

problem 2) Electrostatic force experienced by $-3\mu\text{C}$ charge placed at point 'P' due to a system 'S' of fixed point charges as shown in figure is $\vec{F} = (21\hat{i} + 9\hat{j}) \mu\text{N}$.

(i) Find out electric field intensity at point P due to S.

(ii) If now, $2\mu\text{C}$ charge is placed and $-3\mu\text{C}$ is removed at point P then force experienced by it will be.



Solution : (i) $\vec{F} = q\vec{E} \Rightarrow (21\hat{i} + 9\hat{j})\mu\text{N} = -3\mu\text{C}(\vec{E})$

$$\Rightarrow \vec{E} = -7\hat{i} - 3\hat{j} \frac{\text{N}}{\text{C}}$$

(ii) Since the source charges are not disturbed the electric field intensity at 'P' will remain same.

$$\vec{F}_{2\mu\text{C}} = +2(\vec{E}) = 2(-7\hat{i} - 3\hat{j}) = (-14\hat{i} - 6\hat{j}) \mu\text{N}$$