P # F

Ch 15

$q_A = q_B = +1.0\ \mu C = +1.0 \times 10^{-6}\ C$

$q_C = -1.0\ \mu C = -1.0 \times 10^{-6}\ C$

$r_{AB} = r_{BC} = .50\ m$

$r_{AC} = 1.0\ m$

a) Calculate F_{AB} and F_{AC}

$$F_{AB} = \frac{k \cdot q_A \cdot q_B}{r_{AB}^2} = \frac{(9.0 \times 10^9\ N \cdot m^2/C^2)(+1.0 \times 10^{-6}\ C)(+1.0 \times 10^{-6}\ C)}{(.5\ m)^2}$$

$F_{AB} = .036\ N$

$$F_{AC} = \frac{k \cdot q_A \cdot q_C}{r_{AC}^2} = \frac{(9 \times 10^9\ N \cdot m^2/C^2)(+1.0 \times 10^{-6}\ C)(-1.0 \times 10^{-6}\ C)}{(1.0\ m)^2}$$

$F_{AC} = .009\ N$

F_{AB} ← (repel from B) A (+) → F_{AC} (attract to C)

B (+) C (−)

$F_{net} = .036\ N - .009\ N$

$F_{net} = .027\ N$ (left)

b) $F_{BC} = .036\ N$ (same amount as F_{AB})
$F_{AC} = .009\ N$ (same as part a)

A (+) B (+) ← F_{AC} C (−)

F_{BC}

(Both forces are attracted to +)

$F_{net} = .036 + .009$

$F_{net} = .045\ N$ (left)