NAME: …………………………….. INDEX NO: ……………………………….

SCHOOL: ……………………………… DATE : ……………………………..

CANDIDATE'S SIGNATURE: …………………

232 / 2
PHYSICS
PAPER 2
THEORY
JULY / AUGUST 2014
TIME: 2 HOURS

NANDI NORTH SUB-COUNTY JOINT EVALUATION 2014

Kenya Certificate of Secondary Education (KCSE)
PHYSICS
PAPER 2
TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

(a) *Write your **Name, Index Number** and **School** 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 questions in Section **A** and **B** in the spaces provided below all questions.*

(e) *All working **MUST** be clearly shown in the spaces provided.*

(f) *Mathematical tables and electronic calculators may be used.*

   Take 'g' = 10m/s^2

FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAX. SCORE	CANDIDATE'S SCORE
A	1 - 12	25	
B	13	12	
	14	14	
	15	09	
	16	12	
	17	08	
TOTAL SCORE		80	

1

SECTION A (25 MARKS)
Answer ALL questions in this section in the spaces provided

1. A sharp point of a pin is held in the bare hands and brought near the cap of a positively charged electroscope. **State** and **explain** the observation made on the electroscope. (2mks)

2. **State two ways** in which energy is lost in a transformer and how it can be minimized in each case. (2mks)

Source of energy loss	Remedy
(i)	
(ii)	

3. A bulb marked 60W is connected to 240V mains supply and the current switched on for one minute. **Determine** the number of joules of energy consumed by the bulb in the 1 minute. (2mks)

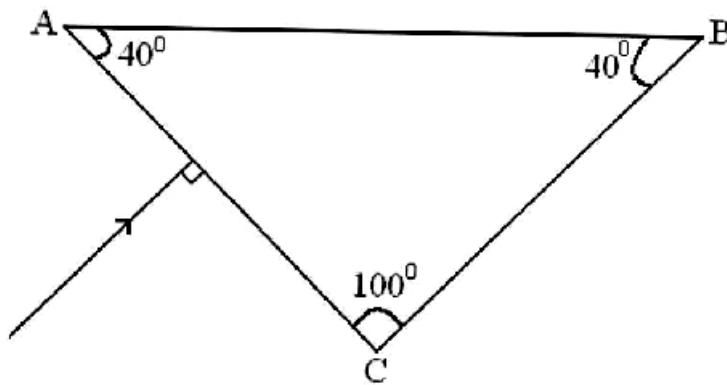4. The figure 1 below shows a ray of light incident on a glass prism.

Fig. 1

Given that the critical angle for the glass is 39^0, **sketch** on the diagram the path of the ray through the prism. (2mks)

5. **Complete** the table of electromagnetic spectrum in the increasing order of wave length from P to Q. (2mks)

P		X-rays			Infra-red		Q

6. Identify the type of emissions that formed the tracks in each case below. (2mks)

Fig. 2

X:...
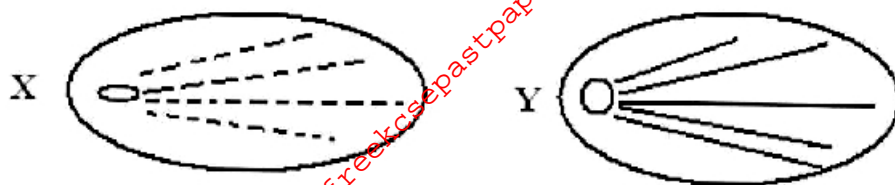
Y:...

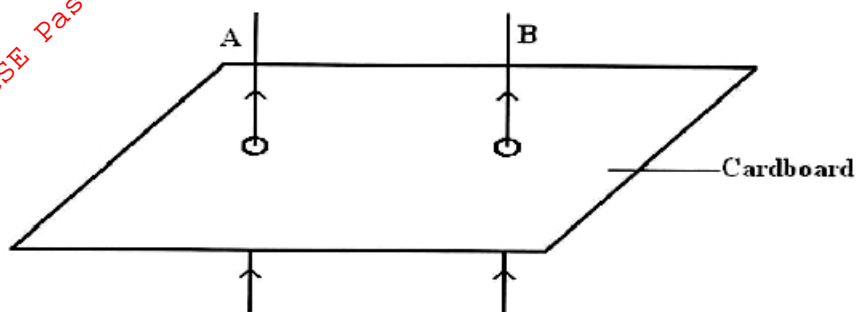7. The figure 3 below shows two conducting wires A and B passing through a horizontal piece of cardboard.

