MARANDA HIGH SCHOOL

Kenya Certificate of Secondary Education

FORM 4 PRE-MOCK EXAMINATIONS 2024

232/2 PHYSICS PAPER 2

MARCH/APRIL 2024 – 2 Hours

Name: ……Adm No: ……

Class: ……Candidate's Signature: …… Date: …./…/2024.

Instructions to candidates

- This paper consists of **TWO** sections; **A** and **B**. Answer **ALL** the questions in section **A** and **B** in the spaces provided.
- **ALL** working **MUST** be clearly shown. Mathematical tables, electronic calculators and slide rules may be used.
- Candidates should check the question paper to ensure that all the **12** pages are printed as indicated and that no questions are missing.

For Examiner's Use Only

SECTION	Question	Maximum Score	Candidate's Score
A	1 – 14	25	
B	15	10	
	16	11	
	17	14	
	18	11	
	19	09	
	Total Score	**80**	

SECTION A (25 MARKS)

Answer ALL the question in this section in the spaces provided

1. State the condition under which the p.d across the terminals of a cell is equal to its e.m.f. (1 mark)

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2. Explain why radio wave signals are easier to receive than TV waves signals in a place surrounded by hills. (2 marks)

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3. Kiss FM is broadcasting at a frequency of 70MHz. What is the wavelength of the waves, if the speed of the waves is 3.0×10^8 m/s? (2 marks)

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4. How can it be shown that the strength of a magnet is concentrated at the poles? (1 mark)

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5. **Figure 1** shows a fuse.

Figure 1

a) Explain how the fuse works in an electric circuit. (2 marks)

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b) What modification can be made on the above fuse so that it can be used in a circuit supplying a higher current? (1 mark)

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6. State the Snell's law of refraction. (1 mark)

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7. Give **two** reasons why soft iron is used as a core of the coil in an electric bell. (2 marks)

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8. A real object of height 1cm placed 50mm from a concave mirror forms a virtual image 100mm from the mirror. Determine the focal length of the mirror. (3 marks)

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9. **Figure 2** shows a p-n junction diode in series with a small bulb. Complete the diagram to show how a battery should be connected so that the diode is forward biased. (1 mark)

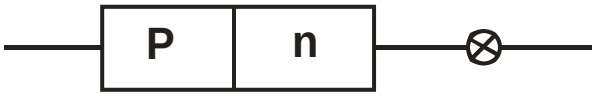

Figure 2

10. Alpha and beta particles from a radioactive source deviate by different amounts when moving in a magnetic field. Give **two** reasons why alpha particles deviate less. (2 marks)

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11. Arrange the following in order of increasing frequency. Visible light, infrared radiation, X-rays, U.V radiation, Radio waves. (1 mark)

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12. **Figure 3** shows a human eye with a certain defect.

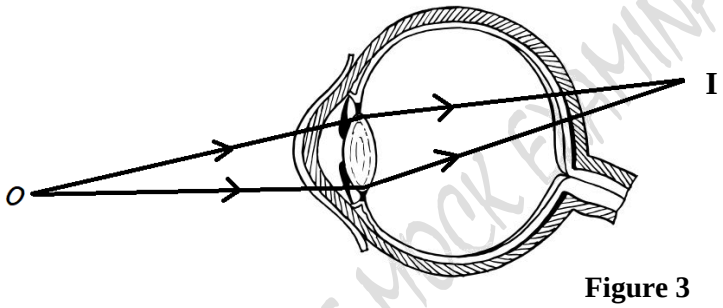

Figure 3

a) Name the defect. (1 mark)

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b) On **Figure 3**, sketch the appropriate lens to correct the defect and sketch the rays to show the effect of the lens. (2 marks)

13. Give the difference in the deflection system of a cathode ray oscilloscope and a television set. (1 mark)

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14. **Figure 4** below shows a single phase demonstration transformer intended to converted 24V, 50Hz as AC supply to 240V, 50Hz.

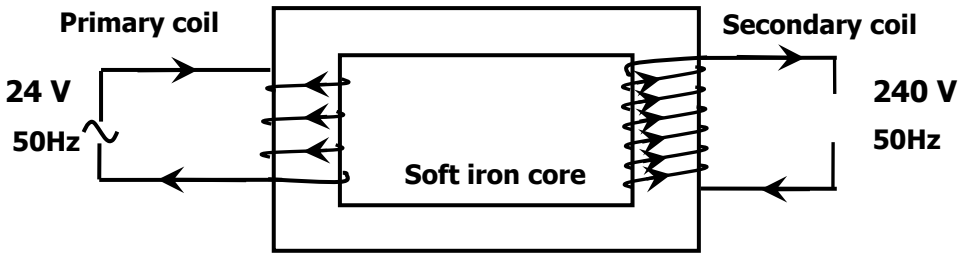

Figure 4

If the primary core has 50 turns of coil, how many turns of coils should the secondary have?

