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- ① B. The Object has the lack of electrons.
Alasannya.

Benda tersebut kekurangan elektron karena memiliki kelebihan Proton bermuatan positif dibanding dengan elektron. Sehingga kelebihan proton tsb berkontribusi thdp muatan seluruh benda.

- ② E. 0,25

Dik: $r_1 = 2 \text{ m}$

$$r_2 = 2 \times r_1 = 4 \text{ m}$$

$$2 \times 2 = 4$$

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

Dit: $F_2 = \dots ?$

Jawaban:

$$F = \frac{1}{r^2}$$

$$F_2 = \frac{k \cdot q_1 \cdot q_2}{(4)^2}$$

$$F_2 = \frac{k \cdot q_1 \cdot q_2}{16}$$

Membandingkan F_1 dan F_2

$$\frac{F_2}{F_1} = \frac{\frac{k \cdot q_1 \cdot q_2}{16}}{\frac{k \cdot q_1 \cdot q_2}{4}} = \frac{k \cdot q_1 \cdot q_2}{16} \times \frac{4}{k \cdot q_1 \cdot q_2}$$

$$\frac{F_2}{F_1} = \frac{4}{16} = \frac{1}{4} = 0,25$$

⑤ A. 0,054

Dik: $q_1 = -9 \mu C$
 $q_2 = +6 \mu C$
 $r = 3 \text{ m}$

Dit: $F = \dots ?$

Jawab:

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

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

$$F = \frac{9 \times 10^9 \text{ Nm}^2/\text{C}^2 \cdot 54 \times 10^{-12} \text{ C}^2}{9 \text{ m}^2}$$

$$= (10^9 \text{ N}) \cdot (54 \times 10^{-12})$$

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

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

④ D. $F\sqrt{2}$

Dik:

$$F_{BC} = F$$

$$q_A = q_B = q_C = q$$

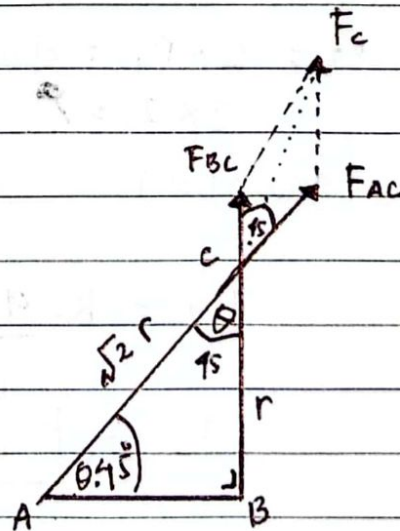
$$F = \frac{k \cdot q_A \cdot q_B \cdot q_C}{r^2}$$

$$F = \frac{k \cdot q_A \cdot q_B \cdot q_C}{(\sqrt{2} r)^2}$$

$$= \frac{k \cdot q_A \cdot q_B \cdot q_C}{2r^2}$$

$$F_{AC} = \frac{1}{2} F$$

$$F_{BC} = \frac{k \cdot q_A \cdot q_B \cdot q_C}{r^2} = F$$



$$F_c = \sqrt{F_{Bc}^2 + F_{Ac}^2 + 2 F_{Bc} \cdot F_{Ac} \cdot \cos 45^\circ}$$

$$F_c = \sqrt{F^2 + \frac{1}{4} F^2 + 2 F \cdot \frac{1}{2} F \cdot \frac{1}{2} \sqrt{2}}$$

$$F_c = \sqrt{F^2 + \frac{1}{4} F^2 + \frac{\sqrt{2}}{2} F^2}$$

$$F_c = \sqrt{\frac{5}{4} F^2 + \frac{\sqrt{2}}{2} F^2}$$

$$F_c = \sqrt{1,25 F^2 + 0,7 F^2}$$

$$F_c = \sqrt{1,95 F^2}$$

$$F_c = 1,4 F \text{ atau } F_c = F \sqrt{2} \text{ N}$$

5) ~~B.0.01~~ N

Dik: $Q_1 = 24 \times 10^{-6}$

$r = 12 \text{ m}$

$Q_2 = 20 \times 10^{-6}$

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

$\epsilon_0 = 3$ Dit: $F = \dots ?$

$$F = \frac{k}{\epsilon} \times \frac{Q_1 \cdot Q_2}{r^2}$$

$$= \frac{9 \times 10^9}{3} \times \frac{24 \times 10^{-6}}{12^2} \times 20 \times 10^{-6}$$

