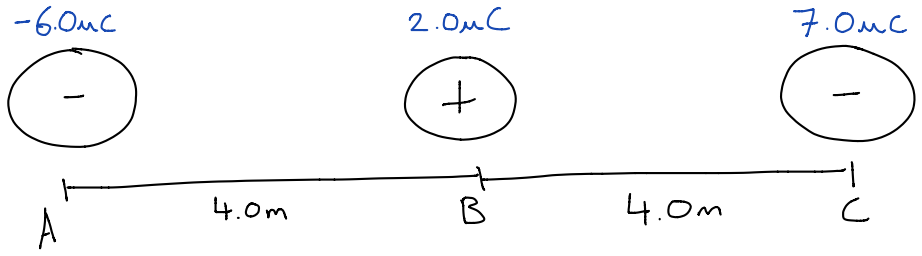
Note Title 28/02/2011

1) Electrons and protons have equal but opposite charges. The magnitude of this charge is known as the:

Elementary Charge = 1.60×10^{-19} C

A hydrogen atom contains one proton and on electron. If the electrostatic force of attraction is 8.2×10^{-8} N, how far apart are they?

2) What is the **magnitude** and **direction** of the net force acting on the 2.0 uC charge shown below?

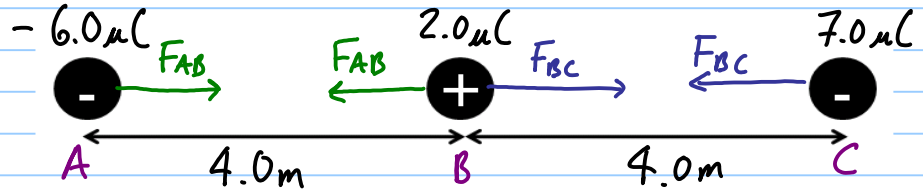


1.) $F_E = \frac{kq_1q_2}{r^2}$ ✓ $r = \sqrt{\frac{kq_1q_2}{F_E}}$

$q_{p+} = q_{e^-} = 1.60\times10^{-19}C$ $r = \sqrt{\frac{(9\times10^9)(1.6\times10^{-19})(1.6\times10^{-19})}{8.2\times10^{-8}}}$

$= \underline{5.3\times10^{-11}\,m}$ ✓

2.)



$F_{AB} = \frac{kq_Aq_B}{r^2} = \frac{(9\times10^9)(6.0\times10^{-6})(2.0\times10^{-6})}{(4.0)^2} = 6.75\times10^{-3}\,N$ ✓

$F_{BC} = \frac{kq_Bq_C}{r^2} = \frac{(9\times10^9)(2.0\times10^{-6})(7.0\times10^{-6})}{(4.0)^2} = 7.875\times10^{-3}\,N$

$F_{net} = F_{BC} - F_{AB} = 7.875\times10^{-3} - 6.75\times10^{-3}$ ✓

$= \underline{1.1\times10^{-3}\,N\ (right)}$ ✓