42. (a) Using Eq. 23-28, we find

$$\begin{aligned}\vec{F} &= (8.00 \times 10^{-5}\,\mathrm{C})(3.00 \times 10^{3}\,\mathrm{N/C})\hat{\imath} + (8.00 \times 10^{-5}\,\mathrm{C})(-600\,\mathrm{N/C})\hat{\jmath} \\ &= (0.240\,\mathrm{N})\hat{\imath} - (0.0480\,\mathrm{N})\hat{\jmath}\ .\end{aligned}$$

Therefore, the force has magnitude equal to

$$F = \sqrt{(0.240\,\mathrm{N})^2 + (0.0480\,\mathrm{N})^2} = 0.245\ \mathrm{N}\ ,$$

and makes an angle θ (which, if negative, means clockwise) measured from the $+x$ axis, where

$$\theta = \tan^{-1}\left(\frac{F_y}{F_x}\right) = \tan^{-1}\left(\frac{-0.0480\,\mathrm{N}}{0.240\,\mathrm{N}}\right) = -11.3^\circ\ .$$

(b) With $m = 0.0100$ kg, the coordinates (x, y) at $t = 3.00\,\mathrm{s}$ are found by combining Newton's second law with the kinematics equations of Chapters 2-4:

$$\begin{aligned}x &= \frac{1}{2}a_x t^2 = \frac{F_x t^2}{2m} = \frac{(0.240)(3.00)^2}{2(0.0100)} = 108\ \mathrm{m}\ , \\ y &= \frac{1}{2}a_y t^2 = \frac{F_y t^2}{2m} = \frac{(-0.0480)(3.00)^2}{2(0.0100)} = -21.6\ \mathrm{m}\ .\end{aligned}$$