NAME: …… **INDEX NO.** ……

SCHOOL: …… **DATE** ……..

CANDIDATE'S SIGN. ……

232/2

PHYSICS

PAPER 2 (THEORY)

JULY /AUGUST 2014

TIME: 2 HOURS

KISUMU WEST DISTRICT JOINT EVALUATION EXAM

Kenya Certificate of Secondary Education (K.C.S.E.)

PHYSICS

PAPER 2 (THEORY)

INSTRUCTIONS TO CANDIDATES:

- *Write your **name, school** and **index number** in the spaces provided above*
- *This paper consists of **two** sections, **A** and **B.***
- *Answer **all** questions in section **A** and **B** in the spaces provided.*
- *All working **must** be clearly shown in the spaces provided.*
- *Scientific calculators and KNEC Mathematical tables may be used.*

For Examiners' Use Only

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1-14	25	
B	15	9	
	16	12	
	17	13	
	18	10	
	19	11	
	TOTAL	80	

This paper consists of 12 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are Missing

SECTION A - 25 MARKS

Answer all questions in this section

1. Figure 1 below shows an object **O** placed in front of a plane mirror. A ray of light is drawn coming object **O** and striking the mirror at **P.** After striking the mirror, the ray of light is reflected.

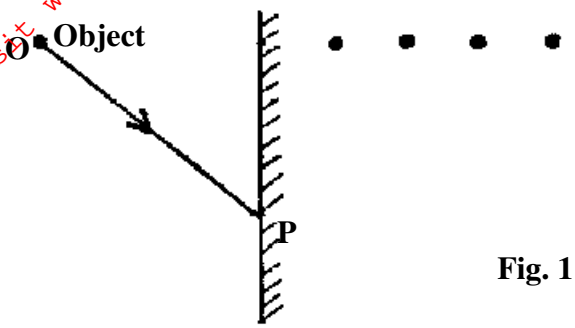


Fig. 1

(i) Which of the four dots represent correct position of the image of **O**? Label this dot **Q** (1mk)

(ii) By drawing a line on the diagram above to represent the reflected ray at **P**, mark the angle of reflection and label it **r**. (1mk)

2. A charged conductor is slowly brought near the cap of a positively charged electroscope. The leaf first collapses and then diverges. State the charge on the conductor (1mk)

3. Give a reason why it is necessary to leave the caps of the cells open when charging an accumulator (1mk)

4. Figure 2 below shows a simple experiment using a permanent magnet and two metal bars **A** and **B** Put close to the iron filings.

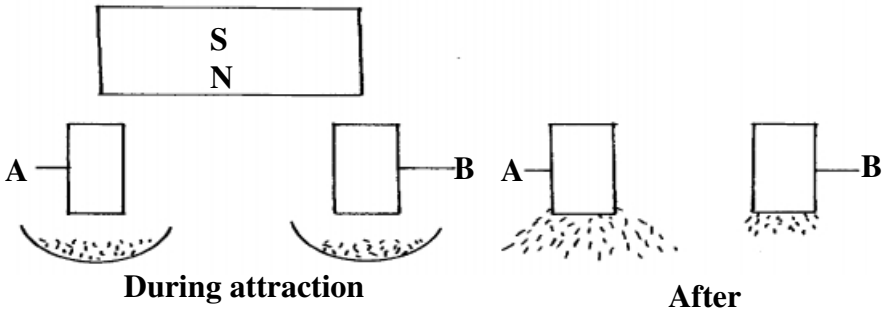


Fig. 2

State with a reason which bar is made from a soft magnetic material. (2mks)

5. Figure 3 below shows two parallel current carrying conductors **P** and **Q** placed close to one another. Current flows in the opposite directions.

Fig. 3

Sketch on the figure the magnetic field pattern formed by the two conductors. (1mk)

6. Figure 4 below shows two identical lamps L_1 and L_2 connected to a battery.

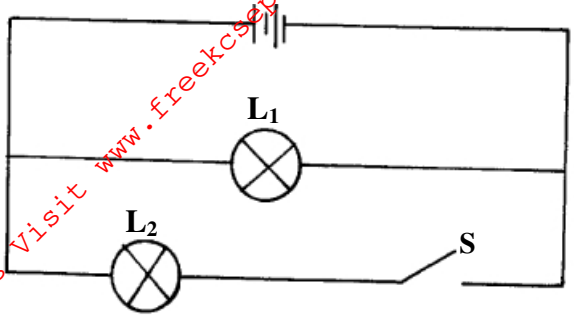


Fig.4

(a) Using an arrow, indicate on the diagram above the direction of the convectional current (1mk)

