NAME: ……CLASS: ……..… ADM NO: ……

SIGNATURE: ……SCHOOL: ……..……DATE……

232/2
Physics Paper 2
FORM FOUR

Time:2 Hours

SULIMO MOCK EXAMINATION – 2025
KENYA CERTIFICATE OF SECONDARY EDUCATION (KCSE)

Instructions to candidates

- This paper consists of two sections ***A*** and ***B***.
- Answer **all** the questions in the two sections in the spaces provided after each question
- All working **must** be clearly shown.
- Electronic calculators and KNEC Mathematical tables may be used.
- All numerical answers **should be expressed** in the **decimal** notations.
- Candidates should answer the questions in **English.**

For Examiner use only

SECTION	QUESTION	MAX MARKS	CANDIDATE'S SCORE
A	1 – 13	25	
B	14	11	
	15	12	
	16	12	
	17	11	
	18	09	
TOTAL		80	

This paper consists of 16 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

SECTION A (25 MARKS)

INSTRUCTION: Answer all the questions in this section

1. **Figure 1** below shows an object placed in front of a pinhole camera.

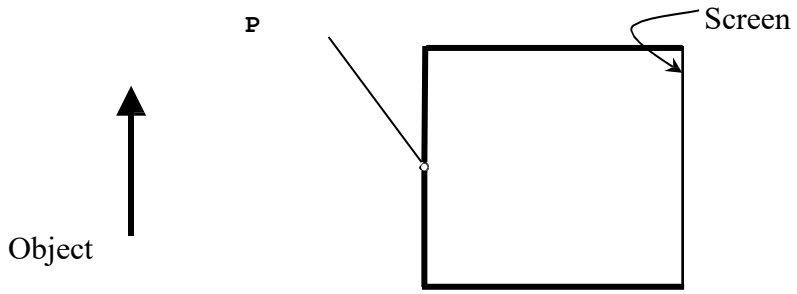

Figure 1

(a) Compare the size of the image formed to that of the object (1 mark)

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(b) Explain what happens to the image formed when the diameter of P is doubled. (2 marks)

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2. A negatively charged rod is brought near the cap of a lightly charged electroscope. The leaf divergence first reduces but as the rod comes nearer, it diverges more.

(i) State the charge of the electroscope. (1mark)

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(ii) Explain the behaviour of the leaf above. (1mark)

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3. A wire made from some alloy has a resistance of 2 ohms per metre. Find the length of this wire which would be required to make a heating coil of rating 240V, 1kW (2 marks)

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4. **Figure 2** below shows a domestic wiring system.

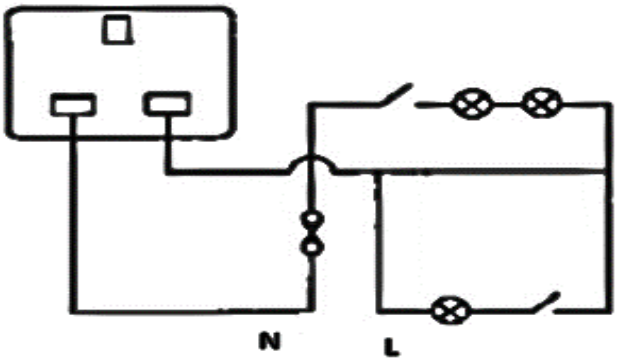

Figure 2

(i) Point out **ONE** fault in the circuit above. (1 mark)

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(ii) State one reason why the earth pin is longer than the rest in a three-pin plug that fits into the socket shown above. (1 mark)

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5. **Figure 3** below shows a bridge rectifier.

