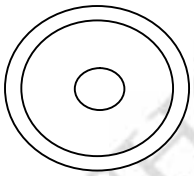
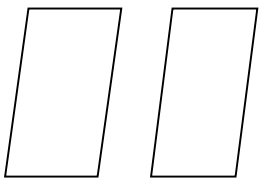
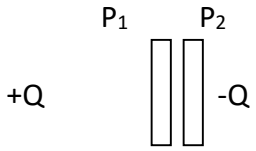
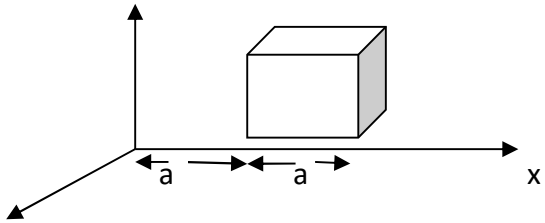
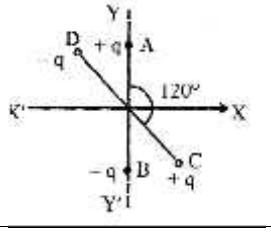
INDIAN SCHOOL DARSAIT
DEPARTMENT OF PHYSICS

Subject : PHYSICS	Topic : ELECTRIC CHARGES AND FIELDS	Date of Worksheet : 3.4.17
Resource Person: SUSAN ANIL		Worksheet #2
Name of the Student :_____	Class & Division : _XII____	Roll Number : __

TWO MARKS QUESTIONS-

1.	Two concentric metallic spherical shells of radii R and 3R are given charges Q1 and Q2 respectively. The surface charge densities on the outer surfaces of the shells are equal. Determine the ratio Q1: Q2.
2.	Two point charges, q1 and q2, are located at points (a, o, o) and (o, b, o) respectively. Find the electric field, due to both these charges, at the point, (o, o, c). (**2013**)
3.	A small metal sphere carrying a charge +Q is located at the centre of a spherical cavity in a large uncharged metallic spherical shell. Write the charges on the inner and the outer surfaces of the shell. Write the expression for the electric field at the point P_1. (**2014**) 
4.	(i) Point charge (+Q) is kept in the vicinity of an uncharged conducting plate. Sketch electric field lines between the charge and the plate. (ii) Two infinitely large plane thin parallel sheets having surface charge densities σ_1 and σ_2 ($\sigma_1 > \sigma_2$) are shown in the figure. Write the magnitudes and directions of the net fields in the region marked II and III. (**2014,2017**) 
5.	Two identical metallic spherical shells A and B having charges +4Q and -10Q are kept a certain distance apart. A third identical uncharged sphere C is first placed in contact with sphere A and then with sphere B, then spheres A and B are brought in contact and then separated. Find the charge on the spheres A and B.(**2011**)
6.	Deduce the expression for the electric field E due to a system of two charges q_1 and q_2 with position vector r_1 and r_2 at a point r with respect to common origin. (**2010**)
7.	Figure shows two large metal plates P_1 and P_2, tightly held against each other and placed between two equal and unlike point charges perpendicular to the line joining them.

	 (i) What will happen to the plates when they are released? (ii) Draw the pattern of the electric field lines for the system. (**2009**)
8.	State Gauss's law in electrostatics. A cube with each side 'a' is kept in an electric field given by $\vec{E} = C\ \hat{\imath}$ (as shown in the figure) where C is a positive dimensional constant. Find out  (i) The electric flux through the cube, and (ii) The net charge inside the cube. (**2012**)
9.	Two small identical electric dipoles AB and CD, each of dipole moment 'p' are kept at an angle of 120^0 as shown in the figure. What is the resultant dipole moment of this combination? If this system is subjected to electric field E directed along +X- direction, what will be the magnitude and direction of the torque acting on this? 
10.	Two charges +Q and –Q are kept at points $(-x_2, 0)$ and $(x_1, 0)$ respectively, in the XY- plane. Find the magnitude and direction of the net electric field at the origin (0, 0). (**2009**)
11.	Two point charges 4Q and Q are separated by 1m in air. At what point on the line joining the charges, is the electric field intensity zero? (**2008**)
12.	A spherical conducting shell of inner radius r_1 and outer radius r_2 has a charge Q. A charge q is placed at the centre of the shell. **(2010)** (a) What is the surface charge density on the (i) inner surface, (ii) outer surface of the shell? (b) Write the expression for the electric field at a point $x(>r_2)$ from the centre of the shell.
13.	A particle of mass 1g and charge 5μC enters into uniform electric field of $2x10^5$N/C, moving with velocity of 20m/s in a direction opposite to that of the field. Calculate the distance it would travel before coming to rest. (**2012**)
14.	A thin straight infinitely long conducting wire having charge density λ is enclosed by a cylindrical surface of radius r and length L, with its axis coinciding with the length of the wire. Find the expression for electric flux through the surface of the cylinder. (**2011**)
15.	A thin metallic spherical shell of radius R carries a charge Q on its surface. A point charge Q/2 is placed at its centre and another charge +2Q outside the shell at point A at a distance x from the centre (x>R). Find (i) the force on the charge at the centre of the shell and at the point A (ii) electric flux through the shell. (**2015**)