

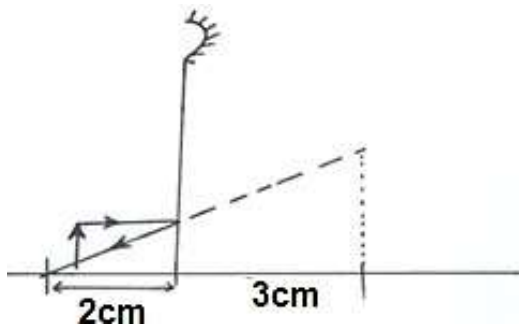
FORM FOUR CLUSTER KCSE MODEL 2

PHYSICS PAPER 2 ANSWER

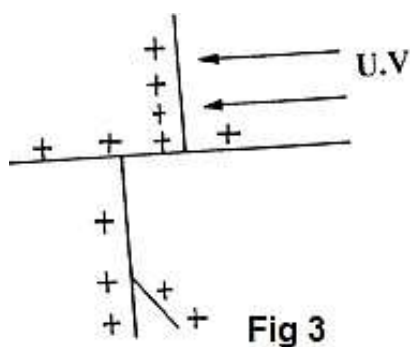
SECTION A (25 Marks)

1. 3 o'clock.

2.



3.



(i) Electrons emitted from zinc plate are attracted by positive charge on the electroscope, hence the leaf does not fall.

(ii) Electron remitted from zinc plate are repelled by the negative charge in the electroscope hence the leaf falls.

4. An increase in p.d increases the heating effect. This produces move electrons by thermionic emission. As a result more intense x-rays are produced.

5.

$$CC+1 \quad E = V + Ir$$

$$E = 1.8 + 1.8r$$

$$CC+2 \quad E = V + Ir$$

$$= 2.4 + 0.6r$$

equity

$$1.2r = 0.6$$

$$r = 0.5\Omega$$

6. The minimum frequency of a radiation required to liberate an electron from a metal surface.

7. (i) x- rays.

(ii) Visible light.

8.

$$n = \frac{\text{velocity of light in air}}{\text{velocity of light in medium}} \checkmark$$
$$1.33 = \frac{3.0 \times 10^8}{V}$$
$$V = \frac{3 \times 10^8}{1.33} \quad \checkmark \checkmark$$
$$= 2.256 \times 10^8 \mu/s$$

9. -Long sighted/hypermetropic.✓

-Use emerging lens.✓

10. Manganese (IV) oxide acts as a depolarizing agent and oxidises gas to water.

11. **q** Beta (β)✓
b $82\sqrt{1/2}$

12. $T = 0.04$

$$f = \frac{1}{T} = \frac{1}{0.04} = \frac{100}{4} = 25Hz$$

$$\lambda = \frac{v}{f} = \frac{200}{25} = 8m$$

13. One sound comes from the axe of the other man. The other sound comes from the echo of his own axe.

SECTION B (55 Marks)

14. (a) Capacitance of a body is a charge of one coulomb raised 0 its p.d by one volt.

(b) (i) -ve charge on the y- plate will move to the earth than +ve in the x will attract -ve charges from y hence the divergence will decrease.

(ii) Divergence will increase when it is increased.

(iii) It varies hence can deflect to the left or right.

(iv) The divergence increases.

(v) There will be no charge.

(c) (i) $x + 2\mu f = \text{combined Capacitance.}$

$$(x + 2)\mu F$$

$$Q = CV$$

$$200 = (x + 2)80$$

$$200 = 80x + 160$$

$$40 = 80x$$

$$x = 0.5\mu F$$

(ii) $Q = CV$ (2mks)

$$Q_1 = C_1 V_1 (0.5 \times 200) = 100 C\checkmark$$

$$Q_2 = 2 \times 200 = 400 C\checkmark$$

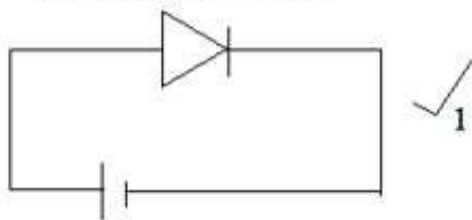
(iii) Initial = $\frac{1}{2} \times 2 \times 10^{-6} \times (200)^2$
 $= 0.04 J\checkmark$

15. (a) (i) Doping. Adding impurities to a semi-conductor to improve conductivity.✓

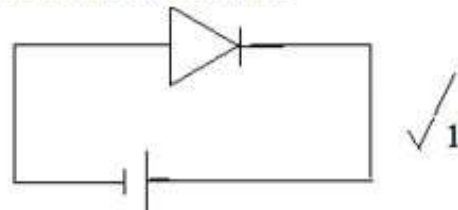
(ii) Diode. A device that allows electric current to flow in one direction only.✓

(b)

