Name ....   Index Number .... / ....

Candidate's Signature ....

Date ....

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

KIKUYU DISTRICT INTERSCHOOLS EVALUATION
KENYA CERTIFICATE OF SECONDARY EDUCATION

232/2
PHYSICS
PAPER 2 (THEORY)
TIME: 2HOURS

Instructions to candidates

1.   Write your name and Index Number in the spaces provided above.
2.   Sign and write the date of examination in the spaces provided above.
3.   Answer all the questions in the spaces provided.
4.   All writing must be clearly shown in the spaces provided.

For Examiner's use only

| Section	Question	Maximum marks	Candidate's marks
1	1 – 12	25	
2	13	14	
	14	9	
	15	10	
	16	9	
	17	13	
	Total	**80**	

SECTION A
### Answer all questions in this section

1.   The figure below (fig 1) shows two plane mirrors inclined at an angle x from each other.
A viewer counts a total of seven images from looking directly from the object O. Determine
the value of x   (3mks)

Figure 1
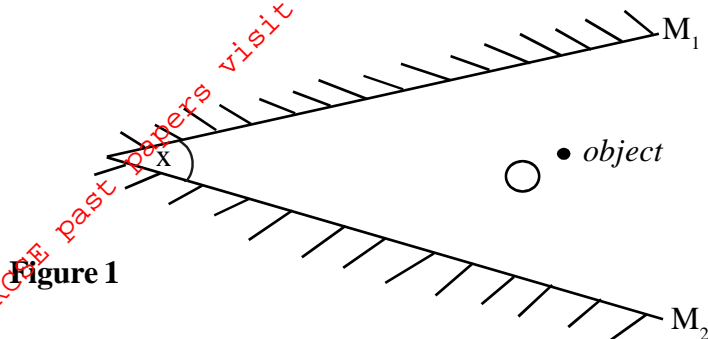
2.   Two metallic spheres A, B stand in contact as shown. A positively charged rod is held near
sphere A. Show the charge on each sphere when the metallic balls are separated and the rod
is removed.   (1mark)
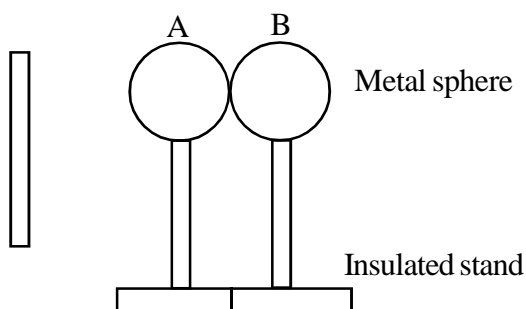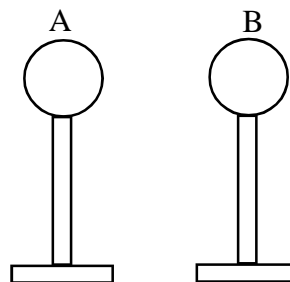
3.   Three identical bulbs are connected in series with a battery. At first, the bulbs shine brightly
but gradually become dimmer. Using the same cells, explain how you would increase the
brightness of the bulbs.   (1mark)

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Physics paper 2   2

4. The force on a conductor carrying a current in a magnetic field can be varied by changing, among others, the magnetic field strength and the magnitude of the current. Name two other factors that can cause the force to vary. (2marks)

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5. Give a reason why a prism disperses white light into the component colours. (1mark)

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6. Two electric heaters A and B rated 1000W and 2500W respectively are connected in parallel across a 240V mains supply. Calculate the ratio $R_A:R_B$ of their resistances (3marks)

7. A radioactive substance has a mass of 0.2g and an activity of 1.0×10^3 disintegration per second at $t = 0$. What would be the activity of a sample of mass 0.6g of the same substance at the time $t = 0$. (2marks)

8. The figure 3 is part of a circuit containing two capacitors of $2\mu f$ and $3\ \mu f$, determine the potential difference across AB given that the total charge in the capacitors is 1×10^{-4} coulombs. (3marks)
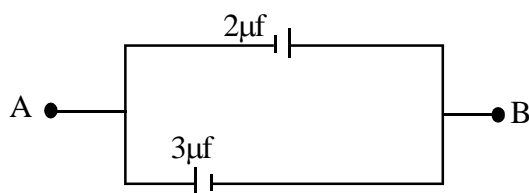
9. The figure shows regions of the electromagnetic spectrum. D is the region of visible light

◄───────────────────────────────

    Decreasing wave length
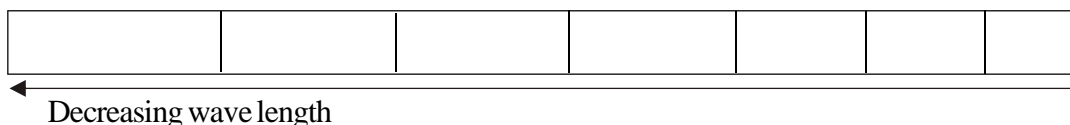
Indicate the region of the following. (2marks)

(i) X-rays

(ii) Ultraviolet

10. State one advantage of using parabolic reflector in a headlamp of a car. (1mark)

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11. Water waves from a given source move from a shallow to a deeper end. What effect would this have on:

(a) frequency (1mark)

....