$$= 3 \times 10^9 \times \frac{480 \times 10^{-12}}{144}$$

$$= \frac{1440 \times 10^{-3}}{144} = 10 \times 10^{-3}$$

$$= 10^{-2}$$

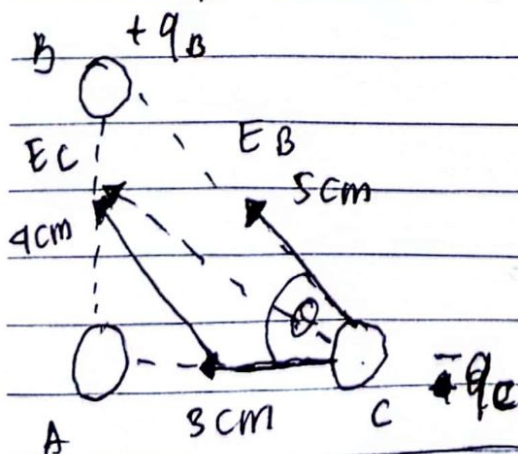
$$= 0,01 \text{ N}$$

⑥ Dik: C

⑦ B. 6 ^{1/2} dyne / uc

Dik: $q_A = 18 \mu c$, $q_B = +25 \mu c$, $q_C = -30 \mu c$

Dit: $E = \dots ?$



$$E_B = \frac{k \cdot q_B}{r_{BC}^2} = \frac{9 \times 10^9 \cdot 25 \times 10^{-6}}{25 \times 10^{-4}}$$

$$= 9 \times 10^7 \text{ N/C}$$

$$E_A = \frac{k q_A}{r_{AC}^2} = \frac{9 \times 10^9 \cdot 18 \times 10^{-6}}{9 \times 10^{-4}}$$

$$= 18 \times 10^7 \text{ N/C}$$

$$E_C = \sqrt{E_B^2 + E_A^2 + 2E_A \cdot E_B \cos \theta}$$

$$= \sqrt{81 \times 10^{14} + 324 \times 10^{14} + 194,4 \times 10^{14}}$$

$$E_C = \sqrt{599,4 \times 10^{14}} = \sqrt{6} \quad E_C = (6)^{1/2} \text{ dyne}$$

8) A

9) Dik: $q_1 = 5 \mu C = 5 \times 10^{-6} C$
 $q_2 = 5 \mu C = 5 \times 10^{-6} C$
 $F = 0,025 N$

Dit: $r = \dots ?$

jawab:

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

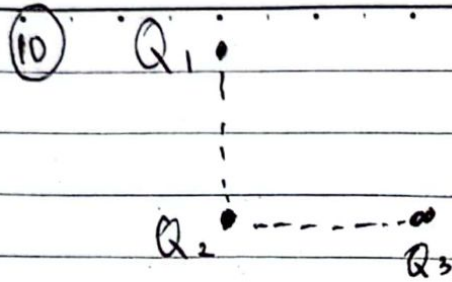
$$0,025 N = \frac{(9 \times 10^9 N/m^2/C^2) \cdot (5 \times 10^{-6} C)(5 \times 10^{-6} C)}{r^2}$$

$$r^2 = \frac{9 \times 10^9 N/m^2 \cdot 25 \times 10^{-12}}{25 \times 10^{-3} N} = 9 m^2$$

$$r = \sqrt{9 m^2} = 3 m //$$

jawab an

D //



Dik : $Q_1 = Q_3 = 50 \mu C = 50 \times 10^{-6} C$
 $Q_2 = 40 \mu C = 40 \times 10^{-6} C$
 Dit : $F(Q_2) = \dots ?$
 Gambar = ... ?

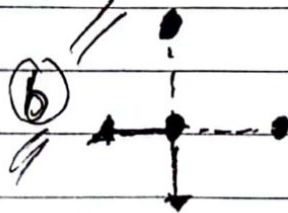
Jwb : $F = k \frac{Q_2}{r^2}$

~~✗~~ $F = (9 \times 10^9 \text{ Nm}^2/\text{C}^2) \cdot \frac{(40 \times 10^{-6} \text{ C})}{r^2}$
 $= \frac{360 \times 10^9 \times 10^{-6} \text{ Nm}^2/\text{C}}{r^2}$

$F = \frac{360 \times 10^3 \text{ Nm}^2/\text{C}}{r^2}$

$F = \frac{3,6 \times 10^5 \text{ Nm}^2/\text{C}}{r^2}$

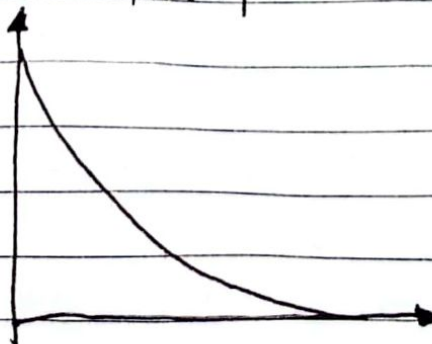
Jawaban.