(2 marks)

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SECTION B (55 MARKS)

Answer ALL the questions in this section in the spaces provided

15. a) **Figure 5** shows ultraviolet light striking a clean zinc plate placed on a positively charged leaf electroscope.

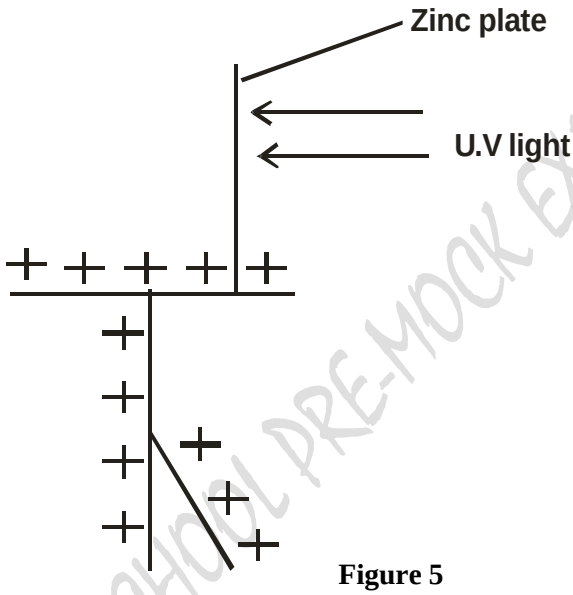

Figure 5

Explain the following observations;

i) The leaf does not fall. (1 mark)

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ii) When the same experiment is carried out with a negatively charged electroscope, the leaf falls. (1 mark)

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b) State **two** factors that affect photoelectric emission. (2 marks)

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c) In an experiment on photoelectric emission, a metal surface was illuminated by light of different 20 frequencies but of constant intensity. The maximum kinetic energy (K.E. $_{max}$) of the photoelectrons emitted for each frequency f, was measured. The graph below shows how the K.E. $_{max}$ varied with frequency.

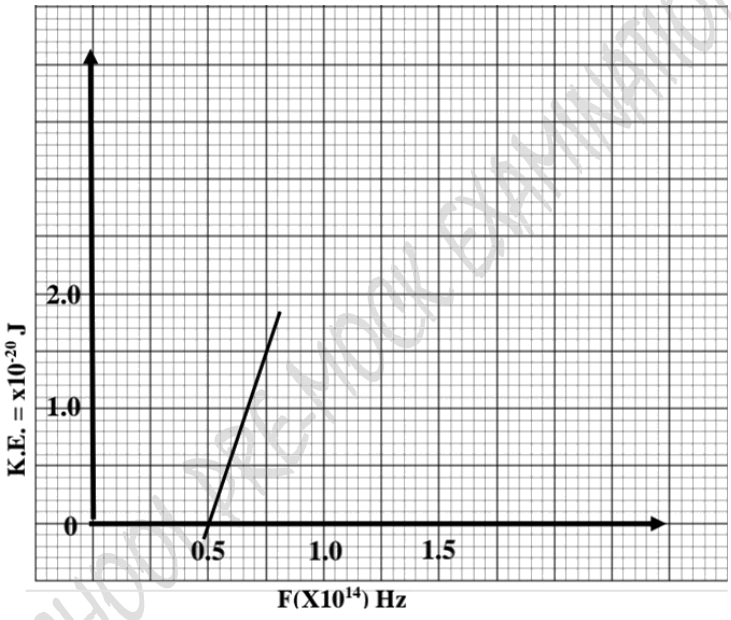

Figure 6

Use the graph and Einstein's equation of photoelectric effect to determine the value of;

i) Planck's constant. (3 marks)

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ii) Work function of the metal surface. (3 marks)

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16. a) **Figure 7** below shows a goldleaf electroscope

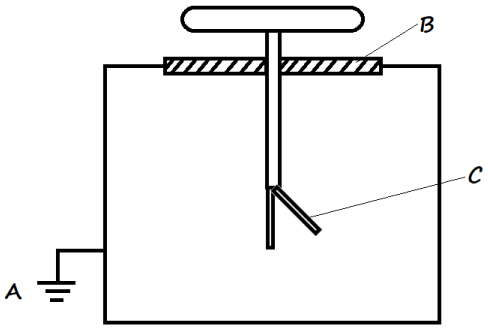

Figure 7

i) Identify the part labeled A (1 mark)

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ii) State the function of the parts labelled

I. B – (1 mark)

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II. C – (1mark)

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b) A highly negatively charged rod is brought close to a lightly positively charged gold leaf electroscope

i) State what is observed on the gold leaf (1 mark)

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ii) Explain the observation made in **b i)** (2 marks)

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c) **Figure 8** shows a thin wire connected to a highly positively charged rod and placed close to a candle flame.