....

(b) wave length (1mark)

....

....

(c) velocity of the wave (1mark)

....

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12. The figure below shows the Guiger-muller tube:
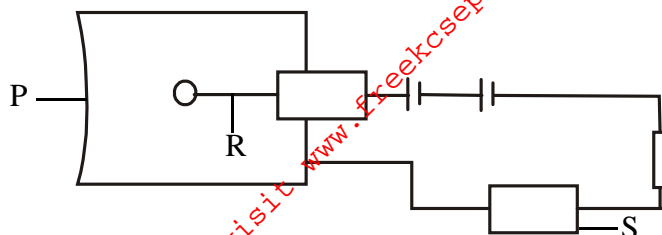
Name the parts labelled:- (3mks)

P ....

Q ....

R ....

B (55 MARKS)

Answer all the questions in this section in the spaces provided

13. (a) Distinguish between thermionic and photo-electric emission (1mk) *BND*

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(b) Draw a well labelled diagram of an experiment set up for observing photo-electric effect. (3mks)

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(c) The table below shows the relationship between the wavelength , of a radiation falling on a surface and the energy E of the emitted electrons.

(m) x 10^{-7}	2.0	1.5	1.0	0.5
E(J) x 10^{-19}	10	13	20	40
FREQUENCY (f)				

(i) Plot a graph of energy E against the frequency f of the incident light (7marks)

(ii)   Determine the work function, Wo of the surface used   (3mks)

(Take C = 3.00 x 10^8 m/s & h 6.663 x 10^{-34} JS^{-1})

14.   (a)   Americium, strontium -90 and cobalt-60 are known sources of alpha, beta

particles and gamma rays respectively. All the three sources are placed in front

of the obstacles shown below.
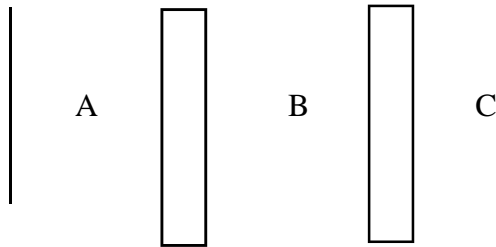
An attempt is then made to detect the particles/radiations at points A, B and C using a

Geiger-Muller. Which particle(s)/ radiations are detected at points A, B, C?   (3marks)

(b)   State two dangers of radioactive emissions   (2marks)

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(c)   Radium (Ra) 226 decays by alpha emission to Radon(Rn). The atomic number of

Ra is 88.

(i)Write down an equation to show this decay.   (2 marks0

(ii)   Rn is itself radioactive and decays by alpha emission to polonium (po) while Po
         can decay by beta emission according to the equation

$${}_{F}^{E}Po \xrightarrow{\quad\quad B \quad\quad} {}_{H}^{G}At$$
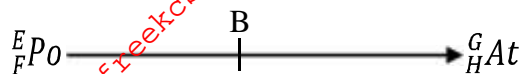
Determine the values of

E   _____

F   _____

G   _____

H   _____   (2 marks)

15. (a)   State Faraday's law of electromagnetic induction.   (1 mark)

_____

(b)   The diagram below shows a simple generator.
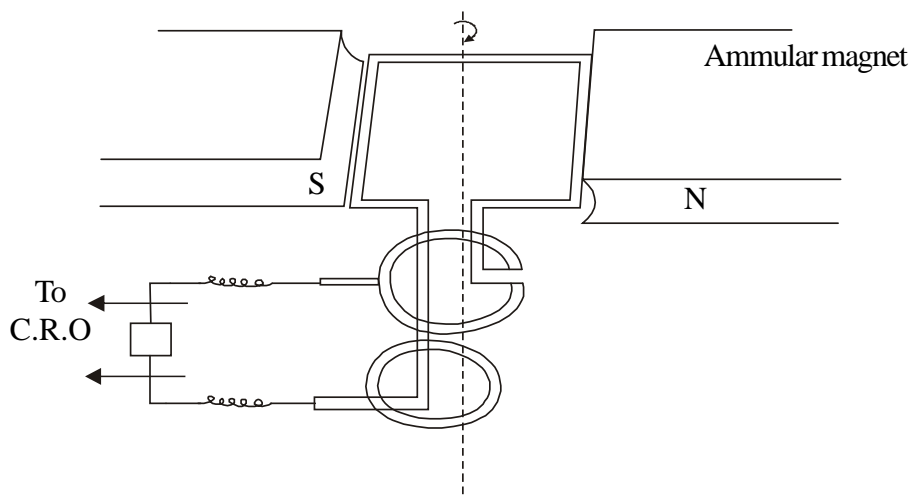
(i)   Name the type of generator

.... (1mark)

(ii)   On the axes below, sketch the graph of the output voltage for two cycles if
       a C.R.O is connected as shown.   (1mark)

(c) The figure below shows a transformer which is 90% efficient.

