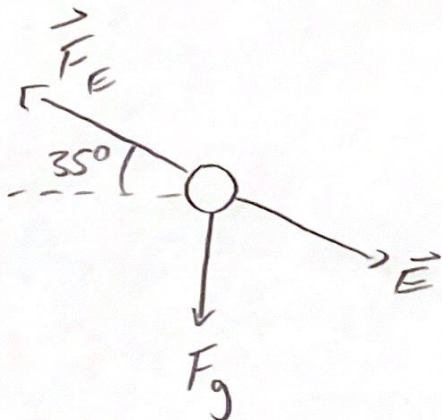


Quiz 18.1C

A 325-gram rubber ball has a net charge of $-14.8 \mu\text{C}$. The ball is in a region filled with a uniform electric field of $61,800 \text{ N/C}$ directed 35.0° below the $+x$ direction. Assume only Earth's gravity and the electric force are relevant in this problem.

What is the magnitude and direction of the acceleration experienced by the ball?



$$|F_g| = (.325)(9.8) = 3.185, -y$$

$$|F_E| = (14.8 \times 10^{-6})(61,800) \\ = 0.9146, 35^\circ \text{ above } -x$$

$$F_{g,x} = 0$$

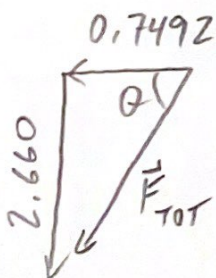
$$F_{g,y} = -3.185$$

$$F_{E,x} = -.9146 \cos 35^\circ \\ = -0.7492$$

$$F_{E,y} = +.9146 \sin 35^\circ \\ = +0.5246$$

$$F_{TOT,x} = -0.7492$$

$$F_{TOT,y} = -2.660$$



$$|F_{TOT}| = \sqrt{0.7492^2 + 2.660^2} \\ = 2.76 \text{ N}$$

$$\theta = \tan^{-1}\left(\frac{2.66}{.7492}\right) = 74.3^\circ \text{ below } -x$$

$$|a| = \frac{F}{m} = \frac{2.76}{.325} = \boxed{8.49 \text{ m/s}^2, 74.3^\circ \text{ below } -x}$$