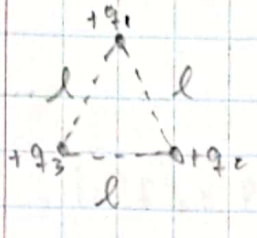
Capítulo 23. Unidad 3, Pag 777-782 Sección 23.1.

3/23.1 #1



$l = 2.00 \times 10^{-15}\ m.$ $\quad q_{p^+} = 1.6022 \times 10^{-19} C$ $\quad q_1 = q_2 = q_3 = q$

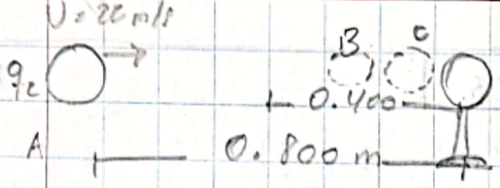
$W = U_{elect.}$

$U_{sist} = \sum U. \Rightarrow U = \frac{Kqq}{l} + \frac{Kqq}{l} + \frac{Kqq}{l} =$

$U = \frac{K}{l}(q^2 + q^2 + q^2) = \frac{3Kq^2}{l} = \frac{3(9\times10^9)(1.6022\times10^{-19})}{2\times10^{-15}\ m.}$

$U = 2.16 \times 10^6\ V.$ $\quad U_{elect} = 2.16 \times 10^6\ V.$ //

5/23.1 #2



$q_1 = -2.80\ \mu C$

$q_2 = -7.80\ \mu C.$ $\quad m = 1.50\ g$

a) $E_A = E_B$

$U_A + K_A = U_B + K_B$

$\frac{Kq_1q_2}{r_A} + \frac{1}{2}m_2V_{2A}^2 = \frac{Kq_1q_2}{r_B} + \frac{1}{2}m_2V_{2B}^2$

$\frac{2}{m_2}\left[Kq_1q_2\left(\frac{1}{r_A} - \frac{1}{r_B}\right) + \frac{1}{2}m_2V_{2A}^2\right] = V_{2B}^2$

$V_{2B} = \sqrt{\frac{2}{1.5\times10^{-3}}\left[9\times10^9(-2.8\mu)(-7.8\mu)\left(\frac{1}{0.8} - \frac{1}{0.4}\right) + \frac{1}{2}(1.5\times10^{-3})(22)^2\right]}$

$V_{2B} = 12.51\ m/s$ //

$r_{12C} = 0.323\ m$

b) $E_{mec\,A} = E_{mec\,C}$

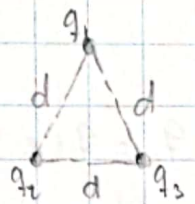
$U_A + K_A = U_C + K_C$

$\frac{Kq_1q_2}{0.8} + \frac{1}{2}m_2V_{2A}^2 = \frac{Kq_1q_2}{r_{12C}}$

$r_{12} = 0.323\ m.$ //

$\frac{(9\times10^9)(-7.8\mu)(-7.8\mu)}{0.8} + \frac{1}{2}(1.5\times10^{-3})(22)^2 = \frac{K(-7.8\mu)(-7.8\mu)}{r_{12C}}$

$q_1 = q_2 = q$ | 11 / 23.1 |



$W = -\Delta U = -(U_2 - U_1)$ $\quad U_1 = 0$.

$U_2 = U_{21} + U_{23} + U_{13} = K\left(q^2 + 2qq_3\right)$

$W = 0$.

$0 = -U_2 - U_1^{\nearrow 0}$.

$0 = -U_2$

$K(q^2 + 2qq_3) = 0$.

$q^2 + 2qq_3 = 0$.

$2qq_3 = -q^2$

$q_3 = \frac{-q^{\not 2}}{2q}$

$q_3 = -q/2$

$q_3 = -q/2$ //

$q = 28\,nC$

$E = 4.00 \times 10^4$ V/m ↑

| 15 / 23.2 |

a) W a 0.450 m (+î)

$V = Ed$

$W = Vq$

$V = (4 \times 10^4)(0.450) = 18 \times 10^3$ V.