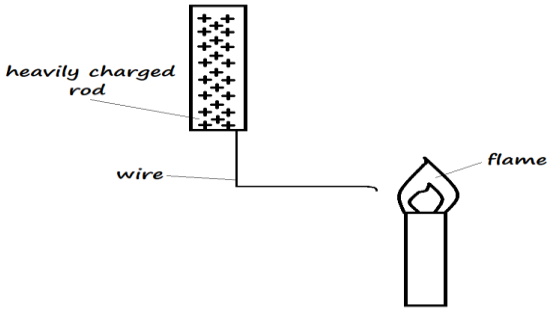

Figure 8

i) State what is observed on the flame when the wire is brought closer (1 mark)

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ii) Explain the reason for the observation in **c i)** (1 mark)

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d) The **figure 9** shows an arrangement of **three** capacitors in a circuit.

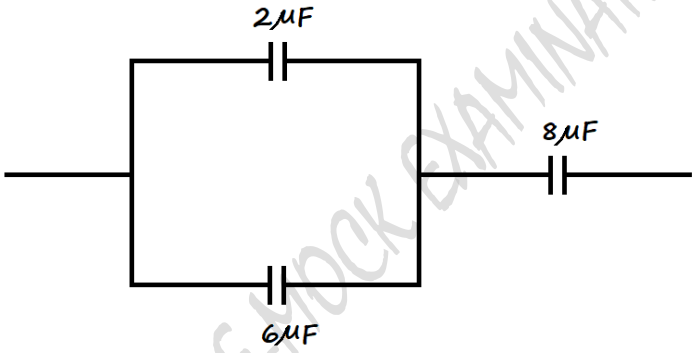

Figure 9

Determine the effective capacitance of the arrangement (3 marks)

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17. a) When power stations generate electricity, it is always stepped up to very high voltages so as to be transmitted over long distances.

i) Explain why it is necessary to do so. (1 mark)

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ii) State any **two** dangers of this high voltage transmission. (2 marks)

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b) **Figure 10** shows a section of a house wiring system.

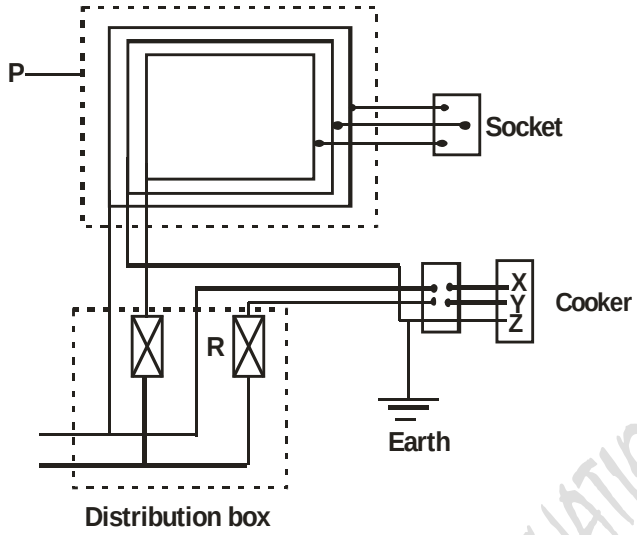

Figure 10

i) Name the circuit labeled **P**. (1 mark)

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ii) Name the terminals labeled **X** and **Y**. (2 marks)

X ……

Y ……

iii) State the purpose of **R** in the circuit. (1 mark)

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iv) Give a reason why **R** is connected to **Y** but not to **X**. (1 mark)

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v) Why is the earthing necessary in such a circuit? (1 mark)

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c) Determine the cost of using an electric iron box rated 1500W, for a total of 30 hours, given that, the cost of electricity is Ksh. 8 per unit. (2 marks)

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d) **Figure 11** shows a Geiger-muller tube:

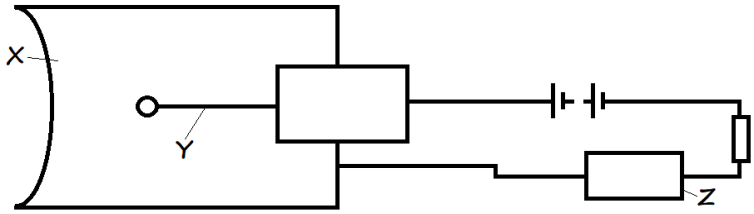

Figure 11

Name the parts labelled **X**, **Y**, **Z** (3 marks)

X ……

Y ……

Z ……

18. a) State **two** differences between hard and soft X-rays (2 marks)

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b) **Figure 12** shows the features of an X-ray tube.

