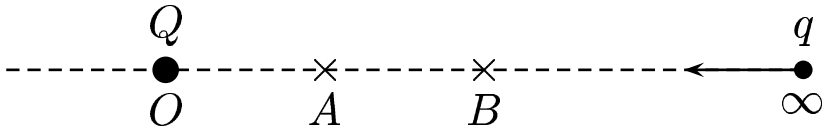
A positive point charge Q is located at O.

Given: The work in bringing another positive charge q from infinity to the point A is $W_{\infty \to A} = 1$ J.



Find the work required in bringing the same q from infinity to the point B, where $\overline{OB} = 2\,a$, with $a = \overline{OA}$.

A) $W = \dfrac{1}{4}$ J

B) $W = \dfrac{1}{2}$ J

C) $W = 1$ J

D) $W = 2$ J

E) $W = 4$ J

$W_{\infty \Rightarrow B} = U|_B = k\,\dfrac{Q\,q}{2a} = \dfrac{1}{2}\,k\,\dfrac{Q\,q}{a}$. Here $k\,\dfrac{Q\,q}{a} = 1$ J, since it is the potential energy at A. So $W_{\infty \Rightarrow B} = \dfrac{1}{2}$ J$= 0.5$ J.

Answer **B**.

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