~~DIAGRAM~~

3nC 1nC

WHICH PARTICLE FEELS A GREATER FORCE?

$$E = k\frac{Q}{r^2}$$

THE 3nC CHARGE PRODUCES A GREATER ELECTRIC FIELD 10cm AWAY FROM IT THAN DOES THE 1nC CHARGE.

$$F = qE$$

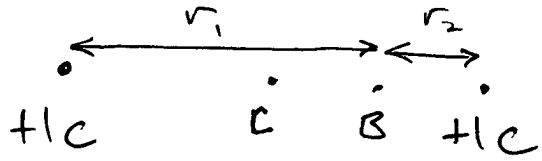
$$F_{\text{ON 1nC}} = (1\times10^{-9}\text{C})E_{\text{PRODUCED BY 3nC}}$$

$$= (1\times10^{-9}\text{C})\left(9\times10^{9}\frac{\text{N}_\text{M}^2}{\text{C}^2}\right)\frac{(3\times10^{-9}\text{C})}{(0.1\text{m})^2}$$

$$F_{\text{ON 3nC}} = (3\times10^{-9}\text{C})E_{\text{PRODUCED BY 1nC}}$$

$$= (3\times10^{-9}\text{C})\left(9\times10^{9}\frac{\text{N}_\text{M}^2}{\text{C}^2}\right)\frac{(1\times10^{-9}\text{C})}{(0.1\text{m})^2}$$

PARTICLES FEEL THE SAME (IN MAGNITUDE) FORCE.
(NEWTON'S 3RD LAW)

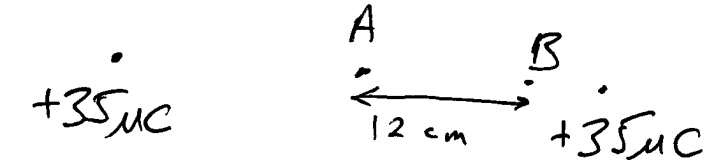


$$V = K\frac{Q}{r}$$

$$V_B = K\frac{Q_1}{r_1} + K\frac{Q_2}{r_2} \qquad \frac{1}{3} + \frac{1}{1} = 1.33$$

$$V_C = K\frac{Q_1}{r_1} + K\frac{Q_2}{r_2} \qquad \frac{1}{2} + \frac{1}{2} = 1$$

CH 17, P16



(1) FIND ELECTRIC POTENTIAL PRODUCED BY BOTH 35μC CHARGES AT A, THEN AGAIN AT B.

$$V_A = K\frac{Q_1}{r_1} + K\frac{Q_2}{r_2}$$

$$= \left(9\times10^9 \frac{N_m^2}{C^2}\right)\frac{(35\times10^{-6}C)}{(0.16m)} + \left(9\times10^9\frac{N_m^2}{C^2}\right)\frac{(35\times10^{-6}C)}{(0.16m)}$$

$$= 3.94\times10^6\ V$$

$$V_B = K\frac{Q_1}{r_1} + K\frac{Q_2}{r_2}$$

$$= \left(9\times10^9\frac{N_m^2}{C^2}\right)\frac{(35\times10^{-6}C)}{(0.28m)} + \left(9\times10^9\frac{N_m^2}{C^2}\right)\frac{(35\times10^{-6}C)}{(0.04m)}$$

$$= 9\times10^6\ V$$

$$PE_A = (0.5\times10^{-6}C)(3.94\times10^6 V) = 1.97\ J$$

$$PE_B = (0.5\times10^{-6}C)(9\times10^6 V) = 4.5\ J$$

$$W = 4.5\ J - 1.97\ J = 2.53\ J$$