Fig. 3

(i) Sketch the resultant magnetic field patterns when the currents of high magnitude are flowing on both wires as shown. (1mk)

(ii) **What** is the resulting effect of the field on the wires at the loose ends? (1mk)

(iii) If the current in B were to be reversed, **state how** resulting would affect the wire conductors. (1mk)

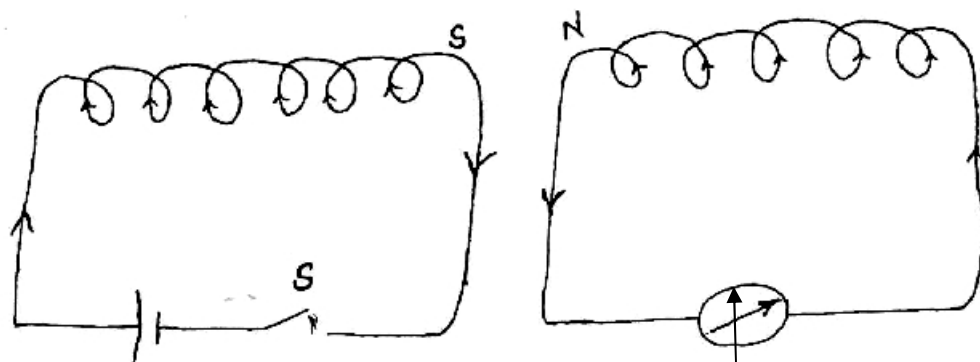8. (i) Indicate the direction in which the pointer will move when switch S is closed. (1mk)

Fig. 4

(ii) **Give a reason** for your answer. (1mk)

3

9. State **one** advantage of an electromagnet as compared to a permanent magnet.

(1mk)

10. Using the circuit shown in figure 4 below, **calculate** the effective capacitance. (2mks)
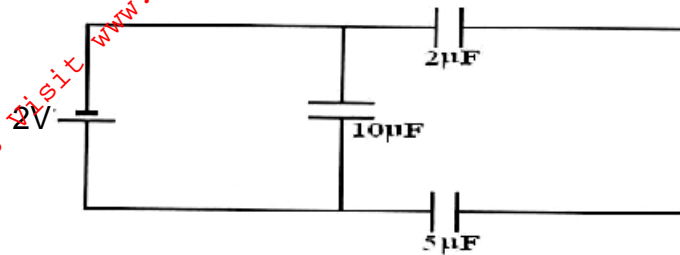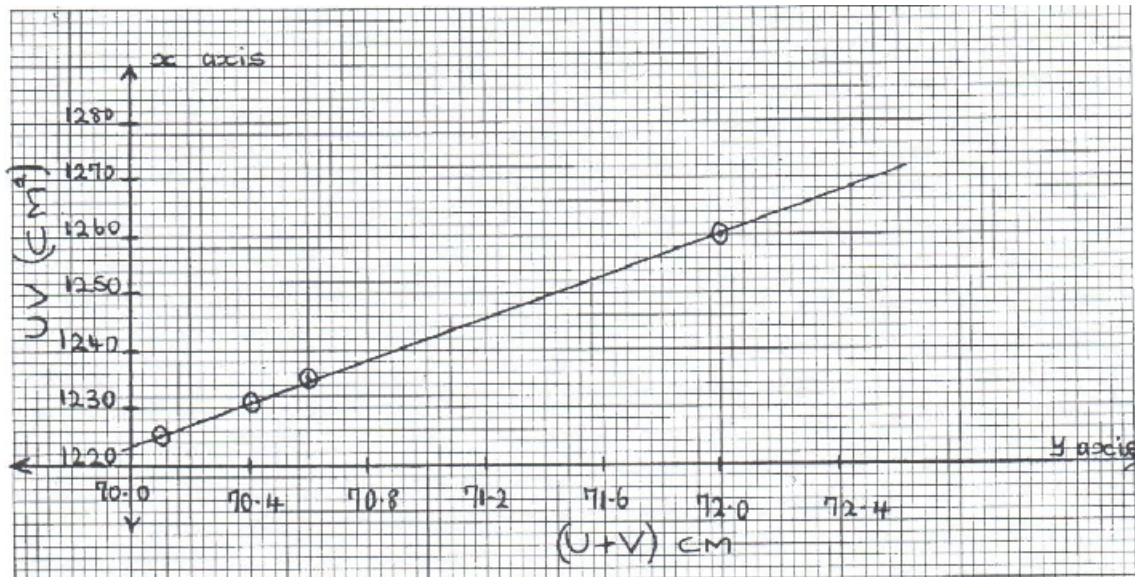