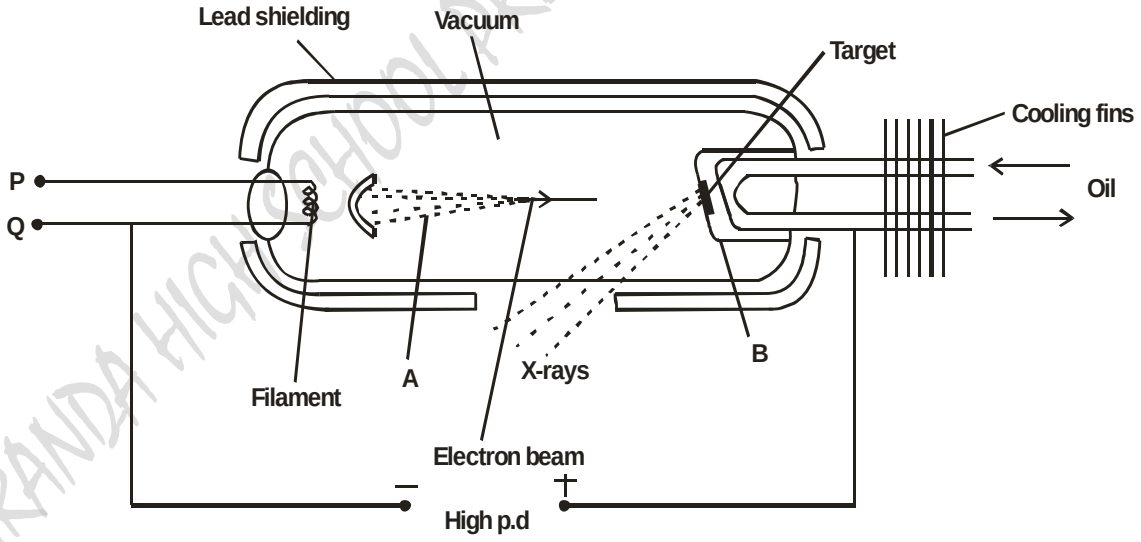

Figure 12

i) Name the parts labeled **A** and **B**. (2 marks)

A……

B……

ii) Explain how a change in the potential across **PQ** changes the intensity of the X-rays produced in the tube. (2 marks)

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iii) During the operation of the tube, the target becomes very hot. Explain how this heat is caused. (1 mark)

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iv) What property of lead makes it suitable for use as a shielding material? (1 mark)

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c) In a certain X-ray tube, the electrons are accelerated by a potential difference (P.d.) of 12000V. Assuming all the energy goes to produce X-rays, determine the frequency of the X-rays produced. (3 marks)

(Planck's constant h = 6.62 x 10^{-34}Js, and charge of an electron **e** = 1.6 x 10^{-19}C)

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19. a) State Fleming's left hand rule (1 mark)

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b) **Figure 13** shows an electric motor with a coil **ABCD** in the magnetic field

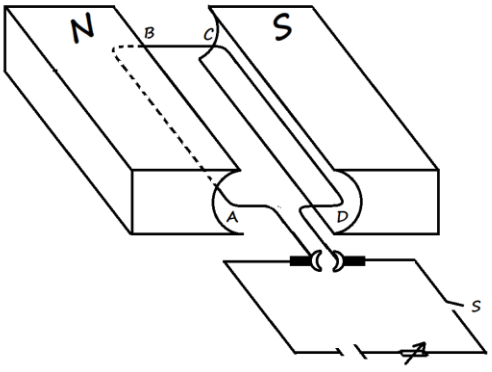

Figure 13

i) Indicate with an arrow on the coil **ABCD**, the direction of the current **I** when switch S is closed

ii) State the direction in which the coil rotates when the switch is closed (1 mark)

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iii) Explain what makes the coil to rotate (3 marks)

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iv) State **three** ways in which the power of this motor can be increased (3 marks)

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v) State the purpose of the rheostat in the setup (1 mark)

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