

NAME..... INDEX NO.....

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

CANDIDATE'S SIGN.....

DATE.....

CENTRAL KENYA NATIONAL SCHOOLS JOINT EXAM - 2015

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

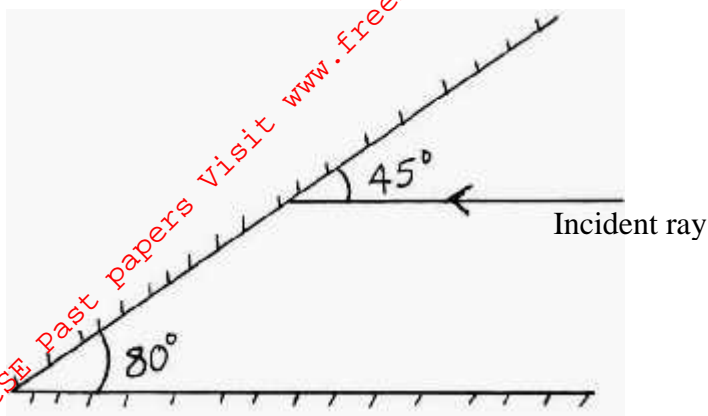
INSTRUCTIONS TO THE CANDIDATE:

- Write your **name** and **index number** in the spaces provided above.
- Sign** and write the **date** of examination in the spaces provided above.
- This paper consists of **two** Sections **A** and **B**.
- Answer **all** the questions in sections **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.

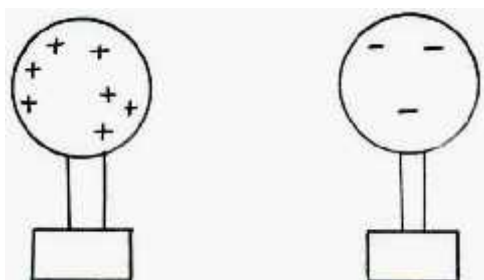
FOR EXAMINER'S USE ONLY:

Section	Question	Maximum Score	Candidate's Score
A	1 – 13	25	
	14	11	
B	15	9	
	16	7	
	17	9	
	18	9	
Total Score		80	

1. The figure below shows two mirrors M_1 and M_2 placed at an angle of 80° . A ray of light incident to the mirror makes an angle of 45° with the mirror M_1 . Find the angle the ray turns after reflection in the two mirrors. (3mks)

