N014ame…… …… Index No:…….
Candidate's Signature …….
Date: ……

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

HOMA-BAY SUB-COUNTY JOINT EVALUATION EXAM

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

232/2
Physics
Paper 2
2 hours

INSTRUCTIONS TO THE CANDIDATES:

- Write your **name** 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.
- Mathematical tables and electronic calculators may be used.

For Examiners' Use Only

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1-13	25	
B	14	10	
	15	09	
	16	12	
	17	07	
	18	08	
	TOTAL	**80**	

This paper consists of 11 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 the questions in this section in the spaces provided

1. Two plane mirrors are inclined at an angle of 120^{o} to each other such that their reflecting surfaces face each other. An object pins stands midway between the mirrors. Draw a ray diagram to show all the images (3mks)

2. State **two** conditions necessary for the occurrence of an annular eclipse (2mks)

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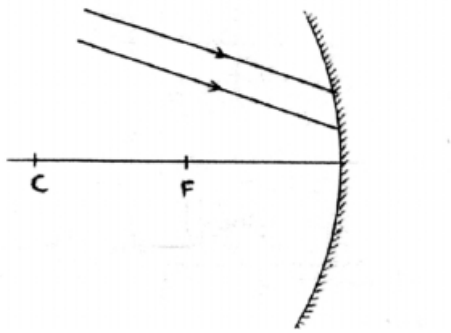
3. The figure below shows two parallel rays incident on a concave mirror. F is the focal point of the mirror



Sketch on the same diagram the path of the rays after striking the mirror. (2mks)

4. State the class of waves to which sound belongs (1mk)

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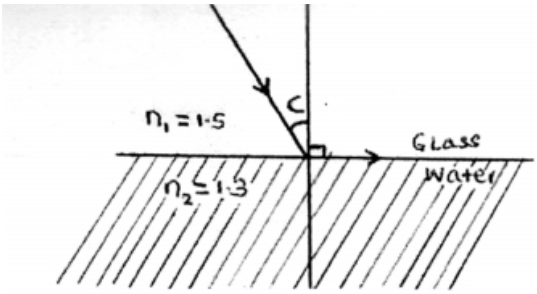
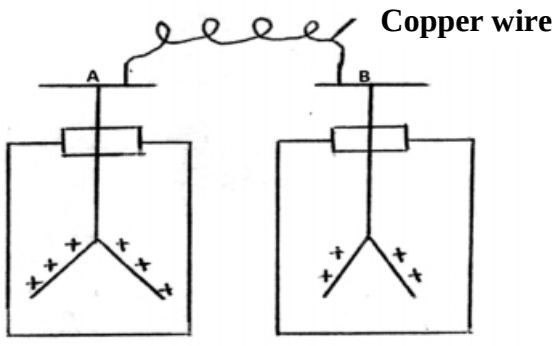
5. Calculate the value of the critical angle C shown in the figure below (2mks)



6. In the diagram below, two electroscopes A and B carry same type of charges as shown. The two are then connected with a copper wire as shown



State and explain the observations (2mks)

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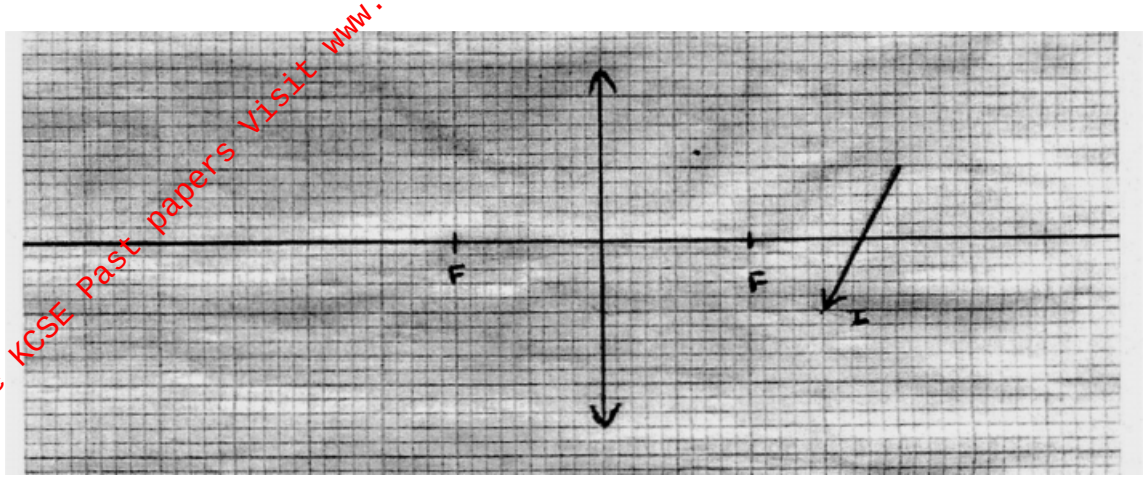
……

