**Name**……  **Index No**……..

**School**……..  **Date**…….

**Candidate's signature**……..

**232/2**
**PHYSICS**
**PAPER 2**
**JULY / AUGUST 2012**
**TIME: 2 HOURS**



# LOITOKITOK DISTRICT JOINT EVALUATION TEST - 2012

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

**INSTRUCTIONS TO THE CANDIDATES:**

1. Write your name and index number in the spaces provided above.
2. This paper consists of two sections: A and B
3. Answer all the questions both in section A and B in the spaces provided below each question
4. All workings must be clearly shown; marks may be awarded for correct steps even if the answers are wrong.
5. Mathematical tables and silent electronic calculators may be used.
6. Take g = $10m/s^2$

**For Examiners' Use Only**

| SECTION | QUESTION | MAXIMUM SCORE | CANDIDATE'S SCORE |
|---|---|---|---|
| **A** | 1 - 14 | 25 | |
| **B** | 15 | 11 | |
| | 16 | 10 | |
| | 17 | 13 | |
| | 18 | 15 | |
| | 19 | 6 | |
| **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)

1. Figure 1 shows a plane mirror suspended using a string and makes an angle of $50^0$ to the ceiling.

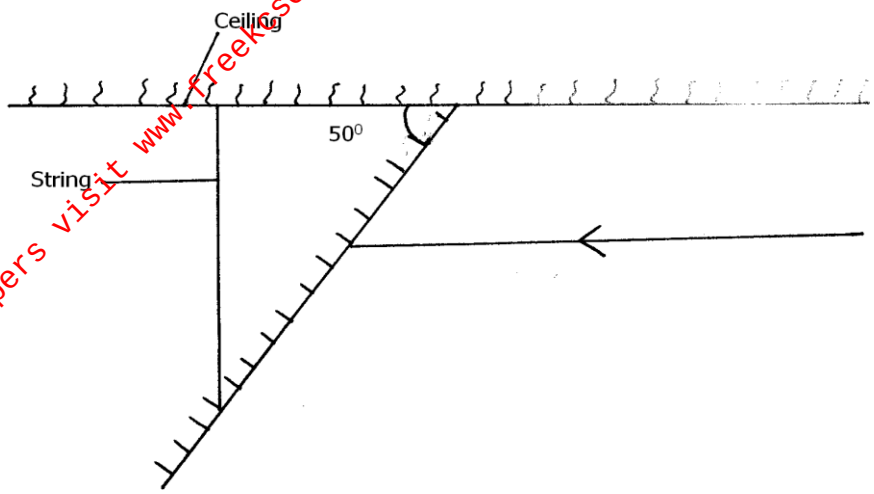


Figure 1

A ray of light strikes the mirror horizontally as shown above. Trace the path of reflected ray. Show all the angles. (2 marks)

2. Auma claps her hands at 0.5 seconds intervals infront of a cliff 85 m away. Each echo produced by the cliff coincides with the next clap. Calculate the speed of sound in air. (2 marks)

3. Figure 2 below shows two identical sources of sound $S_1$ and $S_2$ emmitting sound of same frequency.

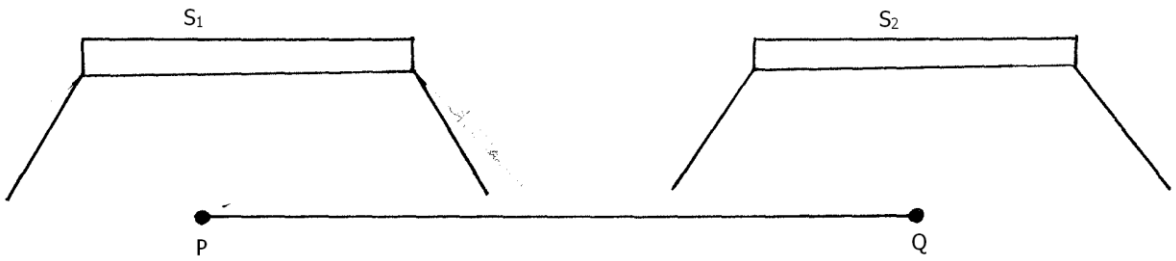


Figure 2

An observer moves slowly along the path PQ infront of the source of listening to the sound emitted. State and explain the observation made. (2 marks)