Fig. 5

11. State **one use** and **one source** of gamma rays. (2mks)

Use:_____

Source:_____

12. Joan performed an experiment to measure the focal length of a convex lens. A series of object distances (u) and image distance (v) were recorded and then a graph of uv against u+v was drawn; as shown.

(i) **Show** that the slope of the graph is equal to the focal length. (2mks)

(ii) **Determine** the focal length of the lens from the graph. (2mks)

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

(2mks)

(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. (1mk)]
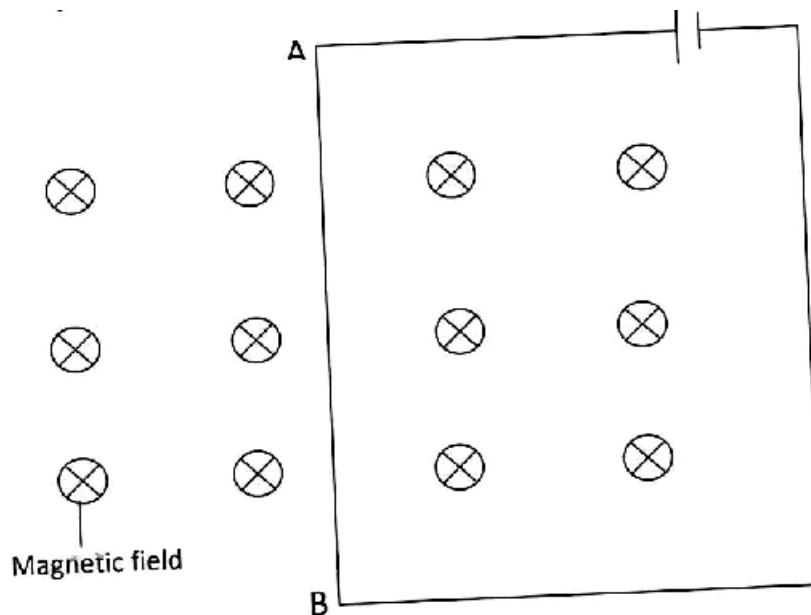

Magnetic field

Fig. 6

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

(d) Calculate the length of a nichrome resistance wire of cross-sectional area $7\times10^{-8}m^2$ required to make a resistor of 10 ohms.
(Take resistivity of nichrome = 1.10×10^{-6} m) (3mks)

