MASENO SCHOOL

Kenya Certificate of Secondary Education 2020

232/2- PHYSICS -Paper 2

(THEORY)

DEC. 2020 - 2 hours

232/2-Physics- P2
Thursday 17/12/2020
Time: 8:00am-10:00am

THE MASENO SCHOOL MOCK

Name …… Index Number……

Candidate's Signature ……..…… Date ……

Instructions to candidates

(a) *Write your name and admission number in the spaces provided above.*
(b) *Sign and write the date of the examination in the spaces provided above.*
(c) *This paper consists of **two** sections **A** and **B**.*
(d) *Answer **all** the questions in sections **A** and **B** in the spaces provided.*
(e) ***All** working **must** be clearly shown.*
(f) *Silent non-programmable electronic calculators may be used.*
(g) ***This paper consists of 8 printed pages.***
(h) ***Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.***
(i) ***Candidates should answer the questions in English.***
(j) ***Take charge of an electron, e=1.6 x10^{-19}C, 1eV= 1.6 x 10^{-19}J, speed of light in air, c= 3.0 x10^{8} ms^{-1}.***

For Examiner's Use Only

Section	Questions	Maximum Score	Candidate's Score
A	1-11	25	
B	12	10	
	13	12	
	14	11	
	15	10	
	16	12	

	Total Score	**80**	

SECTION A (25 marks)

1. a) Define radioactivity. (1 mark)

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b) State the type of radioactive emission that is not affected by electric and magnetic fields.

(1 mark)

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2. A cooking coil of 60Ω and taking a current of 5A develops heat in 2 minutes. Determine the quantity of heat developed. (2 marks)

3. State two characteristics of images formed by plane mirrors. (2 marks)

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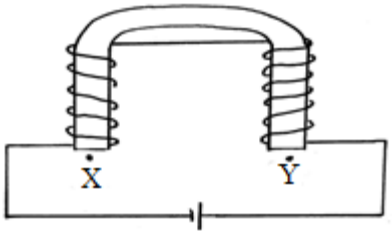
4. Figure 1 below shows magnetization of a material.



a) Identify the polarities of X and Y. (1 mark)

X……Y…….

b) Why is the shape of the core above preferred? (1 mark)

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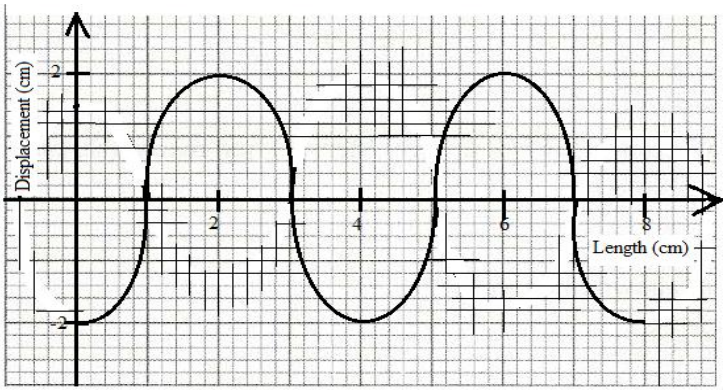
5. Figure 2 below shows a transverse wave.



If the time taken by the wave to travel is 0.10 seconds, determine the frequency of the wave.
(3 marks)

6. a) How are x-rays produced. (1 mark)

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b) Distinguish between hard and soft x-rays in terms of accelerating potential and wavelength.
(2 marks)

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7. State the meaning of the following terms as used in lenses. (2 marks)

a) Principal axis.

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b) Focal length.

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8. State two uses of visible light. (2 marks)

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9. Figure 3 below shows a conductor carrying current placed between the poles of a magnet.

On the same diagram indicate the direction of motion of the conductor and hence sketch the magnetic field patterns around the conductor. (2 marks)

10. The caps of a battery should be left open during charging, name the main gas that escapes from the caps and hence state the process by which it is formed. (2 marks)

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11. The time base on a CRO is set at 1ms/cm and Y gain at 100V/cm. When an alternating voltage is applied to the input terminals, the peak value of the sine curve on the screen is 2.9cm. Calculate;

i) The amplitude of the ac voltage. (1 mark)

ii) The frequency of the ac input signals, if two full waves are formed in a length of 5cm on the screen. (2 marks)

SECTION B (55 marks)

12. a) Define the term **monochromatic light.** (1 mark)

