

NAME..... INDEX NO.....

SCHOOL..... CANDIDATE'S SIGNATURE.....

DATE.....

232/2

PHYSICS

(THEORY)

PAPER 2

JULY/AUGUST 2013

TIME: 2 HOURS

KIHARU/KAHURO DISTRICT JOINT EXAMINATION – 2013

Kenya Certificate of Secondary Education

PHYSICS

PAPER 2

(THEORY)

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

- (a) Write your **Name** and **Index Number** in the spaces provided **above**.
- (b) **Sign** and write the **date** of examination in the spaces provided **above**.
- (c) This paper consists of **two** Sections; **A** and **B**.
- (d) Answer **ALL** the questions in Sections **A** and **B** in the spaces provided.
- (e) All workings must be clearly shown.
- (f) Non-programmable silent electronic calculators and KNEC Mathematical tables and **may be** used.
- (h) Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.

FOR EXAMINER'S USE ONLY:

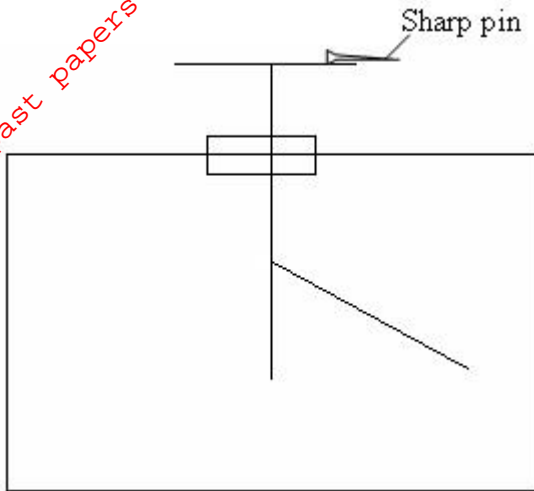
Section	Question	Maximum Score	Candidate's Score
A	1 – 10	25	
B	11	12	
	12	14	
	13	9	
	14	12	
	15	8	
Total Score		80	

SECTION A: (25 MARKS)

Answer **all** questions in this section in the spaces provided:

1. State the property of light suggested by the formation of shadows. (1 mark)

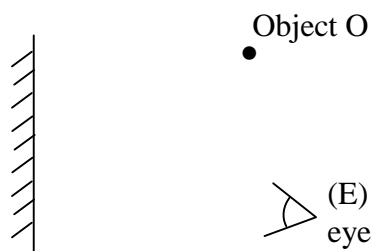
2. The figure **below** shows a sharp pin fixed on a cap of leaf electroscope. The electroscope is highly charged and then left for sometime.



Explain why the leaf collapses.

(2 marks)

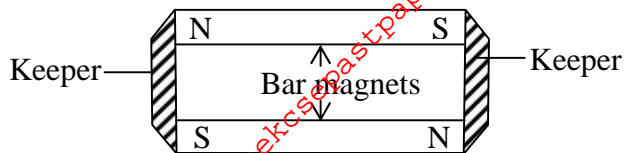
3. The figure **below** shows an object O placed in front of a plane mirror.



On the same diagram, draw rays to locate the position of the image I as seen from the eye E. (2 marks)

4. (a) State the basic law of magnetism. (1 mark)

- (b) The figure **below** shows how magnets are stored in pairs with keepers at the ends.