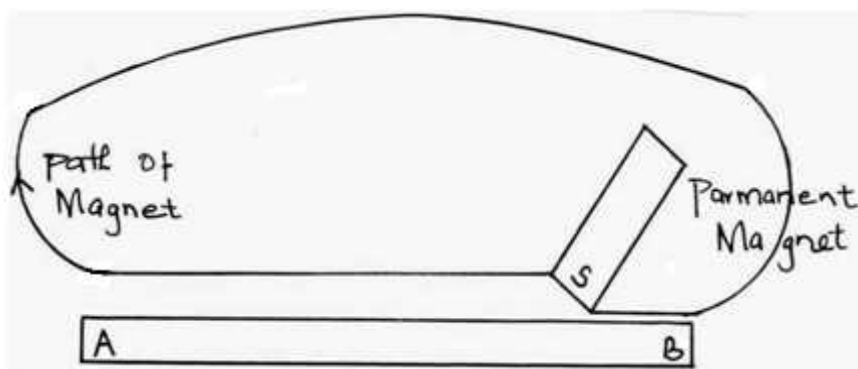


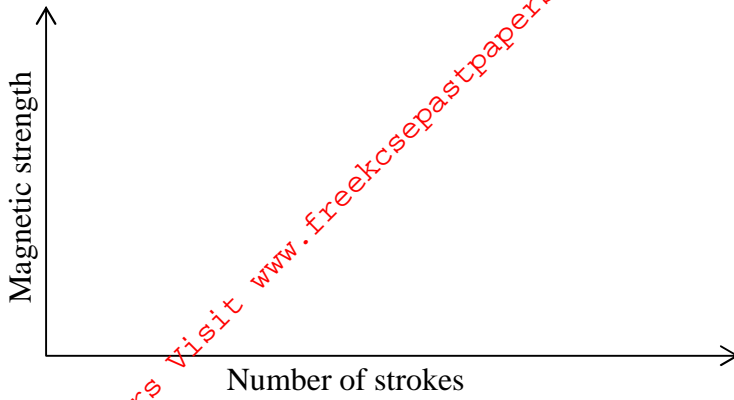
2. The figure below shows two charged spheres A and B. If the two spheres are brought into contact and then separated complete the diagram showing charge distribution on the two spheres after separation. (2mks)



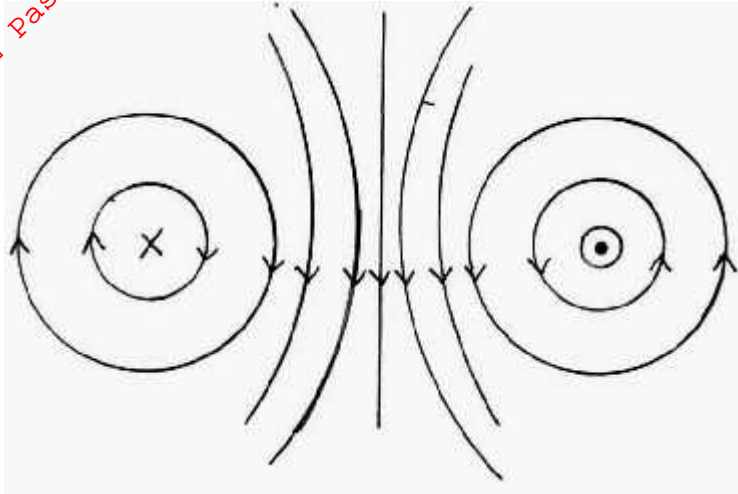
3. Explain how polarization reduces the emf in a simple cell. (1mk)

4. The diagram below shows a method of magnetization.



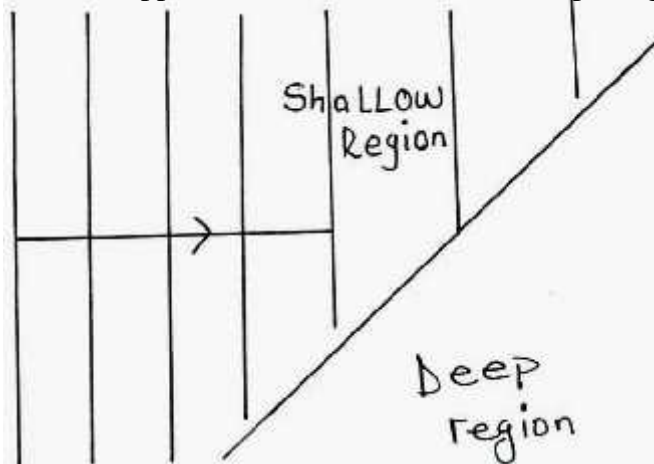


5. The figure below shows the magnetic field between two parallel current carrying conductors **A** and **B** placed close to one another current flows in the opposite directions.



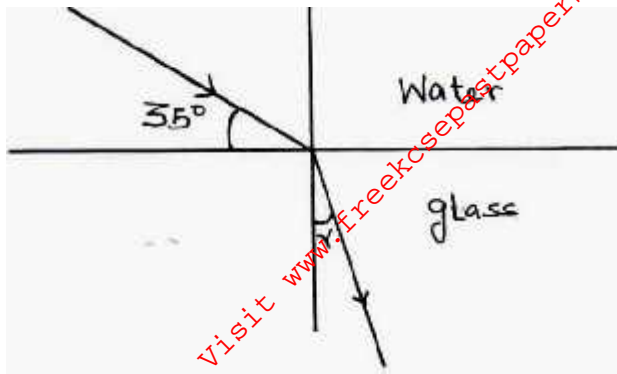
Indicate the direction of force F , due to the current on each conductor.