(b) State the effect if any, of closing switch **S** on L_1 (1mk)

7. Figure 5 below shows a ray of light incident on water-kerosene interphase.

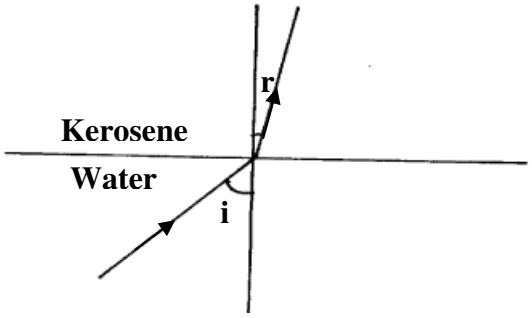


Fig.5

State which one of the two liquids has a higher absolute refractive index. (1mk)

8. The table in **figure 6** below shows part of the electromagnetic spectrum in order of decreasing wavelength

A	B	INFRA RED RADIATION	VISIBLE LIGHT	C	D

Figure 6

(a) How are waves **C** produced? (1mk)

(b) State one use of the wave **D** (1mk)

9. Figure **7** below shows two solenoids, **X** and **Y** close to each other.

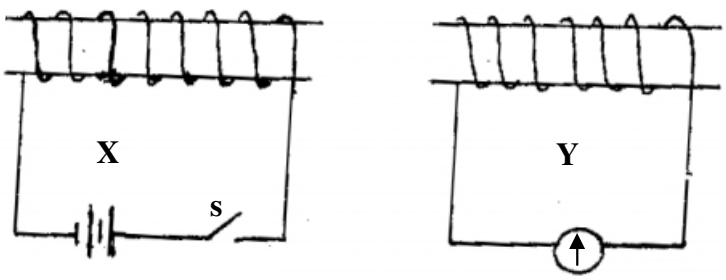


Fig.7

(a) Name the process by which current is caused in **Y** by closing the switch **S**. (1mk)

(b) Show on the diagram above the direction of current in **Y** as switch **S** closes. Use an arrow.

(1mk)

10. A house has a lighting circuit operated from a **240V** mains supply. Four bulbs rated **40W 240V** and six bulbs rated **100W 240V** are switched on for **5** hours a day. Determine the monthly bill for the consumer given that the cost of electricity is at shs. 5.50 per unit.
(Take 1 month = 30 days and the standing charge is sh. 150) (3mks)

11., State **two** properties of X-rays similar to those of visible light. (2mks)

12. Explain why the tube of a cathode ray oscilloscope is made of thick glass walls. (2mks)

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

(c) Explain how the intensity of radiation affects the photo-electric effect (1mk)

14. Figure 8 below shows an eye defect

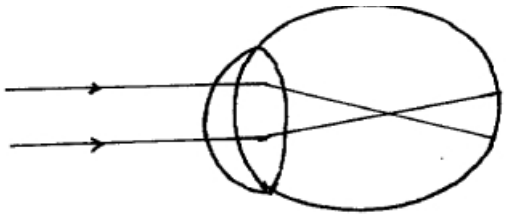


Fig 8

Use a ray diagram to show how the defect above could be corrected. (2mks)

SECTION B - (55 MARKS)

15. (a) An object **O** stands on the principal axis of a concave mirror as shown in figure 9 below.

