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Soal Nomor 1

Jawabanya B → Benda tersebut kekurangan elektron

Sebuah benda dikatakan bermuatan positif bila jumlah proton lebih banyak dari pada jumlah elektron

Soal Nomor 2

Jawabannya B = 4

Diketahui: $r_{12} = 2 \text{ m}$ kita asumsi $r_1 = r_2 = r$

Ditanyakan: $F \rightarrow$ jika r kedarnya 2 kali sebelumnya ?

Jawab

$$\frac{F_1}{F_2} = \frac{k \frac{q_1 q_2}{r_1^2}}{k \frac{q_1 q_2}{r_2^2}} \quad (\text{karena } r_1 = r_2 = r) \\ \text{maka}$$

$$\frac{F_1}{F_2} = \frac{\cancel{k} \frac{q_1 q_2}{\cancel{r_1^2}}}{\cancel{k} \frac{q_1 q_2}{r_2^2}}$$

$$\frac{F_1}{F_2} = \frac{q_1 q_2}{q_1 q_2}$$

$$\frac{F_1}{F_2} = \frac{q_1 q_2}{2 q_1 q_2}$$

$$\frac{F_1}{F_2} = \frac{q_1 q_2}{4 q_1 q_2}$$

$$\frac{F_1}{F_2} = \frac{1}{4}$$

$$4 F_1 = F_2$$

$$\boxed{F_2 = 4 F_1}$$

Cara Coulomb jika kedua muatan
jaraknya diubah menjadi 2 kali semula
adalah $\frac{1}{4}$

Soal Nomor 3

Jawaban: $A = 0,054 \text{ N}$

Diketahui: $q_1 = -9 \text{ } \mu\text{C} = 9 \times 10^{-6} \text{ C}$

$q_2 = +6 \text{ } \mu\text{C} = 6 \times 10^{-6} \text{ C}$

$r_{12} = 3 \text{ m}$

$k = 9 \times 10^9 \text{ Nm}^2/\text{C}^2$

Ditanyakan: F ?

Jawab

$$F = k \frac{q_1 \cdot q_2}{r_{12}^2}$$

$$= \frac{(9 \times 10^9 \text{ Nm}^2/\text{C}^2) (9 \times 10^{-6} \text{ C}) (6 \times 10^{-6} \text{ C})}{(3 \text{ m})^2}$$

$$= \frac{486 \times 10^{-3} \text{ Nm}^2}{9 \text{ m}^2}$$

$$F = 54 \times 10^{-3} \text{ N}$$

atau $F = 0,054 \text{ N}$

Soal Nomor 5

$$\boxed{\text{Jawaban: } C = 100 \text{ N}}$$

Diketahui: $q_1 = 20 \text{ } \mu\text{C} = 20 \times 10^{-6} \text{ C}$ $k = 9 \times 10^9 \text{ Nm}^2/\text{C}^2$
 $q_2 = 24 \text{ } \mu\text{C} = 24 \times 10^{-6} \text{ C}$ $r = 12 \text{ cm} = 12 \times 10^{-2} \text{ m}$

Ditanyakan: F jika kedua muatan diletakkan dalam bahan yang memiliki konstanta relatif 3.

Jawab

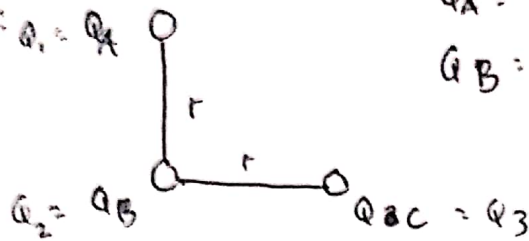
$$\begin{aligned} F &= k \frac{q_1 \cdot q_2}{r^2} \\ &= \frac{(9 \times 10^9 \text{ Nm}^2/\text{C}^2)(20 \times 10^{-6} \text{ C})(24 \times 10^{-6} \text{ C})}{(12 \times 10^{-2} \text{ m})^2} \\ &= \frac{4.320 \times 10^{-3} \text{ Nm}^2}{144 \times 10^{-4} \text{ m}^2} \\ &= 300 \times 10^{-1} \text{ N} \\ &\boxed{F = 300 \text{ N}} \end{aligned}$$

* Dita diletakkan pada bahan yang memiliki $\epsilon_r = 3$!

$$\begin{aligned} F &= \frac{k}{\epsilon_r} \times \frac{q_1 \cdot q_2}{r^2} \\ &= \frac{9 \times 10^9}{3} \times \frac{(2 \times 10^{-5})(24 \times 10^{-6})}{(12 \times 10^{-2})^2} \\ &= \frac{1440 \times 10^{-3}}{144 \times 10^{-4}} \\ &\boxed{F = 1000 \text{ N}} \end{aligned}$$