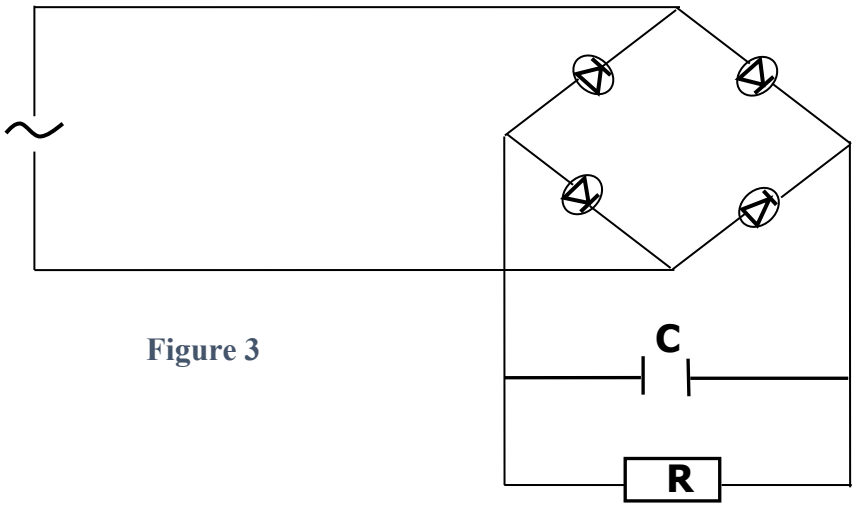

Figure 3

A capacitor has been connected across the resistor R as shown above.

(a) State the function of the capacitor in the rectifier above. (1 mark)

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(b) Sketch on the axes provided below, the output wave profile when CRO is connected across the resistor R. (1 mark)

6. **Figure 4** below shows two pins hanging from a magnet.

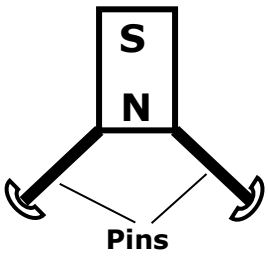

Figure 4

Explain why they do not hang vertically downwards (2 marks)

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7. The diagram in **figure 5** below shows an object placed in front of a concave mirror. By use of correct ray diagram, locate the position of the image. (2 marks)

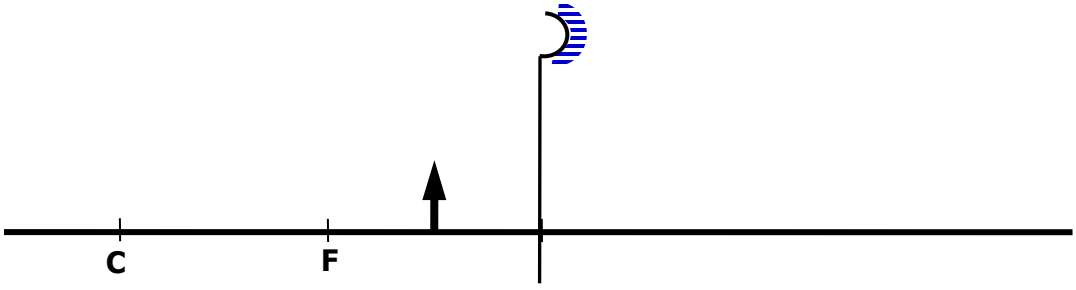

Figure 5

8. **Figure 6** below shows how the displacement varies with time for a certain wave.

Determine the frequency of the wave**.** (2 marks)

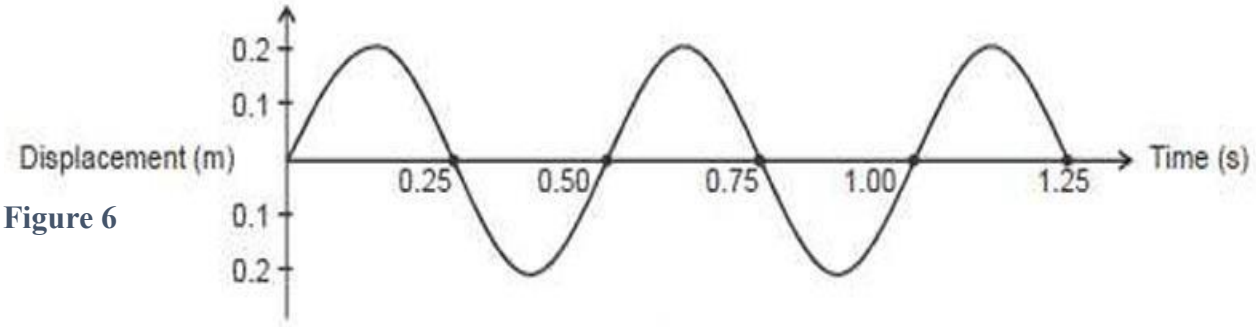

Figure 6

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9. Explain why sound energy travels faster in a metal block than in water. (1mark)

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10. Define the term absolute refractive index of a medium. (1 mark)

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11. A form 4 student at MEC was investigating the brightness of bulbs which she setup in the electric circuits below. She used identical bulbs and cells. The circuits shown in **figure 7** (a) and (b) below were what she setup.