6. The figure below show water waves moving from a shallow region to a deep region. Complete the diagram to show the appearance of the waves in the deeper region. (2mks)



7. An echo sounder produces a pulse and an echo is received from the sea bed after 0.4 seconds. If the speed of sound in water is 1500m/s. Calculate the depth of the sea bed. (2mks)

8. The diagram below shows a ray of light travelling from water to glass given that the refractive index of water and glass are 1.33 and 1.5 respectively find the angle of refraction in glass. (3mks)



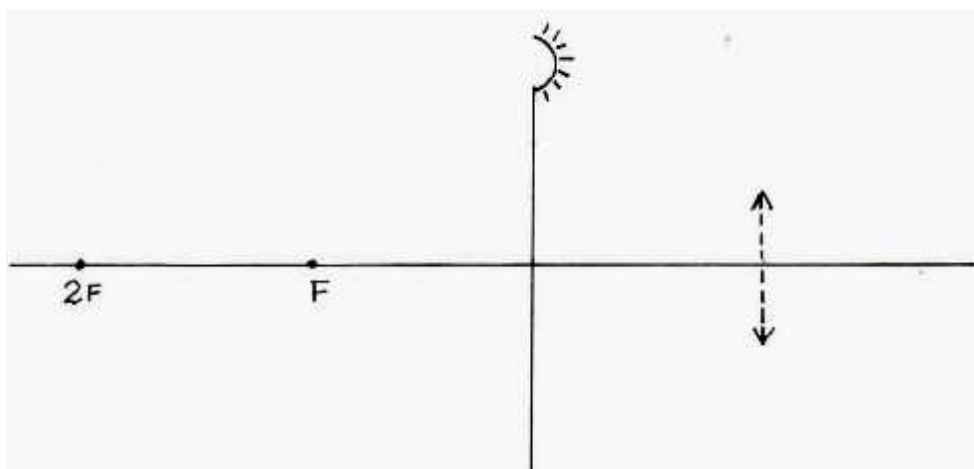
9. Below is part of the electromagnetic spectrum in order of increasing wavelength.

A	B	C	Visible light	Infra-red	D	E
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How are waves **A** produced?

(2mks)

10. The figure below shows an image formed by concave mirror. Complete the drawing rays and locate the position of the object. (2mks)



11. The figure below shows capacitors connected to a d.c. supply.



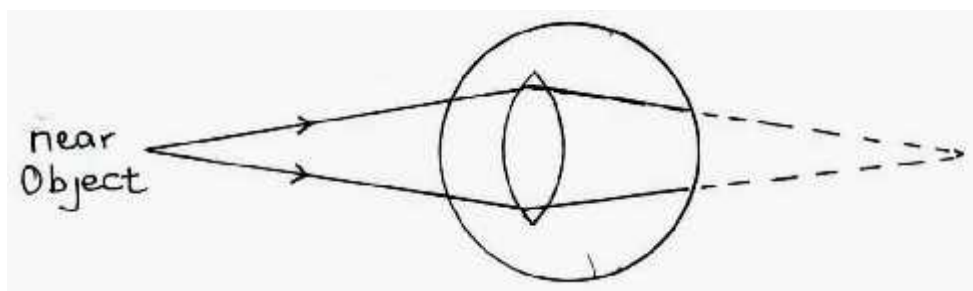
Determine the charge stored in the $3\mu\text{F}$ capacitor.

(3mks)

12. A pendulum bob takes 0.5 seconds to move from its mean position to a maximum displacement position. Calculate its frequency. (2mks)

SECTION B: (55 MARKS)

13. (a) A defective eye focuses a near object as shown in the figure below.