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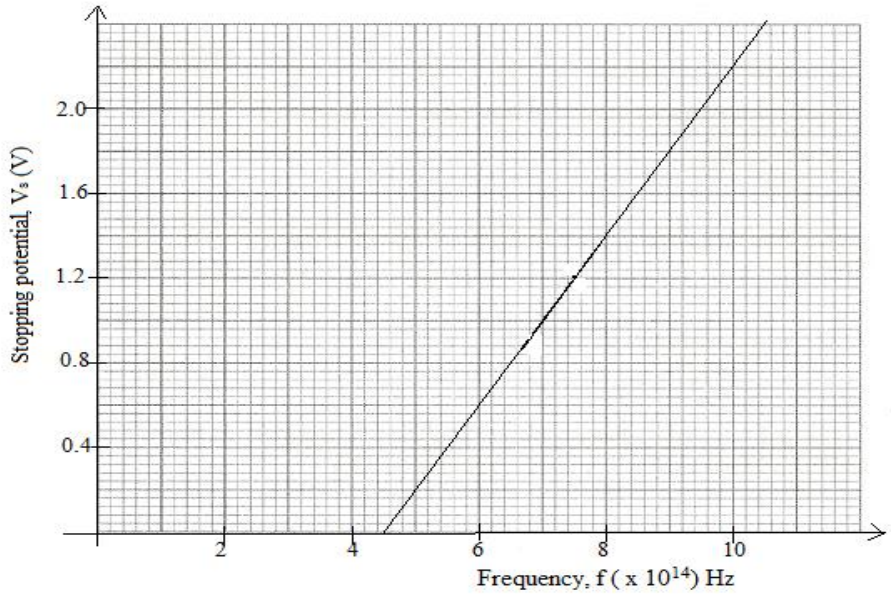
b) Figure 4 below shows a graph of stopping potential, V_s against frequency for a metal surface when monochromatic light is shone on it.



From the graph, determine the:

i) Threshold frequency, f_0. (1 mark)

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ii) Planck's constant, h. (3 marks)

iii) Work function, W_0 in eV. (3 marks)

c) State two applications of photoelectric effect. (2 marks)

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13. a) Define the following terms as used in mirrors. (2 marks)

i) focal length.

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ii) radius of curvature.

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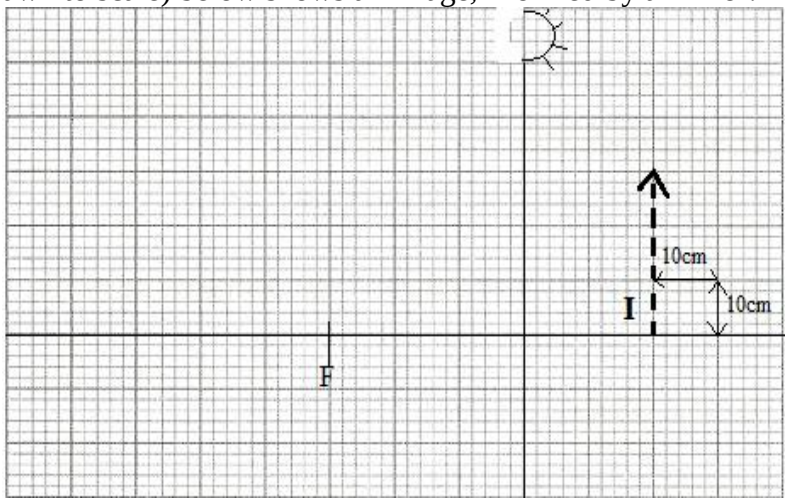
b) The figure 5 (drawn to scale) below shows an image, I formed by a mirror.



i) Draw on the figure a ray diagram to locate the object. (3 marks)

ii) Determine the object distance. (1 mark)

iii) Determine the magnification. (2 marks)

c) State two disadvantages of convex mirrors. (2 marks)

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d) State two defects of curved mirrors. (2 marks)

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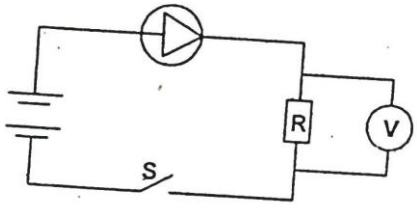
14. a) In the figure 6 below, when the switch is closed the voltmeter shows a reading.



