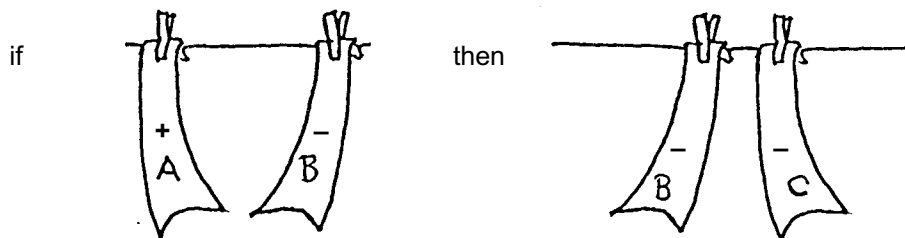


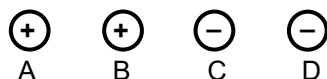
1. "An electrically uncharged object contains equal amounts of positive and negative charges."

2. For example:



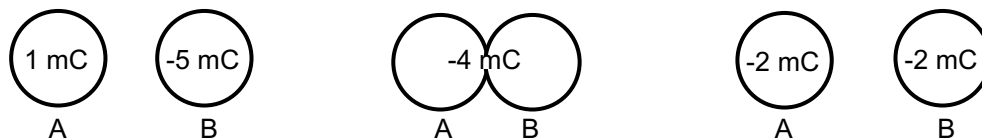
therefore A and C attract each other.

3. For example:



therefore A and D attract each other, B and C attract each other, and B and D attract each other.

4.



5. Since the comb repels a negatively charged sphere, the comb must be negatively charged as well. Therefore Chad has removed electrons from his hair. Now there are more protons than electrons in his hair. Accordingly his hair is positively charged.

6.  $I = \frac{Q}{t} = \frac{180 \text{ C}}{60 \text{ s}} = \underline{3.0 \text{ A}}$

7. a)  $Q = I \cdot t = 0.20 \text{ A} \cdot 600 \text{ s} = \underline{120 \text{ C}}$

b)  $\frac{120 \text{ C}}{1.6 \cdot 10^{-19} \frac{\text{C}}{\text{electron}}} = \underline{7.5 \cdot 10^{20} \text{ electrons}}$

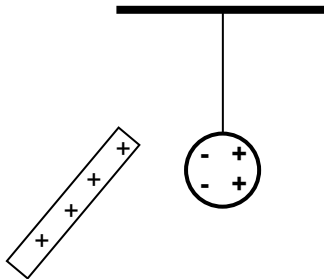
8. a)  $t = \frac{Q}{I} = \frac{100 \text{ C}}{0.50 \text{ A}} = \underline{200 \text{ s}} = \underline{3 \text{ min } 20 \text{ s}}$

b)  $10^9 \text{ El.} \cdot 1.6 \cdot 10^{-19} \frac{\text{C}}{\text{El.}} = 1.6 \cdot 10^{-10} \text{ C}$

$t = \frac{Q}{I} = \frac{1.6 \cdot 10^{-10} \text{ C}}{0.50 \text{ A}} = \underline{3.2 \cdot 10^{-10} \text{ s}}$

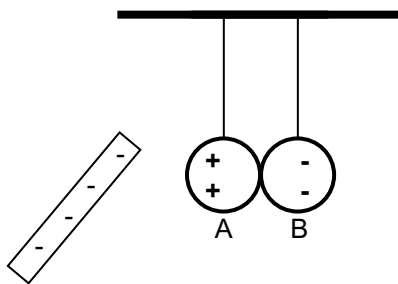
9. a) electric insulator  
b) electric conductor

10. a)



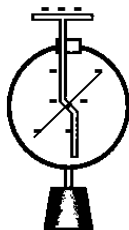
b) As the rod is moving towards the metal sphere, the charges in the sphere are separated (electrostatic induction). The negative side of the sphere and the rod attract each other, while the positive side of the sphere and the rod repel each other. The negative side of the sphere is closer to the rod and thus the attraction is stronger than the repulsion. Therefore the sphere moves towards the rod.

11.

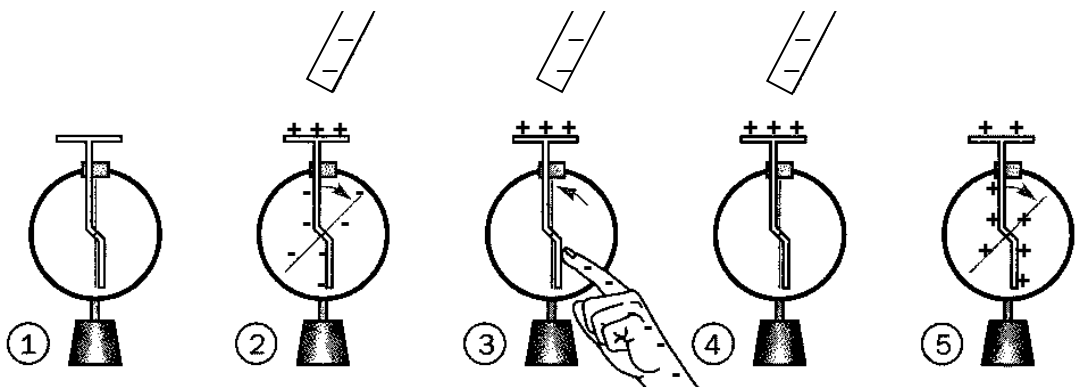


A: positively charged, B: negatively charged

12.



13.



positively charged