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Biochemistry.
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1. SECTION A

a) Charging by Induction:
Electric charged can be obtained on an object without touching it, by a process called electrostatic induction. Consider a negatively charged rubber rod brought near an neutral (unchanged) conducting sphere that is insulated so that there is no conducting path to ground as shown below. The repulsive force between the electrons in the rod, and those in the sphere causes a redistribution of charges on the sphere so that some electron move to the side of the sphere farthest away from the (fig 1.3) rod. The region of the sphere near by the negatively charged rod has an excess of positive charge because of the migration of electron away from this location. If a grounded conducting wire is then connected to the sphere and traced to the earth.

16. $k = 9 \times 10^7$

$q_1 + q_2 = 5 \times 10^{-5} C$

$F = 1N$

$d = 2m$

Charge on each sphere = ?

$$r = \frac{k q_1 q_2}{r^2}$$

$$F = \frac{9 \times 10^9 \times (q_1 q_2 5 \times 10^{-5})}{2^2}$$

$$4 = 9 \times 10^9 \times 5 \times 10^{-5} q_1 + 9 \times 10^9 q_2$$

$$4 = 4.5 \times 10^5 q_1 + 9 \times 10^9 q_2$$

Quadratic Equation.

$$7 \times 10^3 q_2 - 4.5 \times 10^5 q_1 + 4 = 0$$

$$q_1 = 0.000011C \simeq 1.11 \times 10^{-5} C$$

$$q_2 = 0.000038 C \simeq 3.8 \times 10^{-5} C.$$

i. $Q_1 = Q_2 = 8\mu C$