**PROBLEM SHEET BASED ON COULOMB FORCES:**

1. Lightning occurs when there is a flow of electric charge between the ground and a thundercloud. The maximum rate of charge flow in a lightning bolt is about 20000 C/S; this lasts for 100 µs or less. How much charge flows between the ground and the cloud in this time? How many electrons flow during this time?
2. Two small plastic spheres are given positive electrical charges. When they are 15.0 cm apart, the repulsive force between them has a magnitude 0.220N. What is the charge on each sphere a) if the two charges are equal and b) if one sphere has four times the charge of the other?
3. Three point charges are arranged on a line. Charge Q3= +5.00nc and is at origin. Charge

Q2 = -3.00nc and is at x=+4.00 cm. Charge Q1 is at x=+2.00 cm. What is Q1 (magnitude and sign) if the net force on Q3 is zero?

1. Three point charges are arranged along the x-axis. Charge Q1=+3.00 µc is at the origin, and charge Q2 = -5.00µc is at x=0.200m. Charge Q3=-8.00µc. Where is Q3 located if the net force on Q1 is 7.00N in the X-direction?
2. You are given a total charge Q. How do you divide it into two parts so that the force between them is maximum
3. Two point charges +9e and +e are placed at a distance of 16cm from each other. At what point between these charges should a third charge q be placed so that it remains in equilibrium?
4. Two similarly and equally charged identical metal spheres A and B repel each other with a force of 2.0×1o-5 N. A third identical uncharged sphere C is touched with A and then placed at the midpoint between A and B. What is net electric force on C?