Explain how this method of storing helps in retaining magnetism longer. (2 marks)

5. Why is a convex mirror better than plane mirror when used as a driving mirror? (1 mark)

6. The chart **below** shows an arrangement of different parts of the electromagnetic spectrum.

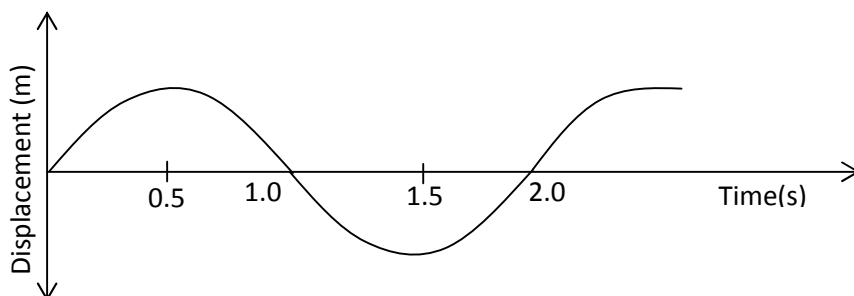
Radio	A	Infrared	Visible	B	X-Rays	Gamma Rays
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- (i) Name the radiation represented by **B**. (1 mark)

- (ii) Name a device that can be used to detect radiation **A**. (1 mark)

7. (a) Distinguish between a transverse and a longitudinal wave. (1 mark)

- (b) Determine the frequency of the wave shown below. (2 marks)



- (c) State **one** reason why ultrasound is preferred to audible sound in echo-sounding. (1 mark)

8. An electric heater rated 240V, 3000W is to be connected to a 240V mains supply, through a 10A fuse. Determine whether the fuse is suitable or not. (3 marks)

9. (a) What are extrinsic semi-conductors. (2 marks)

- (b) Explain what happens to the depletion layer when a diode is forward biased. (2 marks)

10. (a) State the purpose of cooling fins in the X-ray tube. (1 mark)

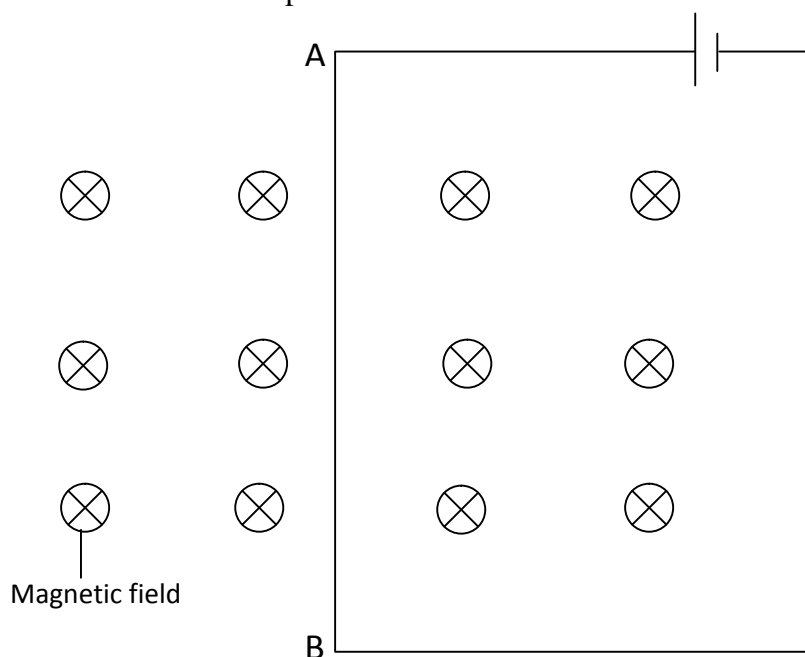
- (b) State **two** differences between X-rays and gamma rays. (2 marks)

SECTION B: (55 MARKS)

Answer question in this section in the spaces provided.

