NAME: …… INDEX NO: ……

SCHOOL: …… DATE : ……

SIGNATURE: ……

232 / 2
PHYSICS
PAPER 2
THEORY
JULY / AUGUST 2013
TIME: 2 HOURS

NANDI NORTH DISTRICT JOINT MOCK EVALUATION TEST 2013

Kenya Certificate of Secondary Education (KCSE)
PHYSICS
PAPER 2
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 questions in Section A and B in the spaces provided below all questions.*

(e) *All working MUST be clearly shown.*

(f) *Non-programmable silent electronic calculators and KNEC Mathematical tables may be used.*
Take g = 10Nkg^{-1}

FOR EXAMINER'S USE ONLY

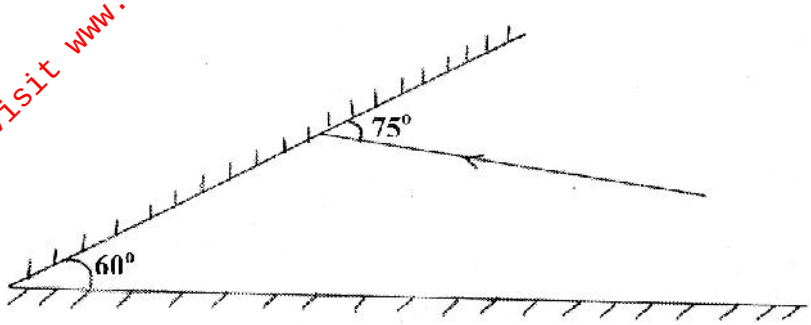
SECTION	QUESTION	MAX. SCORE	CANDIDATE SCORE
A	1 - 12	25	
B	13	12	
	14	09	
	15	11	
	16	11	
	17	12	
TOTAL SCORE		**80**	

SECTION A (25 MARKS)

Answer ALL questions in this section in the spaces provided

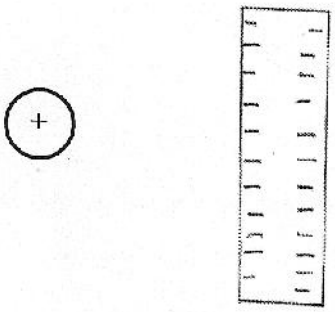
1. Figure 1 below shows a ray of light incident to the first of the two mirrors inclined at an angle of 60^0. Complete the path of the ray after reflection from the mirror. (1mk)

Fig. 1



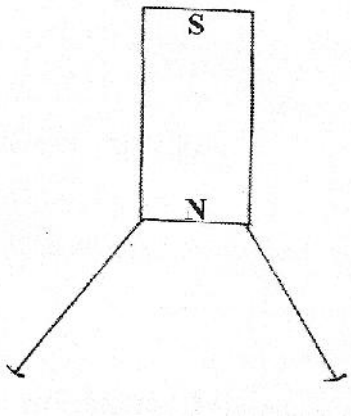
2. Figure 2 below shows a positive charge near a plate carrying negative charge. Draw the electric field between them. (2mks)

Fig.2



3. Two pins are hanging from a magnet S shown in diagram below figure 3.

Fig. 3



Explain why the nails do not hang vertically downwards. (2mks)

4. Draw diagrams to illustrate what happens when plane waves are incident on a slit.

   (i) When the width of the slit is large compared with the wavelength of the waves. (2mks)

   (ii) When the width of the slit is small compared with wavelength of the waves. (2mks)

5. What energy conversion occurs in a photocell? (1mk)

6. (i) Arrange the following waves in order of decreasing wavelength; x-rays, infrared, microwaves and visible light. (1mk)

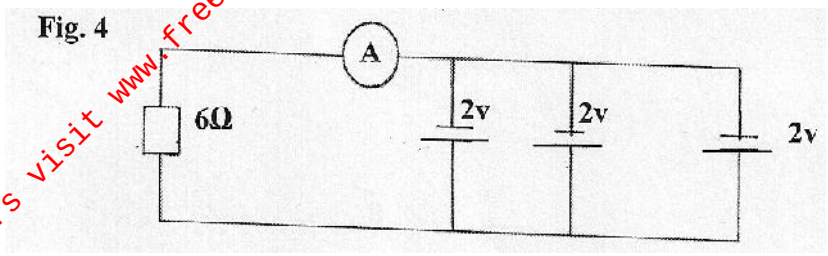
   (ii) State **one** application of visible light. (1mk)

