

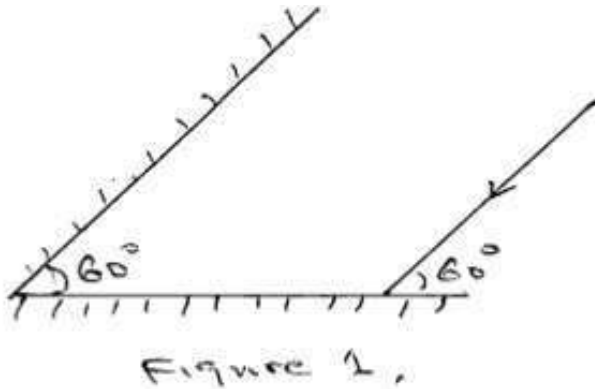
# FORM FOUR CLUSTER KCSE MODEL6

## PHYSICS PAPER 2 QUESTIONS

### SECTION A (25 Marks)

#### Answer all questions

- Figure 1 shows two mirrors inclined at an angle of  $60^\circ$  to each other. A ray of light is shown incident on one of the mirrors.



Sketch on the same diagram the path of the ray until it leaves the two mirrors. Indicate the angles at each reflection.

- State two uses of a charged gold leaf electroscope.

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- Explain how polarization reduces current in a simple cell.

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- Figure 2 shows the poles of two magnets close together.



Figure 2

Sketch the magnetic field pattern in the space between the poles

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- Figure 3 shows a ray of light on a convex mirror.

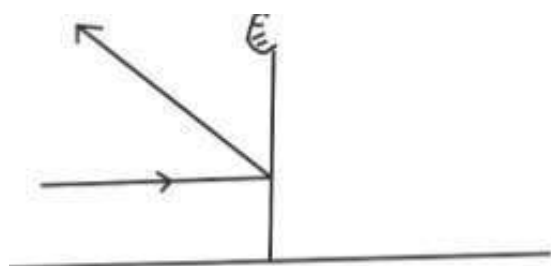


Figure 3

Using a suitable construction on the same diagram, determine the radius of curvature of the mirror. ....

6. Figure 4 shows a current carrying conductor.

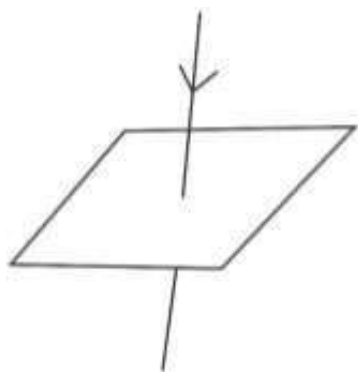


Figure 4

Sketch on the diagram the magnetic field pattern due to the current.

7. The wavelength of a radio wave is 1km. Determine its frequency. (Take the speed of light is  $3.0 \times 10^8 \text{ ms}^{-1}$ ). ....

8. Figure 5 shows a ray of light incident on a glass air interface

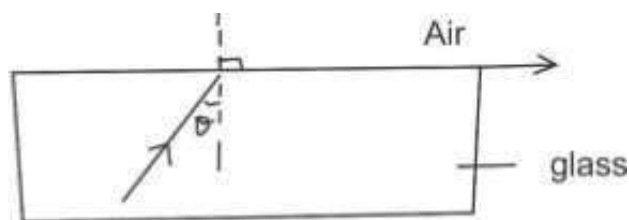


Figure 5

Given that the refractive index of the glass is 1.6. Determine angle

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9. Figure six shows plane light waves in air incident on a convex lens whose principal focus F is shown. The waves move past point G.



Figure 6

Complete the diagram to show the pattern of the emergent waves between the lens and point G.

10. A heating coil is rated 100w, 240v. At what rate would it dissipate energy if it is connected to a 220v supply? .....

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11. Table 1 shows radiations and their respective frequencies

Type of radiation	Yellow light	Gamma rays	Radio waves	Micro waves
Frequency (Hz)	$1 \times 10^{15}$	$1 \times 10^{22}$	$1 \times 10^6$	$1 \times 10^{11}$

Arrange the radiations in order of increasing energy

12. A heater of resistance R1 is rated P watts, V volts while another of resistance R2 is rated 2p watts,  $\frac{1}{2}$  volts. Determine R1/R2.

