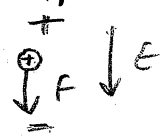
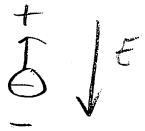
Electric fields #2

① $E = \frac{F}{q} = \frac{2.4\ N}{1.8\times10^{-6}\ C} = 1.3\times10^{6}\ N/C$ downwards.



② $E = \frac{F}{q} = \frac{8.0\times10^{-16}\ N}{1.6\times10^{-19}\ C} = 5000\ N/C$ downwards



③ $F = qE = (1.6\times10^{-19})(600) = 9.6\times10^{-17}\ N$

④ $F = qE = (1.6\times10^{-19})(2200) = 3.52\times10^{-16}\ N$

$F = ma$

$3.52\times10^{-16} = 9.1\times10^{-31}(a)$

$a = 3.87\times10^{14}\ m/s^2$

⑤ $F = ma = (1.67\times10^{-27})(7.6\times10^{4}) = 1.27\times10^{-22}\ N$

$E = \frac{F}{q} = \frac{1.27\times10^{-22}\ N}{1.6\times10^{-19}\ C} = 7.93\times10^{-4}\ N/C$

⑥ $v_i = 0$

$v_f = ?$

$a = $ __

$d = 0.015\ m$

$\Sigma F = ma$

$F_E = ma$

$3.2\times10^{-15} = (9.1\times10^{-31})a$

$a = 3.5\times10^{15}\ m/s^2$

$F_E = qE$

$= (1.6\times10^{-19})(2\times10^{4})$

$= 3.2\times10^{-15}\ N$

$d = \left(\frac{v_i + v_f}{2}\right)t$

$0.015 = \left(\frac{0 + 3.5\times10^{15}t}{2}\right)t$

$0.03 = 3.5\times10^{15}t^2$

$t = 2.9\times10^{-9}\ s$

$v_f = v_i + at$

$v_f = 0 + 3.5\times10^{15}t$

$v_f = 0 + 3.5\times10^{15}(2.9\times10^{-9})$

$v_f = 1.02\times10^{7}\ m/s$