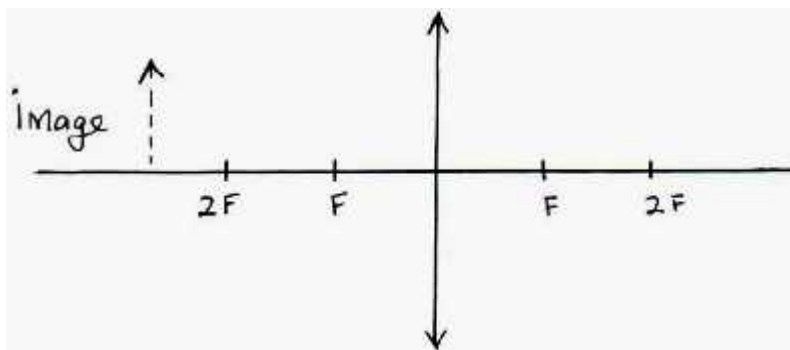
- (i) State the defect. (1mk)

- (ii) Suggest a suitable lens that can be used to correct the defect. (1mk)

- (iii) Draw a diagram to illustrate the correction of the defect. (2mks)

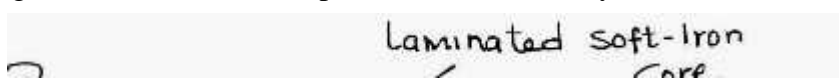
(b) (i) A real image, half the size of the object is formed by a lens. If the distance between the object and the image is 450mm. Determine the focal length of the lens. (3mks)

(ii) The figure below shows a virtual image formed by a convex lens. Complete the ray diagram to show the position of the object. (3mks)



14. (a) State Faraday's law of electromagnetic induction. (1mk)

(b) The figure below shows a simple transformer. Study it and answer the questions that follow.



(i) Explain why the core is a continuous loop. (1mk)

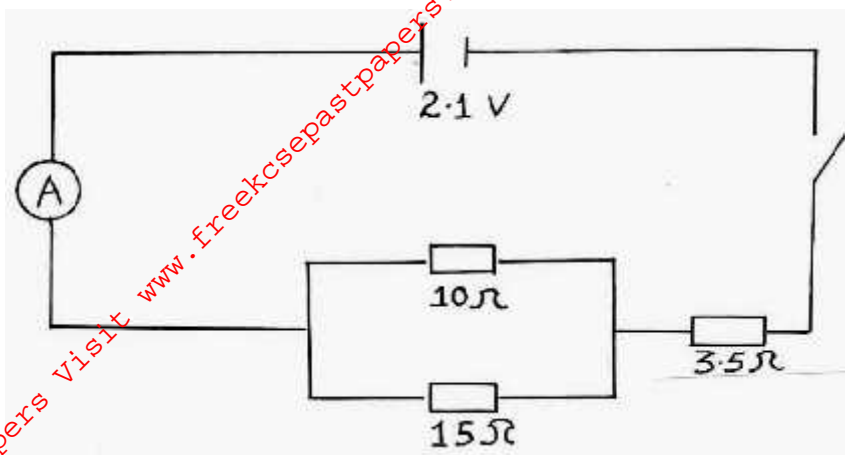
(ii) Give a reason as to why the core is laminated. (1mk)

(iii) State and explain which coils are thicker. (2mks)

(c) State **one** difference and **one** similarity between a step up transformer and an induction coil. (2mks)

(d) State **two** advantages of the use of alternating voltage for the transmission of electrical energy. (2mks)

