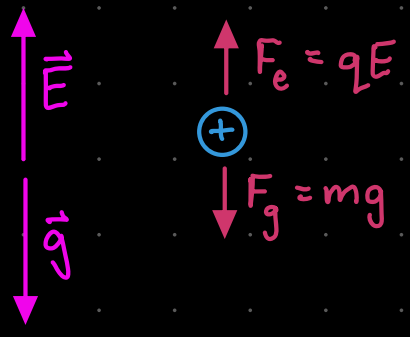
What is the magnitude of an electric field in which the electric force on a proton is equal in magnitude to its weight?

→ need to calculate E such that $F_g = F_e$ for a proton



$qE = mg$ $q = e$ = elementary charge

m = proton mass

$g = 9.8\ N/kg$

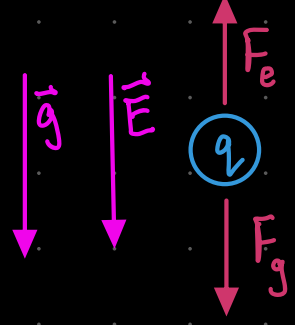
$$E = \frac{mg}{q} = \frac{(1.67 \times 10^{-27}\ kg)(9.8\ N/kg)}{1.6 \times 10^{-19}\ C} = 1 \times 10^{-7}\ N/C$$

What charge must a particle of mass 1.46 g have for it to remain stationary when placed in a downward-directed electric field of magnitude 660 N/C?

→ need to find q on a particle that is suspended in an electric field and gravitational field.

→ we know: $m = 1.46\ g = 1.46 \times 10^{-3}\ kg$

$\vec{E} = 660\ N/C$ downward



q must be negative in order for F_e to be upward

$F_e = F_g \rightarrow qE = mg$

$$q = \frac{mg}{E} = \frac{(1.46 \times 10^{-3}\ kg)(9.8\ N/kg)}{660\ N/C} = 2.2 \times 10^{-5}\ C$$