6. The figure below shows a real image I formed by a convex lens



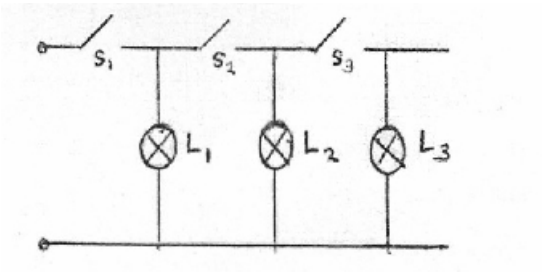
On the same grid, construct a ray diagram to locate the position of the object (2mks)

7. State a property of electromagnetic wave on which the operation of a radar system is based (1mk)

……

……

8. The figure below shows an attempt to supply each of the three lamps L1,L2 and L3 with a switch



(i) Explain why this is a poor connection (1mk)

……

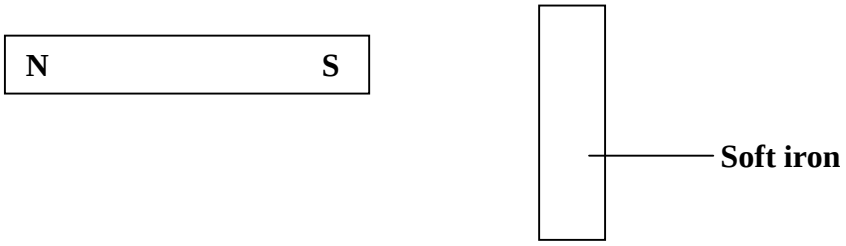
……

(ii) Redraw an adjacent diagram to show the best positioning for the switches (1mk)

9. State one use of x-ray in medicine and one use in industry (2mks)

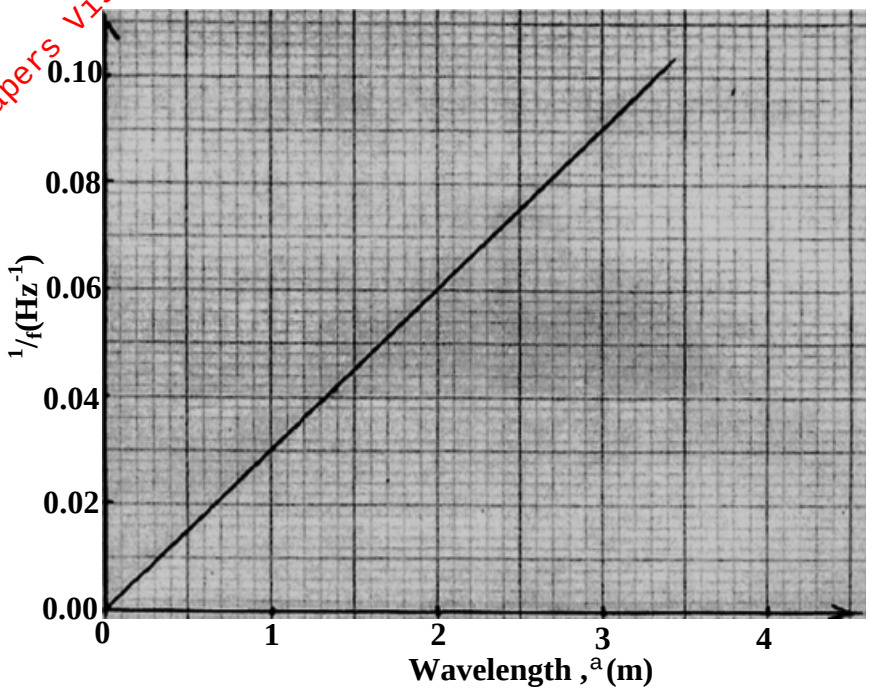
……

10. Draw the magnetic field lines due to the configuration shows below (1mk)



11. Sketch the current –voltage characteristic of a junction diode with a forward bias (1mk)

12. The graph below represents valves of –and corresponding valves of wavelength for waves transmitted in a certain medium



From the graph, determine the speed of the waves (3mks)