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13. State the effect of decreasing the distance between the plates of a parallel plate capacitor on the capacitance. ....

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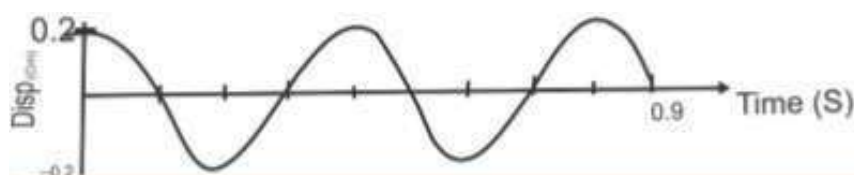
## SECTION B: (55 Marks)

### Answer all questions

14. a) Distinguish between longitudinal and transverse waves. (1mark)

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- b) Figure 7 shows a displacement time curve of a certain wave.



- i) Calculate the frequency of the wave. (3marks)

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- ii) On the same diagram, draw a wave which has half the amplitude and twice the frequency of the one shown. (2marks) .....

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- c) i) State any two factors that affect the speed of sound in air. (2marks)

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- ii) Two people stand facing each other 200m apart on one side of a high wall and the same

perpendicular distance from it. When one fires a pistol, the other hears a report 0.6sec after the flash and a second sound 0.25 sec later. Explain this and calculate the perpendicular distance of the people from the wall. (6marks)

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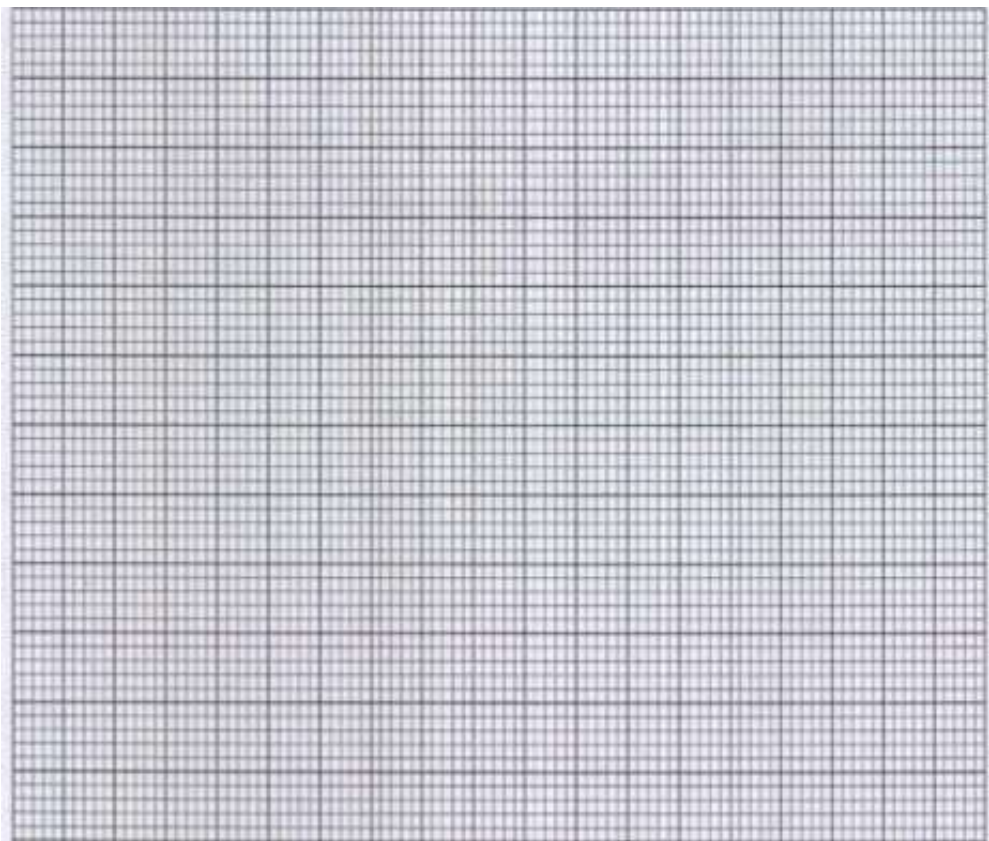
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15. . In an experiment to determine the refractive index of a liquid, the liquid was poured into a measuring cylinder. A pin was placed at the bottom of the cylinder and another pin was used to locate the apparent position of the first pin. The real depth and apparent depth were measured. The experiment was repeated with another values of real depth. The table below shows the results obtained.

