



St Mary's School
Class XII: Physics
Chapter: Electrostatics
Assignment - 2

1. Three capacitors of capacitances $2F$, $4F$ and $6F$ are connected in series with a source voltage $12 V$. Calculate the voltage across each capacitor and also the total energy of the combination.
2. What are the various application of electrostatics ?
3. The net capacitance of 3 identical capacitors in series is 2 microfarad. What will be their net capacitance if connected in parallel? Find the ratio of energy stored in the two configurations if they are both connected to the same source
4. Derive the expression for the potential energy for the 3 charges from infinity in the presence of an external electric field.
5. Two charges of 2 microfarad and 4 microfarad are separated by a distance 4 cm. Find the electric field at a point 3 cm from the centre of the dipole length on a line perpendicular to the axis of dipole
6. A parallel plate capacitor is charged by a battery . After sometime the battery is disconnected and a dielectric slab dielectric constant K with its thickness equal to the plate separation is inserted between the plates . How will (i) the capacitance of the capacitor (ii) the energy stored in the capacitor be affected ? Justify your answer in each case
7. Using Gauss's law derive an expression for electric field for a hollow sphere at (i) on the sphere (ii) at a point inside the sphere
8. An electric dipole of length 4 cm , when placed with its axis making an angle of 60° with a uniform electric field , experiences a torque of $4(3)^{1/2} Nm$. Calculate the potential energy of the dipole , if it has charge of $8 nC$.
9. Derive an expression for the electric potential of an electric dipole on(i) axial point (ii) equatorial point
10. There are 3 charges A , B and C. A is having a charge of $2 C$ and B has $3 C$. C is having a charge of $0 C$. A and B are placed at a distance R . Following steps are followed :-First A is touched to C then B is touched to C .A and B are again placed closed to each other at same distance as it was earlier. Calculate the ratio of the initial force between A and B and final force between A and B.