13. State one causes of power loss in long distance transmission wires and how these loses can be minimized (1mk)

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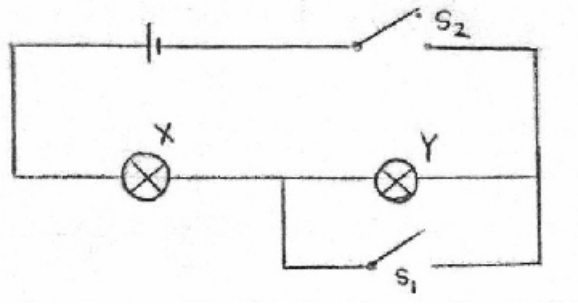
SECTION B (55 MKS)

Answer all questions in the spaces provided

14. (a) Study the circuit shown below.



State and explain what happens to the identical lamps **X** and **Y** in the circuit shown when

(i) Switch S_2 only is closed (2mks)

……

……

(ii) Switches S_1 and S_2 are closed (2mks)

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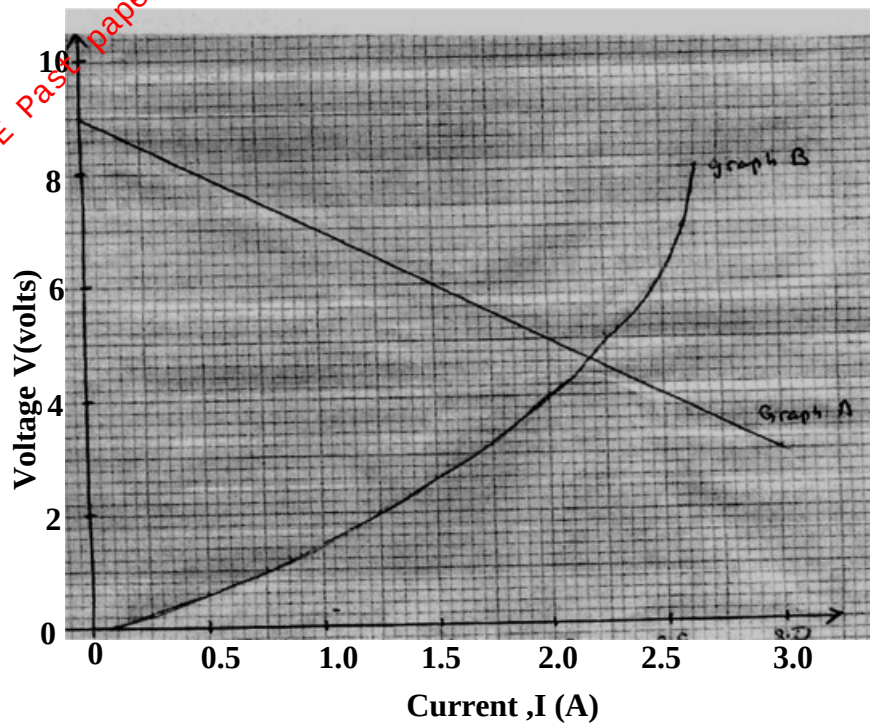
……

(b) Graph **A** shows how potential difference across a battery varies with the current supplied.
Graph **B** shows how the current in a filament lamp varies with potential difference across it



(i)

I. Use graph A to determine e.m.f of the battery (1mk)

……

II. The internal resistance of the battery given V=-ir+E (3mks)

……

……

III. Calculate the resistance of the filament lamp when current through it is 1.5V (2mks)

15. (a) (i) The following nuclear reaction is part of a radioactive series

$$\overset{210}{82}A \xrightarrow{\beta} \overset{210}{X} \xrightarrow{r} \overset{210}{84}B \xrightarrow{s} \overset{206}{Y}C \qquad D$$

I. Name the radiation represented by **r** and **s** (1mk)

r……

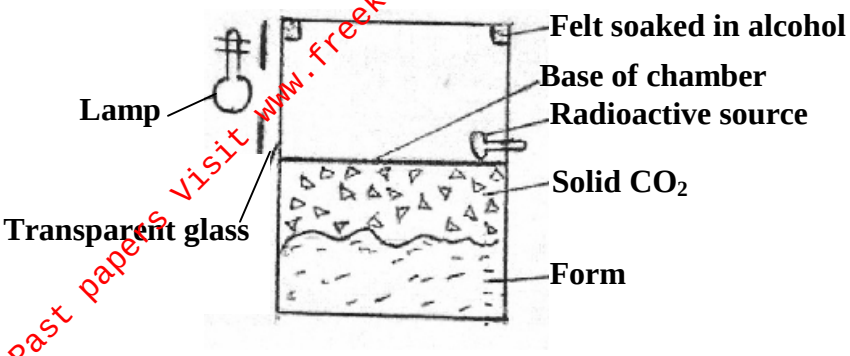
s……

II. Determine the number represented by **x** and **y** (1mk)

x……..

y……..

