Class 12   Time : 1 hr.
14-5-2015   First Unit Test in PHYSICS   M. Marks : 20

1.   Why charge is quantized?   (1)

2.   An arbitrary surface encloses a dipole. What is the electric flux through this surface?   (1)

3.   Two point charges q and 4q are separated by a distance of 6a. Find the point on the line
        joining the two charges where the electric field is zero.   (2)

4.   Three point charges q_1, q_2 and q_3 are at three points with the relative distances r_{12}, r_{23} and r_{13}
        Derive an expression for electric potential energy stored in a system of charges.   (2)

5.   Form a system of charges and find the location at which (i) $\mathbf{E}$=0, V≠0 (ii) V=0, $\mathbf{E}$≠0 where
        E and V have usual meaning.   (2)

6.   Derive the expression for magnitude of electric field intensity due to dipole at a point on
        the axis.   (2)

7.   Two concentric spheres of radius R_1 and R_2 (R_1< R_2) have the charges on their surface Q_1
        and Q_2 respectively. When the two spheres are connected by a wire, show that the charges
        flow from smaller sphere to bigger sphere no matter what amount of charges present on

        them.   (2)

8.   Three charges q, q and –q are placed at the vertices of an equilateral triangle of side 9cm.
        Calculate the net force acting on the negative charge.   (2)

9.   An electric dipole is held in a uniform electric field. (i) Using a suitable diagram, Show that
        the dipole is in translatory equilibrium (ii) Derive an expression for the torque acting on it
        and specify
        its direction.   (3)

10.   State Gauss's theorem. Using Gauss theorem show that for a spherical shell, the electric field
        inside the shell vanishes, whereas outside, the charged sphere behaves as a point charge as
        if the entire charge on the sphere is concentrated at its centre.   (3)

-x-x-x-x-x-