

1. B. The object has the lack of electrons

Alasan:

Benda disebut bermuatan positif jika benda tersebut kekurangan elektron. Muatan positif terbentuk ketika benda kehilangan satu atau lebih elektron. Elektron memiliki muatan negatif, sehingga ketika benda kehilangan elektron, muatan positifnya relatif lebih banyak daripada muatan negatifnya.

2. E. 0,25

Alasan:

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

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

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

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

Ditanya $F_2 = \dots?$

$$\frac{F_1}{F_2} = \frac{\frac{1}{r_1^2}}{\frac{1}{r_2^2}} = \frac{r_2^2}{r_1^2} = \frac{4^2}{2^2} = \frac{16}{4} = 4$$

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

$$F_2 = 0,25 F_1$$

3. A. 0,054 N

Diket: $q_1 = -9 \mu\text{C}$ $q_2 = +6 \mu\text{C}$

$r = 3 \text{ m}$ $k = 9 \times 10^9 \text{ Nm}^2/\text{C}^2$

Dit $F = \dots?$

$$F = k \frac{q_1 q_2}{r^2} = 9 \times 10^9 \cdot (-9 \times 10^{-6}) \cdot (6 \times 10^{-6}) = 54 \times 10^{-3} \text{ N}$$

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

4. D. $F\sqrt{2}$

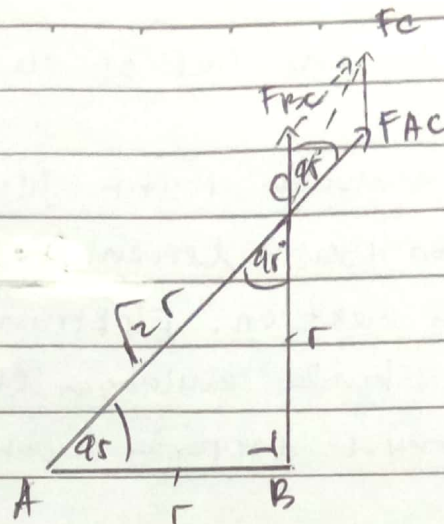
Jawab:

Diket:

$$F_{AC} = F$$

$$F_{BC} = F$$

$$q_A = q_B = q_C = q$$



$$F_{AC} = \frac{kqq}{(\sqrt{2}r)^2} = \frac{kqq}{2r^2}$$

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

$$F_{BC} = \frac{kqq}{r^2} = F$$

$$F_C = \sqrt{F_{BC}^2 + F_{AC}^2 + 2F_{BC} \cdot F_{AC} \cdot \cos 45^\circ}$$

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

$$F_C = \sqrt{\frac{5}{4}F^2 + \frac{1}{2}F^2}$$

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

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

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

5. B. 0,01 N

Diket:

$$q_1 = 24 \mu\text{C} = 24 \times 10^{-6} \text{ C} \quad \epsilon_r = 3$$

$$q_2 = 20 \mu\text{C} = 20 \times 10^{-6} \text{ C} \quad r = 12 \text{ m}$$

Dit F ---?

$$F = \frac{k \cdot q_1 \cdot q_2}{\epsilon_r \cdot r^2} = \frac{9 \times 10^9 \cdot 24 \times 10^{-6} \cdot 20 \times 10^{-6}}{3 \cdot (12)^2} = 10^{-2} = 0,01 \text{ N}$$

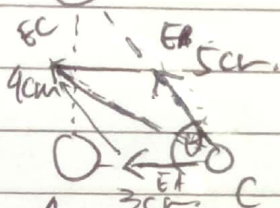
6. C. Beside right charge q_2

Alasan: Untuk menemukan lokasi dimana muatan $+10 \mu C$ akan ditempatkan sehingga tidak dipengaruhi oleh gaya Coulumb dari q_1 dan q_2 , kita perlu mempertimbangkan medan listrik yg dihasilkan oleh keduanya. Karena q_1 dan q_2 berlawanan ada titik diantara keduanya dimana medan listrik saling meniadakan. Shg titik $+10 \mu C$ lebih dekat ke muatan yg lbh besar (q_2)

7. B. $(6)^{1/2}$ dyne/mc

Diket: $q_a = 18 \mu C$, $q_b = +25 \mu C$, $q_c = -30 \mu C$ Dit $E \dots ?$

B. $(6)^{1/2}$ dyne/mc



$$E_B = \frac{k q_B}{r_{BC}^2} = \frac{9 \times 10^9 \cdot 25 \times 10^{-6}}{(25 \times 10^{-4})^2} = 9 \times 10^7 \text{ N/C}$$

$$E_A = \frac{k q_A}{r_{AC}^2} = \frac{9 \times 10^9 \cdot 18 \times 10^{-6}}{(9 \times 10^{-4})^2} = 18 \times 10^7 \text{ N/C}$$

$$E_C = \sqrt{E_B^2 + E_A^2 + 2E_A E_B \cos \theta} = \sqrt{81 \times 10^{14} + 324 \times 10^{14} + 194,4 \times 10^{14}}$$

$$E_C = \sqrt{599,4 \times 10^{14}}$$

$$E_C = \sqrt{6} \rightarrow E_C = (6)^{1/2} \text{ dyne/mc}$$

8. D. Disebelah kanan agak jauh dengan muatan di titik B. (On the right some distance from the charge at point B)

Alasan:

Untuk menentukan lokasi dimana muatan C tidak dipengaruhi oleh gaya Coulumb dari A dan B, maka perlu mempertimbangkan medan listrik yg dihasilkan keduanya. Karena muatan B lebih besar dan berlawanan dengan muatan A, medan listrik di sebelah kanan B akan lebih kuat.

