

1. B.

Karena apabila suatu objek kekurangan elektron, maka objek tersebut akan bermuatan positif. Contohnya apabila terdapat logam magnesium dengan jumlah elektron 12, kehilangan 2 elektronnya menjadi ion  $Mg^{2+}$  maka dapat dikatakan bahwa ion  $Mg^{2+}$  adalah bermuatan positif atau kekurangan  $2e^-$  dari asalnya.

2. Dik:  $r_1 = 2m$

$$r_2 = 2r_1$$

$$F_2 = ?$$

Jwb:

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

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

$$\frac{F_1}{F_2} = \frac{(2r_1)^2}{r_1^2}$$

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

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

$$F_1 \cdot r_1^2 = F_2 \cdot 4r_1^2$$

$$F_2 = \frac{F_1 \cdot r_1^2}{4r_1^2}$$

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

$$\Rightarrow F_2 = 0,25 \text{ (E)}$$

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

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

$r = 3 \text{ m}$

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

Dit:  $F = ?$

Jawab:

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

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

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

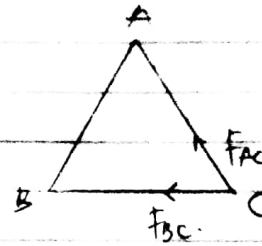
$$= 0,054 \text{ N (A)}$$

$$q \times f_{bc} = k \frac{q_b \cdot q_c}{r^2}$$

Anggap  $q_A = q_b = q_c$

$$f_{bc} = k \frac{q^2}{r^2}$$

$$\begin{aligned} \times f_{ac} &= k \frac{q_A \cdot q_c}{r^2} \\ &= k \frac{q^2}{r^2} \end{aligned}$$



$$\begin{aligned} \times f_c &= \sqrt{f_{bc}^2 + f_{ac}^2 + 2 \cdot f_{bc} \cdot f_{ac} \cos 60} \\ f_c^2 &= f_{bc}^2 + f_{ac}^2 + 2 \cdot f_{bc} \cdot f_{ac} \cos 60 \\ f_c^2 &= f^2 + f^2 + 2 \cdot f^2 \cdot \frac{1}{2} \\ f_c^2 &= 3f^2 \end{aligned}$$

Anggap  $f_{bc} = f_{ac} = f$

$$f_c = \sqrt{3f^2}$$

$$f_c = f\sqrt{3} \quad (\text{B})$$

$$\begin{aligned} \text{Dik: } q_1 &= 24 \mu\text{C} = 24 \times 10^{-6} \text{ C} \\ q_2 &= 20 \mu\text{C} = 20 \times 10^{-6} \text{ C} \\ r &= 12 \text{ cm} = 0,12 \text{ m} \\ e &= 3 \end{aligned}$$

Dit:  $f$

Jwb:

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

$$= \frac{9 \times 10^9 \text{ Nm}^2\text{C}^{-2}}{3} \cdot \frac{24 \times 10^{-6} \text{ C} \times 20 \times 10^{-6} \text{ C}}{(0,12 \text{ m})^2}$$

$$F = 3 \times 10^9 \text{ N} \times \frac{48 \times 10^{-11}}{144 \times 10^{-4}}$$

$$F = \frac{144 \times 10^{-2} \text{ N}}{144 \times 10^{-4}}$$

$$F = 10^2 \text{ N}$$

$$F = 100 \text{ N (C)}$$

6.  $-q_{MC} = -9 \times 10^{-6} \text{ C}$   $-q_{MC} = -4 \times 10^{-6} \text{ C}$

$q_1$   $q_2$   $q_3$

$25 \text{ cm} = 0.25 \text{ m}$   $25 \text{ cm} = 0.25 \text{ m}$

$$F_{13} = k \frac{q_1 q_3}{r^2}$$

$$= 9 \times 10^9 \text{ N m}^2 \text{ C}^{-2} \cdot \frac{9 \times 10^{-6} \text{ C} \cdot 5 \times 10^{-6} \text{ C}}{(0.25 \text{ m})^2}$$

$$= \frac{405 \times 10^{-3} \text{ N}}{6.25 \times 10^{-2}}$$

$$= 64.8 \times 10^{-1} \text{ N}$$

$$F_{23} = k \frac{q_2 q_3}{r^2}$$

$$= 9 \times 10^9 \text{ N m}^2 \text{ C}^{-2} \cdot \frac{4 \times 10^{-6} \text{ C} \cdot 5 \times 10^{-6} \text{ C}}{(0.25 \text{ m})^2}$$