4. The chart below shows an arrangement of different parts of the electromagnetic spectrum.

Radio A Visible B X-Rays Gamma Rays

Name the radiations represented by A. B. (1 mark)

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

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6. The following reaction is part of a radioactive series

$$\rightarrow {}^{210}_{83}X \xrightarrow{r} {}^{210}_{84}Y \xrightarrow{\alpha} {}^{c}_{b}Z$$

Identify $\alpha$ and determine the values of b and c.

$\alpha$

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b

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c

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7. Figure 3 below shows a diode in series with a resistor connected to an ac source on the axis provided. Sketch the graph of p.d against time as seen on the CRO screen. (1 mark)

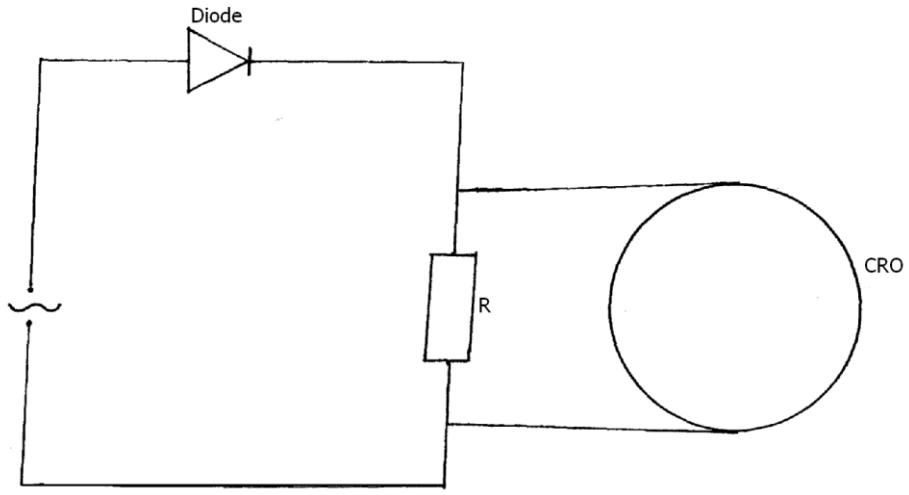


Figure 3


8. Figure 4 below shows an image of an object placed infront of a concave morror.
Complete the diagram to locate the position of the object hence determine the magnification.

(2 marks)

