(ii) Vector	Angle	X-Component	Y-Component
$E_1 = 1.469$ N/C	90°	$E_{1x} = 1.469 \cos 90°$ $= 0$	$E_{1y} = 1.469 \sin 90°$ $= 1.4994$
$E_2 = 12$ N/C	36.8°	$E_{2x} = 12 \times \cos 36.8$ $= 9.6$	$E_{2y} = 12 \times \sin 36.8$ $= 7.178$
		$\Sigma x = 9.6$ N/C	$\Sigma E_y = 8.677$ N/C

The magnitude of resultance electric field E of point P is

$$E = \sqrt{\Sigma E_x^2 + \Sigma E_y^2}$$

$$= \sqrt{9.6 - 8.677}$$

$$= 0.960 \text{ N/C}$$

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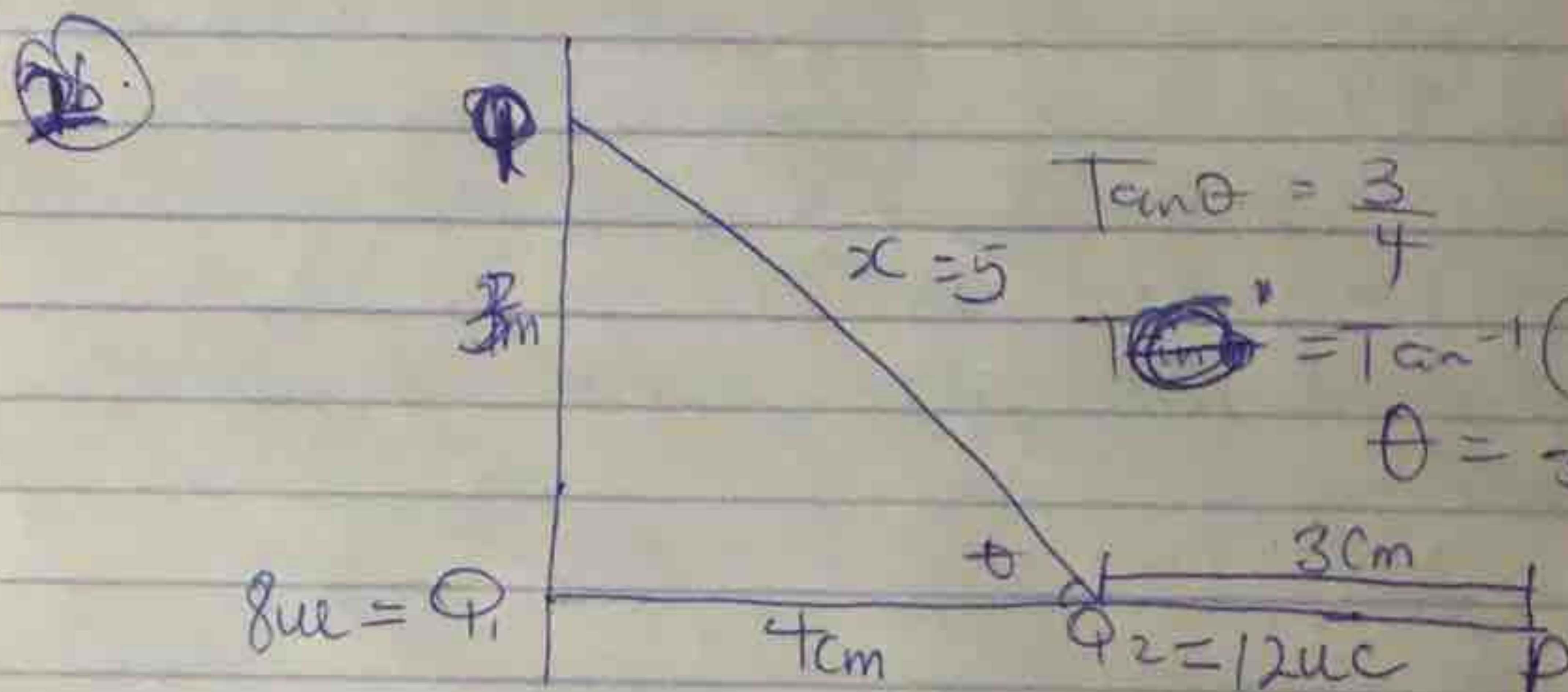
(2) Electric Field is the region or space where charge experiences electrical force or has been influenced by electric force.