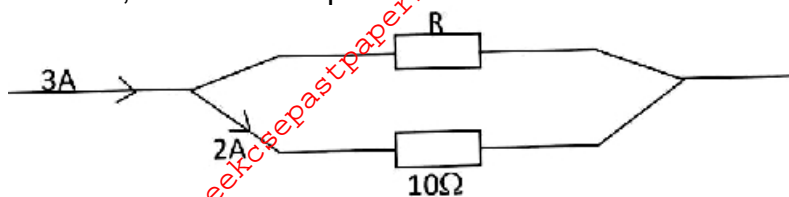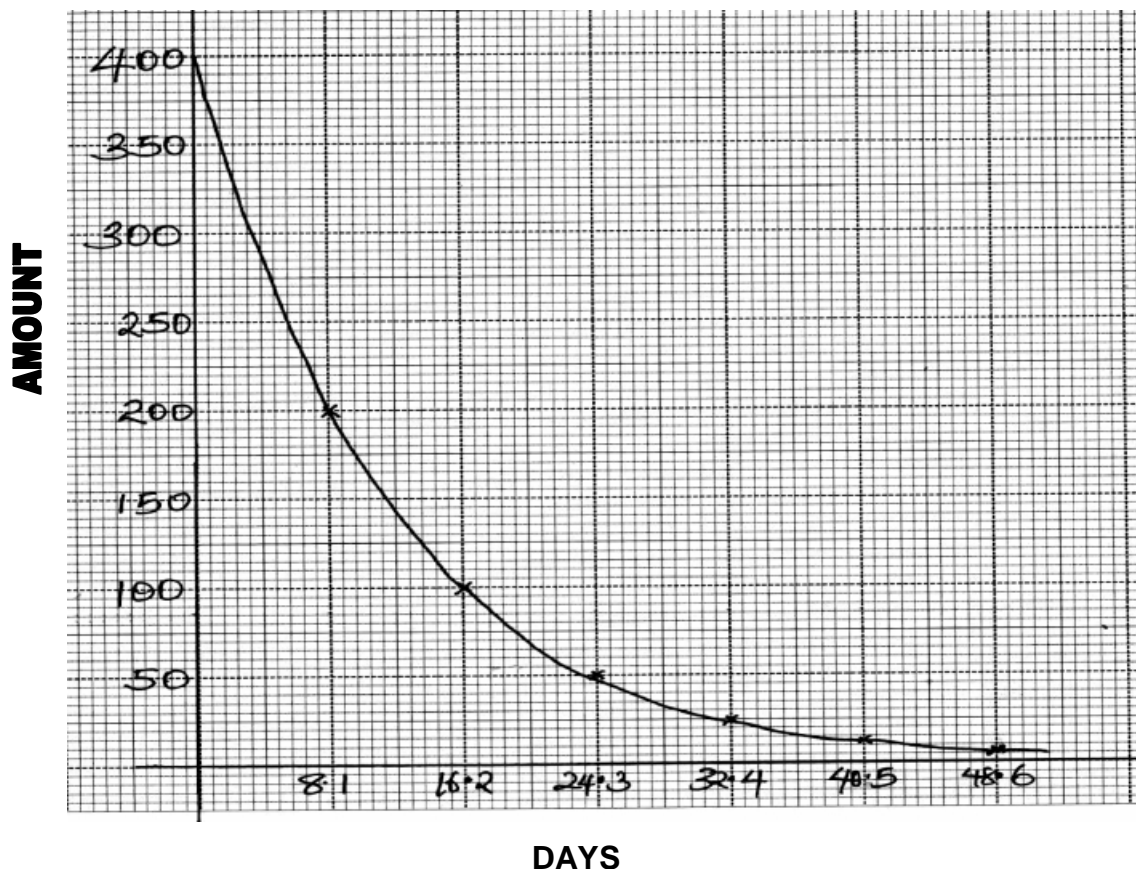(e) In figure **below**, calculate the p.d across resistor R. (2mks)

Fig. 7

14. (a) The half life of cobalt 60 is 5 years. How long will a sample take for the activity to decrease to $^1/_{16}$ of its value? (2mks)
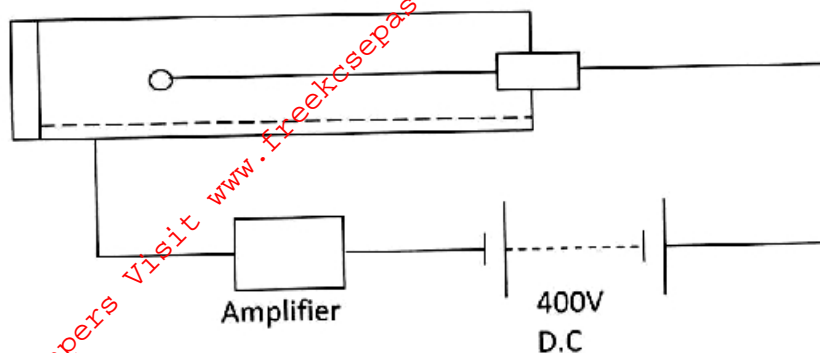
(b) The graph below shows radioactive decay of iodine.

