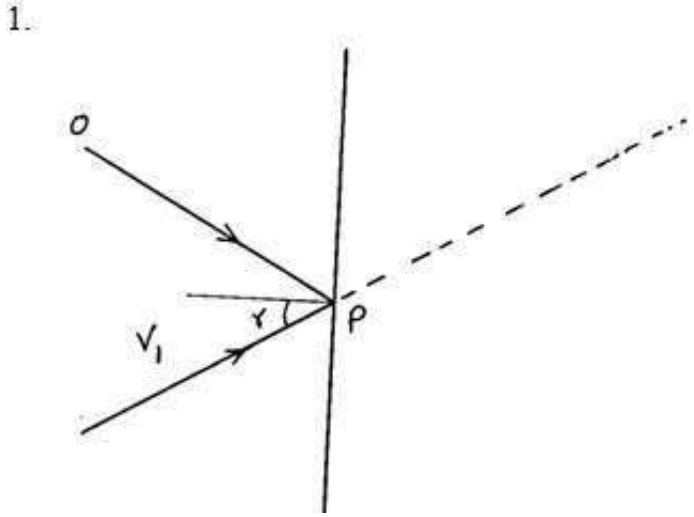
FORM FOUR CLUSTER KCSE MODEL 3

PHYSICS PAPER 2 ANSWERS

SECTION A (25 Marks)

Answer ALL the questions in this sections in the spaces provided.

1.

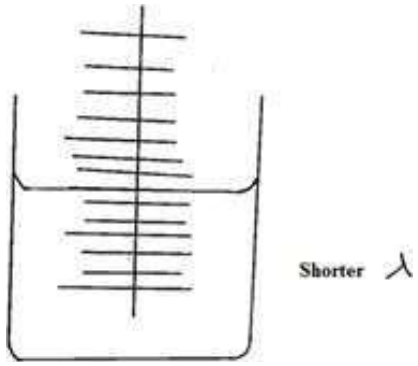


2.

3.(i) Between F and P/focal point and the pole of the mitror.

(ii) Between C and F.

4.

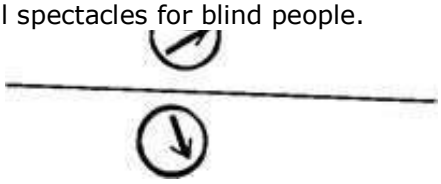


5.-Determine the depth of sea, lake, and ocean.

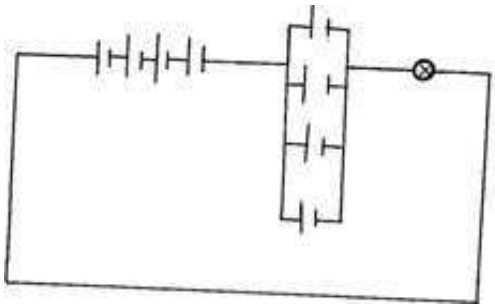
-Under water exploration of gas and oil.

-Location of shoals of fish.

-Making special spectacles for blind people.

6. 

7.The circuit containing the diode will be reverse biased hence the diode will repel the charge no√ current will flow√ initially it was forward biased soconducted.

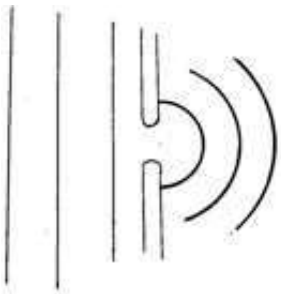
8. 

9. $Serie\ \frac{1}{c}=\frac{1}{1}+\frac{1}{4}=\frac{5}{4}\Rightarrow c=\frac{4}{5}\sqrt{1}$

$\text{Parallel}\ \ 2+\frac{4}{5}=2\frac{4}{5}=2.8=\frac{14}{5}\sqrt{1}$

$\text{Inseries}\ \ \frac{1}{c}=\frac{1}{1}+\frac{1}{1}+\frac{\frac{1}{14}}{5}\sqrt{}=2+\frac{5}{14}=\frac{33}{14}\sqrt{}$

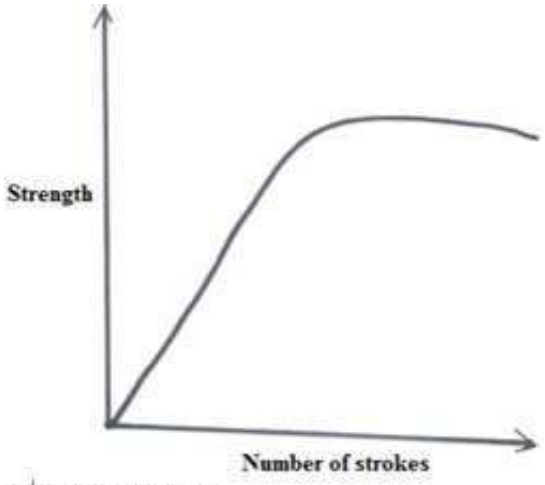
10. $\text{Combined}=\frac{14}{33}$

11. 

-Evidence of bending√

- ↗ remains the same√

12.