Soal Nomor 10

Diketahui: $q_1 = q_A$

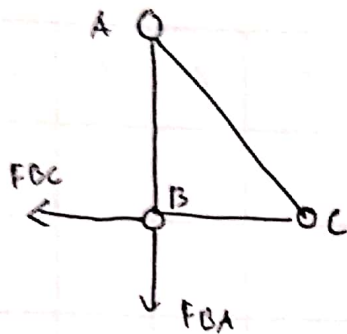


$$q_A = q_B = 50 \text{ } \mu\text{C} = 50 \times 10^{-6} \text{ C}$$

$$q_B = 40 \text{ } \mu\text{C} = 40 \times 10^{-6} \text{ C}$$

$$r_{AB} = r_{BC} = r$$

(asumsikan $r = 1$)



a.) F_{BC}

$$F_{BC} = k \frac{q_B \cdot q_C}{r_{BC}^2}$$

$$= \frac{(9 \cdot 10^9)(40 \times 10^{-6})(50 \times 10^{-6})}{(1)^2}$$

$$= 18.000 \times 10^{-3}$$

$$\boxed{F_{BC} = 18 \text{ N}}$$

b.) F_{BA}

$$F_{BA} = k \frac{q_B \cdot q_A}{r_{BA}^2} = \frac{(9 \cdot 10^9)(40 \times 10^{-6})(50 \times 10^{-6})}{(1)^2}$$

$$= 18.000 \times 10^{-3}$$

$$\boxed{F_{BA} = 18 \text{ N}}$$

c. Menghitung F dengan pythagoras

$$F = \sqrt{F_{BA}^2 + F_{BC}^2}$$

$$= \sqrt{18^2 + 18^2}$$

$$= \sqrt{324 + 324}$$

$$F = \sqrt{648}$$

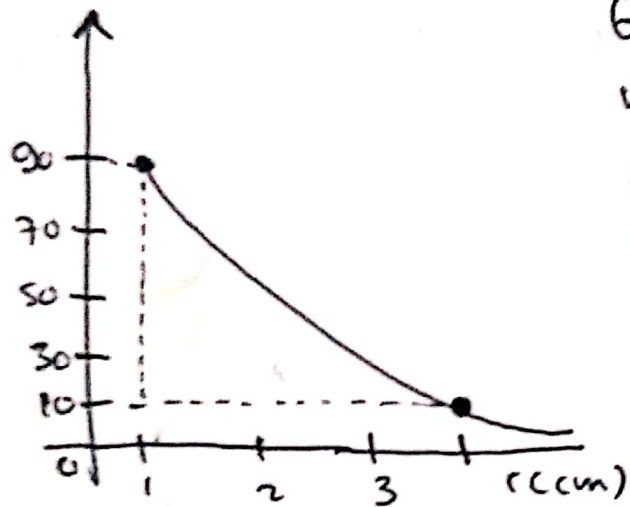
$$= \sqrt{324 \times 2}$$

$$= \sqrt{324} \times \sqrt{2}$$

$$F = 18\sqrt{2}$$

Essay

Nomor 1 Essay



Grafik ini

mengatakan hubungan

antara jarak (r) dengan

gaya listrik (F) yang

terjadi ~~jika~~ ketika dua muatan

Q_1 & Q_2 diletakkan pada

Satu garis lurus

3 Essay

Dik: $q_1 = 24 \mu\text{C} = 24 \times 10^{-6} \text{ C}$
 $q_2 = 18 \mu\text{C} = 18 \times 10^{-6} \text{ C}$

$r = 12 \text{ cm}$
 $= 12 \times 10^{-2} \text{ m}$

Dit: a.) F berada di udara
b.) F jika $\epsilon_r = 2$

Jawab

$$\begin{aligned} \text{a.) } F &= k \frac{q_1 \cdot q_2}{r^2} \\ &= \frac{(9 \times 10^9)(24 \times 10^{-6})(18 \times 10^{-6})}{(12 \times 10^{-2})^2} \\ &= \frac{3.888 \times 10^{-3}}{144 \times 10^{-4}} \end{aligned}$$

$$\boxed{F = 270 \text{ N}}$$

$$\begin{aligned} \text{b.) } F &= \frac{k}{\epsilon} \times \frac{q_1 \cdot q_2}{r^2} \\ &= \frac{9 \times 10^9}{3} \frac{(24 \times 10^{-6})(18 \times 10^{-6})}{(12 \times 10^{-2})^2} \\ &= (3 \times 10^9) \left(\frac{432 \times 10^{-12}}{144 \times 10^{-4}} \right) \\ &= \frac{1296 \times 10^{-3}}{144 \times 10^{-4}} \end{aligned}$$

$$\boxed{F = 90 \text{ N}}$$