**DAYS**

Use the graph to determine the half-life of iodine. (2mks)

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

Amplifier   400V
                 D.C

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

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

(iii) What is the purpose of the halogen vapour? (1mk)

(d) The figure below shows a simple cathode ray tube.

Y   X   Fluorescent
                      screen
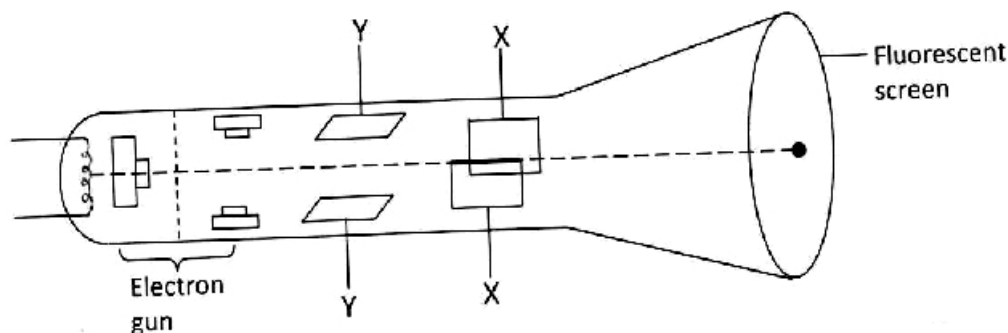
Electron
gun
Y   X

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

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

(iii) At what part of the cathode ray tube would the time base be connected? (1mk)

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

7

15. (a) The figures below show diagrams of the human eye.

(a)

(b)

(i) Sketch in figure (a) a ray diagram to show long sightedness. (1mk)

(ii) Sketch in figure (b) a ray diagram to show how a lens can be used to correct the long sightedness. (2mks)

(b) Draw a ray diagram to show how a convex lens can be used as a magnifying glass. (2mks)

(c) The diagram below shows a ray of light travelling between water-glass interface.

Water

Glass

$28°$
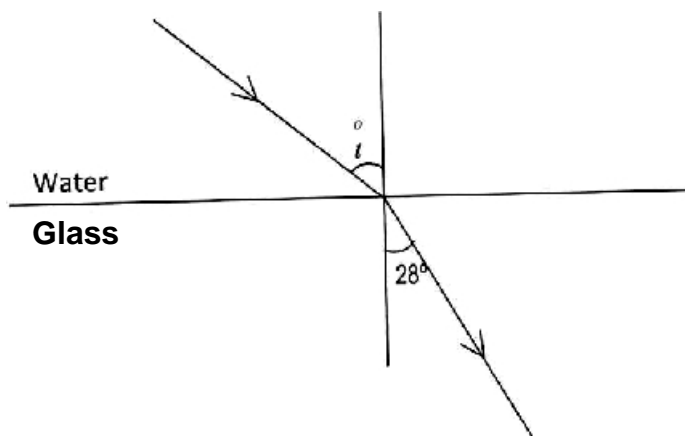
Calculate the value of i given that $a^n g = 1.52$ and $a^n w = \frac{4}{3}$ (2mks)

(d) State **two** conditions for total internal reflection to occur. (2mks)

8

16. (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 produced heat at the rate of 1000W. Assuming 100% efficiency, determine the:

(i) Voltage in the secondary circuit. (2mks)

(ii) Current in the primary circuit. (2mks)

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

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

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

(ii) Calculate the cost of using the following appliances in one month (30 days) if the company rate is Ksh. 9.50 per unit. (3mks)

 I. A 2000W water heater for 2 hours per day.

 II. A 75W bulb for 10 hours per day.

 III. A 1500W electric iron for 1 hour per day.

(iii) Find the total monthly bill for the above household if in addition to the energy consumed, the power company charges each consumer a standing charge of Ksh. 200 and fuel cost at 70 cents per unit. (2mks)

17. (a) Define the term work function. (1mk)

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

(i) The work function of the metal. (2mks)

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

(iii) The frequency of the source. (3mks)