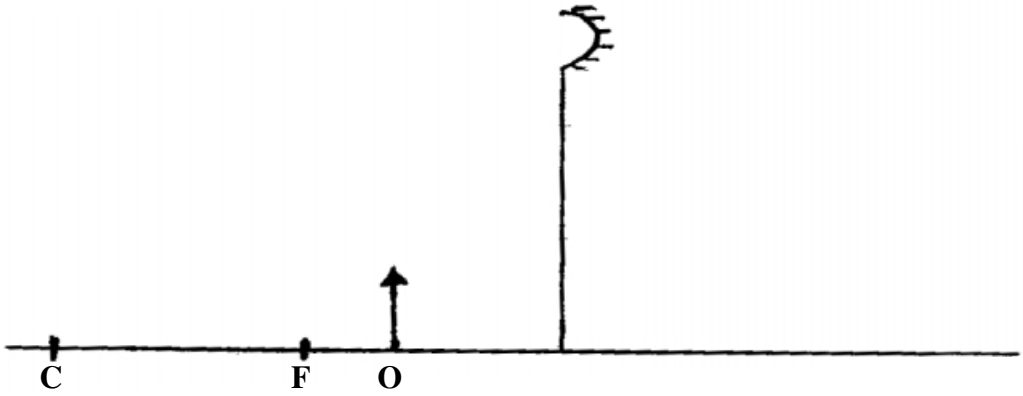
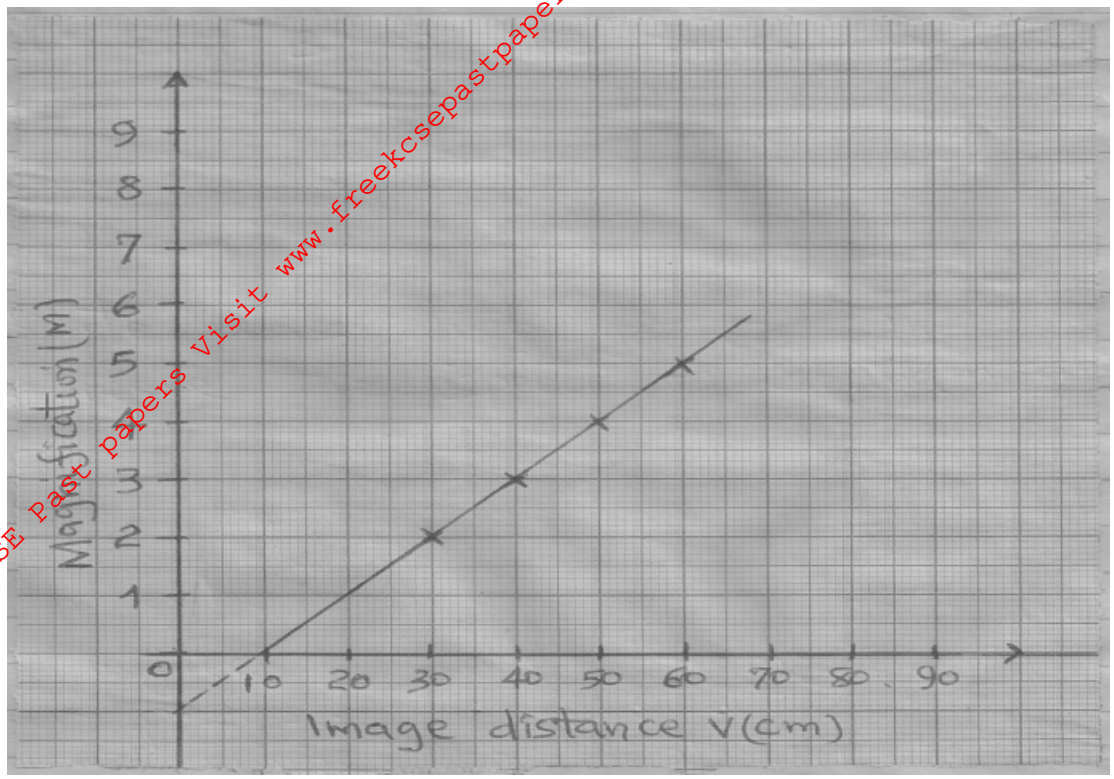


Fig. 9

(i) By drawing suitable rays, show the position of the image (2mks)

(ii) Determine the magnification of the image formed (2mks)

(b) In an experiment to determine the focal length of a concave mirror, a group of form two students collected some data and used the results to plot the graph shown in figure **10** below.



Using the graph above, determine:

(i) The object position when the image position is 45 cm (2mks)

(ii) Slope of the graph. (2mks)

(iii) The focal length of the mirror given

$$\mathbf{m} = \frac{v}{f} - 1$$ (1mk)

16. (a) Students set up a mass attached to a spring such that when it oscillates it taps on water surfacein a wide shallow tank as in figure 11 below.