11. (a) State **two** ways in which one can increase the strength of an electromagnet. (2 marks)

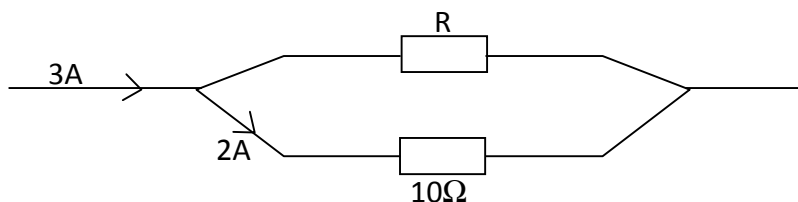
- (b) The following figure shows a conductor placed in a magnetic field. Indicate on the diagram the direction of motion of part AB of the conductor. (1 mark)



- (c) A cell drives a current of 5A through a 1.6Ω resistor. When connected to a 2.8Ω resistor, the current that flows is 3.2A. Find E and r for the cell. (4 marks)

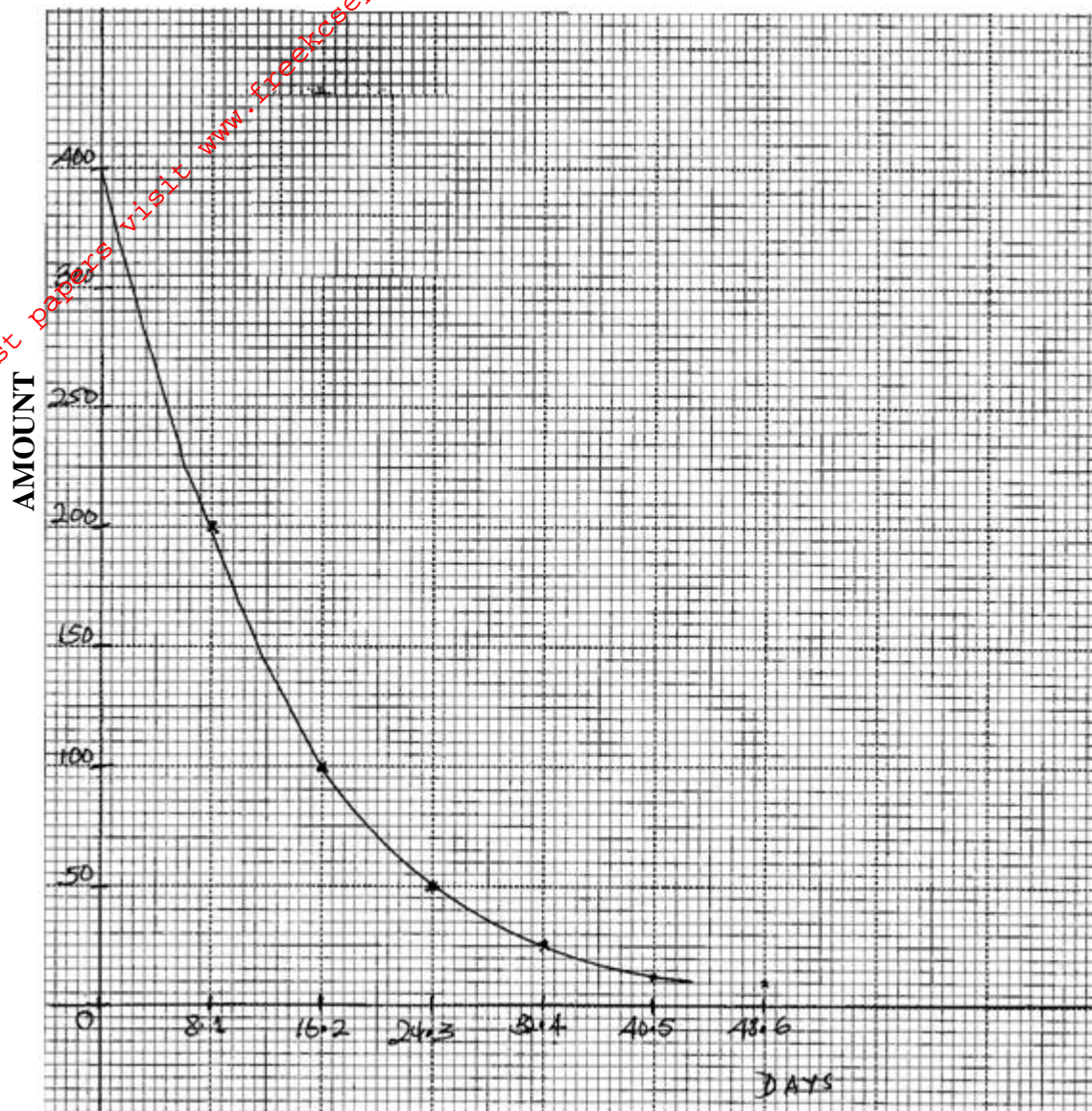
- (d) Calculate the length of a nichrome resistance wire of cross-sectional area $7 \times 10^{-8} \text{m}^2$ required to make a resistor of 10 ohms. (Take resistivity of nichrome = $1.10 \times 10^{-6} \Omega \text{m}$). (3 marks)