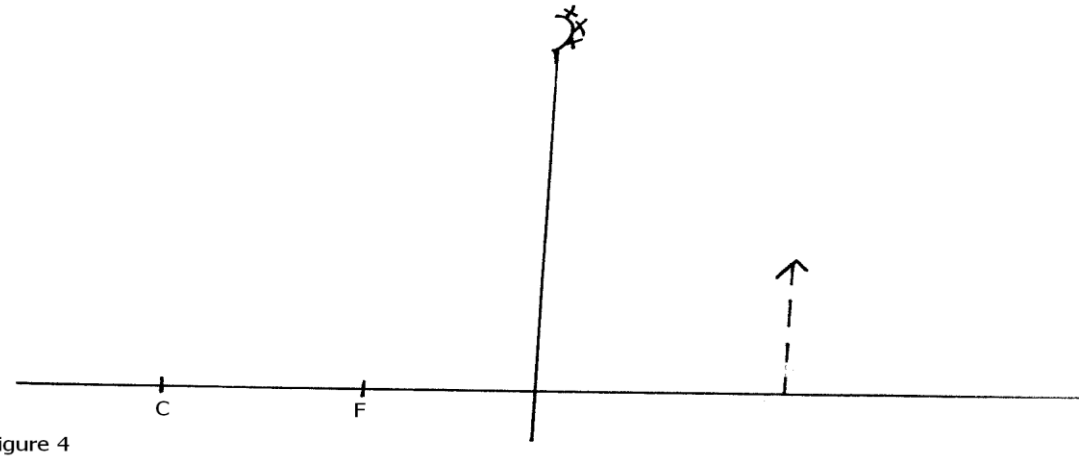


Figure 4

9. Figure 5 below shows how the displacement varies with distance for a wave whose velocity is 340 m/s.

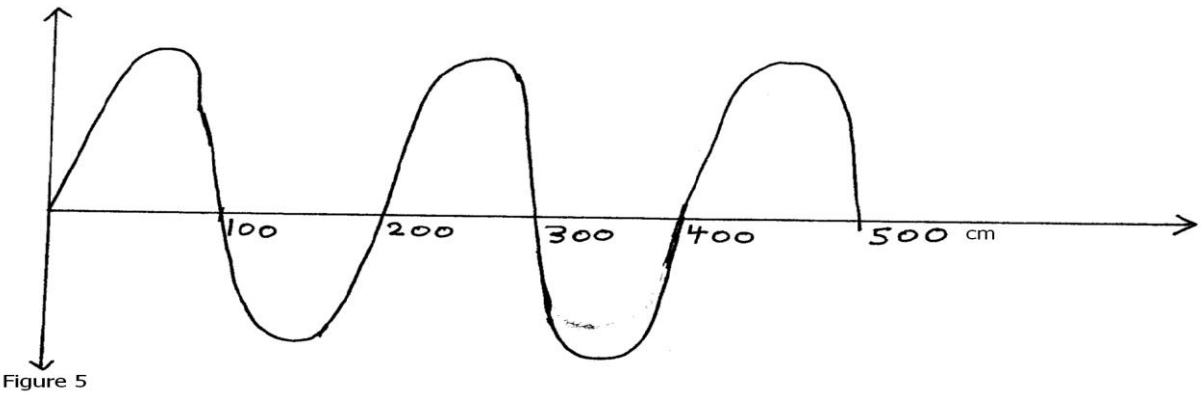


Figure 5

Determine the periodic time of the wave. (2 marks)

10. In order to make a magnet by electrical method, a student placed a steel rod into solenoid as shown in figure 6 below. He then held a soft iron rod at one end of the steel rod.

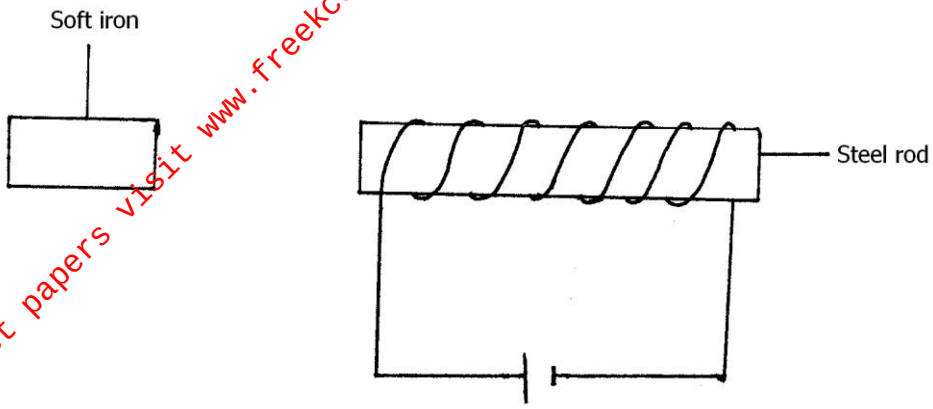


Figure 6

Draw the magnetic field pattern around the end of the steel rod near the soft iron. (2 marks)

11. Calculate the fuse rating of an electrical appliance rated 2KW, 240V. (2 marks)

12. Figure 7 below shows a negatively charged leaf electroscope. A steel pin was placed on the cap of the electroscope for some time.