$W = (18 \times 10^3)(28\,n) = 5.04 \times 10^{-4}$

$W = 5.04 \times 10^{-4}$ J //

b) W a 0.670 (+ĵ)

$V = (4 \times 10^4)(0.670) = 26800$

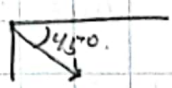
$W = (26800)(28\,n) = 7.50 \times 10^{-4}$ J

$W = 7.50 \times 10^{-4}$ J //

c) 2.60 m a. 45°

$2.60 \cos 45 = 1.838\,\hat{i}$

$2.6 \operatorname{Sen} 45 = 1.838\,\hat{j}$

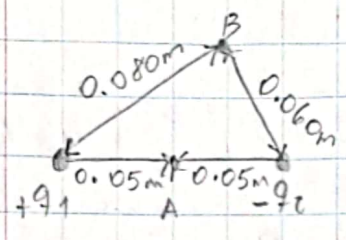


$V = (4 \times 10^4)(1.8384) = 73536.$

$W = (73536)(28\,n) = -2.06 \times 10^{-3}$ J.

$W = -2.06 \times 10^{-3}$ J. //

19/23.2 #5



$q_1 = 2.40\,nC$

$q_2 = -6.50\,nC$

a) $V_A = V_1 + V_2$

$V_1 = \frac{K(2.40n)}{0.05} = 432\ V.$

$V_2 = \frac{K(-6.5n)}{0.05} = -1170\ V.$

$V_A = 432 - 1170 = -738\ V.$

$V_A = -738\ V.$

b) $V_B = V_1 + V_2$

$V_1 = \frac{K(2.40n)}{0.08} = 270\ V.$ $\quad V_2 = \frac{K(-6.50n)}{0.06} = -975\ V.$

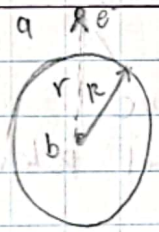
$V_B = 270 - 975 = -705\ V.$ $\quad V_B = -705\ V.$

c) $W = q(V_B - V_A)$ $\quad q = 2.5\,nC$

$W = (2.50n)(-705 - (-738)) = 8.25 \times 10^{-8}\ J.$

$W = 8.25 \times 10^{-8}\ J$

27/23.3 #6



$R = 0.15m$

$Q = 24\,nC$

$r = 0.30m$

a) La fuerza del $\bar{e}$ produce movimiento oscilatorio del $\bar{e}$ en el eje del anillo.

b) $K_a + U_a = K_b + U_b$

$U_a = K_b + U_b$

$K_b = U_a - U_b$

$K_b = qV_a - qV_b$

$K_b = eV_a - eV_b$

$\frac{1}{2}mv_b^2 = eV_A - eV_b$

$v_b = \sqrt{\frac{2e(V_B - V_A)}{m}}$

$V_A = \frac{K(24n)}{\sqrt{(0.3)^2 + (0.15)^2}} = 643\ V.$

$V_B = \frac{K(24n)}{0.15} = 1438\ V.$

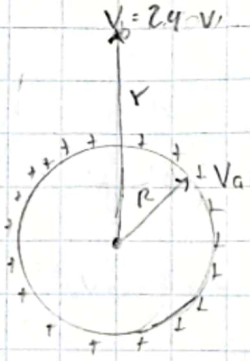
$v_b = \sqrt{\frac{2(1602 \times 10^{-19})(1438 - 643)}{(9 \times 1094 \times 10^{-31})}} =$

$v_B = 1.67 \times 10^7\ m/s.$ $\quad v_b = 1.67 \times 10^7\ m/s$

[28/23.3] #7.

R = 0.400 m.

V = 24.0 V a 1.20 m del centro.



$r = 1.20\ m + R$

$q = q$

$V_b = K\frac{q}{r}$ $\quad \frac{V_b r}{K} = q$ $\quad \frac{V_b r}{K} = \frac{V_a R}{K}$

$V_a = \frac{Kq}{r}$ $\quad \frac{V_a R}{K} = q$ $\quad \frac{V_b r}{R} = V_a$

$$V_a = \frac{(24)(1.20)}{0.4} = 72\ V.$$

$V = 72\ V.$ //

[36/23.3] #8.

a) $\sigma = 47\ nC/m^2$

$$E = \frac{\sigma}{\varepsilon_0} = \frac{47 \times 10^{-9}}{8.8542 \times 10^{-12}} = 5308.2\ N/C.$$

$E = 5308\ N/C$ //

b) $V = Ed.$

$V = (5308)(0.0220) = 116.77\ V$

$V = 117\ V.$ //

c) El campo eléctrico se mantiene ya que no depende de la distancia, mientras que el potencial eléctrico se duplicaría.