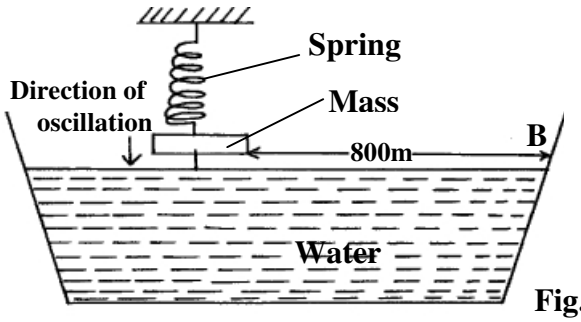


Fig. 11

The students measured time for 20 oscillations and found that the mass takes 36 seconds. Determine:

(i) The periodic time of the mass (2mks)

(ii) The frequency of the waves produced on the water surface (1mk)

(iii) The speed of the waves if the students counted four ripples between the mass and end **B** of the tank (3mks)

(b) State any **two** factors that would increase the speed of sound in air (2mks)

(c) An echo sounder of a ship received the reflected waves from a sea bed after 0.20s.

(i) Determine the depth of the sea bed if the velocity of sound in water is 1450m/s (2mks)

(ii) When the ship above passes over a sunken reef, the echo sounder receives an echo after 0.16s. Determine the height of the sunken reef (2mks)

17. (a) (i)Define capacitance of a capacitor (1mk)

……..

……..

(ii) **Figure 12** below shows a pair of parallel plates of a capacitor connected to a battery.

The upper plate is displaced slightly to the left.

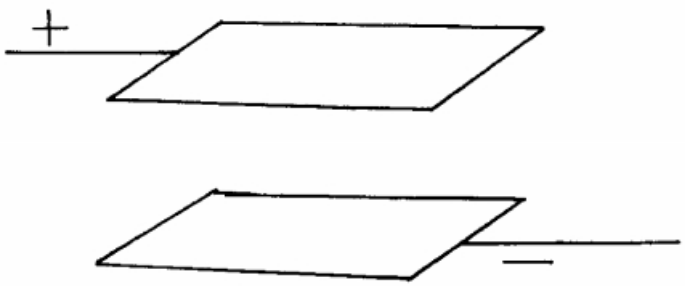


Fig 12.

State with a reason the effect of this movement on the capacitance (2mks)

……..

……..

iii) The circuit diagram in figure13 below shows four capacitors connected between two points **A** and **B**

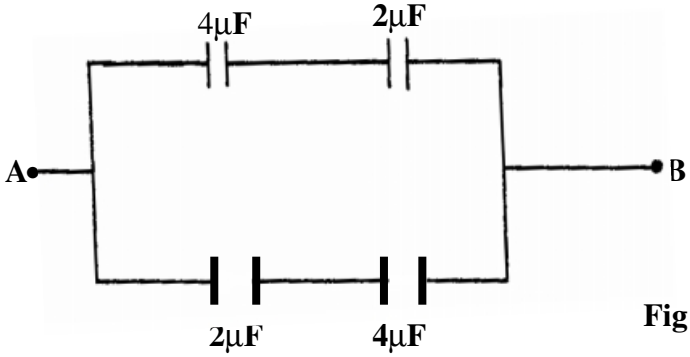


Fig 13

Determine the capacitance across **AB** (3mks)

(d) **Figure 14** below shows metal plates **X** and **Y**. Metal **Y** is illustrated by ultra-violet radiation.

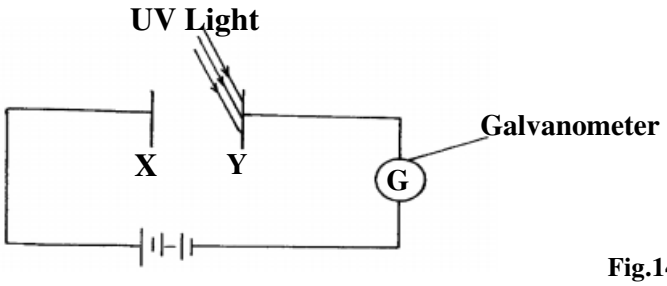


Fig.14

(i) State the observation made on the galvanometer (1mk)

……

……

(ii) Explain the observation in (i) above (2mks)

……

……

(iii) A material has a work function of 2.0eV. Determine the largest wavelength of incident radiation that can cause photo electrons to be emitted from its surface.

C = 3×10^{8} m/s, h = 6.63×10^{-34} Js (4mks)

1eV = 1.6×10^{-19}J

18. (a) Define Radioactivity (1mk)

……

……

(b) An element **R** decays by giving off an alpha particle. Complete the equation below showing the valves of **a** and **b** (1mk)

$$^{236}_{72}R \quad = \quad ^{a}_{b}V + ^{4}_{2}He$$

a = _____ b = _____

(c) Figure **15** below shows the features of a diffusion cloud chamber used for detecting radiations from radioactive sources.