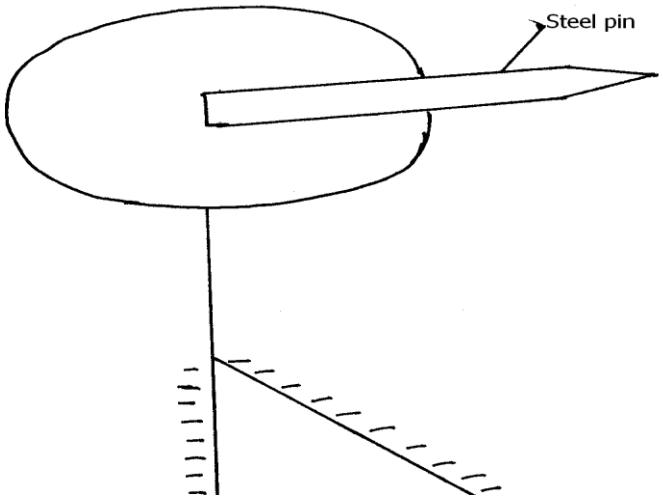


Figure 7

State and explain the observation made. (2 marks)

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13. The figure 8 below shows a capacitor connected to a d.c supply.

Determine charge in the $3\mu F$ capacitor. (2 marks)

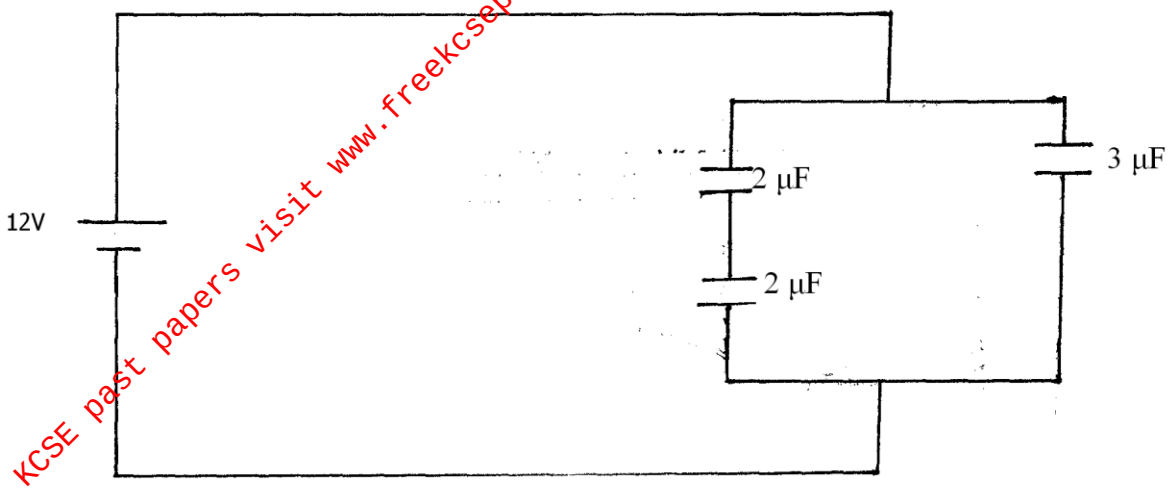


Figure 8



14. State Ohms law. (1 mark)

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## SECTION B(55 MARKS)

**Answer all the questions in this section**

15. a) What do you understand by the term mutual induction? (1 mark)

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b) State two factors that determine magnitude of e.m.f induced in a coil. (2 marks)

