

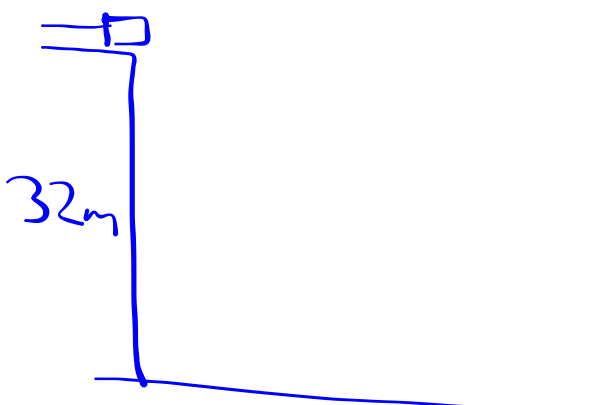
A pipe organ behaves like a free-free end system. How long does the pipe have to be to create a 150Hz wave in the second harmonic? Assume room temperature to be 20°C.

A 10kg giant slug slides down a frictionless ramp from a height of 5m above the ground. At the end of the slide the frictionless surface stops, and the slug continues to slide on a smooth table top with a coefficient of kinetic friction of 0.15

How far does the slug slide before coming to a complete stop?

A 900W electric pump is 90% efficient. If the pump runs for 3 minutes, what mass of water can be pumped to a height of 2m?

$v = 8.6 \text{ m/s}$



32m

Time of flight?
Range?

The diagram shows a horizontal line representing the ground. A vertical line of height 32m extends upwards from the ground. At the top of this vertical line, a small rectangle represents a projectile. A horizontal arrow points to the right from the top of the vertical line, labeled with the equation $v = 8.6 \text{ m/s}$. A horizontal line extends to the right from the base of the vertical line, representing the ground level.

What is the coefficient of static friction for a 95kg object that “slips” when a horizontal force of 180N is applied to it?

A 90 kg person pushes on a 50 kg person with a force of 45 N.

What is the acceleration of the 90 kg person?

If the frequency of a wave is 340 Hz and the wavelength is 2.5 m, what is the speed of the wave?

A 2 kg rock is thrown straight upward from the edge of a 40m tall cliff, with a velocity of 12 m/s.

The ground below the cliff is the zero reference line.

What is the **(i)** potential energy, **(ii)** kinetic energy, and **(iii)** the TOTAL energy of the rock at the instant it is thrown?

What is the TOTAL energy and maximum height the rock achieves during its flight?

What is the potential and kinetic energy of the rock when it is 6m off of the ground?

What is the velocity of the rock the instant before it strikes the ground?

A roller coaster descends 45 m from the top of the first high point to the first low point in the track.

The roller coaster converts gravitational potential energy to kinetic energy with an efficiency of 38%.

What is the velocity of the roller coaster at the bottom of the first low point?

The speed of a wave on a string with a fixed end and a free end is 380 m/s.

The frequency of the wave is 480.0 Hz.

What length of string is necessary to produce a standing wave with the *second* harmonic?