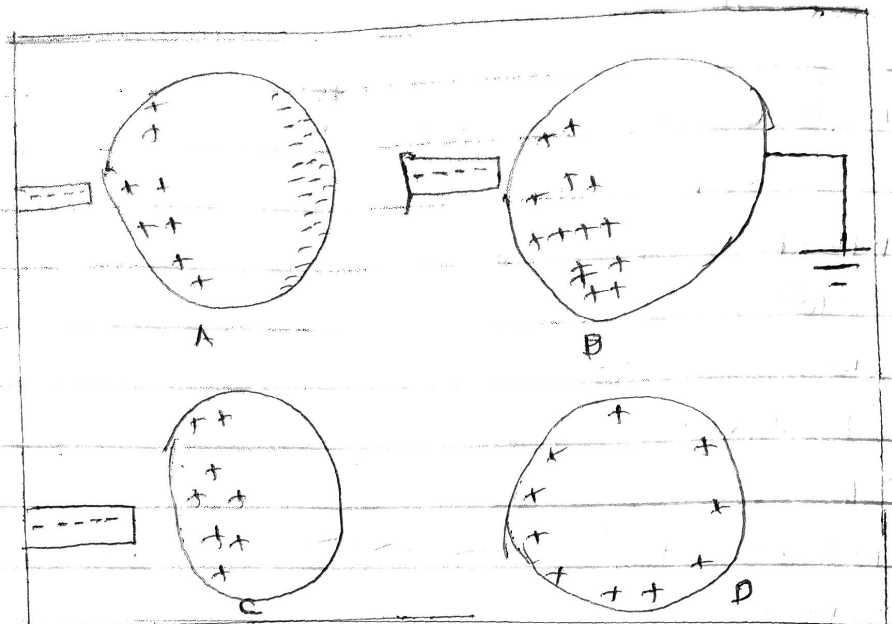
EKPOLO- EWOMAZINO - ESTHER
19/MHS02/045
NURSING
MEDICINE AND HEALTH SCIENCE
Number of questions answered 4
NO 1
Explain with the aid of diagram how can you produce a negatively charged sphere
Answer8



The charge has be provided with it being in content. from the diagram the sphere remain content but the negative charge is being produced.

IB

$q_1+q_2 = 5\times10^{-5}$

$q_1 = 5\times10^{-5} - q_2$

recall that $F = \frac{Kq_1q_2}{r^2}$

$q_1q_2 = \frac{Fr^2}{K}$

$(5.0\times10^{-5}-q_2)q_2 = \frac{1\times2^2}{9\times10^9}$

$5.0\times10^{-5}q_2 - q_2^2 = 4.4\times10^{-10}$

rearrange

$-q_2^2 + 5\times10^{-5} q_2 - 4.4\times10^{-10} = 0$ Negate

Using Almighty formula:

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

But $a = 1$ $b = -5\times10^{-5}$ $c = 4.4\times10^{-10}$

$$\frac{-(-5\times10^{-5}) \pm \sqrt{(-5\times10^{-5})^2 - 4\times1\times4.4\times10^{-10}}}{2\times1}$$

$q_2 = 3.85\times10^{-5}C$

r negative:

$$\frac{-(-5\times10^{-5}) - \sqrt{(-5\times10^{-5})^2 - 4\times1\times4.4\times10^{-10}}}{2\times1}$$

$q_2 = 1.15\times10^{-5}C$

en $q_2 = 3.85\times10^{-5}$

$q_1 = 5.0\times10^{-5} - 3.85\times10^{-5}$

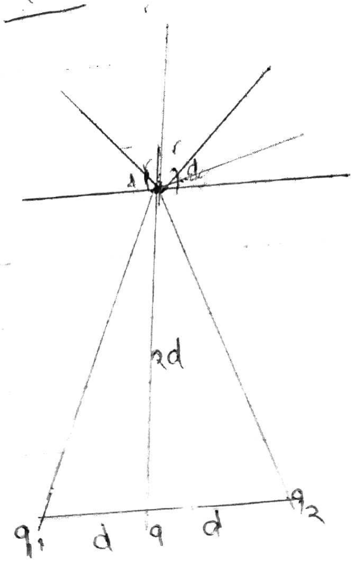
$= 1.15\times10^{-5}C$

en $q_2 = 1.15\times10^{-5}$

$= 5.0\times10^{-5} - 3.85\times10^{-5}$

$= 3.85\times10^{-5}C$

5: 1C



$\tan\theta = \frac{opp}{Adj} = \frac{2d}{d}$.

$\tan^{-1} 2 = 63.43°$.

using pyt theorm

$r^2 = 1^2 + 0.5^2$

$r^2 = 1.25$

$r = \sqrt{1.25} = 1.12m$.

But $E = \frac{Kq_1}{r^2} = \frac{9\times10^9 \times 8\times10^{-6}}{1.25}$

$E = 57600$

$E = \frac{KQ}{r^2} = \frac{9\times10^9 \times 8\times10^{-6}}{1.25}$

$= 57600$

$E_q = \frac{9\times10^9 \times q}{1} = 9\times10^9 q$

Vector	Angle	x-comp	y-comp
57600	63.43°	25763.95	51516.78
57600	63.43°	2563.93	51516.78
$9\times10^9 q$	90°	0	$9\times10^9 q$
		0	$103033.56 + 9\times10^9 q$

$E_R = 0^2 + 103033.56 + 9\times10^9 q$

$-103033.56 = 9\times10^9 q$

$q = \frac{-103033.56}{9\times10^9}$

$q = -1.14\times10^{-6}$

$q = -1.14 C$.

