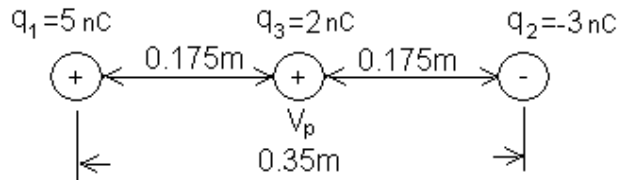


a)

$$V_p = k \left(\frac{q_1}{r_1} + \frac{q_2}{r_2} \right) = 9 \times 10^9 \frac{N \cdot m^2}{C^2} \left[\frac{5 \times 10^{-9} C}{0.175 m} - \frac{3 \times 10^{-9} C}{0.175 m} \right] = 102.85 V$$

b)



$$w = q_3 \times V_p = 2 \times 10^{-9} C \times 102.85 V = 206 \text{ nJ} = 206 \times 10^{-9} J$$

c)

$$u = k \left(\frac{q_1 q_3}{r_{13}} - \frac{q_3 q_2}{r_{32}} - \frac{q_1 q_2}{r_{12}} \right)$$

$$u = 9 \times 10^9 \frac{N \cdot m^2}{C^2} \left[\frac{(5 \times 10^{-9} C)(2 \times 10^{-9} C)}{0.175 m} - \frac{(2 \times 10^{-9} C)(3 \times 10^{-9} C)}{0.175 m} - \frac{(5 \times 10^{-9} C)(3 \times 10^{-9} C)}{0.35 m} \right]$$

$$u = -0.18 \mu J$$