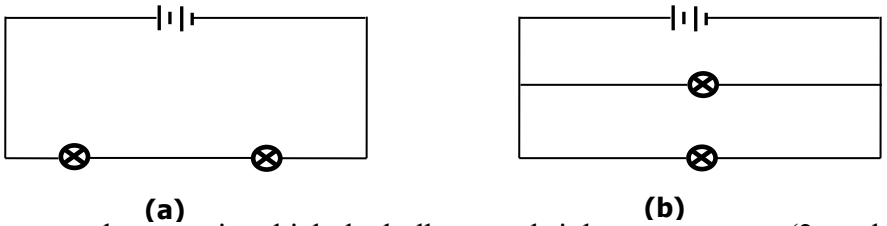

Figure 7

Identify with a reason, the setup in which the bulbs were brightest. (2 marks)

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12. **Figure 8** below shows how a distant object is focused in a defective eye.

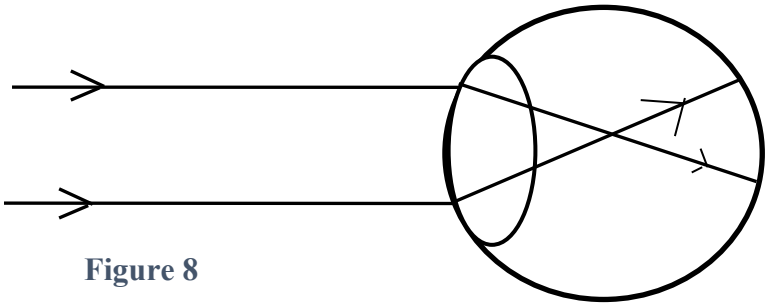

Figure 8

(i) Explain the above defect. (1mark)

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ii) On the same diagram, sketch the appropriate lens to correct the defect and sketch rays to show the effect of the lens. (2 marks)

13. **Figure 9** below shows some region of part of the electromagnetic spectrum.

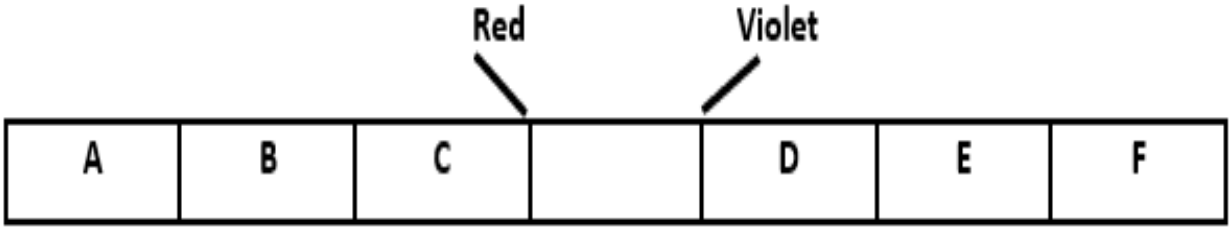

Figure 9

State one use of the wave in the region labelled B. (1 mark)

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SECTION B (55 MARKS)

INSTRUCTION: Answer all the questions in this section

14. (a) State Lenz's law of electromagnetic induction. (1 mark)

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(b) The diagram in **figure 10** below shows a magnet and a coil of wire which is connected to a galvanometer.

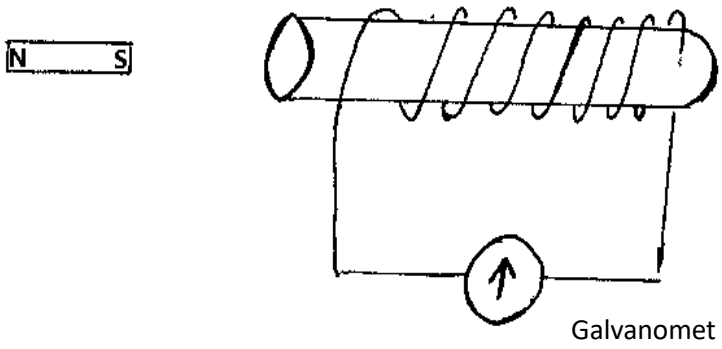

Figure 10

The magnet is moved slowly into the coil.

i. State the observation made. (1 mark)

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ii. Explain the observation above. (2 marks)

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iii. State two ways in which the magnitude of the induced emf in the coil can be increased. (2 marks)

