NAME.....INDEX.....ADM NO.....DATE.....

SCHOOL .....STREAM.....SIGNATURE.....

232/2
PHYSICS
PAPER 2
2 HOURS

BUNYORE – MARANDA JOINT EXAM

Kenya Certificate of Secondary Education

232/2
PHYSICS
PAPER 2

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided above
- This paper consists of two sections A and B
- Answer all the questions in the spaces provided
- All working must be clearly shown in the spaces provided
- Mathematical tables and electronic calculators may be used
- Take velocity of light $3.0 \times 10^{8} ms^{-1}$ and plank's constant $h = 6.63 \times 10^{-34}$ *Js*; charge on an electron $e = 1.6 \times 10^{-19}$ C.

For Examiner's Use Only

Section	Question	Maximum	Candidate's Score
A	1-10	25	
B	11	11	
	12	10	
	13	13	
	14	11	
	15	10	
		80	

SECTION A (25 MARKS)

1. Explain why sharp shadows support the theory that light travels in straight lines (1 mark)

2. State one application of total internal reflection (1 mark)

3. a) Give two reasons why radioactive disintegration is different from ordinary chemical changes? (2 marks)

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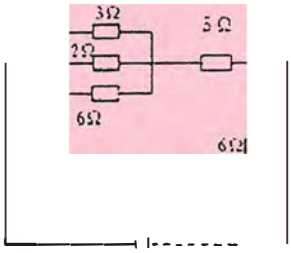
b) A radioactive isotope $^{232}_{90}Th$ emits two alpha particles and two beta particles as a result of four successive disintegration. If the daughter product is represented as $^{A}_{Z}Y$ Work out the values of A and Z. (2 marks)

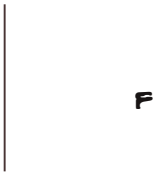
4. Use the circuit in fig (10) below to answer the questions that follow.



(a) Calculate the total resistance in the circuit. (2 marks)

(b) Calculate current the effective current in the circuit (2 marks)

(i) The sketch below shows an image placed some distance from a biconvex lens.



Draw rays to locate the image on the diagram (2 marks)

(ii) A biconcave lens forms an erect image twice the size of the object. If the focal length of the lens is 20cm, determine the object distance. (2 marks)

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5. P-type and n-type semi-conductors are made from a pure semi-conductor by a process known as doping.

(i) What is meant by doping (1 mark)

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(iii)Explain how doping produces an n-type semi-conductor (2 marks)

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6. The figure below shows part of a circuit containing three capacitors of 4μF, and 5μF respectively.

Determine the p.d across the 5μF capacitor given that the total charge stored in the capacitors is 0.0000052 C. (3 marks)

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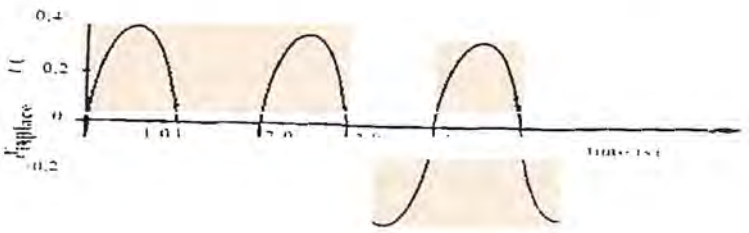
7. Figure 5 below shows how the displacement varies for a certain wave.



Determine the frequency of the wave. (2 marks)

8. Arrange the following in order of increasing frequencies: Red, Green, yellow, Infra-red, (1 mark)

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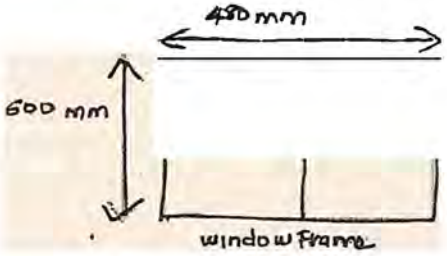
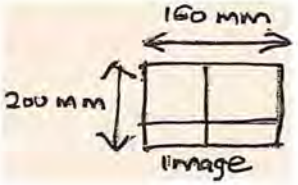
9. Determine the largest number of 75W bulbs which can be safely used to run on a 240V source with a 5A fuse. (2 marks)

SECTION B (55 MARKS)

10. (i) Distinguish between the term principal focus and focal length (1 mark)

(ii) The figure below shows scale drawing of a window frame and its image produced on a screen by a convex lens.





a) State the nature of the mage formed (1 mark)

b) Calculate the linear magnification of the image (2 marks)

c) The image of the frame was produced 500mm from the lens. Calculate:

I. The distance of the actual frame from the lens (2 marks)

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II. The focal length of the lens (2 marks)

iii) A student finds that at a distance of 25cm the words in a book look blurred.

a) What eye defect is the student suffering from (1 mark)

