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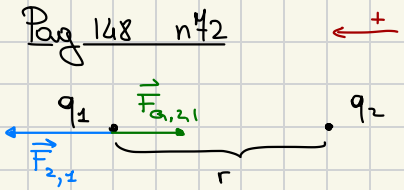


$q_1 = 38\,nC$ $\quad m_1 = 56\,mg$ $\quad r = 23\,cm$

$q_2 = 72\,nC$ $\quad m_2 = 89\,mg$

1) $a_1, a_2 = ?$

2) L'acc. rimane costante?

Spesso da trascurare

1) $F_{2,1} = k_0 \frac{|q_1||q_2|}{r^2}$ $\qquad F_{G,2,1} = G\frac{m_1 m_2}{r^2}$ $\qquad \vec{F}_{TOT,1} = \vec{F}_{2,1} + \vec{F}_{G,2,1}$

II principio $\vec{F}_{TOT,1} = m_1 \vec{a}_1$

▷ $F_{TOT,1} = F_{2,1} - F_{G,2,1} \approx F_{2,1}$ $\rightsquigarrow$ $a_1 = \frac{F_{2,1}}{m_1} \approx 8{,}3\ m/s^2$

▷ $F_{TOT,2} = \underbrace{-F_{1,2} + F_{G,1,2}}_{\text{Simmetrico}} \approx -F_{2,2}$ $\rightsquigarrow$ $a_2 = -\frac{F_{1,2}}{m_2} \approx -5{,}2\ m/s^2$

2) L'acc. diminuisce con l'aumentare della distanza

46 $\quad m = 9{,}16 \cdot 10^{-8}\,kg$

carica negativa

$F_E = F_G$

$q = ?$ Quanti elettroni in q?

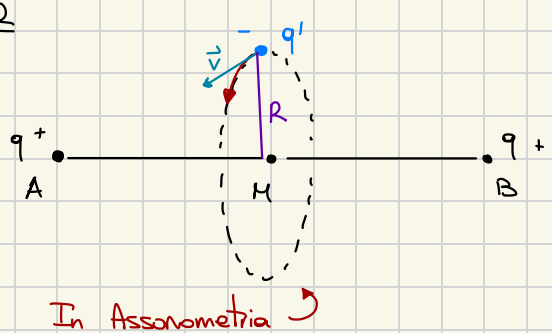
$F_E = k_0 \frac{|q|^2}{r^2} = G\frac{m^2}{r^2} = F_G$ $\rightsquigarrow$ $q^2 = m^2 \frac{G}{k_0}$

$\rightsquigarrow$ $q = -m\sqrt{\frac{G}{k_0}} = -7{,}89 \cdot 10^{-18}\,C$

carica neg

▷ $e \cdot N = q$ $\rightsquigarrow$ $N = q/e \approx 49$

82



In Assonometria

$q = 5 \cdot 10^{-6}\ C$

$AB = 2\ell = 12\ cm$

$AM = \ell = 6\ cm$

$m = 9\ mg \quad q' = -4{,}0 \cdot 10^{-6}\ C$

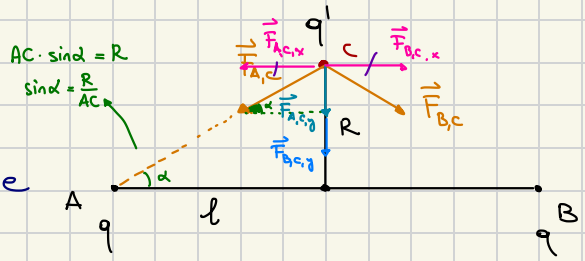
MCU

$f = 1\ kHz$

Gravitazione da trascurare

1) $\vec{F}_{TOT}$ su q'

2) $v = ?$



Rifaccio il disegno in sezione

Schema delle forze

Sull'asse x tutto si semplifica per simmetria. La forza totale su C sarà soltanto data dalle comp. y

$$F_{A,C} = k_0 \frac{|q||q'|}{AC^2} \rightsquigarrow F_{TOT} = 2F_{A,C,y} \overset{\text{II principio}}{=} ma$$

Se trovo AC, risolvo il problema

Remind: In MCU: $T = \frac{2\pi R}{v} \rightsquigarrow f = \frac{1}{T} = \frac{v}{2\pi R} \rightsquigarrow \boxed{v = 2\pi R f}$

$$a = \frac{v^2}{R} = \frac{4\pi^2 R^2 f^2}{R} = 4\pi^2 R f^2$$

$$a = \frac{2F_{A,C,y}}{m} = \frac{2}{m} F_{A,C} \cdot \sin\alpha = \frac{2}{m} k_0 \frac{|q||q'|}{AC^2} \cdot \frac{R}{AC}$$

Ponendo le acc. uguali ottengo:

$$4\pi^2 R f^2 = \frac{2}{m} k_0 \frac{|q||q'|}{AC^3} \cdot R$$

$$AC^3 = \frac{2k_0|q||q'|}{4\pi^2 f^2 m} \rightsquigarrow \text{Radice cubica} \quad AC \approx 0{,}1\,m = 10\,cm$$

$$R^2 + \ell^2 = AC^2 \rightsquigarrow R^2 = AC^2 - \ell^2 \approx 64\,cm^2 \rightsquigarrow R \approx 8\,cm$$

Per calcolare il resto dei risultati, usare le formule sopra con i dati