240V a.c

12V, 36W
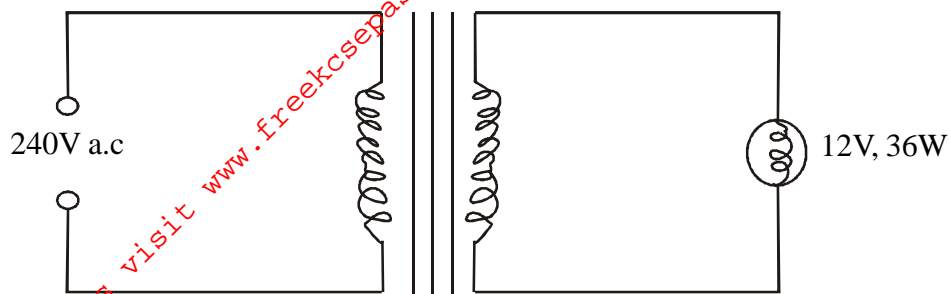
(i) Determine the number of turns in secondary coil if the number of turns in the primary.

coil is 4000 (2marks)

(ii) Determine the current in primary coil if the bulb is operating normally. (3mark

(d) Explain why long distance power transmission is done at a very high voltage. (2marks)

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16. (a) With an aid of a ray diagram show how a convex lens can be used as a magnifying glass.

(b)   From the definition of magnification M and equation $f = \dfrac{uv}{v + u}$ show the magnification

$M = v/f - 1$ where the symbols have their visual meanings.   (3marks)

(c)   Two converging lenses whose focal lengths are $f1 = 5cm$ and $f2 = 10cm$ are arranged
to have a common axis as shown in figure below.
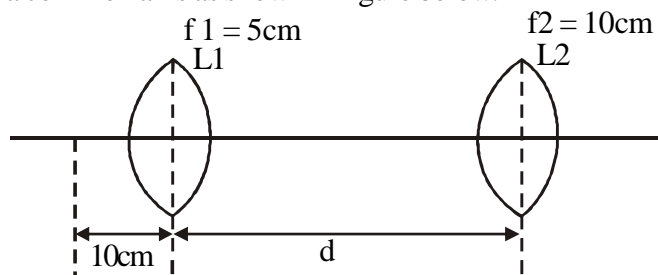
A point object is placed 10cm from L1. Given that the final image is formed 20cm
to the left of $L2_1$ calculate the separation d of the lenses.   (3marks)

17.   (a)   Draw a ray diagram to show how two right angled isosceles triangle is used in
the prism periscope.   (2marks)

(b)   Figure 8 represents a ray of light falling normally on the curved surface of a semi-circular glass block A, at an angle of 32^0 at O and emerging into the air at an angle of 48^0.

Figure 8

(i)   Calculate the absolute reflective index of the glass of which the block is made..
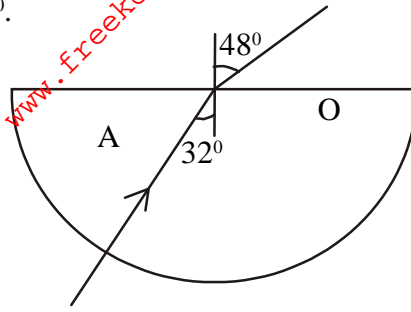*(Assume air to be a vaccum)*   (3marks)

(ii)   Describe briefly how the glass block in figure 8 can be used to find the critical angle for glass   experimentally given to use a ray box and protractor.   (5marks)

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(c)   The diagram in figure 9 shows a certain eye defect.

Parallel ray from
a distance object   *retina*

Figure 9

(i)   Name the eye defect   (1mark)

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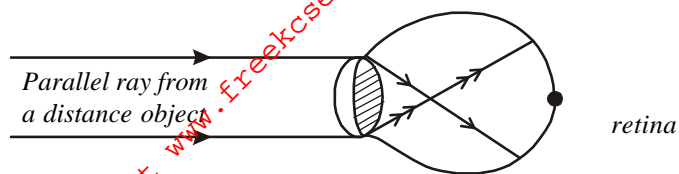(ii)   On the same arrangement draw an arrangement to show how the defect can
        be corrected.   (2marks)