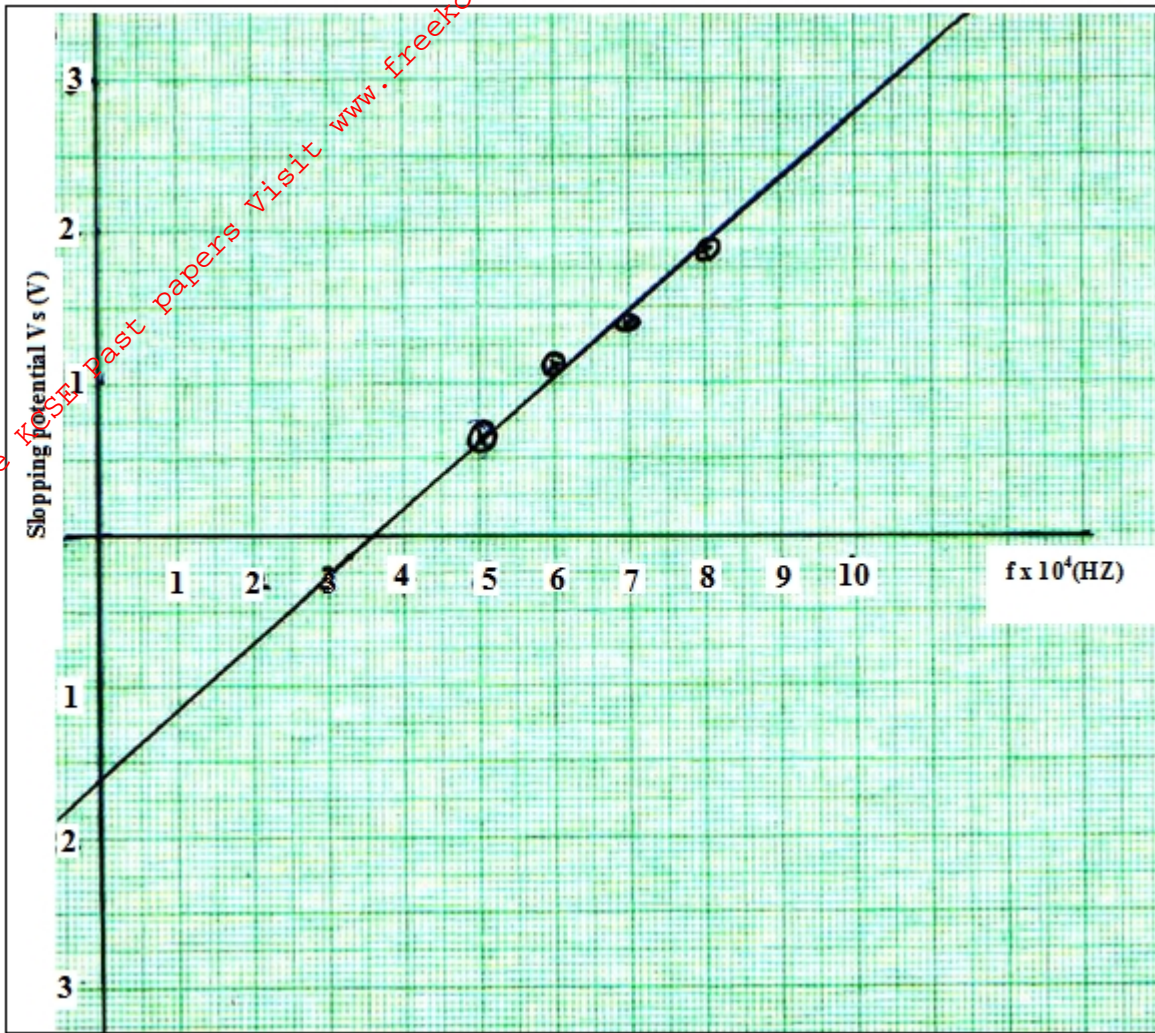
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ii) The kinetic energy of the ejected electrons when sodium is shone with light of frequency  $8.6 \times 10^{14}$  Hz

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- d) A certain metal is illuminated with radiation of different frequencies and corresponding stopping potential determined. The graph below shows how the stopping potential vary with frequency. Electronic charge,  $e=1.6 \times 10^{-19}$ .



Using the graph determine

- i) Planks constant. (3marks)

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- ii) Work function of the metal (3marks)

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16. a. State ohms law (1mark)

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b. A battery of Emf E drives a current of 0.25A when connected to a  $5.5\Omega$  resistor. When the  $5.5\Omega$  resistor is replaced with  $2.5\Omega$  resistor the current flowing becomes 0.5A. Find the emf, E and the internal resistance, r, of the battery. (4marks)

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c) A capacitor of capacitance  $6\mu\text{F}$  capacitor is charged using a 6v d.c source. It is then connected across a  $12\mu\text{F}$  capacitor. Find :-

i) Final voltage (2marks)

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ii) Charge stored in each capacitor (2marks)

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17.  
a) State Snell's law (1mark)

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b) A ray of light travelling from water to glass makes an angle of incident of  $30^\circ$ . Find the angle of refraction in the glass. Refractive index of water =  $\frac{4}{3}$ . Refractive index of glass =  $\frac{3}{2}$  (3marks)

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c) State the necessary and sufficient conditions for total internal reflection to occur. (2marks)

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d) You are provided with a glass block, a soft board, white sheet of paper and three optical pins. With the help of a diagram explain how you would use these apparatus to determine the refractive index of the glass block using real and apparent depth method. (4marks)

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18. a)  $^{226}_{88}\text{Ra}$  decays into  $^{222}_{86}\text{Rn}$  by emission of an alpha particle. Write a nuclear equation for the decay (2marks)

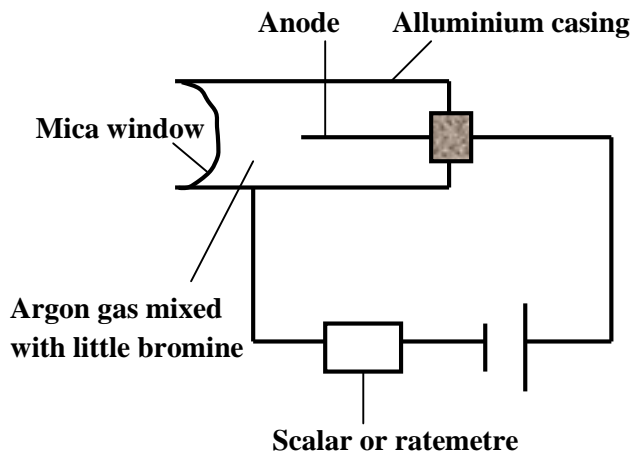
b) i) What do you understand by the term half-life of a radioactive substance. (1mark)

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ii) A G.M tube registers an initial count rate of 3200 counts for a certain substance and 100 counts 30 hours later. What is the half-life of this substance. (3marks)

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c) The figure below shows a G.M tube.



i) What is the purpose of the mica window? (1mark)

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ii) What is the purpose of the bromine (1mark)

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iii) Briefly explain how it works. (2marks)

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