(ii) The figure below shows the features of diffusion cloud chamber used for detecting radiations from radioactive sources



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

……

II. What is the purpose of the solid CO_2? (1mk)

……

III. Explain how the radiation from the radioactive source is detected in the chamber. (2mks)

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……

IV. State one advantage of the cold chamber over a charged gold leaf electroscope w hen used as detectors of radiation (1mk)

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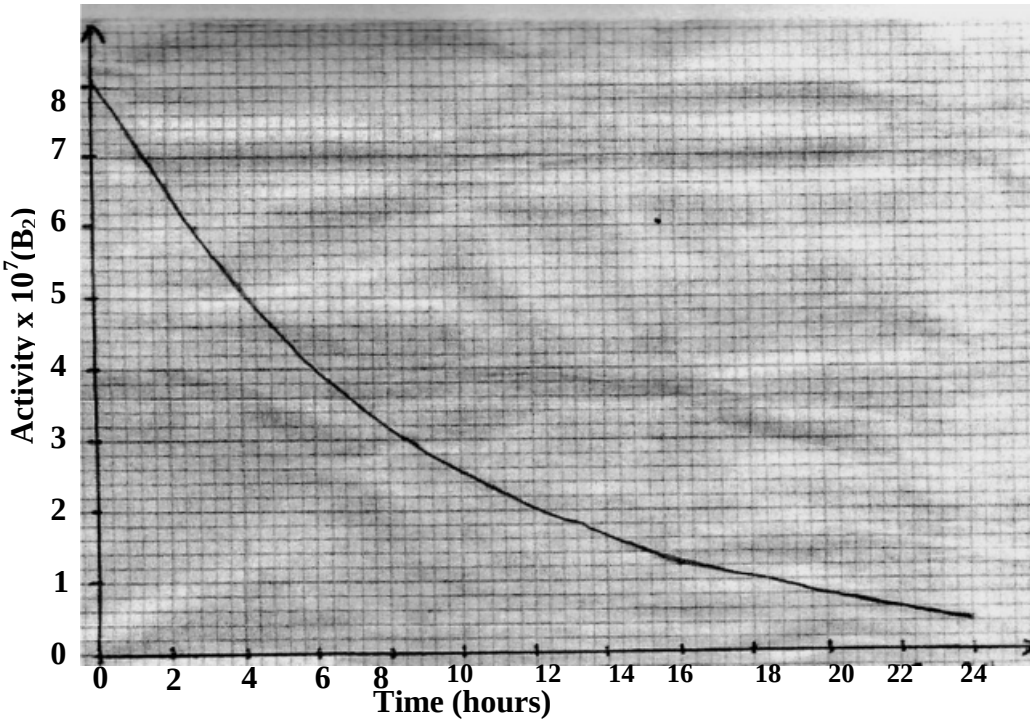
(b) The graph below shows how the activity of a sample of the radioisotope technetium which is used extensively in medicine, varies with time



I.Use the graph to determine the half-life. T ½ of technetium (1mk)

