



Sheet 3

1] A 2 mC positive charge is located in vacuum at $P_1(3, -2, -4)$ and a $5\mu\text{C}$ negative charge is at $P_2(1, -4, 2)$:

a) Find the vector force on the negative charge.

b) What is the magnitude of the force on the charge at P_1 ?

2] Find the force on a $100\mu\text{C}$ charge at $(0, 0, 3)\text{m}$ if four like charges of $20\mu\text{C}$ are located on the x and y axes at $\pm 4\text{m}$.

3] Two point charges, $Q_1=50\mu\text{C}$ and $Q_2=10\mu\text{C}$ are located at $(-1, 1, -3)\text{m}$ and $(3, 1, 0)\text{m}$, respectively. Find the force on Q_1 .

4] Point charge $Q_1=300\mu\text{C}$, located at $(1, -1, -3)\text{m}$, exerts a force $F_1= 8a_x - 8a_y + 4a_z\text{ N}$ due to point charge Q_2 located at $(3, -3, -2)\text{m}$. Determine Q_2 .

5] Find the electric field intensity at point $(2, 1, 3)$ due to two charges of $Q_1=5\mu\text{C}$ and $Q_2=8\mu\text{C}$, at points $(3, 1, 2)$ and origin.

6] An electron beam may be approximated by a right circular cylindrical of radius R that contains a volume charge density $\rho_v = \frac{K}{C+r^2}\text{ C/m}^3$ where K and C are constants, Evaluate the total charge per unit length of beam.

7] A plane $y = 3\text{m}$ contains a uniform charge distribution of a density $\rho_s = \left(\frac{10^{-8}}{6\pi}\right)\text{ C/m}^2$

Determine \vec{E} at all points

8] Determine \vec{E} at $(x, -1, 0)\text{m}$ due to a uniform sheet charge with $\rho_s = \left(\frac{1}{3\pi}\right)\text{ nC/m}^2$

is located at $z = 5\text{m}$ and a uniform line charge with $\rho_l = \left(\frac{-25}{9}\right)\text{ nC/m}$ at $z = 3, y = 3\text{m}$.