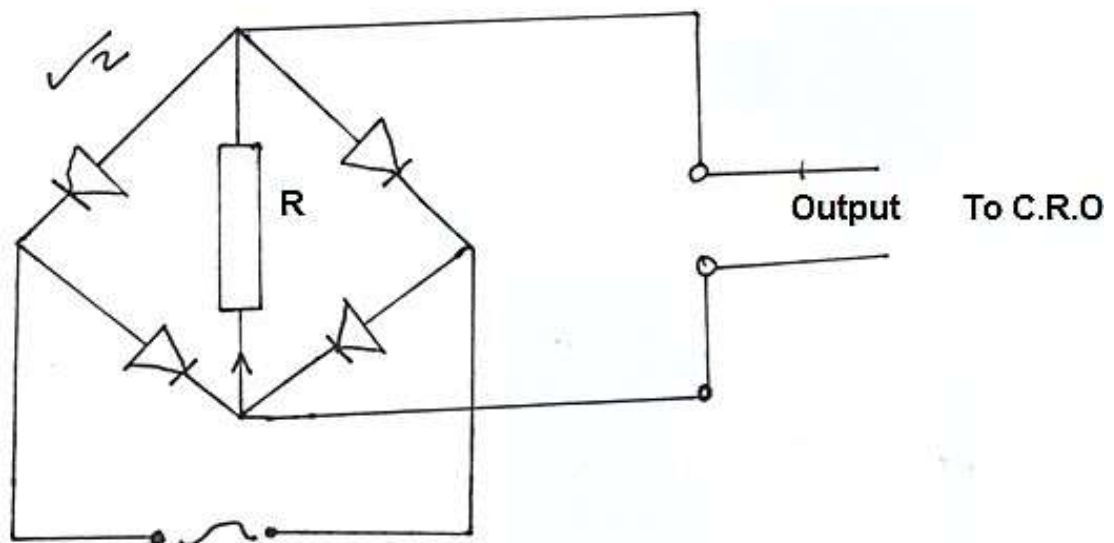
Forward biased diode



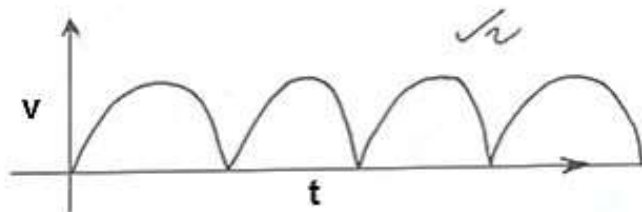
Reverse biased diode



(c) (i)



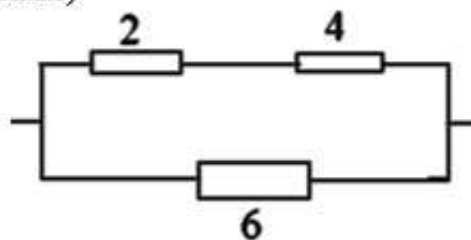
(ii)



16. (a) (i) Occurs when charge flowing through a conductor has its movement impeded by collision with the atoms and impurities in it.

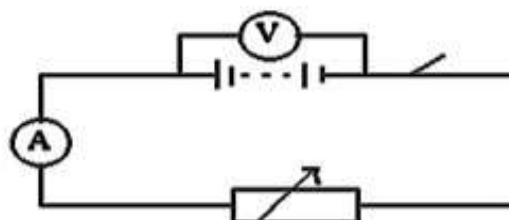
(ii)

(2mks)



(c)

(i)



- (ii) e.m.f = voltage intercept
= 9.5 V; ✓
- (iii) Internal resistance = slope

$$\frac{9-4}{2-3} = \frac{2}{-1.1}$$

$$-1.818\Omega$$

(d) $P=IV$

$$P = \frac{V^2}{R}$$

$$75 = \frac{240 \times 240}{R}$$

$$R = \frac{240 \times 240}{75}$$

$$R = 768\Omega$$

(b) -Value of voltage across a cell in an open circuit. -Value of voltage across a cell when not delivering current in a circuit.

17. (a) (i) B- Anodes. E- X-Plates.✓

(ii) Have high melting point.✓

(iii) The cathode C. Heated indirectly by the filament circuit A.✓ Electrons are then produced by thermionic emission.

(iv) D is the grid controls the intensity of electrons/controls the brighter of the screen.✓

(v) To prevent accumulation of electrons on the screen. ✓

(vi) Yes.✓ X rays are produced when fast moving electrons are stopped.✓

(b) (I) $T = 50 \times 4 = 200 \text{ MS} = 0.2 \text{ seconds.} \checkmark$

$$f = \frac{1}{T} \checkmark = \frac{1}{0.2} = 5 \text{ Hz } \checkmark \quad (3 \text{ mks})$$

(II) Peak voltage = 2 div x 200 ✓
= 400V ✓

18. (a) (i) Direction of induced current is always such as to oppose the change producing it.

(ii) -Laminated core.

-Thick upper or as wires.

-Maximum flux linkage/common core.

-Use of soft iron core.

(b) (i) Very high voltages?

-Reduces power loss.

(ii) Alternating voltage?

-It is possible to be stepped up or down.

$$(c) \quad \frac{V_P}{V_S} = \frac{N_P}{N_S} \quad \checkmark \quad 220:9$$

$$(d) \quad (i) \quad \text{The number of } kWh \text{ per months} \\ = \left(\frac{1500 \times 6}{1000} \right) + \left(\frac{300 \times 8}{1000} \right) \times 30 \quad \checkmark \\ = (9 + 2.4) \times 30 \quad \checkmark \\ = 342 \text{ } kWh \quad \checkmark$$

$$(ii) \quad \text{Monthly bill} \\ 342 \times 6 = \text{Ksh } 2052.00 \quad \checkmark \\ 342 \times \frac{335}{100} = \text{Kshs } 1145.70 \quad \checkmark \\ 342 \times \frac{76}{100} = \text{Ksh } 259.92 \quad \checkmark \\ \text{Total bill Ksh. } 3,457.62 \\ \text{Ksh. } 3457.62 \quad \checkmark$$