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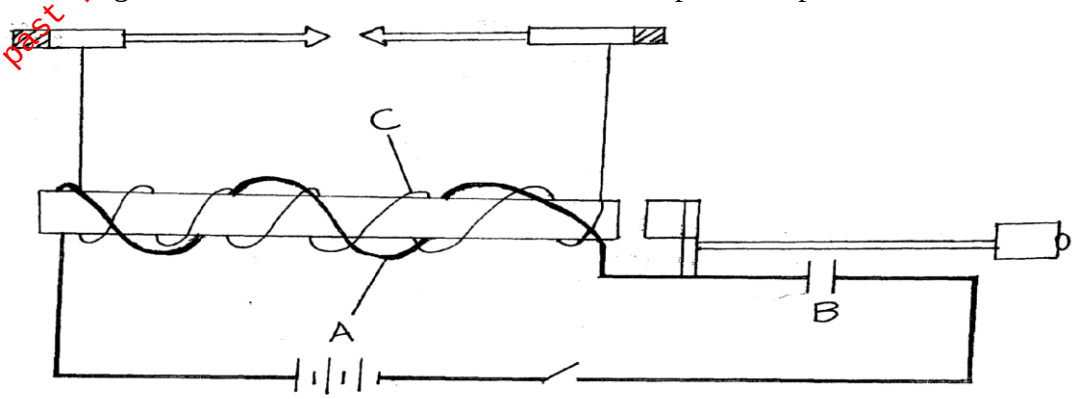
c) The figure below shows an induction coil used to produce sparks.




i) Name the parts labeled A, B and C (3 marks)

A

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B

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C

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ii) Briefly explain how induction oil works.

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d) A transformer is used on a 240 V a.c supply to deliver energy taken from the supply is dissipated in the transformer.

i) Calculate the current in the coil. (3 marks)

ii) Account for the two causes of the 20% energy dissipation in the transformer above. (2 marks)

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16. a) Define the term radioactivity. (1 mark)

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b) The table below shows how the activity of a radioactive nuclide varies with time.

| Time(Minutes) | 0 | 1 | 2 | 3 | 5 | 6 | 8 | 11 |
|---|---|---|---|---|---|---|---|---|
| Activity Dis./Min | 420 | 341 | 285 | 230 | 162 | 131 | 85 | 50 |

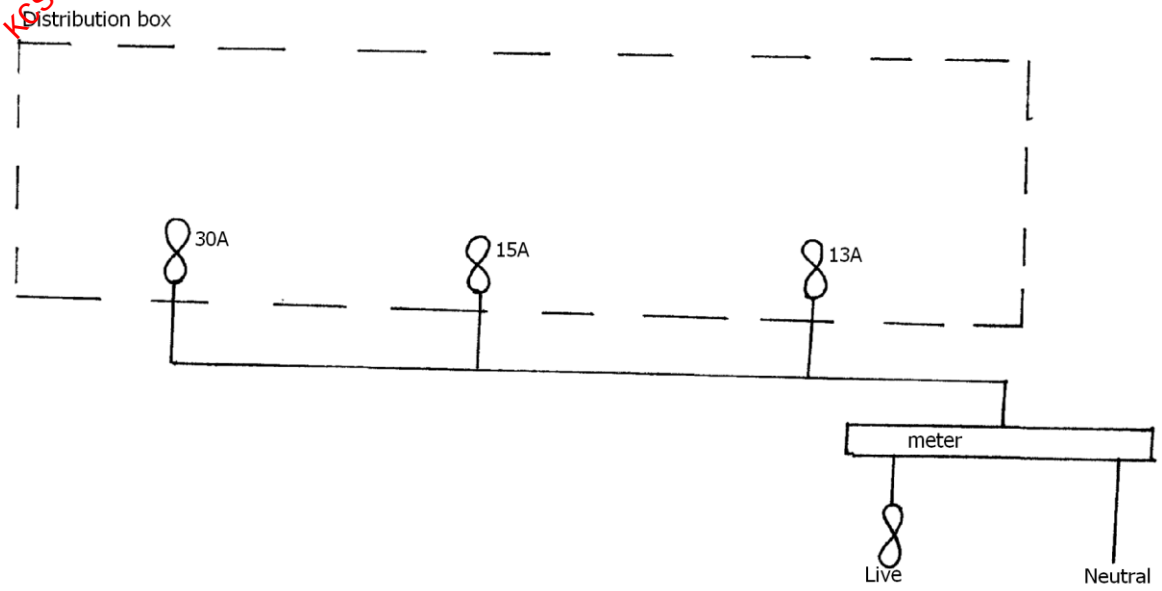
If background radiation count is 10 dist/min.

