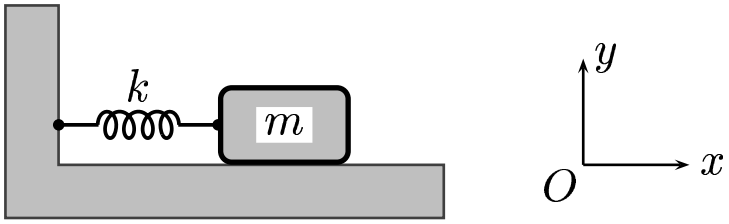
Consider a mass-spring system, where the oscillation is describe by $x = A\cos\omega t$. The kinetic energy is $K = \left(\frac{1}{2}\right) m \left(\frac{dx}{dt}\right)^2$. The potential energy is $U = \frac{k\,x^2}{2}$. The maxima are $K_{max} = \frac{m\,(\omega\,A)^2}{2}$, and $U_{max} = \frac{k\,A^2}{2}$.



Which choice below gives the total energy of oscillations?

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

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 $x = 0$, 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** .

13.02-06˙Total˙Energy˙of˙a˙Simple˙Harmonic˙Motion 2004-3-24