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(c) A transformer has 400 turns in the primary coil while the secondary coil has 200 turns. The transformer is connected to 240V a.c mains. If a current of 2.5A flows in primary coil and 4.8A flows in secondary coil,

i. Calculate the voltage across the secondary coil if the efficiency of the transformer is 95%. (2 marks)

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ii. State how energy loss in the transformer due to hysteresis is minimized (1 mark)

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(d) An insulated copper wire was wound on an iron nail to form a weak electromagnet. State ***two*** changes that could be made to increase the strength of the electromagnet. (2 marks)

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15. **a) Figure 11** below shows a set up used to observe interference of light waves.

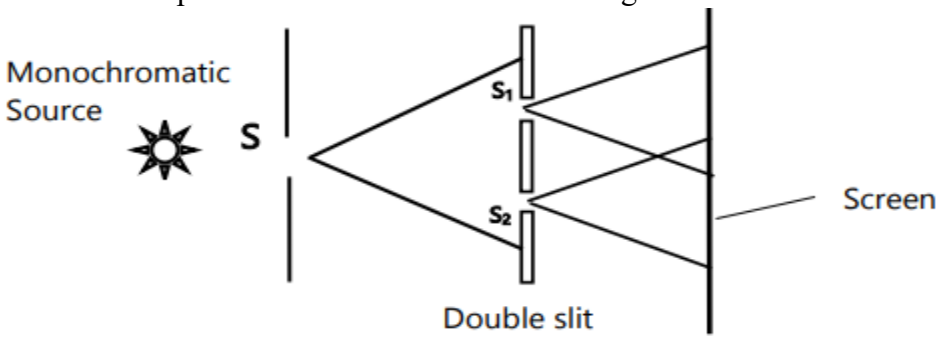

Figure 11

i. Define the term interference as used in waves (1 mark)

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ii. State the function of the double slits (1 mark)

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iii. State and explain what is observed on the screen. (2 marks)

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b) State what will be observed on the screen when

I. white light is used instead of monochromatic source. (1 mark)

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II. The slit separation distance is increased. (1 mark)

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c) Name **ONE** factor that determines the velocity of photoelectrons produced on a zinc metal surface when light is shone on it. (1 mark)

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d) The graph in **figure 12** shows the variation of stopping potential, V_S with incident radiation's frequency, f for a certain metal producing photoelectrons.

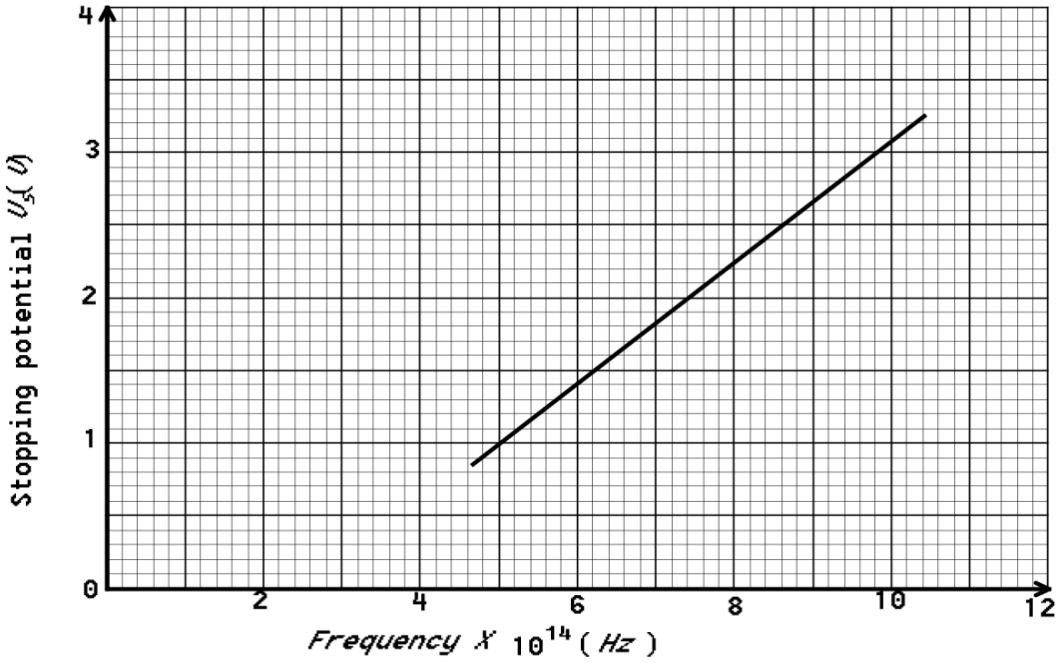

Figure 12

i. Determine threshold frequency. (1 mark)

