**Statics Conceptual Questions**

1. After a comb is rubbed on a wool sweater, it is able to pick up small pieces of paper. Why does the comb lose that ability after a few minutes?
2. List some insulators and conductors.
3. What property makes metal a good conductor and rubber a good insulator?
4. A rubber rod can be charged negatively when it is rubbed with wool. What happens to the charge of the wool? Why?
5. An apple contains trillions of charged particles. Why don’t two apples repel each other when they are brought together?
6. Why do socks taken from a clothes dryer sometimes cling to other clothes?
7. Explain how to charge a conductor negatively if you have only a positively charged rod.
8. What is the difference between ‘net charge’ and ‘free charge’? Give an example of an object that has both and give an example of one that has neither.
9. Why is it very safe to be inside a car during a lightning storm?
10. A plastic ruler is rubbed with wool. It can then be used to attract neutral pieces of lightweight paper. Explain how a charged object is able to attract an uncharged object.

**Coulomb’s Law**

1. A point charge of 1.23 x 10-8 C and a point charge of -2.0 μC are separated by 30.0 cm. What is the force between the charges?
2. Two charged objects are separated by a distance of 23 cm. One of the charges is 1.23 μC, and there is an attractive force of 1.8 N between the charges. What is the value of the second charge?
3. A particle with a charge of 1.01 μC and a particle with a charge of 907 nC exert a force of 4.56 N on each other. What is the distance between the two particles?
4. Two identical positive charges separated by 12.5 cm exert a repulsive force of 1.24 N on each other. How much charge is on each?
5. Two negatively charged particles are separated by 89.0 cm. One particle has 4.2 times the charge of the other particle. If the repulsive force between the particles is 0.097 N, what is the amount of charge on each particle?
6. A tiny metal sphere carrying a charge of -43.6 nC is touched to an identical neutral metal sphere. The spheres are then placed 1.02 cm apart. What is the force between the two spheres?

Answers

1. 0.0025 N attractive 2. 8.6 μC 3. 4.25 cm 4. 1.5 μC 5. 1.4 μC 6. 0.041 N