i) Plot a graph of activity against time. (5 marks)

ii) From the graph determine the half life of the sample. (1 mark)

c) Radioactive element X of half life of 28 days decay to element Y. a sample of X of mass 16g is kept in a container. Assuming Y is stable, calculate the mass of Y that will be kept in the container after 112 days. (3 marks)

17. a) The figure below represents parts of the main circuit.




i) It is not advisable to fix a fuse on the neutral line. Explain. (2 marks)

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ii) Why is the fuses of different rating in the distribution fix? (2 marks)

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b) A heater is rated 500w is used in to heat water for 6 hours. Calculate the cost of electricity at 90 cents per unit. (3 marks)

c) Give a reason why transmission of electric power is done at very high voltage. (1 mark)

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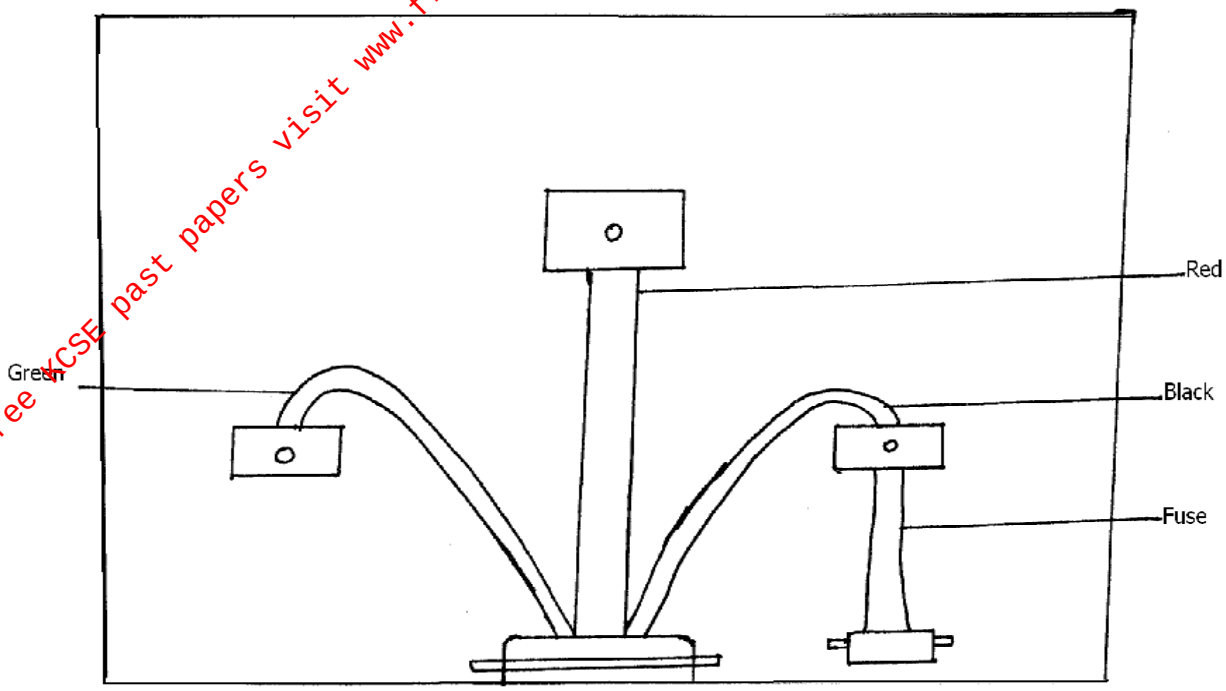
d) Figure below shows a connection of a three pin plug.