Alasan: karena semua muatan bernilai positif sehingga saling tolak menolak.

Essay.

1) Buatlah sketsa grafik Pengaruh gaya Coulomb terhadap/memperoleh h jarak?



$F \approx \frac{1}{r^2}$

~~1~~ Dik : $q_1 = 24 \mu\text{C} = 24 \times 10^{-6} \text{ C}$
 $q_2 = 18 \mu\text{C} = 18 \times 10^{-6} \text{ C}$

3 $r = 12 \text{ m}$
 Dit : $F = \dots ?$

Jwb :

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

$$F = 9 \times 10^9 \frac{(24 \times 10^{-6})(18 \times 10^{-6})}{12^2}$$

$$F = \frac{3888 \times 10^{-3}}{144}$$

$$F = 27 \times 10^{-3}$$

$$= 0,027 \text{ N}$$

2 Dik : $q_1 = 8 \mu\text{C} = 8 \times 10^{-6} \text{ C}$
 $q_2 = -4 \mu\text{C} = -4 \times 10^{-6} \text{ C}$
 $r = 2 \text{ m}$

Dit : $F = \dots ?$

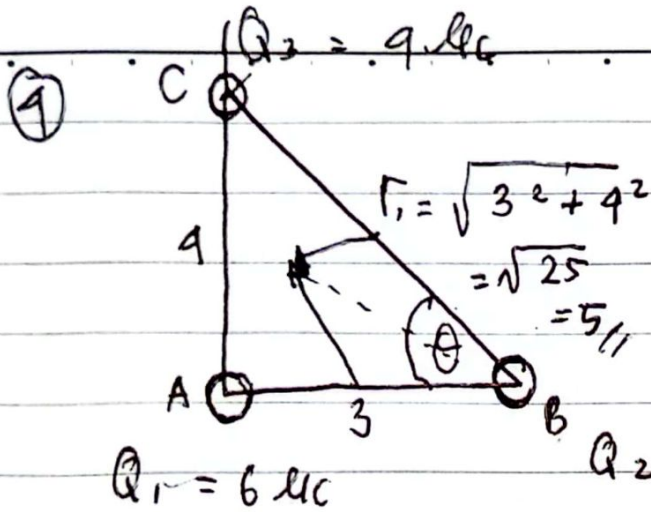
Jwb :

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

$$= 9 \times 10^9 \cdot \frac{8 \times 10^{-6} \cdot 4 \times 10^{-6}}{2^2}$$

$$= 72 \times 10^{-3}$$

$$= 0,072 \text{ N}$$



Dik: $Q_1 = +6 \mu\text{C} = 6 \times 10^{-6} \text{ C}$

$Q_2 = -6 \mu\text{C} = -6 \times 10^{-6} \text{ C}$

$Q_3 = -9 \mu\text{C} = -9 \times 10^{-6} \text{ C}$

Dit:

$E_B = \dots ?$

medan listrik 1.

$$E_{BC} = k \cdot \frac{Q_1}{r_1} = (9 \times 10^9) \left(\frac{4 \times 10^{-6} \text{ C}}{(5)^2} \right) = 1,44 \times 10^3 \text{ N/C}$$

$$E_{AB} = k \frac{Q_2}{r_{AB}} = (9 \times 10^9) \left(\frac{6 \times 10^{-6}}{9} \right) = 6 \times 10^3 \text{ N/C}$$

$$E_B = \sqrt{E_{BC}^2 + E_{AB}^2 + 2 E_{BC} + E_{AB} \cos \theta}$$

$$= \sqrt{(1,44 \times 10^3)^2 + (6 \times 10^3)^2 + 2 \cdot 1,44 \times 10^3 \times 6 \times 10^3}$$

$$E_B = \sqrt{2,0736 \times 10^6 + 36 \times 10^6 + 10,368 \times 10^6}$$

$$E_B = \sqrt{48,4416 \times 10^6}$$

$$E_B = 696 \times 10^3 = 696 000 \text{ N/C} //$$