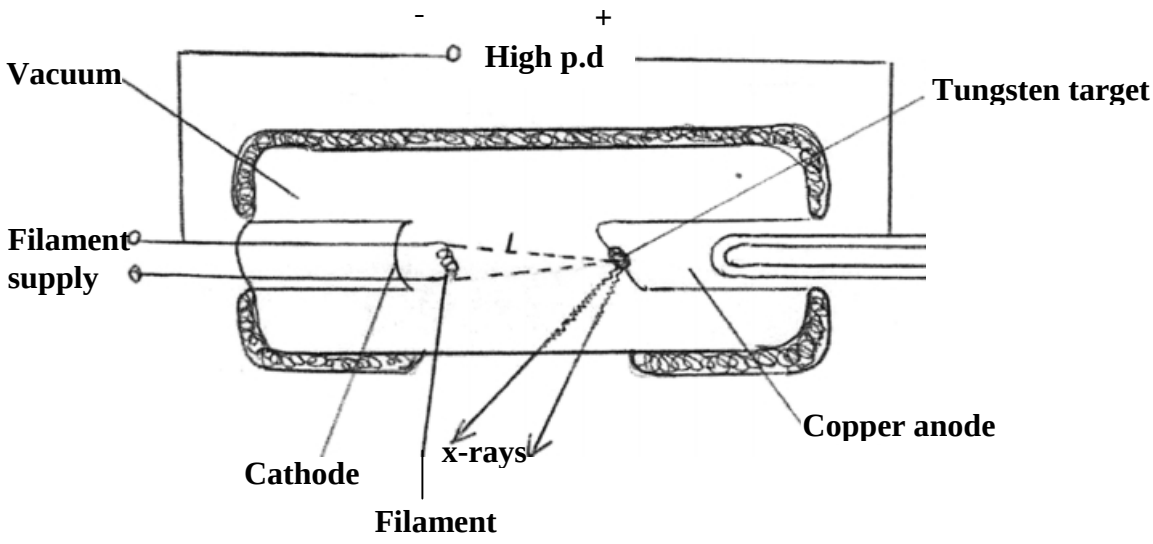
……

……

II. Hence calculate the decay constant for technetium given that $T_{1/2} = \frac{0.6931}{a}$ where λ is the decay constant. (1mk)

III. Determine the number of technetium atoms remaining in the sample after 24 hours (1mk)

16. The figure below shows the features of an X-ray tube



(a)(i) What is the purpose of the oil going in and out of the anode (1mk)

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……

(ii) State with reason the property of tungsten that makes it suitable as a target (1mk)

……

……

(b) An X-ray tube operates with a potential difference of 100kv and filament current is 20mA. Calculate ;

I. The power transferred to the target of X-ray tube (2mks)

……

……

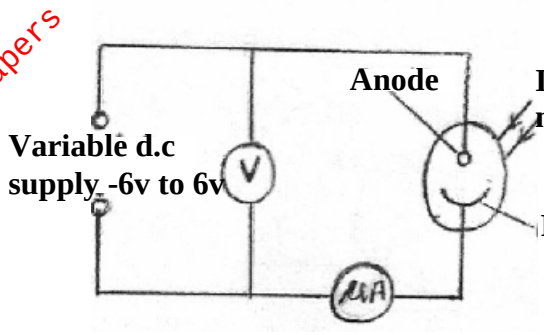
II. The number of electrons hitting the target per second (2mks)

……

……

III. The maximum energy of X-ray produced (Take charge of an electron=$1.6x10^{-19}$C, mass of an electron =$9.1x10^{-31}$kg) (2mks)

(c) The diagram shows monochromatic radiation falling on a photocell connected to a circuit



The incident radiation has a wavelength o f $2.15x10^{-7}$m. The metal surface of the photocell has a work function of 2.26 eV

I. Calculate the energy in eV of a proton of the incident radiation *(Take speed of light C=3.0x108ms^{-1}, planck's constant, h=$6.63x10^{-34}$JS and electronic charge, e=$1.6x10^{-19}$C)* (3mks)

II. What is the maximum kinetic energy of the emitted electrons (2mks)

III. Write down the value of the stopping potential (1mk)

17. (a) State Lenz's law of electro-magnetic induction (1mk)

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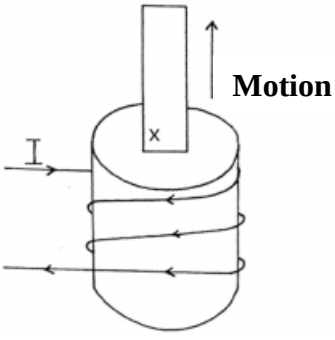
(b) In the figure below, the bar magnet is moved out of the coil



(i) If the current, I is induced in the coil in the direction shown, what is the polarity of x of the magnet? (1mk)

……

……

(ii) Explain briefly the source of electrical energy in the circuit (1mk)

……

……

(c) A hydro-electric power station produces 500KW at a voltage of 10KV. The voltage is then stepped up to 150KV and the power is transmitted through cables of resistance 200Ω to a step down transformer in a sub-station. Assuming that both transformers are 100% efficient. Calculate;

(i) The current produced by the generator (2mks)

(ii) The current that flows through the transmission cables (2mks)

(iii) The voltage drop across the transmission cables (2mks)

(iv) The power loss during transmission (2mks)

(v) The power that reaches the sub-station (2mks)

18. (a) State **two** factors that determine the capacitance of a parallel place capacitor (2mks)