i) Identify any two mistakes in this wires. (2 marks)

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ii) Suggest what would happen if this plug was connected to the mains of the socket. (1 mark)

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iii) Give two reasons why the earth pin is normally longer than two pins. (2 marks)

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18. a) Differentiate between Thermionic emission and Photoelectric effect. (1 mark)

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b) Give one application of photoelectric effect. (1 mark)

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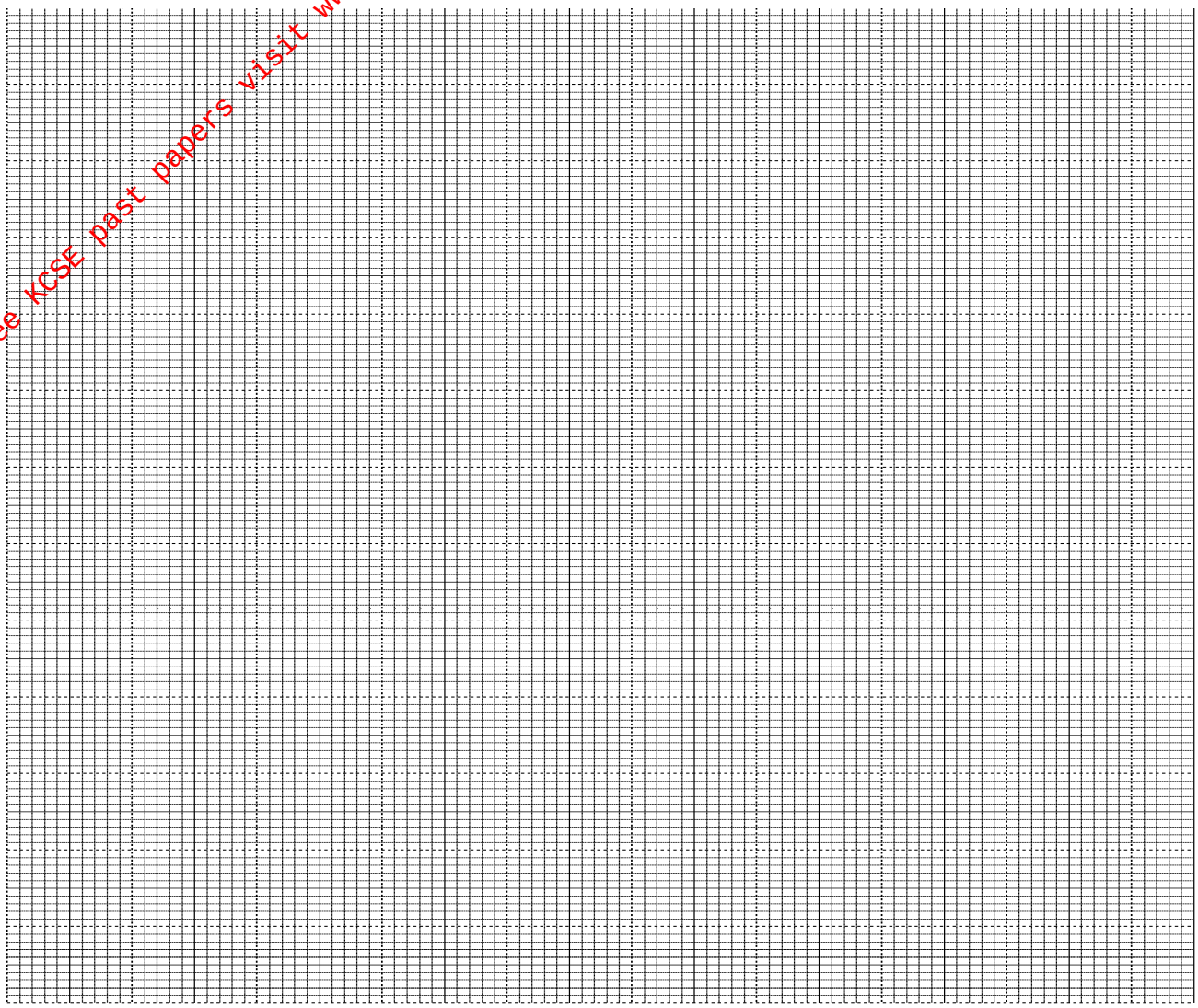
c) In an experiment to observe photoelectric emission from a clean caesium surface, the following readings were obtained.

