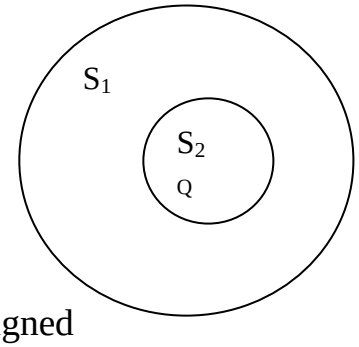
Electrostatics

1. What are basic properties of charge?
2. Write the Coulomb's law in vector form. Plot the variation of F versus 1/r for attractive and repulsive force.
3. Derive an expression for electric field at a point due to a point charge.
4. Write the physical quantities having units 1] N/C 2] J/C 3] C/V 4] Nm^2C^{-2}
5. What is an electric dipole ? Define electric dipole moment. An electric dipole is held in the uniform electric field, derive expression for torque acting on it. What is the net force acting on the dipole.
6. Derive expression of electric field at the axial and equatorial point of an electric dipole.
7. Define equipotential surfaces. Show that the field lines are normal to the equipotential surface. What will be the work done in moving 10nC of charge from one point to the other point on an equipotential surface?
8. What is capacitor? Derive expression of energy stored in a parallel plate capacitor.
9. Define one farad. Derive expression for capacitance of parallel plate capacitor filled with a compound dielectric slab.
10. State Gausses theorem. Using it derive the expression of electric field due to :1]a charged spherical shell 2] long line of charge 3] plane sheet of charge. Plot the variation of E versus r for thin charged spherical shell.
11. What will be the ratio of electric flux through s_1 and s_2



12. An electric dipole with dipole moment $4x10^{-9}$Cm is aligned At 30^0 with the direction of electric field of magnitude $5x10^4$ N/C. Calculate the torque and net force acting on it.