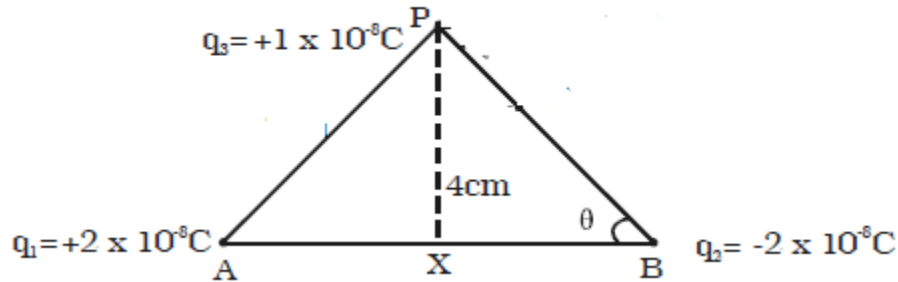
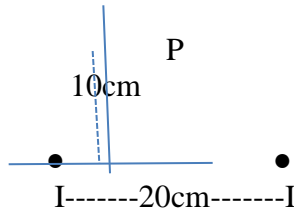


- Two small equal and unlike charges $2 \times 10^{-8} \text{C}$ are placed at A and B at a distance of 6 cm is shown in fig. below. Calculate the magnitude and direction of force on the charge $1 \times 10^{-8} \text{C}$ placed at P, where P is 4cm on the perpendicular bisector of AB. [8.64×10^{-4} , along +X axis]



- A glass rod rubbed with silk and glass rod acquires a charge of $+8 \times 10^{-12} \text{C}$. The number of electrons it has gained or lost. [1.85×10^7 , electrons loss]
- The sum of two point charges is $6 \mu\text{C}$. They attract each other with a force of 0.9 N, when kept 40 cm apart in vacuum. Calculate the charges. [$q_1 = 8 \times 10^{-6} \text{C}$, $q_2 = -2 \times 10^{-6} \text{C}$]
- Compare the magnitude of the electrostatic and gravitational force between an electron and a proton at a distance r apart in hydrogen atom. (Given : $m_e = 9.11 \times 10^{-31} \text{ kg}$; $m_p = 1.67 \times 10^{-27} \text{ kg}$; $G = 6.67 \times 10^{-11} \text{ Nm}^2 \text{ kg}^{-2}$; $e = 1.6 \times 10^{-19} \text{ C}$) [2.27×10^{39}]
- Two point charges $+9e$ and $+1e$ are kept at a distance of 16 cm from each other. At what point between these charges, should a third charge q to be placed so that it remains in equilibrium? [0.12 m]
- Two point charges $+4q$ and $+q$ are placed 30 cm apart. At what point on the line joining them the electric field is zero?
- A dipole is placed in a uniform electric field with its axis parallel to the field. What is Torque on it?
- Two charges $10 \times 10^{-9} \text{ C}$ and $20 \times 10^{-9} \text{ C}$ are placed at the two corners of a equilateral triangles. The length of the arms is 0.03 m. calculate the electric field out the third corner of the triangles.
- Two equal charges of $10 \times 10^{-5} \text{ C}$ are shown in fig below; each produces an electric field at point P on Y axis. (a) What is the magnitudes of the fields at P? (b) what is direction of

field? (c) Find the X and Y components of the field vector. (d) What is the direction of the net field?



10. Calculate (i) the potential at a point due a charge of $4 \times 10^{-7} \text{ C}$ located at 0.09m away (ii) work done in bringing a charge of $2 \times 10^{-9} \text{ C}$ from infinity to the point.
11. If a point lies at a distance x from the midpoint of the dipole, calculate the electric potential at this point.
12. The electric potential difference between the ground and a cloud in a particular thunderstorm is $1.2 \times 10^9 \text{ V}$. In the unit electron-volts, what is the magnitude of the change in the electric potential energy