

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

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

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

## MAKINDU DISTRICT INTER – SECONDARY SCHOOLS EXAMINATION

*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 10 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	1-12	25	
B	13	11	
	14	15	
	15	12	
	16	07	
	17	10	
TOTAL SCORE		80	

**SECTION A: 25 MARKS**

1. The image formed by a convex mirror is virtual. State two other characteristics of image formed by the convex mirror. (2 Marks)

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2. State the function of the control grid in a cathode ray oscilloscope (1 Mark)

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3. A metal iron has work function of  $6.8 \times 10^{-19} \text{J}$ . Calculate the minimum frequency of light that can cause photoelectric emission. (Take  $h = 6.63 \times 10^{-34} \text{Js}$ ) (2 Marks)

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4. In the figure shows a rectifier circuit for an alternating current input.



- (a) On the circuit, indicate the flow of current to illustrate rectification. (1 Mark)
- (b) Sketch a graph to show how the voltage across R varies with time.

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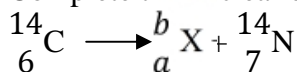
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5. Complete the nuclear equation below by inserting the values of a and b. (2 Marks)



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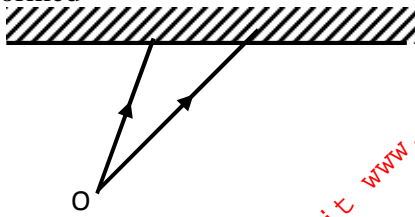
6. State and explain the effect of increasing the E.H.T in an ex-ray tube on the x-rays. (2 Marks)

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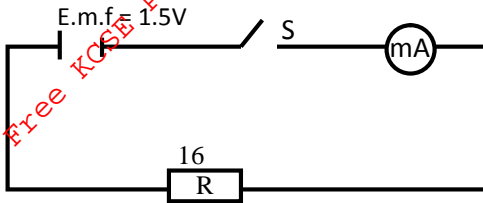
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7. The figure below shows the incident rays from a point object O. Draw a ray diagram to show the image formed (3 Marks)



8. When the switch is closed in the figure below, the milliammeter reads 75mA. Determine the internal resistance of the cell (3 Marks)



9. Determine the cost of using an electric heater rated 3kW for 12 hours given that the cost of electricity per kilowatt-hour is Sh. 8.00. (2 Marks)

10. Name two types of electromagnetic radiations whose wavelengths are greater than that of ultraviolet radiation (2 Marks)

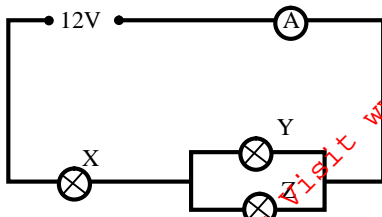
11. What is the main difference between an a.c. and d.c generators (1 Mark)

12. State two conditions to be satisfied for total internal reflection of light to take place. (1 Mark)

13. Give an example of a longitudinal wave (1 Mark)

**SECTION B**

14. (a) The figure below shows how a student set up a circuit using 3 identical bulbs X, Y and Z each rated “12V, 2.0A”



(i) When operating normally, calculate the resistance of one of the bulbs (2 Marks)

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(ii) Calculate the effective resistance of the three bulbs. (2 Marks)

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(iii) What will be reading of the ammeter? (2 Marks)

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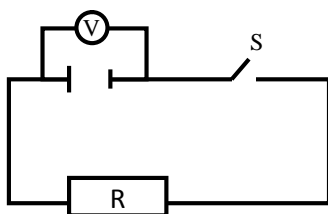
(iv) Draw a circuit diagram showing the three bulbs connected in such a way that they would all work at the same brightness especially if they are not identical. (2 Marks)

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(b) When the switch S is kept open in the circuit shown below the voltmeter reads 1.5V. When the switch is closed, the readings drops to 21.3V and the current through the resistor is 0.5A.



(i) What is the e.m.f of the cell? (1 Mark)

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(ii) What the terminal voltage of the cell?

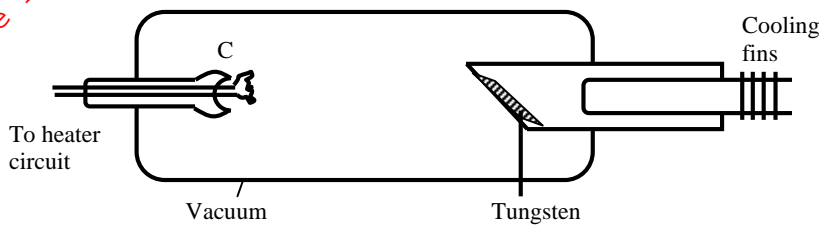
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(iii) Calculate the value of R.

