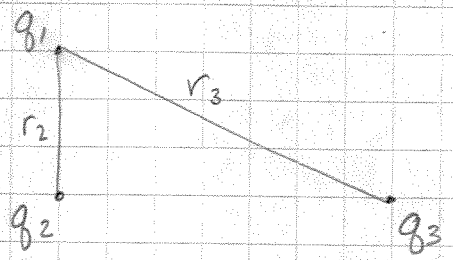
# P #14

Ch 16 – Pg 524

$q_1 = 8 \times 10^{-6} C$
$q_2 = 2 \times 10^{-6} C$
$q_3 = 4 \times 10^{-6} C$

$r_2 = .03\ m$
$r_3 = .067\ m$




Find V at point 1:

$$V = V_1 + V_2$$

$$= k_e \cdot \Sigma \frac{Q}{r}$$

$$= (9.0 \times 10^9\ N \cdot m^2/C^2) \cdot \left( \frac{2 \times 10^{-6} C}{.03 m} + \frac{4 \times 10^{-6} C}{.067 m} \right)$$

$$V = 1.14 \times 10^6\ V$$

Find $PE_i$ (at point 1)

$$PE = q \cdot V$$

$$= (8.0 \times 10^{-6} C)(1.14 \times 10^6\ V)$$

$$PE_i = 9.1\ J$$

Find $PE_f$ (at $\infty$)

$PE_f$ is defined to be zero

$$W = \Delta PE = PE_f - PE_i$$

$$= 0\ J - 9.1\ J$$

$$\boxed{W = -9.1\ J}$$