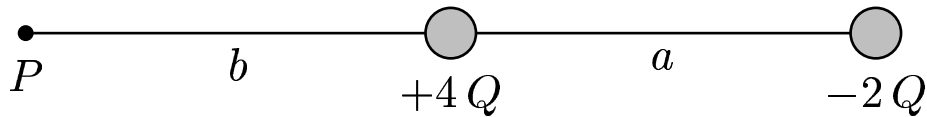


Two point charges are located a distance a apart and lie on the x -axis. Point P is located a distance b from the charge $+4Q$ (the left-most charge).



At P , the direction of the electric field due to the $-2Q$ charge and the $+4Q$ charge are in opposite directions.

Compare the magnitude of the electric fields from the two charges at a point P to the left of the $+4Q$ charge on the x -axes.

- A) Only $E_{-2Q} > E_{+4Q}$ is possible.
- B) Only $E_{-2Q} = E_{+4Q}$ is possible.
- C) Only $E_{-2Q} < E_{+4Q}$ is possible.
- D) All of the above are possible.
- E) None of the above are possible.

Coulomb's law is $\vec{E} = k \frac{Q}{r^2} \hat{r}$.

$$\|\vec{E}_{+4Q}\| = k \frac{|+4Q|}{b^2}$$

$$\|\vec{E}_{-2Q}\| = k \frac{|-2Q|}{(a+b)^2} < k \frac{|-2Q|}{b^2} < k \frac{|+4Q|}{b^2},$$

therefore only $E_{-2Q} < E_{+4Q}$ is possible.

Answer **C**.

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