

Review Problem Solutions ch. 11 Pt. 1

1) $q_1, q_2 = 2.0 \times 10^{-6} \text{ C}$ $F = \frac{K q_1 q_2}{d^2}$
 $d = 0.70 \text{ m}$
 $K = 9.0 \times 10^9 \text{ Nm}^2/\text{C}^2$
 $F = ?$

$$= \frac{(9.0 \times 10^9 \text{ Nm}^2/\text{C}^2)(2.0 \times 10^{-6} \text{ C})^2}{(0.70 \text{ m})^2}$$

$$= \frac{0.036}{0.49} = \boxed{0.073 \text{ N}}$$

2. $q_1, q_2 = 4.0 \times 10^{-14} \text{ C}$ $F = \frac{K q_1 q_2}{d^2}$ OR $d = \sqrt{\frac{K q_1 q_2}{F}}$
 $F = 2.0 \times 10^{-12} \text{ N}$
 $K = 9.0 \times 10^9 \text{ Nm}^2/\text{C}^2$
 $d = ?$

$$= \sqrt{\frac{(9.0 \times 10^9)(4.0 \times 10^{-14})^2}{2.0 \times 10^{-12}}} = \sqrt{\frac{1.44 \times 10^{-17}}{2.0 \times 10^{-12}}}$$

$$= \sqrt{0.0000072}$$

$$d = \boxed{0.0027 \text{ m}} \text{ OR } \boxed{2.7 \times 10^{-3} \text{ m}}$$

3. $F = 3.0 \times 10^{-6} \text{ N}$
 $E = ?$
 $q = 1.6 \times 10^{-19} \text{ C}$

$$E = \frac{F}{q} = \frac{3.0 \times 10^{-6} \text{ N}}{1.6 \times 10^{-19} \text{ C}}$$

$$= \boxed{1.88 \times 10^{13} \text{ N/C}}$$

(1)