①

(a) $|E_1| = \frac{1}{4\pi\varepsilon_0}\frac{|q_1|}{|r|^2} = 9\times10^9 \frac{3.12\times10^{-6}C}{(0.123m)^2} = +1.86\times10^6 \ N/c$

in $+x$ direction

(b) $|E_2| = \frac{1}{4\pi\varepsilon_0}\frac{|q_2|}{|r|^2} = 9\times10^9 \frac{1.48\times10^{-6}}{(0.123m)^2} = 8.8\times10^5 \ N/c$

in $+x$ direction

(c) $F_1 = q_1 E_2 = 2.75N$ in $+x$ direction

$F_2 = q_2 E_1 = 2.75N$ in $-x$ direction

② $q = \frac{E r^2}{1/4\pi\varepsilon_0} = \frac{(2.30 N/c)(0.75 m)^2}{9\times10^9} = 1.44\times10^{-10}C$

③ $E = \frac{1}{4\pi\varepsilon_0}\frac{q}{r^2} = (9\times10^9)\frac{1.60\times10^{-19}C}{(0.053\times10^{-9}m)^2} = 5.13\times10^{11} N/c$