- Electric field intensity is the force per unit charge or the ratio of force acting on a charge to the quantity of that charge.

(2b)



$\tan\theta = \frac{3}{4}$

$\theta = \tan^{-1}\left(\frac{3}{4}\right)$

$\theta = 36.8^\circ$

Finding x using pythagoras theorem

$x^2 = 3^2 + 4^2$

$x = \sqrt{3^2 + 4^2}$

$x = \sqrt{9 + 16}$

$x = \sqrt{25} = 5$

let E be the electric field at P as a result of q

$k = 9 \times 10^9$ N/C

$E_1 = \frac{kq_1}{r^2} = \frac{9 \times 10^9 \times 8 \times 10^{-6}}{7^2} = 1.469$ N/C

$E_2 = \frac{kq_2}{r^2} = \frac{9 \times 10^9 \times 12 \times 10^{-6}}{3^2} = 12$ N/C

The net Electric field intensity $= E_1 + E_2 = 1.469 + 12$

$= 13.469$ N/C

(4.) magnetic can be seen as the collection of forces that makes up the magnetic field. It is the number of
4.1 magnetic field lines passing through a given close surface.
They are number of magnetic lines of forces set up a magnetic circuit.

(4b.) - Given mass of electron $- m = 9.11 \times 10^{-31} kg$
radius $- m = 1.4 \times 10^{-7} m$
Magnetic field $- B = 3.5 \times 10^{-1} wm^{-1}$

$$\text{Cyclotron Frequency} = \frac{q \times B}{2 \times m}$$

Charge $q = ?$
magnetic force $= qvB$
Magnetic force = Centripetal force --- (i)
Centripetal force = Gravitational force --- (ii)
Gravitational force $= mg$

$$F = 9.11 \times 10^{-31} \times 10 = 9.11 \times 10^{-30} N$$

$$F = \frac{mv^2}{r} \quad \text{- from eqn (ii)}$$

$$v = \sqrt{\frac{F \times r}{m}} = \sqrt{\frac{9.11 \times 10^{-30} \times 1.4 \times 10^{-7}}{9.11 \times 10^{-31}}}$$

$$= 1.4 \times 10^{-68} ms^{-1}$$

magnetic force = Gravitational force

$$F = qvB$$

$$q = \frac{F}{vB} = \frac{9.11 \times 10^{-30}}{1.4 \times 10^{-68} \times 3.5 \times 10^{-1}}$$

$$= 1.86 \times 10^{39} C$$

$\therefore$ Cyclotron Frequency $= \dfrac{qvB}{2 \times m} = \cancel{1.86 \times 10^{39}}$

(8)

$$= \frac{1.86 \times 10^{39} \times 1.4 \times 10^{-68} \times 3.5 \times 10^{-1}}{2 \times 9.11 \times 10^{-3}}$$

$$= 4.15 \times 10^{-32} Hz$$

(c) Since t
we nee
magnetic
force
total for
Weber
magn

3a (a) Volume charge density: is the ratio of charge to volume of a round disc.

$$\rho = \frac{dQ}{dv}$$

(b) Surface charge density $\sigma = \frac{dQ}{dA}$

It the ratio of charge to areas of the disc in consideration

(c) Linear charge density is the ratio of charge to length of disc (diameter) in consideration

$$\lambda = \frac{dQ}{dl}$$

3b. Electric potential difference can be defined as the workdone per unit charge against electric force in moving the charge from one point to another. It is measured in Volt (v) and is a scalar quantity

External force acting on charge $[F] = q_0 E$

Workdone $\rightarrow dW = F \cdot dl$

$$d \cdot W = -q_0 E dl$$

when it is moved from point $A \rightarrow B$

$$W(A \rightarrow B) = -q_0 \int_A^B E dl$$

$$V_A - V_B = \frac{W(A \rightarrow B)}{q_0}$$

$\cancel{V_A - V_B} =$

$$V_A - V_B = -\int_A^B E \cdot dl$$

(c) Since the charge is part of Cyclotron frequency equation, we need to obtain it by relating all forces together: magnetic force being equal to gravitational force and Gravitational force equals to Centripetal force. From these Centripetal force equation, a common force is used to get the velocity needed to obtain q-charge ~~in~~ from magnetic force.