Real depth (cm)	10	20	30	40	50
Apparent depth (cm)	6.6	13.4	20	26.6	33.4

- i) Plot the graph of apparent depth (y-axis) against real depth. (4marks)



- ii) Determine the gradient of your graph. (3marks)

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- iii) What does the gradient represent? (1mark)

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16. a) State Ohm's law (1mark)

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b) State any one factor that affects the resistance of an Ohms conductor. (1mark)

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c) A cell supplies a current of 0.6A through a  $2\Omega$  resistor and a current of 0.2A through a  $7\Omega$  resistor. Determine the e.m.f and internal resistance of the cell. (6marks)

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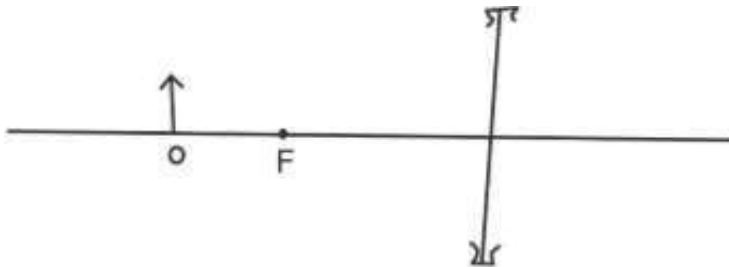
d) One  $4\Omega$  and two  $2\Omega$  resistors are available. Draw a diagram of their arrangement that would give a total resistance of: i) Less than  $2\Omega$  (1mark)

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ii) More than  $4\Omega$  but less than  $8\Omega$  (1mark)

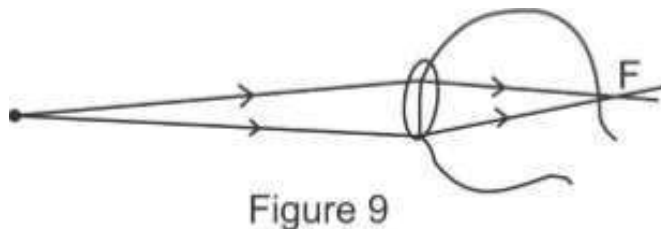
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17. . a) Figure 8 shows an object O placed in front of a diverging lens whose principal focus is F.



On the figure, draw a ray diagram to locate the image formed. (3marks)

b) Figure 9 shows a human eye with a certain defect.



i) Name the defect. (1mark)

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ii) State one cause of the defect. (1mark)

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

c) A vertical object is placed 20cm in front of a convex lens of focal length 5cm. Determine:

i) The image distance. (3marks)

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ii) The magnification (2marks)

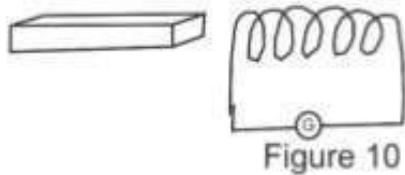
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iii) State two characteristics of the image formed. (2marks)

18. a) State Lenz's law. (1mark)

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b) In the set – up in figure 10, the magnet is moved towards the coil and stopped when inside the coil.



It is observed that the galvanometer deflects to one side and then goes back to zero. Explain this observation. (2marks) .....

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c) The primary coil of a transformer has 1200 turns and the secondary coil has 60 turns. The transformer is connected to 240V a.c source. Determine:

i) the turns ratio (1mark)

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ii) the output voltage. (1mark)

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iii) the output current when the primary coil has a current of 0.5A (Assume there are no energy losses). (3marks)

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