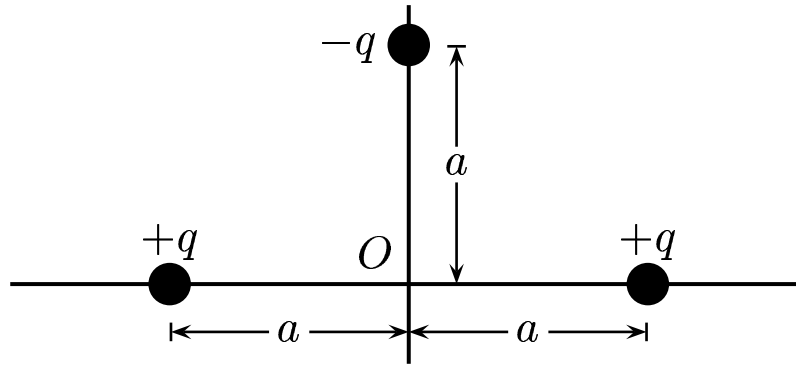


Three point charges are placed at equal distance from O .



Find the potential energy required to bring these charge from infinity to the positions shown above.

A) $U = k q^2 \left[\frac{1}{\sqrt{2}} - 1 \right]$

B) $U = k q^2 \left[\sqrt{2} - \frac{1}{2} \right]$

C) $U = k q^2 \left[\frac{1}{2} - \sqrt{2} \right]$

D) $U = k q^2 \left[1 - \frac{1}{\sqrt{2}} \right]$

$$\begin{aligned} U &= -k \left[\frac{(-q)(+q)}{\sqrt{2} a} + \frac{(-q)(+q)}{\sqrt{2} a} + \frac{(+q)(+q)}{2 a} \right] \\ &= -\frac{k q^2}{a} \left[-\frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2}} + \frac{1}{2} \right] \\ &= k q^2 \left[\frac{1}{2} - \sqrt{2} \right] . \end{aligned}$$

Answer C.

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