(2 Marks)

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15. The figure below is of an x-ray tube



(a) Explain how x-rays are produced by the tube

(4 Marks)

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(b) Explain briefly the energy changes that take place when the x-ray tube is operating

(3 Marks)

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(c) Why is it necessary to maintain a vacuum inside the tube?

(2 Marks)

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(d) The accelerating voltage of an x-ray tube is 12V. Calculate the speed of the electron on reaching the anode. (Charge to mass ratio of an electron  $\frac{e}{me} = 1.76 \times 10^{11}$ )

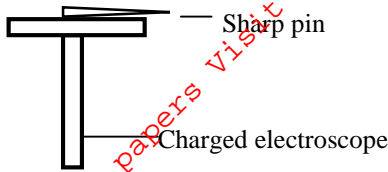
(3 Marks)

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16. (a) Define capacitance

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(b) In the figure below, a sharp pin is fixed on a cap of a leaf of the electroscop. The electroscop is highly charged and then left for some time.

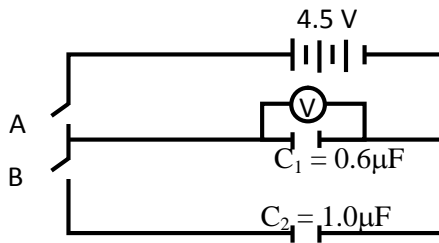


State and explain the observation made after sometime

(2 Marks)

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(c) The figure below shows a circuit where a battery of e.m.f. 4.5V, switches A and B, two capacitors  $C_1 = 0.6\mu\text{F}$  and  $C_2 = 1.0\mu\text{F}$  and a voltmeter are connected.



(i) Determine the charge on  $C_1$  when both switch A is closed and switch B is open.

(2 Marks)

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(ii) What is the effective capacitance when both switches are closed?

(2 Marks)

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(iii) State and explain what is observed on the voltmeter when;

♦ Switch A is closed and switch B is open

(2 Marks)

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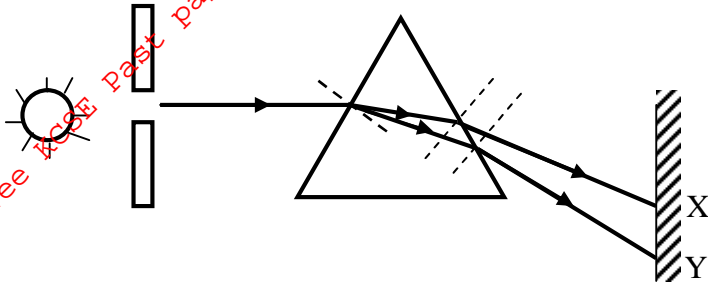
♦ Switch A is closed and B is closed

(2 Marks)

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(d) State two ways in which the capacitance of a parallel plate capacitor can be reduced. (2 Marks)

17. (a) The diagram below shows a narrow beam of white light onto a glass prism.



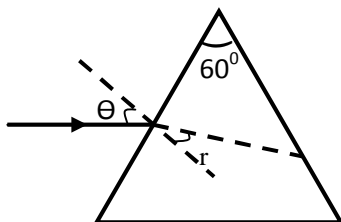
(i) What is the name of the phenomenon represented in the diagram? (1 Mark)

(ii) Name the colour at X and Y (2 Marks)

(iii) Give a reason for your answer in part (ii) above (1 Mark)

(iv) What is the purpose of the slit (1 Mark)

(b) The figure below shows the path of ray of yellow light through a glass prism. The speed of yellow light in the prism is  $1.8 \times 10^8$  m/s



(i) Determine the refractive index of the prism material (Speed of light in vacuum,  $C = 3.0 \times 10^8$  m/s) (3 Marks)

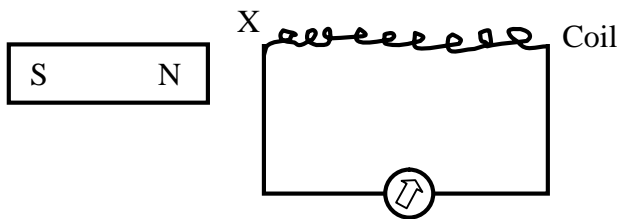
(ii) Show on the same diagram, the critical angle C and hence determine its value.

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(iii) Give that  $r = 31.2^\circ$  determine the angle  $\theta$  (3 Marks)

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18. (a) In the figure below the bar magnet is moved into the coil.



State and explain what is observed in the galvanometer (2 Marks)

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(b) State two ways in which energy is lost from a transformer and explain each. (2 Marks)

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