| Stopping potential(V) | 0.6 | 1.0 | 1.4 | 1.8 | 2.2 |
|---|---|---|---|---|---|
| Frequency($x10^4$Hz) | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 |

i) Plot a graph of stopping potential $V_s$(y-axis) against frequency. (5 marks)



ii) From the graph, determine the threshold frequency of the surface. (1mark)

iii) Use the graph to determine Plank's Constant(Charge of electron=$1.6x10^{-19}$C)

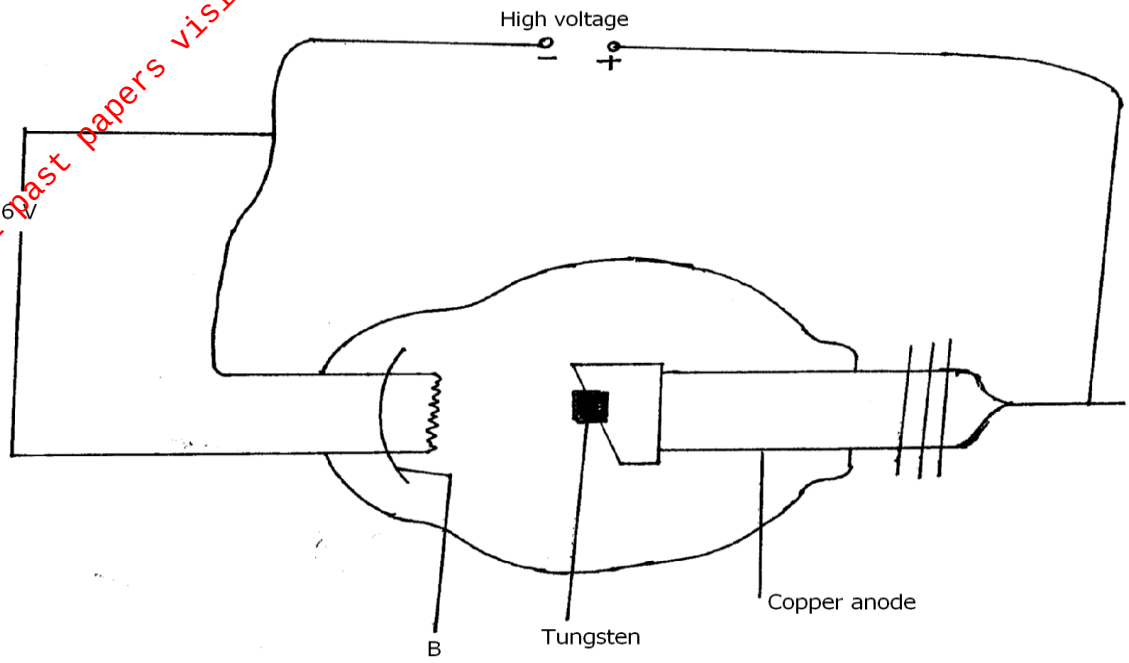
(2 marks)

iv) Calculate work function of the metal. (3 marks)

v) Calculate the threshold wavelength of the radiation.($C=3.0x10^8$) (2 marks)



19. The diagram below represents an X-ray tube. The anode is made up of copper metal and tungsten as the target.




a) What are the functions of parts A and B. (2 marks)

A

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B

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b) Explain how x-rays are produced from the tube. (2 marks)

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c) How can the quality of x-rays produced be controlled in the tube? (1 mark)

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d) How can the quality of the x-rays be increased? (1 mark)

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