- (e) In figure below, calculate the p.d across resistor **R**. (2 marks)



12. I (a) The half life of cobalt 60 is 5 years. How long will a sample take for the activity to decrease to $\frac{1}{16}$ of its value. (2 marks)

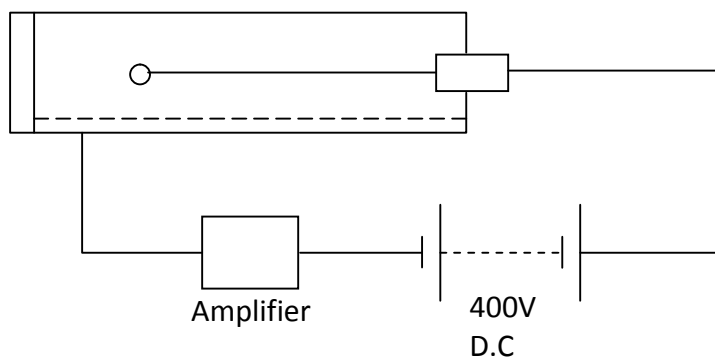
- (b) The graph **below** shows radioactive decay of iodine.



Use the graph to determine the half-life of iodine.

(2 marks)

- (c) The figure **below** shows a G.M tube.

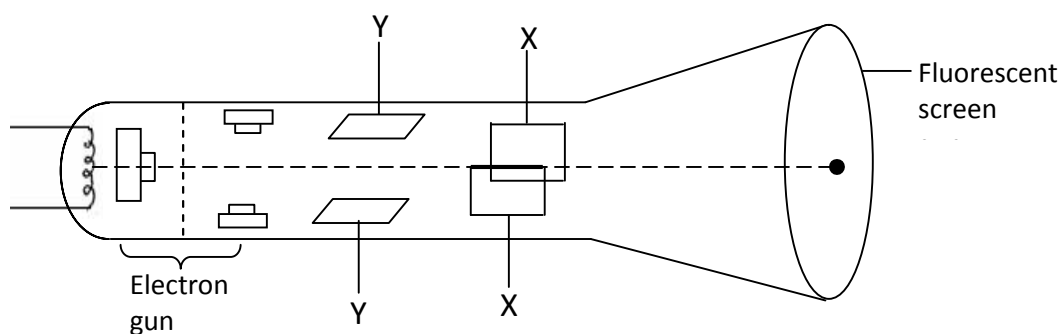


- (i) Give the reason why the mica window is made thin. (1 mark)

- (ii) Explain how the radiation entering the tube through the tube is detected by the tube. (3 marks)

- (iii) What is the purpose of the halogen vapour. (1 mark)

II The figure **below** shows a simple cathode ray tube.