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ii. Use the graph to determine the maximum wavelength of the radiation that would dislodge electrons from the zinc surface. ($c = 3.0 \times 10^8\ ms^{-1}$) (2 marks)

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iii. Determine work function given planks constant as 6.63 x 10^{-34}Js (2 marks)

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16. a) **Figure 13** below shows the features of a cathode ray tube.

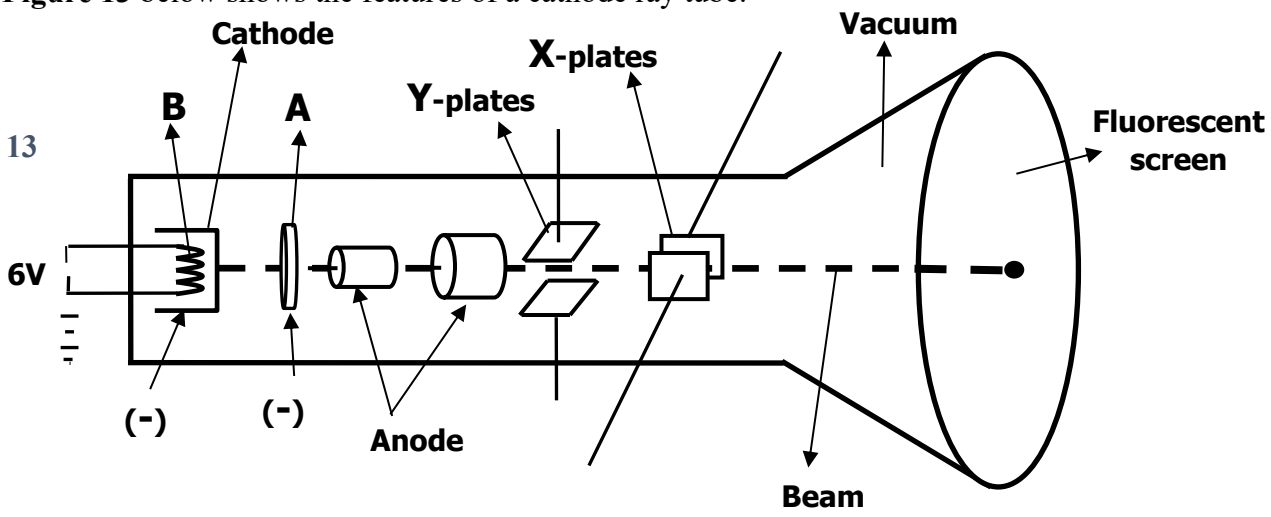

Figure 13

(i) Name the parts labeled:

A…… (1mark)

B…… (1mark)

(ii) Explain how the cathode rays are produced (2 marks)

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(iii) Explain why the Cathode Ray oscilloscope must be evacuated. (1mark)

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b) The **figure 14** below shows a cathode ray beam entering a magnetic field, perpendicular to the plane of the paper. Complete the diagram to show the path of the beam in the field. (1mark)

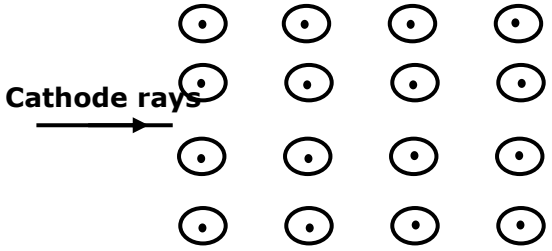

Figure 14

c) An X-ray tube is operating with an anode potential of 20kV and a current of 10 mA.

I. Explain how the Intensity of X-rays from such a tube may be increased. (1 mark)

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II. Calculate the number of electrons hitting the anode per second. (2 marks)

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III. Determine the velocity with which the electrons strike the target.

$(charge\ of\ an\ electron = 1.6x10^{-19}c\ , mass\ of\ electron = 9.11x10^{-31}kg)$

(3 marks)

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17. a) The diagram in **figure 15** below shows a Geiger Müller (G.M.) tube.