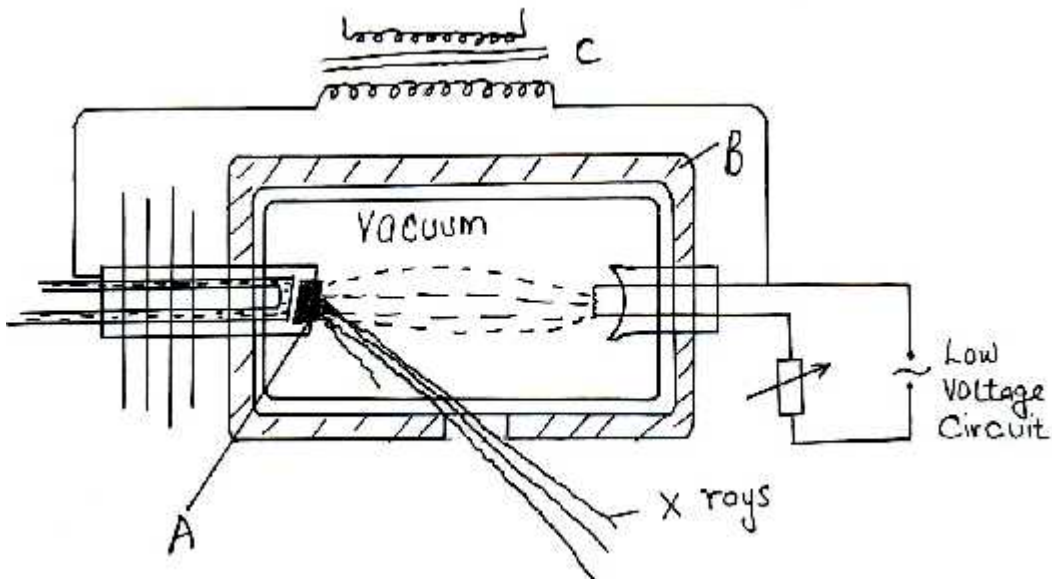
(e) In the circuit below, the e.m.f of the battery is 2.1V and has an internal resistance of 0.5Ω.



(i) Determine the effective resistance in the circuit. (2mks)

(ii) Determine the ammeter reading when the switch is closed. (2mks)

15. (a) Figure 6 below shows an X-ray tube.



(i) Name the elements used in making the parts labelled A and B. (2mks)

(ii) Explain the use of the part labelled C. (1mk)

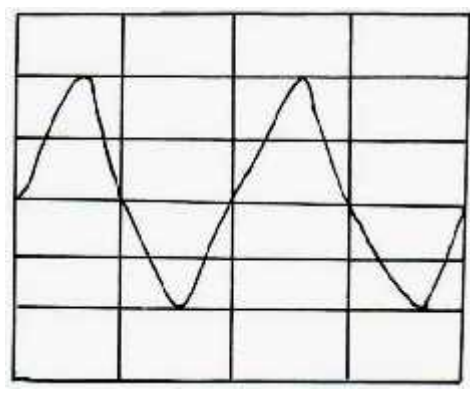
(iii) Explain how the X-rays are produced. (2mks)

(iv) Why is the X-ray tube evacuated? (1mk)

(b) The penetrating power of X-rays is normally varied depending on the intended use. Explain briefly how this is done. (1mk)

