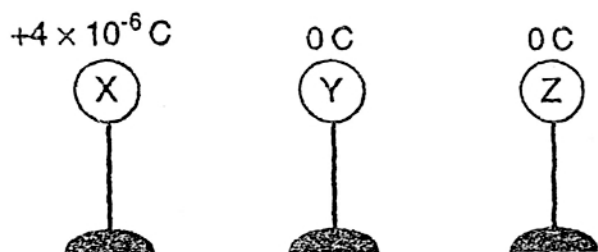


Electrostatics Practice

12. The diagram below shows the initial charge and position of three metal spheres, X , Y , and Z on insulating stands.



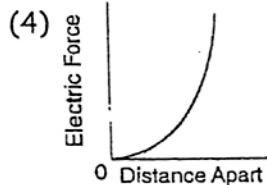
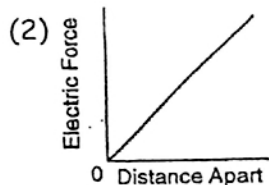
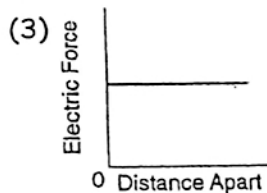
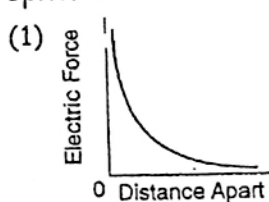
Sphere X is brought into contact with sphere Y and then removed. Then sphere Y is brought into contact with sphere Z and removed. What is the charge on sphere Z after this procedure is completed?

- (1) $+1 \times 10^{-6} \text{ C}$ (3) $+3 \times 10^{-6} \text{ C}$
 (2) $+2 \times 10^{-6} \text{ C}$ (4) $+4 \times 10^{-6} \text{ C}$

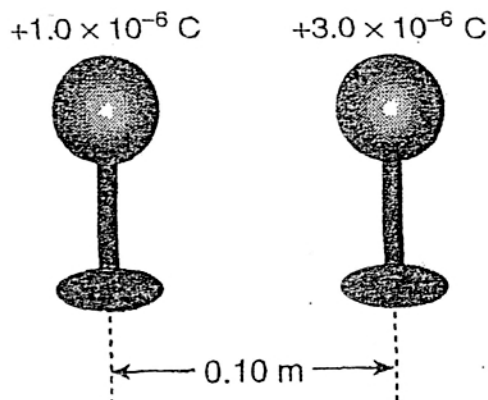
13. An electrostatic force of magnitude F exists between two metal spheres having identical charge q . The distance between their centers is r . Which combination of changes would produce *no* change in the electrostatic force between the spheres?

- (1) doubling q on one sphere while doubling r
 (2) doubling q on both spheres while doubling r
 (3) doubling q on one sphere while halving r
 (4) doubling q on both spheres while halving r

14. Two similar metal spheres possessing $+1.0$ coulomb of charge and -1.0 coulomb of charge, respectively, are brought toward each other. Which graph best represents the relationship between the magnitude of the electric force between the spheres and the distance between them?



15. The diagram below shows two metal spheres charged to $+1.0 \times 10^{-6}$ coulomb and $+3.0 \times 10^{-6}$ coulomb, respectively, on insulating stands separated by a distance of 0.10 meter.



The spheres are touched together and then returned to their original positions. As a result, the magnitude of the electrostatic force between the spheres changes from 2.7 N to

- (1) 1.4 N (3) 3.6 N
 (2) 1.8 N (4) 14 N

16. The magnitude of the electrostatic force between two point charges is F . If the distance between the charges is doubled, the electrostatic force between the charges will become

- (1) $\frac{F}{4}$ (3) $\frac{F}{2}$
 (2) $2F$ (4) $4F$

17. Electrostatic force F exists between two point charges. If the distance between the charges is tripled, the force between the charges will be

- (1) $\frac{F}{9}$ (3) $3F$
 (2) $\frac{F}{3}$ (4) $9F$

18. If the charge on each of two small charged metal spheres is doubled and the distance between the spheres remains fixed, the magnitude of the electric force between the spheres will be
- (1) the same (3) one-half as great
 (2) two times as great (4) four times as great