

**Coulombs Law Application #6**

How far apart must 2 electrons be if the electric force between them is equal the weight of either at sea level? (Electron mass =  $9.11 \times 10^{-31} \text{ kg}$ )

$q_e = -1.602 \times 10^{-19} \text{ C}$

$F_g = mg$   
 $= (9.11 \times 10^{-31} \text{ kg})(9.81)$   
 $= 8.94 \times 10^{-30} \text{ N}$

$F = \frac{kQ_1Q_2}{d^2}$

$d = \sqrt{d^2} = \sqrt{\frac{kQ_1Q_2}{F}} = \sqrt{\frac{(9 \times 10^9)(1.602 \times 10^{-19} \text{ C})^2}{8.94 \times 10^{-30} \text{ N}}}$   
 $= 5.08 \text{ m}$

UNITS  
 $\sqrt{\frac{\frac{\text{Nm}^2}{\text{C}^2} \cdot \text{C}^2}{\text{N}}} = \sqrt{\frac{\text{Nm}^2}{\text{N}}} = \text{m}$

Dec 13-1:47 PM