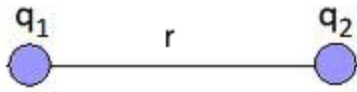Answer on Question #42287, Physics, Electric Circuits

1)

Spheres have the same in magnitude and opposite signed charges $q_1 = -q_2 = q$;

Force evaluated due to Coulomb law: $F = k * q^2/r^2$;

$\Rightarrow q = r * (F/k)^{1/2} = 8 * 10^{-5}C.$

$where\ k = 9 * 10^9\ N * m^2/C^2$

Number of electrons equal to the ration between charge of sphere and single electron charge:

$N_e = q/e = 5 * 10^{14},$ where $e = 1.6 * 10^{-19}\ C$

Answer: $q = 8 * 10^{-5}C$, $N_e = 5 * 10^{14}$.

2)Superposition principle says that forces provided by each charge can be summed into one force.

3) Equilibrium state means that the sum of all forces =0. It is not the case for this problem, but possible for another charge configurations.