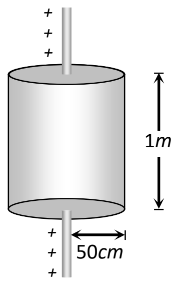
ELECTROSTATICS

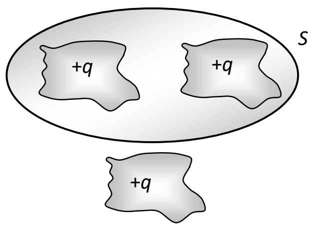
DPP-06

1. The S.I. unit of electric flux is
   (a) *Weber* (b) *Newton per coulomb*
   (c) *Volt* $\times$ *metre* (d) *Joule* per *coulomb*

2. Electric charge is uniformly distributed along a long straight wire of radius 1*mm*. The charge per *cm* length of the wire is *Q coulomb*. Another cylindrical surface of radius 50 *cm* and length 1*m* symmetrically encloses the wire as shown in the figure. The total electric flux passing through the cylindrical surface is
   (a) $\frac{Q}{\varepsilon_0}$
   (b) $\frac{100Q}{\varepsilon_0}$
   (c) $\frac{10Q}{(\pi\varepsilon_0)}$
   (d) $\frac{100Q}{(\pi\varepsilon_0)}$

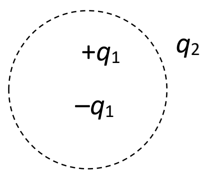


3. Shown below is a distribution of charges. The flux of electric field due to these charges through the surface *S* is



   (a) $3q/\varepsilon_0$ (b) $2q/\varepsilon_0$
   (c) q/ε_0 (d) Zero

4. Consider the charge configuration and spherical Gaussian surface as shown in the figure. When calculating the flux of the electric field over the spherical surface the electric field will be due to
   (a) q_2
   (b) Only the positive charges
   (c) All the charges
   (d) $+q_1$ and $-q_1$

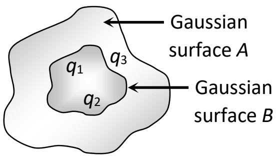


5. Gauss's law is true only if force due to a charge varies as
   (a) r^{-1} (b) r^{-2}
   (c) r^{-3} (d) r^{-4}

6. An electric dipole is put in north-south direction in a sphere filled with water. Which statement is correct
(a) Electric flux is coming towards sphere
(b) Electric flux is coming out of sphere
(c) Electric flux entering into sphere and leaving the sphere are same
(d) Water does not permit electric flux to enter into sphere

7. Two infinite plane parallel sheets separated by a distance d have equal and opposite uniform charge densities σ. Electric field at a point between the sheets is
(a) Zero
(b) $\frac{\sigma}{\varepsilon_0}$
(c) $\frac{\sigma}{2\varepsilon_0}$
(d) Depends upon the location of the point

8. The electric flux for Gaussian surface *A* that enclose the charged particles in free space is (given $q_1 = -14\ nC$, $q_2 = 78.85\ nC$, $q_3 = -56\ nC$)
(a) $10^3\ Nm^2\ C^{-1}$
(b) $10^3\ CN^{-1}\ m^{-2}$
(c) $6.32 \times 10^3\ Nm^2\ C^{-1}$
(d) $6.32 \times 10^3\ CN^{-1}\ m^{-2}$



9. The electric intensity due to an infinite cylinder of radius R and having charge *q* per unit length at a distance $r(r > R)$ from its axis is
(a) Directly proportional to r^2
(b) Directly proportional to r^3
(c) Inversely proportional to *r*
(d) Inversely proportional to r^2

10. A sphere of radius *R* has a uniform distribution of electric charge in its volume. At a distance *x* from its centre, for $x < R$, the electric field is directly proportional to
(a) $\frac{1}{x^2}$ (b) $\frac{1}{x}$
(c) x (d) x^2

11. It is not convenient to use a spherical Gaussian surface to find the electric field due to an electric dipole using Gauss's theorem because
(a) Gauss's law fails in this case
(b) This problem does not have spherical symmetry
(c) Coulomb's law is more fundamental than Gauss's law
(d) Spherical Gaussian surface will alter the dipole moment