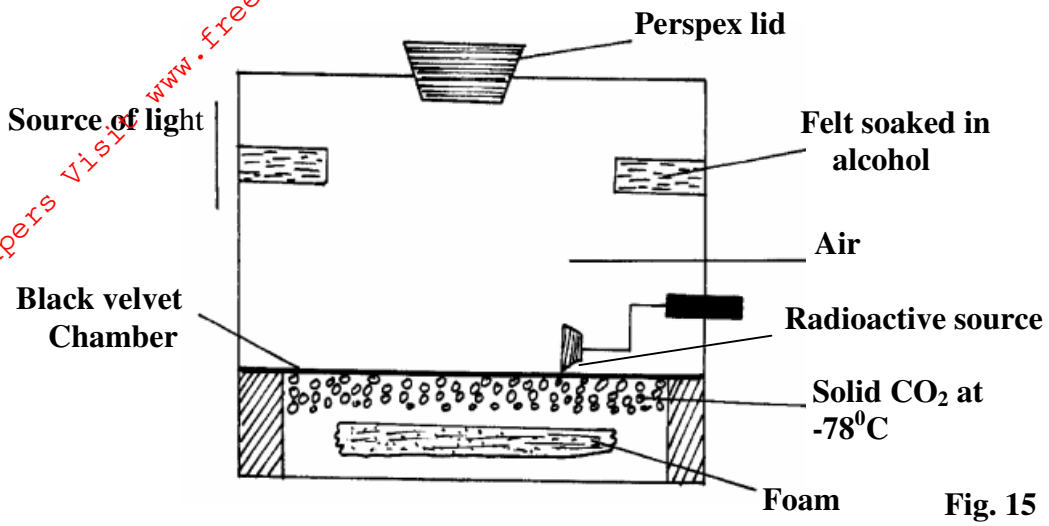


Fig. 15

(i) State the property of alcohol that makes it suitable for use in the chamber (1mk)

……

……

(ii) State the function of the Perspex lid. (1mk)

……

……

(iii) Explain why the base velvet chamber is painted black (1mk)

……

……

(iv) Explain how the radiation from the radioactive source is detected in the chamber. (4mks)

……

……

……

……

……

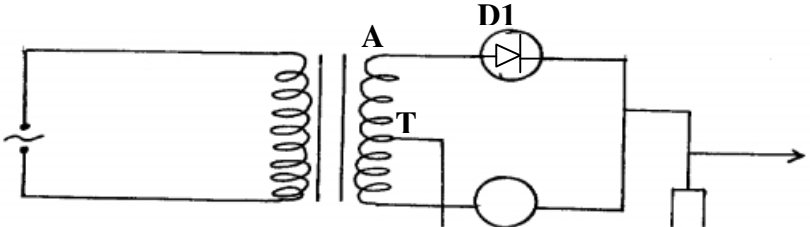
……

(v) State **one** advantage of the cloud chamber over a charged leaf electroscope when used as detectors of radiations (1mk)

……

……

19. A student connected a circuit as shown in figure 16 below hoping to produce a rectified out put



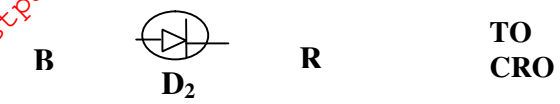


Fig 16.

(a) Sketch the graph of the out put on the **CRO** screen (1mk)

(b) Explain how the output above is produced (2mks)

……

……

(c) Name other **two** uses of a junction diode (2mks)

……

……

……

(e) Graph in figure 17 below shows a forward bias characteristic of a **P - N** junction

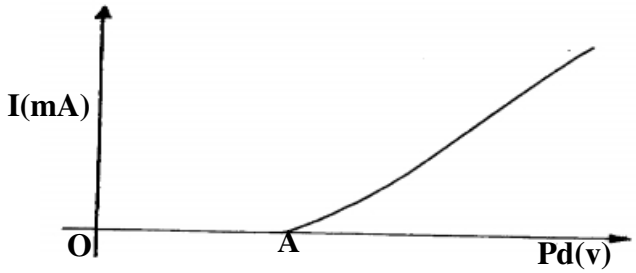


Fig.17

The depletion layer decreases from **O** to **A**. Explain what is meant by depletion layer. (2mk)

……

……

(f) (i) Define the term doping (1mk)

……

……

(ii)Explain how doping produces a P-type semi-conductor. (3mks)

……

.....

.....

.....