PROPERTIES OF CONDUCTOR:

1. under static conditions, no charge and no electric field can exist at any point within the conducting material.

2. The charge can exist on the surface of the conductor giving rise to surface charge density

3. within a conductor, the charge density is always zero

4. The charge distribution on the surface depends on the shape of the surface.

5. The conductivity of ideal conductor is infinite

6. The conductor surface is an equipotential surface.

Properties of dielectric materials.

1. The dielectrics donot contain any free charges but contain bound charges

2. Bound charges are under the internal molecular and atomic forces and cannot contribute to the conduction.

3. When subjected to an external field $\vec{E}$, the bound charges shift their relative positions. Due to this, small electric dipoles get induced inside the dielectric. This is called Polarization.

4. Due to the Polarization, the dielectrics can store the energy

5. Due to the Polarization, the flux density of the dielectric increases by amount equal to the Polarization.

6. The induced dipoles produce their own electric field and align in the direction of the applied electric field.

7. When Polarization occurs, the volume charge density is formed inside the dielectric while the surface charge density is formed over the surface of the dielectric

8. The electric field outside and inside the dielectric gets modified due to the induced electric dipoles.