$$= \frac{180 \times 10^{-3} \text{ N}}{6.25 \times 10^{-2}}$$

$$= 28.8 \times 10^{-1} \text{ N}$$

$$F_{\text{total}} = F_{13} - F_{23}$$

$$= (64.8 \times 10^{-1} \text{ N}) - (28.8 \times 10^{-1} \text{ N})$$

$$= 36 \times 10^{-1} \text{ N} \text{ ke kiri}$$

$$= 3.6 \text{ N ke kiri (B)}$$

7.  $F_{AC} = k \frac{q_A q_C}{r^2}$

$$= 9 \times 10^9 \text{ N m}^2 \text{ C}^{-2} \cdot \frac{20 \times 10^{-6} \text{ C} \cdot 30 \times 10^{-6} \text{ C}}{(2 \times 10^{-2} \text{ m})^2}$$

$$= \frac{5400 \times 10^{-3} \text{ N}}{4 \times 10^{-4}}$$

$$= 13.5 \times 10^{+3} \text{ N}$$

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

$$= 9 \times 10^9 \text{ N m}^2 \text{ C}^{-2} \cdot \frac{60 \times 10^{-6} \text{ C} \cdot 30 \times 10^{-6} \text{ C}}{(3 \times 10^{-2} \text{ m})^2}$$

$$= \frac{16200 \times 10^{-9} \text{ N}}{9 \times 10^{-4}}$$

$$= 18 \cdot 10^{+3} \text{ N}$$

$$F_C = \sqrt{(F_{AC})^2 + (F_{BC})^2 + 2 \cdot F_{AC} \cdot F_{BC} \cdot \cos 60}$$

$$F_C = \sqrt{13,5 \times 10^{+3} \text{ N} + 18 \times 10^{+3} \text{ N} + 2 \cdot 13,5 \times 10^{+3} \cdot 18 \times 10^{+3} \cdot \frac{1}{2}}$$

$$F_C = 16,224 \text{ N}$$

$$3. \quad F = k \frac{q_1 q_2}{r^2}$$

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

$$0,025 \text{ r}^2 = 225 \times 10^{-3}$$

$$\text{r}^2 = \frac{225 \times 10^{-3}}{0,025}$$

$$0,025$$

$$\text{r}^2 = \frac{225 \times 10^{-3}}{25 \times 10^{-3}}$$

$$25 \times 10^{-3}$$

$$\text{r}^2 = 9$$

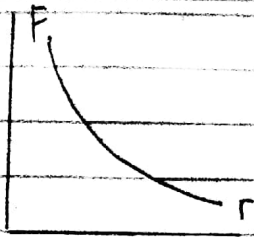
$$\text{r} = \sqrt{9}$$

$$\text{r} = 3 \text{ m} \quad (D).$$



## Essay

1.



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

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

2.  $q_1 = +8 \text{ MC} = 8 \times 10^{-6} \text{ C}$

$$q_2 = -4 \text{ MC} = -4 \times 10^{-6} \text{ C}$$

$$r = 2 \text{ m}$$

$$D_{12} = \frac{1}{r^2}$$

Jawab:

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

$$= 9 \times 10^9 \text{ Nm}^2 \text{C}^{-2} \cdot 8 \times 10^{-6} \text{ C} \cdot 4 \times 10^{-6} \text{ C} \cdot (2 \text{ m})^2$$

$$= 9 \times 10^9 \text{ N} \cdot \frac{8}{32} \times 10^{-12}$$

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

$$= 0.072 \text{ N}$$

$$\begin{aligned}
 3. a) F &= k \frac{q_1 q_2}{r^2} \\
 &= 9 \times 10^9 \cdot \frac{(24 \cdot 18) \cdot 10^{-6}}{(12)^2} \\
 &= 9 \times 10^9 \cdot \frac{432 \cdot 10^{-12}}{144} \\
 &= 9 \times 10^9 \times 3 \times 10^{-12} \\
 &= 27 \times 10^{-3}
 \end{aligned}$$

$$\begin{aligned}
 b) \Phi &= \frac{9 \cdot 10^9 \cdot 24 \cdot 10^{-6} \cdot 18 \cdot 10^{-6}}{2 \cdot (12)^2} \\
 &= 13.5 \cdot 10^{-3} \text{ N}
 \end{aligned}$$