1. Two point charges A and B, having charges +Q and –Q respectively, are placed at certain distance apart and force acting between them is F. If 25% charge of A is transferred to B, then force between the charges becomes

   A. 4F/3

   B. F

   C. 9F/16

   D. 16F/9

2. Suppose the charge of a proton and an electron difer slightly. One of them is –e, the other is (e + Δe). If the net of electrostatic force and gravitational force between two hydrogen atoms placed at a distance d (much greater than atomic size) apart is zero, then Δe is of the order of [Given: mass of hydrogen $m_h = 1.67 \times 10^{-27}$ kg]

   A. 10^{-23} C

   B. 10^{-37} C

   C. 10^{-47} C

   D. 10^{-20} C

3. Two identical charged spheres suspended from a common point by two massless strings of lengths l, are initially at a distance d ($d << l$) apart because of their mutual repulsion. The charges begin to leak from both the spheres at a constant rate. As a result, the spheres approach each other with a velocity v. Then v varies as a function of the distance x between the spheres, as

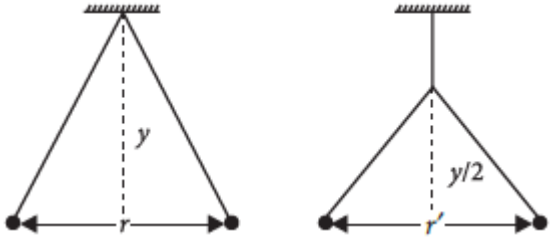
   A. $v \propto x^{-1/2}$

   B. $v \propto x^{-1}$

   C. $v \propto x^{1/2}$

   D. $v \propto x$

4. Two pith balls carrying equal charges are suspended from a common point by strings of equal length, the equilibrium separation between them is r. Now the strings are rigidly clamped at half the height. The equilibrium separation between the balls now become



   A. $\left(\frac{2r}{\sqrt{3}}\right)$

B. $\left(\frac{2r}{3}\right)$

C. $\left(\frac{1}{\sqrt{2}}\right)^2$

D. $\left(\frac{r}{\sqrt[3]{2}}\right)$

5. Two positive ions, each carrying a charge q, are separated by a distance d.If F is the force of repulsion between the ions, the number of electrons missing from each ion will be (e being the charge on an electron)

A. $\frac{4\pi\varepsilon_0 Fd^2}{e^2}$

B. $\sqrt{\frac{4\pi\varepsilon_0 Fe^2}{d^2}}$

C. $\sqrt{\frac{4\pi\varepsilon_0 Fd^2}{e^2}}$

D. $\frac{4\pi\varepsilon_0 Fd^2}{q^2}$