2A

Electric field is defined as a region or space that experience an electri force.

While

electric Intensity is the force per unit charge.

$$E_1 = \frac{Kq_1}{r^2} = \frac{9\times10^9 \times 8\times10^{-9}}{(7^2)}$$

$E = 1.5$

$$E_2 = \frac{Kq_2}{r^2} = \frac{9\times10^9 \times 12\times10^{-9}}{(3^2)}$$

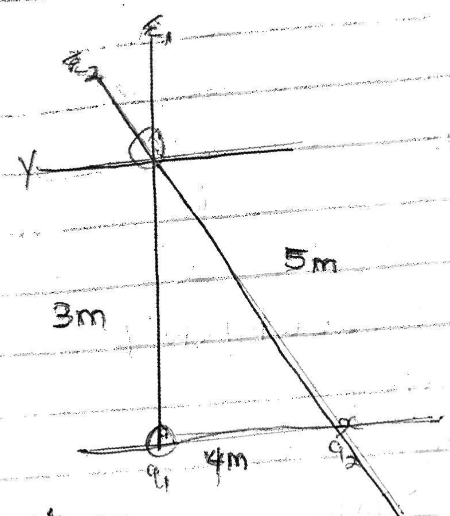
$E_2 = 12$

Vectors	Angle	x-comp	y-comp
1.5	0	1.5	0
12	0	12	0
		$\Sigma x = 13.5$	

$$\Sigma R = \sqrt{(13.5)^2 + 0^2}$$

$\Sigma R = 13.5$

For B



Using Pyth theorm

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

$x^2 = 9 + 16$

$x = 5m$

$$E = \frac{Kq_1}{r^2} = \frac{9\times10^9 \times 6\times10^{-9}}{(3)^2}$$

$E_1 = 8 N/C$

$E_2 = \frac{kq_1}{r^2} = \frac{9\times10^9 \times 12\times10^{-9}}{(5)^2}$

$= 4.32N$

Vector	Angle	X-comp	Y-comp
8	90°	0	8
4.32	36.86	3.456	2.59
		3.456	10.59

$E_R = \sqrt{(3.456)^2 + (10.59)^2}$

$E_R = \sqrt{11.94 + 112.169}$

$E_R = 11.2C.$

Angle $= \tan^{-1}\frac{10.59}{3.456}$ $\tan^{-1} = 71.9°$.

3A

Volume charge $\rho = \frac{dQ}{dV}$

Surface charge $\sigma = \frac{dQ}{dA}$

Linear charge $\lambda = \frac{dQ}{dL}$

3b

The electric potential difference between two point in an electric potential difference

Answer.

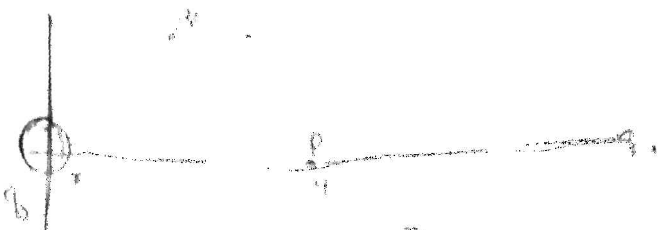
$V_B \rightarrow V_A = \frac{W(A\rightarrow B)}{q_0}$

where $V_B \rightarrow V_A$ = Change in potential difference.

$W[A\rightarrow B]$ = Workdone..

q_0 = charge.

it is also measured in volts.



$$V = K\left[\frac{q_1}{r_1} + \frac{q_2}{r_2}\right]$$

$$0 = 9\times10^{9}\left[\frac{10\times10^{-6}}{4+x} - \frac{2\times10^{-6}}{x}\right]$$

Dbs by 9×10^{9}

$$0 = \frac{10\times10^{-6}}{4+x} - \frac{2\times10^{-6}}{x}$$

$$\frac{2\times10^{-6}}{x} = \frac{10\times10^{-6}}{4+x}$$

c.m

$$8\times10^{-6} + 2\times10^{-6}x = 10\times10^{-6}x$$

$$8\times10^{-6} = 8\times10^{-6}x$$

$$x = \frac{8\times10^{-6}}{8\times10^{-6}}$$

$$x = 1$$

(4A)

Magnetic Flux is defined as The strength of a magnetic field represented by the lines of force.

(4B)

$$r = \frac{MV}{|q|B}$$

$$14.0 = \frac{9.11\times10^{-31}\times V}{1.6\times10^{-19}\times0.35}$$

$$V = 8.60\times10^{11}\ m/s$$

Angular velocity

$$W = \frac{|q|B}{M} = \frac{1.6\times10^{-19}\times0.35}{9.11\times10^{-31}}$$

~~W = 6.15 × 10^{10}~~

$$W = 6.15\times10^{10}\ rad$$