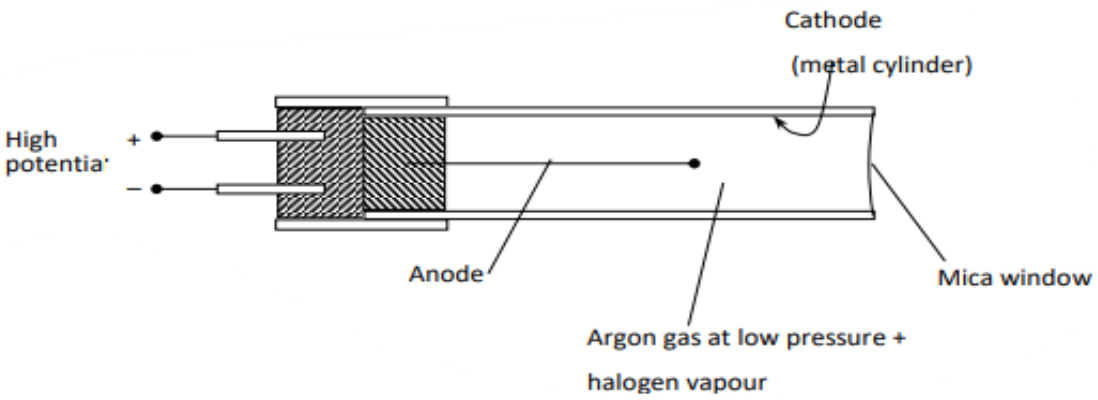

Figure 15

i. Give the reason why mica window is made thin. (1 mark)

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ii. Explain how the radiation entering the tube through the window is detected by the tube. (3 marks)

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iii. State the purpose of the halogen vapor (1 mark)

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b) The half – life of cobalt – 60 is 5years. Determine the time it will take for a sample of cobalt- 60 to take for the activity to decrease to $\frac{1}{6}$ of its original value. (2 marks)

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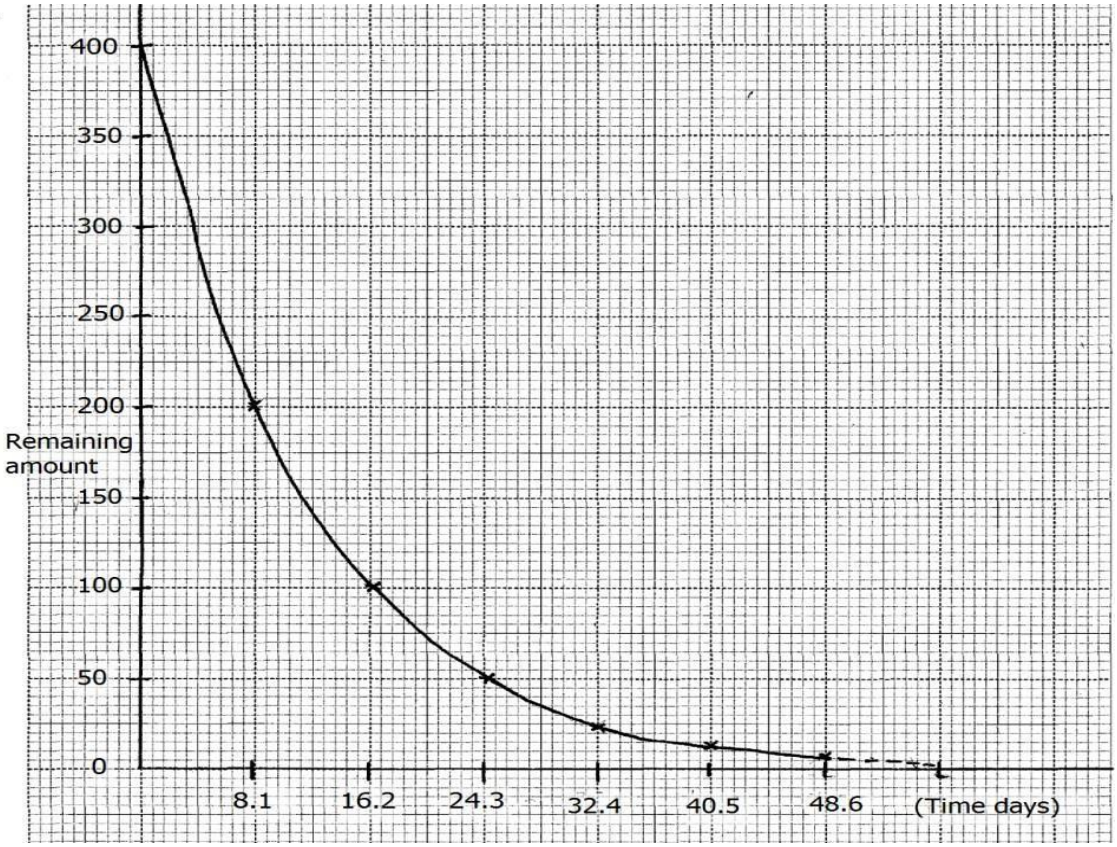
c) The graph below shows radioactive decay of iodine.