When the battery terminals are reversed and switch is closed the voltmeter reading is zero. Explain these observations. (2 marks)

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b) The battery in the circuit diagram in figure 6 above was replaced with an a. c. power source. On the axis provided sketch a graph of the p. d. across resistor R against time when the switch is closed. (1 mark)

c) State two ways through which the electrical conductivity of a semi-conductor can be increased. (2 marks)

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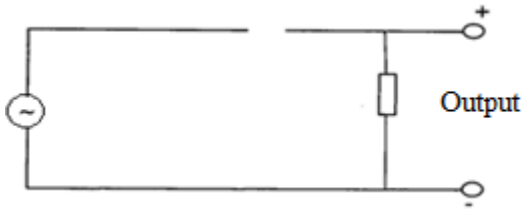
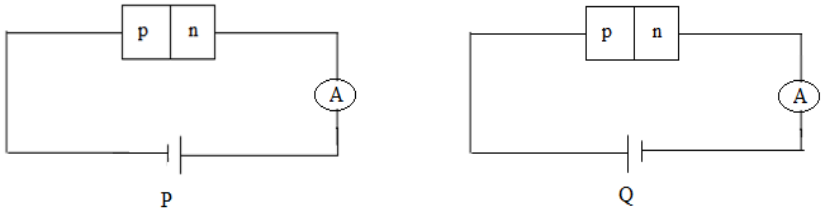
d) The figure 7 below shows an incomplete circuit diagram for a half-wave rectification of an AC voltage.



i) Complete the diagram by inserting a diode so that the output terminals are positive and negative as shown. (1 mark)

ii) On the axes provided below sketch a graph showing how the output voltage varies with time. (1 mark)

e) Figure 8 below shows two ways of biasing a P-N junction.



In which circuit will the current not flow? Explain. (2 marks)

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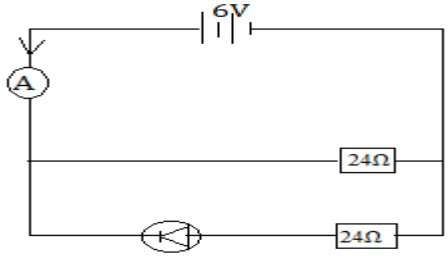
f) Two identical resistors and a diode are connected as shown in the circuit in figure 9 below.



Calculate the reading of the ammeter A. (2 marks)

15. a) State Faraday's law of electromagnetic induction. (1 mark)

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b) A transformer with 1200 turns in the primary circuit and 120 turns in the secondary circuit produces heat at the rate of 600W. Assuming 100% efficiency, determine the:

i) Voltage in the secondary circuit. (2 marks)

ii) Current in the primary circuit. (2 marks)

iii) The current in the secondary circuit. (1 mark)

c) Give a reason for using platinum as contacts in induction coil. (1 mark)

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d) Figure 10 below shows a diagram of a simple electric generator.

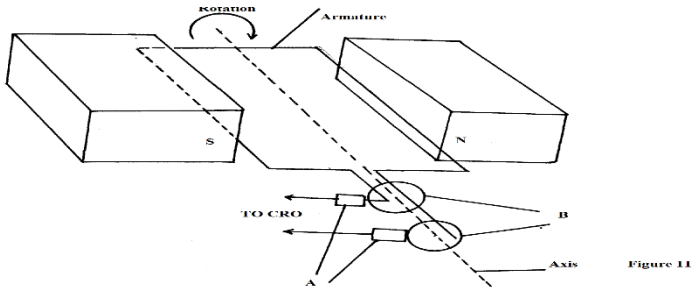
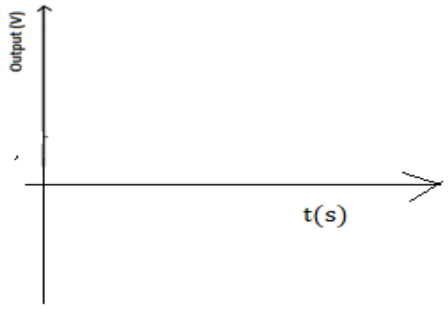


Figure 11

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

A……B……

ii) On the axis provided in the diagram below sketch the output as seen on the screen of the cathode ray oscilloscope (CRO) when the amature is rotated starting at the position shown in the figure. (1 mark)



16. a) Define capacitance of a capacitor and state its SI unit. (1 mark)

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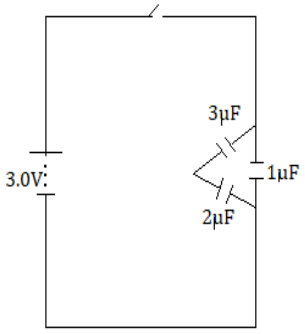
b) Figure 11 below shows an arrangement of capacitors.



Determine the;

i) Effective capacitance.

ii) (2 marks)

iii) Voltage across the 2μF capacitor. (3 marks)

iv) Energy stored in the 3μF capacitor. (3 marks)

c) State two factors that affect the capacitance of a capacitor. (2 marks)

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d) State the use of an electroscope related to earthing of charges. (1 mark)

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