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b) In which direction does he move the book to be able to see the words clearly from the distance (1 mark)

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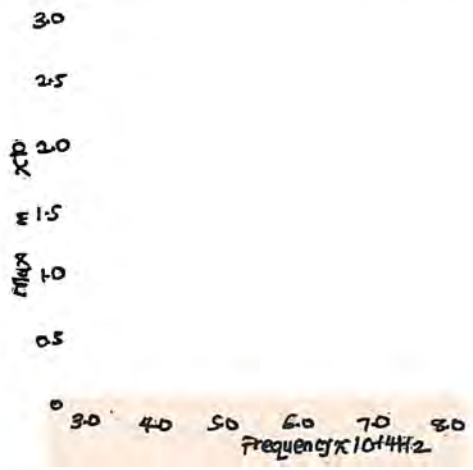
c) Which lens can be used to correct the above defect (1 mark)

11. a) Define the term "Work function" (1 mark)

b) A student investigated how the maximum kinetic energy of the photoelectrons, emitted form a zinc cathode, varies with the frequency of the incident radiation. The results obtained were plotted as shown on the graph below.



From the graph determine:

(i) The plank's constant (3 marks)

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(ii) The work function of the cathode (3 marks)

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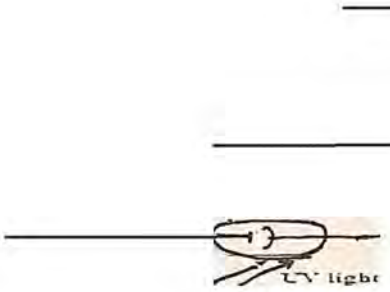
(b) The figure below shows the diagram of a setup used in an experiment to investigate photo-electricity. The frequency of the ultra-violet light was constant throughout the experiment.



Sketch on the same axes the graphs of photo-electric current (y-axis) against the voltage for two different intensities A_1 and A_2 of ultra-violet where $A_1 > A_2$ (3 marks)

12. a) A hydro-electric power station produces 500KW at a voltage of 10KV. The voltage is then stepped up to 150KV and power is transmitted through cables of resistance 200 a step down transformer in a sub-station. Assuming that both transformers are 100% efficient calculate;

(i) The current produced by the generator (2 marks)

(ii) The current that flows through the transmission cables (2 marks)

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(iii) The voltage drop across the transmission cables (2 marks)

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(iv) The power loss during transmission (2 marks)

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(v) The power that reaches the sub-station (2 marks)

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b) An immersion heater is rated 950W 250V. It is used for 2 hours daily. If electricity cost sh12.00 per unit, calculate the weekly cost of running the heater. (1 mark)

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14a) Explain how doping produces a p-type semi conductor for pure semi conductor material (2 marks)

(i) Explain using a diagram how diodes can be used in a full-wave rectification (4 marks)

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(ii) Figure 7 shows the output of a wave from an a.c source

Using a circuit show how the above output is produced. (3 marks)

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d) Name two ways of enhancing the conductivity of a semiconductor (2 marks)

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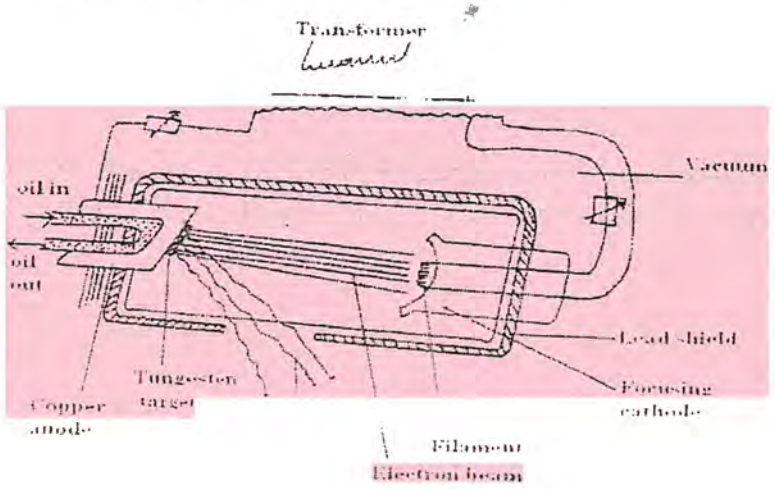
15. The figure below shows the essential component of a X-ray tube.



(i) Explain how X-ray are produced. (2 marks)

(ii) Why is the target made of tungsten? (1 mark)

(iii) Why would it be necessary for the target to rotate during operation of this machine? (1 mark)

(iv) What adjustment on the x-ray tube will:

I. Increase the hardness of the x-rays (1 mark)

II. Reduce the intensity of the x-rays. (1m ark)

(v) An x-ray tube has an accelerating p.d of 50 kV. Determine the shortest wavelength of in its x-ray beam. (3 marks)