9. D. 3 m.

Diket :

$$q_1 = 5 \mu\text{C} = 5 \times 10^{-6} \text{ C} \quad F = 0,025 \text{ N}$$

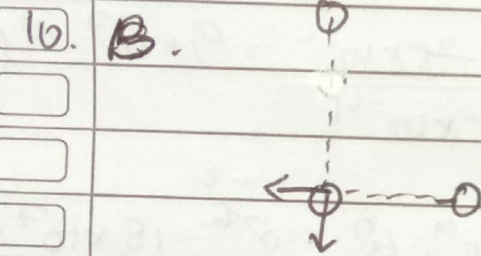
$$q_2 = 5 \mu\text{C} = 5 \times 10^{-6} \text{ C}$$

Dit $r = \dots ?$

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

$$25 \times 10^{-3} = 9 \times 10^9 \cdot \frac{5 \cdot 10^{-6} \cdot 5 \cdot 10^{-6}}{r^2}$$

$$r = \sqrt{9} = 3 \text{ m}$$



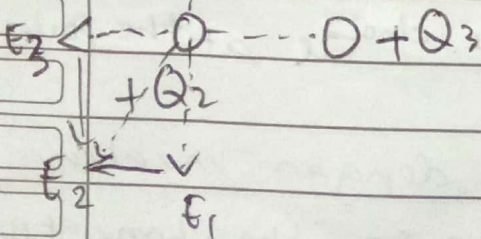
Jawaban :

+ Q₁

karena muatan sejenis maka

Q₁ dan Q₂ tolak menolak

Q₂ dan Q₃ tolak menolak



Nama: Anis Tsyami

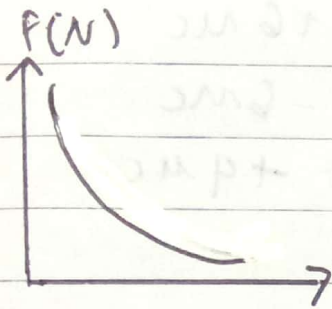
Elektrodinamika

Npm: 2323022008

No. _____

Date: _____

1. Grafik gaya Coulumb (F) terhadap jarak (r)



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

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

gaya berbanding terbalik dengan kuadrat jarak.

2. Diket

$$q_1 = +8 \mu\text{C} \quad q_2 = -4 \mu\text{C} \quad r = 2 \text{ m}$$

Dit $F = \dots?$

Jawab

$$F = \frac{k \cdot q_1 \cdot q_2}{r^2} = \frac{9 \times 10^9 \cdot 8 \times 10^{-6} \cdot 4 \times 10^{-6}}{4} = 72 \times 10^{-3}$$

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

3. Diket:

$$q_1 = 24 \mu\text{C} \quad q_2 = 18 \mu\text{C} \quad r = 12 \text{ m}$$

Dit $F = \dots?$

Jawab

$$F = \frac{k \cdot q_1 \cdot q_2}{r^2} = \frac{9 \times 10^9 \cdot 24 \times 10^{-6} \cdot 18 \times 10^{-6}}{144}$$

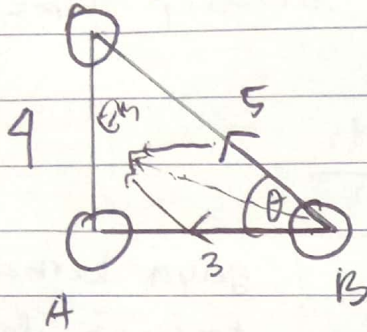
$$F = 27 \times 10^{-3}$$

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



9.

$$q_c = +4 \mu C$$



$$q_A = +6 \mu C$$

$$q_B = -6 \mu C$$

Diket:

$$q_A = +6 \mu C$$

$$q_B = -6 \mu C$$

$$q_c = +4 \mu C$$

Dit $E_B = \dots ?$

Jawab

$$E_{BC} = \frac{k q_c}{r_{BC}^2} = \frac{9 \times 10^9 \cdot 4 \times 10^{-6}}{25} = 1,44 \times 10^3 \text{ N/C}$$

$$E_{AB} = \frac{k q_A}{r_{AB}^2} = \frac{9 \times 10^9 \cdot 6 \times 10^{-6}}{9} = 6 \times 10^3 \text{ N/C}$$

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

$$E_B = \sqrt{(1,44 \times 10^3)^2 + (6 \times 10^3)^2 + 2 \cdot 1,44 \times 10^3 \times 6 \times 10^3 \cdot \frac{3}{5}}$$

$$E_B = \sqrt{2,10736 \times 10^6 + 36 \times 10^6 + 10,368 \times 10^6}$$

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

$$E_B = 696 \times 10^2$$

$$E_B = 6960 \text{ N/C}$$

