

Energies + Mechanical oscillators and waves

1. Object with weight 2 kg is situated at a table in the height 1 m over the floor. Calculate its potential energy with the respect of the floor.
2. How many times greater is an objects potential energy when three times higher?
3. What is the kinetic energy of a falling stone with the weight 2 kg after 5 seconds of free fall (starting with zero velocity)?
4. How many times greater is the kinetic energy of a ball that is going five times faster?
5. The equation of harmonic oscillator is: $y = 8\sin(4\pi t + 0.25\pi)$ [cm]. Find amplitude, period, frequency, phase and amplitude in $t = 0$ s.
6. Wind gusts create wave-ripples on the ocean that have a wavelength of 5 cm and propagate at 2 m/s. What is their frequency?

HW: How large is the velocity of a falling 1.2 kg ball, in the moment, when it hits the ground 3.5 meters below? (additional comment: it starts to fall from rest.)