7. State **two** advantages of an alkaline accumulator over lead acid accumulator. (2mks)

8. A girl shouts and hears an echo after 0.6 seconds later from a cliff. If velocity of sound is 330m/s, calculate the distance between her and the cliff. (3mks)

9. What is dispersion of light? (1mk)

10. Determine the reading of the ammeter in figure 4 below. (2mks)



11. A ray of light is incident on a glass-oil interface as shown in fig. 5 below. Determine the value of r. (Take refractive index of glass and oil as $^{3}/_{2}$ and $^{8}/_{5}$ respectively) (1mk)

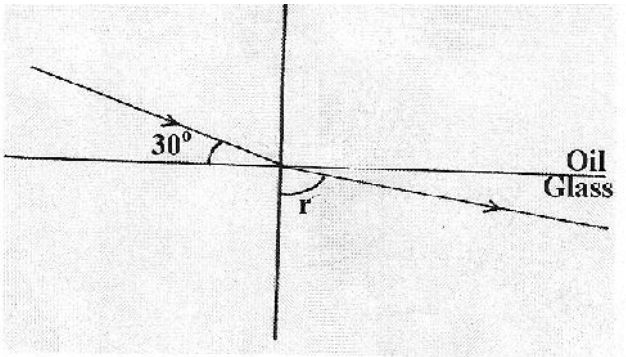


Fig. 5

12. State **two** factors that affect the capacitance of a parallel-plate capacitor. (2mks)

SECTION B (55 MARKS)

Answer ALL the questions in this section in the spaces provided

13. (a) What is meant by:-

(i) Radioactive decay (1mk)

(ii) Unstable nuclide. (1mk)

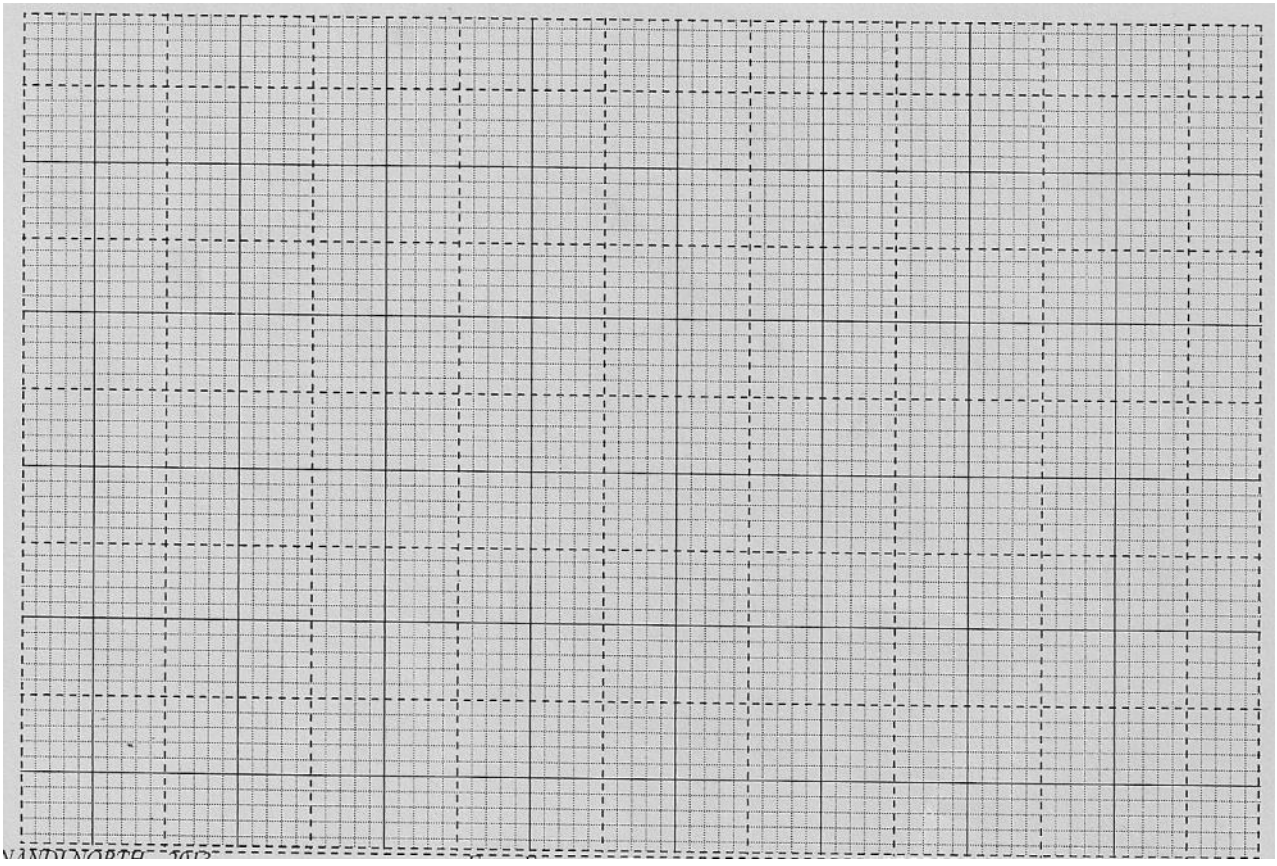
(b) A radioactive nuclide $^{228}_{90}X$ decays by emitting an alpha particle and a neutron to become a nuclide $^{a}_{b}M$. Write a decay equation for the process giving the actual values of a and b.