-√Correct shape

13. -

$$\eta = \frac{\sin i}{\sin r} \surd$$

$$\frac{1}{1.48} = \frac{\sin 90}{\sin \theta} \surd$$

$$Sin\theta = \frac{1}{1.48} = 0.6757$$

$$\theta = 42.4^0 \surd$$

SECTION B (55 Marks)

Answer ALL questions in this section

14.

(a)(i) 9.0V √1

(ii) Gradient $= \frac{3-8}{8-0.5} = -r\sqrt{}$

$= -0.6667$

$-r = -0.6667$

$r = 0.6667\Omega\sqrt{}$

(iii) $\frac{5.0-0.3}{2.45-0.55}\sqrt{}\sqrt{}$

$= \frac{4.7}{1.9} = 2.474\Omega\sqrt{}$

(b)(i) A - brown/red √1

B -Yellow/green√1

C -Black√1

(ii) Fuse breaks the circuit incase of excess current hence protecting the appliance from damage/the over from electro action.

15.

a) The direction of the induced emf is such that it produces a current which produce a magnetic effect that oppose the change producing it.

b) (i) No pole

(ii) The magnetic field cuts the coil inducing emf in the coil hence electrical energy.

c) (i) $P = 1V$

$500\,000 = I \times 10\,000$

$I = 50A$

(ii) $\frac{V_S}{V_P} = \frac{I_P}{I_S}$

$= \frac{50}{I_S}$

$I_S = 3.33A$

(iii) $V = IRR$

$= 3.333 \times 200$

$= 666.6\Omega$

(iv) $p = 1^2 R = 3.333^2 \times 200$

$= 2221.7\,\text{W}$

16.

a) Y - 4

b) (i) Due to background radiations caused by naturally occurring radio isotopes.

(ii) X – ray, other radiations (α, β) cannot penetrate aluminium.

(iii) Higher reading was recorded because all the radiations ($\alpha\beta\chi$) reached the G-M tube.

c) (i) Mica window allow radiations into the tube.√

(ii) Rate meter reads voltage between the electrodes.√

(iii) GM is portable√

GM is easier to read

d) $1 \longrightarrow \frac{1}{2} \longrightarrow \frac{1}{4} \longrightarrow \frac{1}{8} \longrightarrow \frac{1}{16} \longrightarrow \frac{1}{32} \longrightarrow \frac{1}{64}$

Fraction that has decayed $= 1 - \frac{1}{64} = \frac{63}{64}$ √

e) $X = 238 - 12 = 224$

$Y = 92 - 2 = 90$

17

a) The light energy should have a frequency gentle than threshold frequency of the metal/cathode.

b) (i) $f_0 = 1 \times 10^{15} H_3$ √ (from graph)

(ii) Gradient =h√1

$\therefore h = \frac{(10-0)\times 10^{-19}}{(2.5-1)\times 10^{15}}$ √√

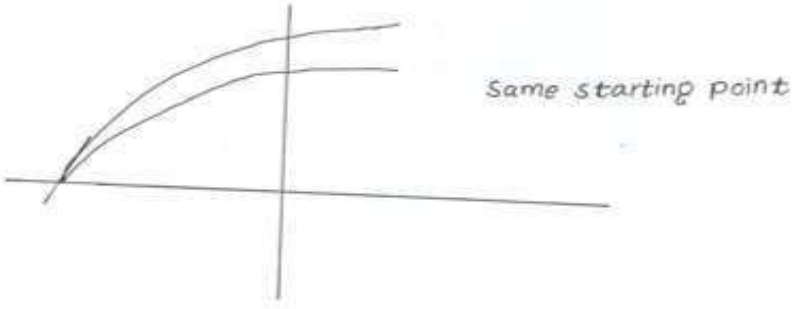
$= 6.67 \times 10^{-34} J S$ √

(iii) $W_0 = hf_0$ √

$= 6.67 \times 10^{-34} \times 1 \times 10^{15}$ √

$= 6.67 \times 10^{-19} J$ √

Allow T.E from (i & ii)



c)

Same starting point.

18.

a)(i) A - Tungsten/molybolenum target √
B – Lead shield √

(ii) X –rays requires high accelerating voltage.
C – Steps up voltage to the required potential.

(iii) - Current is allowed to flow through the filament in the cathode heating it and boiling off electrons/through thermionic emission.
-The potential difference between anode and cathode accelerates the electrons to the target.
-Electrons hit the target and their energy produce x-rays and heat/ x-rays produced when electrons hit the target.

(iv) The tube is evacuated for the electrons not to lose their energy though collisions with the air molecules on their way to the target.

b) The penetrating power of the X-ray is varied by varying the accelerating potential/anode-cathode difference.
-Electrons moves faster hitting the target with greater impact causing radiations with higher energy.

c) $\frac{Q}{t} = I \left| \; I = \frac{n\ell}{t} \right.$

$= n \times 1.6 \times 10^{-19}$

$\therefore \frac{40}{1000} = n \times 1.6 \times 10^{-19}$

$n = \frac{40}{100} \times 1 \times \frac{1}{1.6 \times 10^{-19}} = 2.5 \times 10^{17} \; electrons / \sec ond$