

Name :

Solution

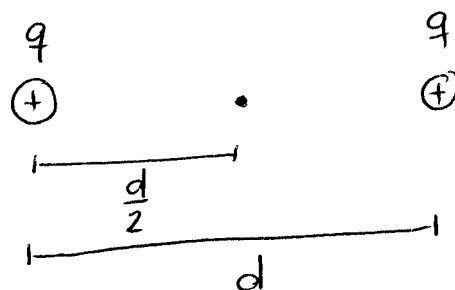
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Sec. # :

Two equal positive point charges are held a fixed distance apart and are found to repel one another with a force of 0.85 N. What is the electric potential at the point midway between the two charges? (Recall that the force between two point charges is given by $F = k q_1 q_2 / r^2$)

The force between
the two point charges is

$$F = k \frac{q^2}{d^2}$$



The potential at the
midway point is

$$V = k \frac{q}{\frac{d}{2}} + k \frac{q}{\frac{d}{2}} = 4k \frac{q}{d}$$

$$\Rightarrow V^2 = 16 k^2 \frac{q^2}{d^2} = 16 k F$$

$$\Rightarrow V = 4 \sqrt{k F}$$

$$= 4 \times \sqrt{9 \times 10^9 \times 0.85}$$

$$\Rightarrow \boxed{V = 3.5 \times 10^5 \text{ V}}$$