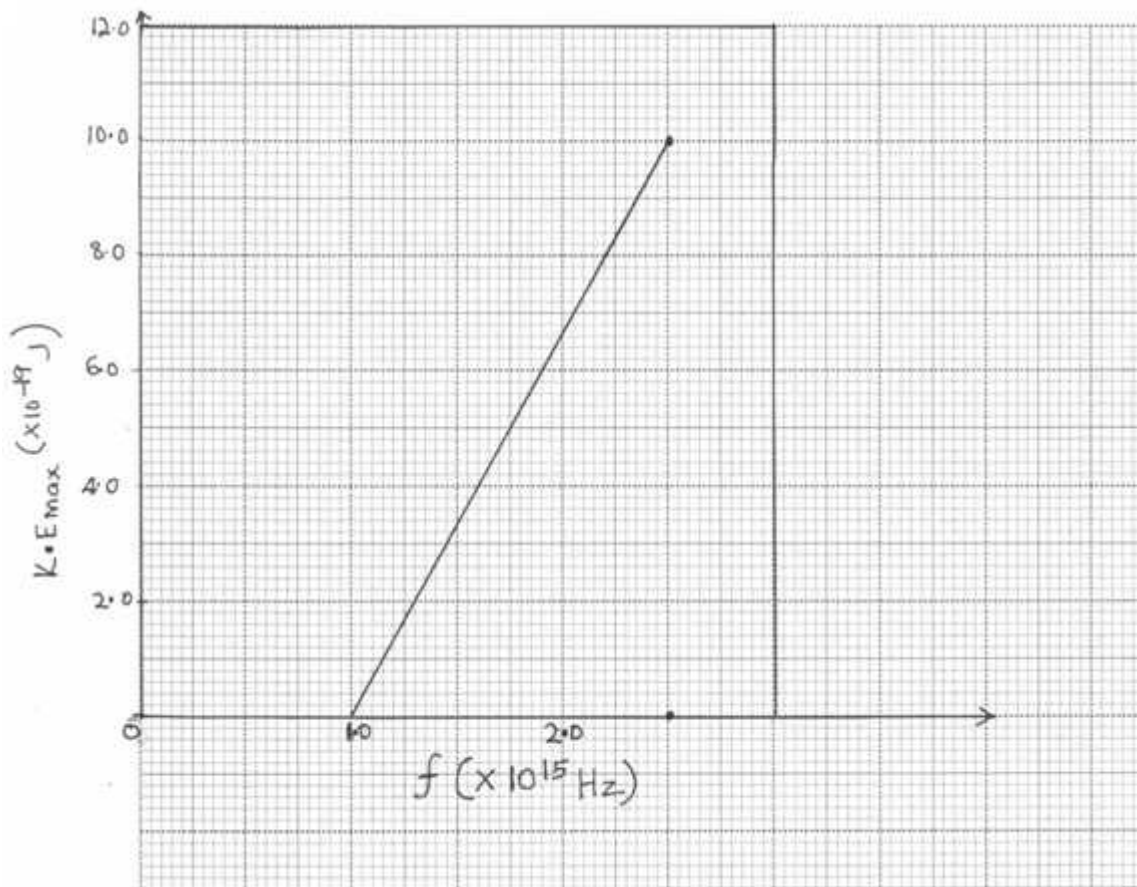
(c) The energy of X-rays is 1.989×10^{-14} joules. Given that the speed of light is 3.0×10^8 m/s and plank's constant is 6.63×10^{-34} JS. Find the wavelength of the X-rays. (2mks)

(d) The figure below shows a wave form displayed on the screen of C.R.O when the time base is set at 20ms per division.



16. (a) Give a condition necessary for electrons to be emitted from the cathode of a photocell. (1mk)

(b) In an experiment using a photocell, ultraviolet light of varying frequency strikes a metal surface. The maximum Kinetic Energy ($K.E_{\max}$) of photoelectrons for each frequency f is measured. The graph below shows how the maximum kinetic energy varies with the frequency f .



Use the graph to determine:

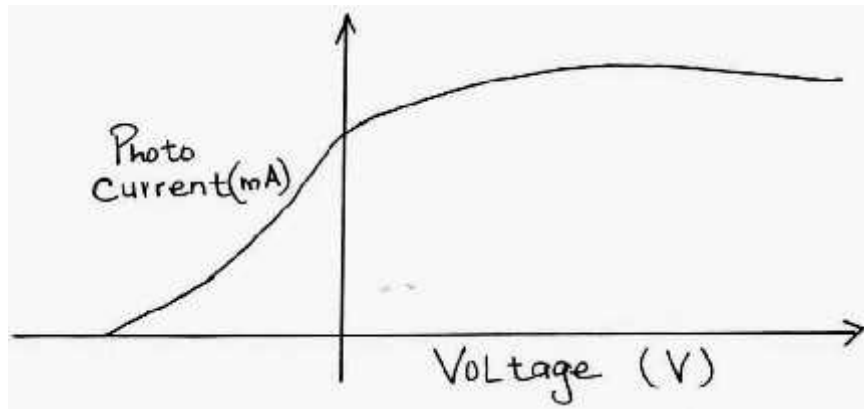
(i) The Threshold frequency, f . (1mk)

(ii) Planck's constant, h .

