Consider a mass-spring system, where the oscillation is described by $y = A\,\sin(\omega\,t)\,.$
The kinetic energy of the system is

$$K = \frac{1}{2}\,m\,\left(\frac{d\,y}{d\,t}\right)^2\,.$$

The potential energy of the system is

$$U = \frac{1}{2}\,k\,y^2\,.$$

The maxima are

$$K_{max} = \;m\,\frac{(\omega\,A)^2}{2}\,,\text{ and}$$

$$U_{max} = \;k\,\frac{A^2}{2}\,.$$

The total energy E of the system during the oscillations is

A) $E = K_{max} = U_{max} = \;m\,\dfrac{(\omega\,A)^2}{2}\,.$

B) $E = K_{max} + U_{max} = \;m\,(\omega\,A)^2\,.$

C) $E = K_{max} + U_{max} = \;k\,A^2\,.$

The total energy $E = K + U$, of the mass-spring system is a conserved quantity. E stays the same throughout the oscillations. When the mass passes the point $y = 0$, its potential energy is 0 and its kinetic energy is at its maximum. At the maximum stretch, its potential energy is maximum and its kinetic energy is 0.

Answer **A**.

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