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(b) A 5μF capacitor is charged to a potential difference of 200V and isolated. It is then connected to a 10μ capacitor. Find

(i) The resultant potential difference across the combination (3mks)

……

……

(ii) Energy stored before connection (2mks)

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(iii) Total energy in the capacitors after connection (2mks)

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(c) Give one application of capacitors (1mk)

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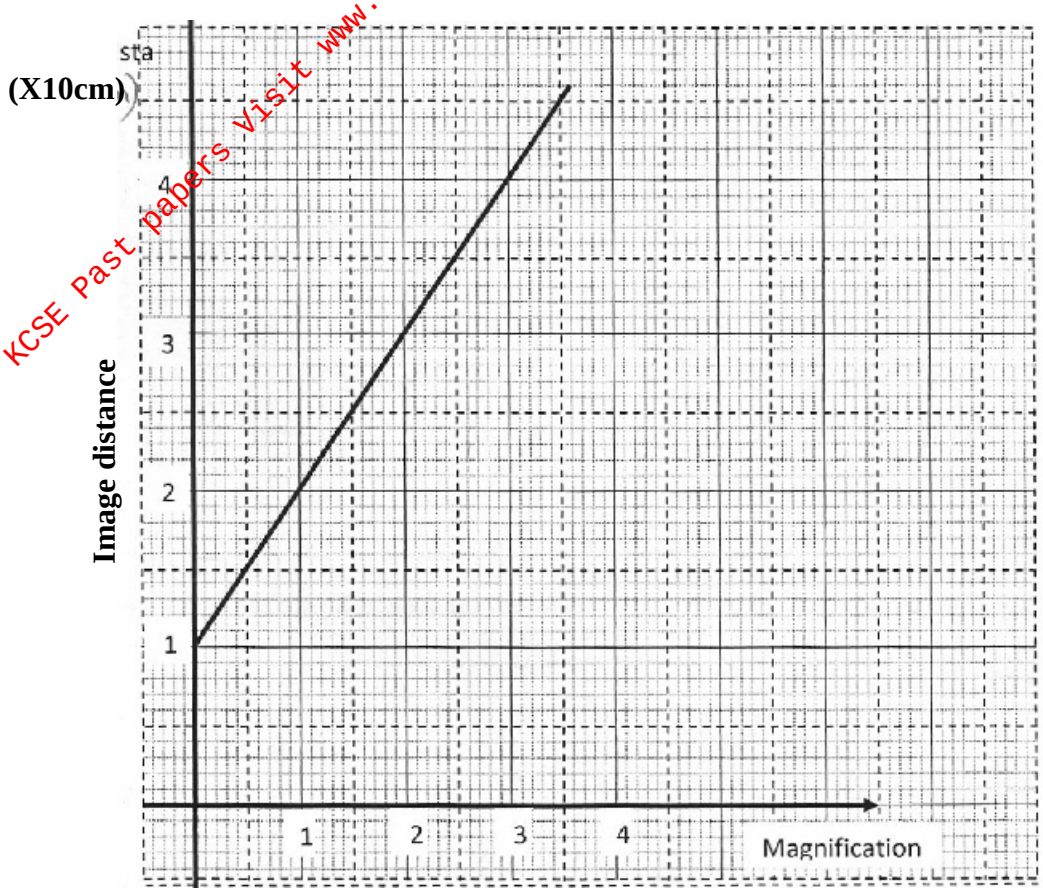
19. (a) The following graph shows the variation of image distance, v, with magnification, for a converging lens



Using the graph and the equation $\frac{v}{f} = M + 1$ determine:

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

……

……

(ii) The focal length of the lens (2mks)

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(iii) The power of the lens (2mks)

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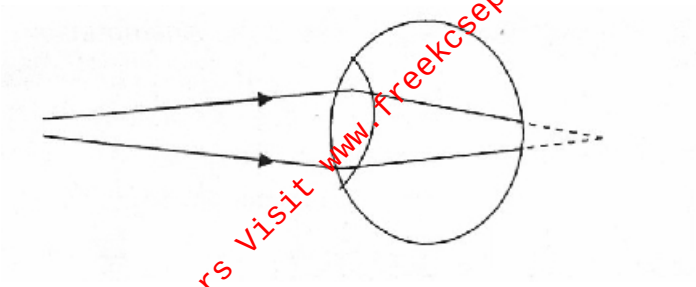
(b) The following figure shows an eye defect



Name the defect and illustrate on the same diagram how the defect could be corrected. (2mks)

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