(3mks)

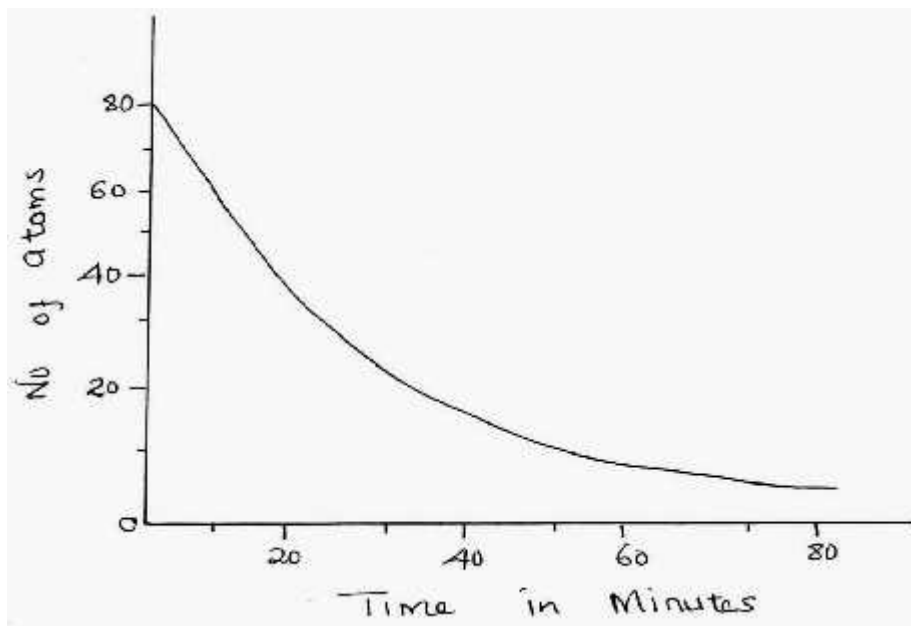
(iii) Work function of the metal. (3mks)

(c) The figure below shows the variation of photoelectric current with applied voltage when a surface was illuminated with light of a certain frequency. On the same axes, sketch the graph when a light of higher intensity but same frequency is used to illuminate the same surface. (1mk)



17. (a) (i) Define the term half life of a radioactive material. (1mk)

(b) The figure below shows a decay of a certain element. The diagram is drawn to scale.



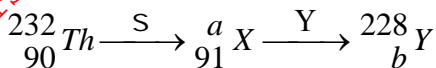
From the graph find:

(i) Half life of the element.

(1mk)

(ii) Number of half lives undergone when the count rate is 10 atoms. (2mks)

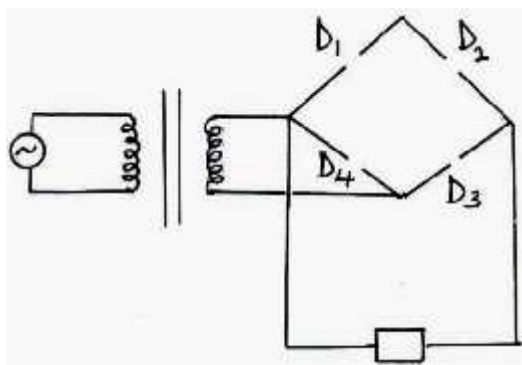
(iii) The following is part of a radioactive decay series.



Determine the value of 'a' and 'b'. (2mks)

18. (a) Define the term doping. (1mk)

(b) The diagram below shows a bridge rectifier for alternating current. Complete the diagram by placing the diodes in the correct order. (2mks)



(c) Explain why a bridge rectifier circuit is better than a single diode rectifier circuit. (1mk)

(d) What happens to depletion layer when diode is reverse biased. (1mk)