Use the graph to determine the:-

i. Fraction of the amount remaining after 16.2 days**.** (1mark)

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ii. Determine the half – life of iodine**.** (1mark)

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d) The following is a decay series of Uranium 238.

$$^{238}_{x}\mathrm{U} \xrightarrow{\alpha - Particle} \mathrm{Th} \xrightarrow{\beta - Particle} {}^{y}_{91}\mathrm{Pa}$$

Determine the values of *x* and *y*. (2 marks)

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18. **(a) Figure 16** represents two parallel plates of a capacitor separated by a distance, *d.*

Each plate has an area of A square units.

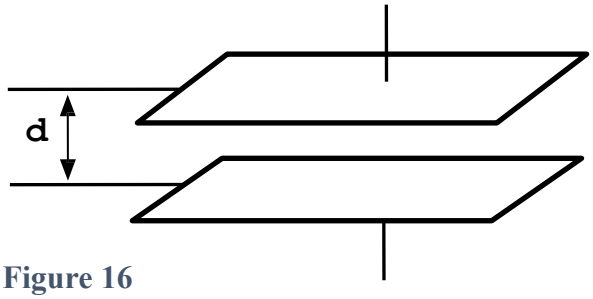

Figure 16

Suggest **ONE** adjustment that can be made on the capacitor so as to reduce the effective charge stored per unit voltage (1 mark)

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(b) Figure 17 below shows a capacitor **C** being charged.

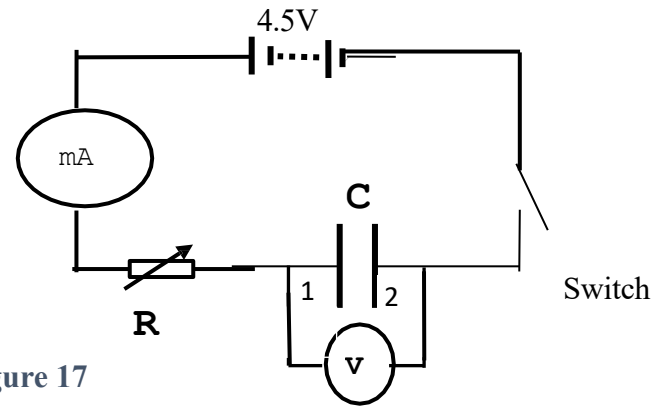

Figure 17

(i) State what will be observed on the following when the switch is closed.

I. The voltmeter. (1mark)

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II. The Milliammeter. (1mark)

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(ii) Explain how the capacitor is charged (2marks)

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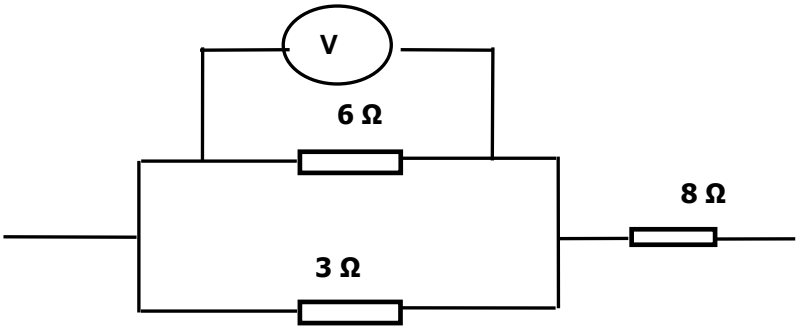
(c) **Figure 18** below shows three resistors connected as shown.



If the voltmeter reads **4V**, find the:

(i) Effective resistance. (2marks)

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(ii) Current through the 3Ω resistor. (2 marks)

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