(c) A Geiger Muller tube without a radioactive substance near it recorded a count rate of 50 counts per minute. When a radioactive substance was held near it, the following data was obtained.

Count rate in disintegration / min	950	750	550	400	300	230	170	130
Time in days	0	2	4	6	8	10	12	14

On the grid provided below, plot a graph of count rate in disintegrations per minute. (Y-axis) verses Time in days.

Use the graph to answer the questions that follow. (5mks)



(i) Determine the half-life of the substance used. (1mk)

(ii) Determine the appropriate count rate on the 11th day. (1mk)

14. (a) Distinguish between intrinsic and extrinsic semi-conductors. (2mks)

(b) (i) A junction diode is used as a rectifier. Draw a simple circuit to show how two junction diodes and a centre tapped transformer can be used to produce a full wave rectified a.c. (3mks)

(ii) Name **two** other uses of a junction-diode. (2mks)

(c) The graph in fig. 6 below shows a forward bias characteristic of a p-n junction.

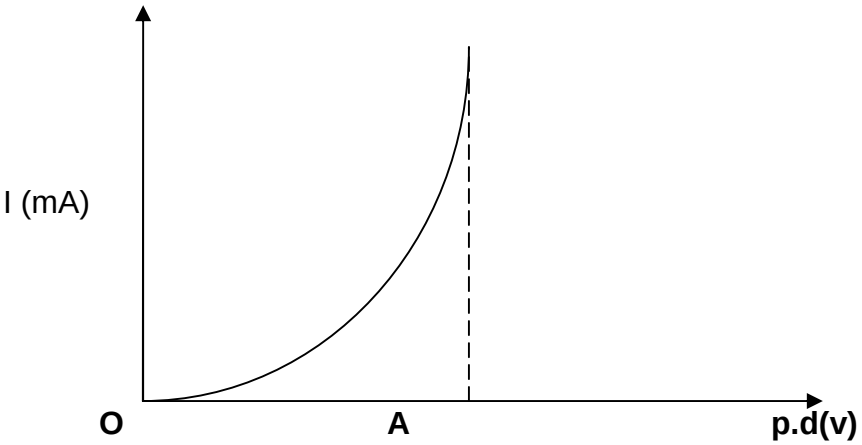


Fig. 6

The depletion layer decreases from O to A. Explain what is meant by the depletion layer. (1mk)

(d) What is the advantage of rectifying using four diodes instead of two? (1mk)

15. (a) The figure below shows the features of an X-ray tube.