- (i) Explain how the electrons are produced in the tube. (2 marks)

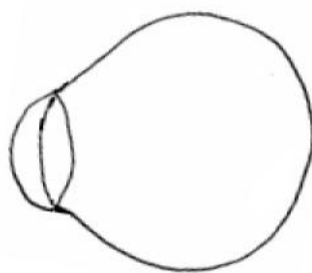
- (ii) State **one** function of the anode. (1 mark)

- (iii) At what part of the cathode ray tube would the time base be connected. (1 mark)

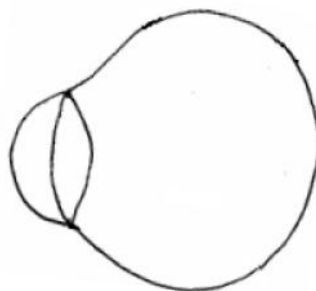
- (iv) Why is a vacuum created in the tube? (1 mark)

13. (a) The figures **below** shows diagrams of the human eye.

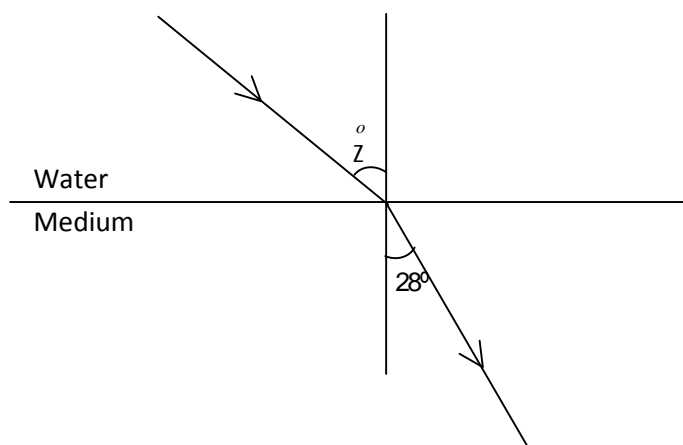
(a)



(b)



- (i) Sketch in figure (a) a ray diagram to show long sightedness. (1 mark)
- (ii) Sketch in figure (b) a ray diagram to show how a lens can be used to correct the long sightedness. (2 marks)
- (b) Draw a ray diagram to show how a convex lens can be used as a magnifying glass. (2 marks)
- (c) The diagram **below** shows a ray of light travelling between water-glass interface.



Calculate the value of z given that $a^e g = 1.52$ and $a^n w = \frac{4}{3}$.

(3 marks)

(d) State **one** conditions for total internal reflection to occur.

(1 mark)

14. (a) A transformer with 2000 turns in the primary circuit and 150 turns in the secondary circuit has its primary circuit connected to a 800V a.c. source. It is found that when a heater is connected to the secondary circuit it produces heat at the rate of 1000W. Assuming 100% efficiency, determine the:

(i) Voltage in the secondary circuit.

(2 marks)

(ii) Current in the primary circuit.

(2 marks)

(iii) Current in the secondary circuit. (1 mark)

(iv) State the type of transformer represented above. (1 mark)

(b) (i) State the reason why long distance power transmission is done at a very high voltage and using thick cables. (1 mark)

(ii) Calculate the cost of using the following appliances in one month (30 days) of the company rate is Ksh.9.50 per unit.

I	A 2000W water heater for 2 hours per day.	
II	A 75W bulb for 10 hours per day.	
III	An 1500W electric iron for 1 hour per day.	(3 marks)

(iii) Find the total monthly bill for the above household if in addition to the energy consumed, the power company charges each consumer.

I	A standing charge of Ksh.200.	
II	Fuel cost levy at 70 cents per unit.	(2 marks)

15. (a) Define the term work function. (1 mark)

- (b) The minimum frequency of light that can cause photoelectric emission to occur from a surface of metal is $6.94 \times 10^{14} \text{ Hz}$. If the speed of the emitted electrons is $8.0 \times 10^5 \text{ ms}^{-1}$. Calculate:- ($h = 6.63 \times 10^{-34} \text{ Js}$, $m_e = 9.11 \times 10^{-31} \text{ kg}$).
- (i) the work function of the metal. (2 marks)

- (ii) the maximum kinetic energy of the photoelectron. (2mks)

- (iii) the frequency of the source. (3 marks)