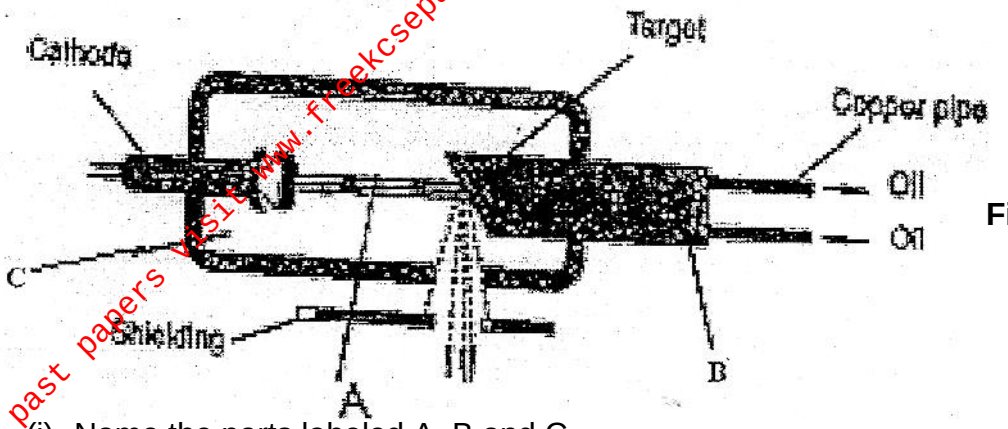


Fig. 7

(i) Name the parts labeled A, B and C. (3mks)

(ii) Briefly describe how X-rays are produced. (2mks)

(iii) Why is it necessary to maintain a vacuum inside an X-ray tube? (1mk)

(iv) During the operation of the tube, the target becomes very hot. Explain how this heat is caused. (1mk)

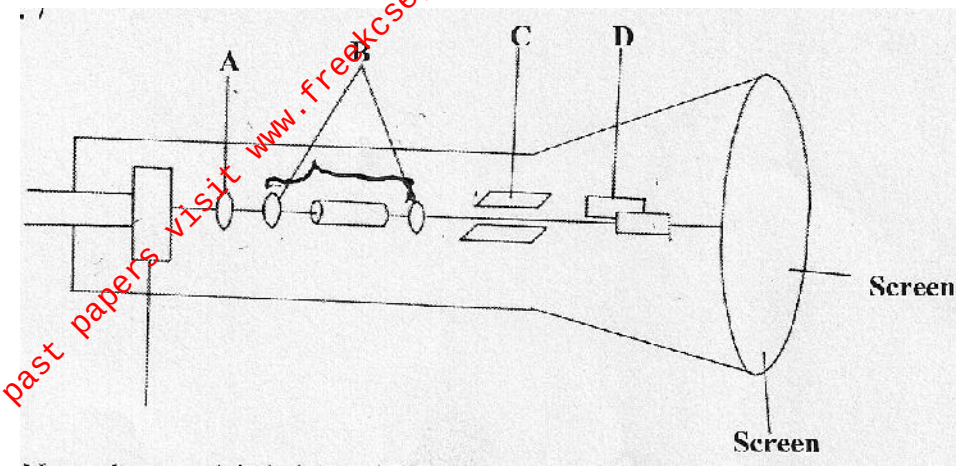
(b) An X-ray tube produces X-rays whose wavelengths vary from 6.0×10^{-13}m to 4.5×10^{-9}m. ($v=3.0 \times 10^{8} ms^{-1}$ and $h = 6.63 \times 10^{-34}$Js). Determine:-

(i) The range of the frequency of X-rays. (2mks)

(ii) The highest energy of the X-rays. (2mks)

16. (a) The figure 8 below represents a cathode ray oscilloscope (C.R.O.)

Fig. 8



(i) Name the parts labeled A and B. (2mks)

A

B

(ii) What are the functions of parts labeled C and D? (2mks)

(iii) Explain how electrons are produced. (1mk)

(iv) Give a reason why the tube is evacuated. (1mk)

(b) Four 40W bulb, and six 100W bulbs were switched on for 5 hours a day for domestic use in a certain institution. Find the monthly bill for the consumer given that the cost of electricity in the country is at sh. 5.50 per unit (Take 1 month = 30 days and standing charge of shs. 150/=) (4mks)

(c) Give **one** advantage of high voltage transmission over long distances. (1mk)

17. (a) (i) State Lenz's law of electromagnetic induction. (2mks)

(ii) Give the structural features in transformer design which help in achieving high efficiency. (3mks)

(b) Define the following terms as used in curved mirrors:

(i) Principal focus (F) (1mk)

(ii) Focal length (f) (1mk)

(c) By use of a ray diagram, show how a concave mirror may be used as a dentist mirror. (2mks)

(d) You are provided with the following apparatus; a white screen, metre rule and concave mirror. Using the apparatus, describe an approximate method of determining the focal length of the mirror. (3mks)