

Third Exam

Monday, October 21, 2013

This exam is closed book, but you may use calculators. Make sure your name is on all pages. Show all work, and show it in a logical and organized manner.

- A mass weighing 10 kilograms is hung vertically on a spring, and stretches the spring 40 cm. The mass is initially stretched down 50 cm from its resting position, then released with an initial downward velocity of 25 cm per second.
 1. Write down a function giving the location $y(t)$ of the weight at time $t \geq 0$.
 2. Calculate the natural frequency ω , period T , amplitude R , and phase shift δ of the mass' oscillations, where the oscillation is of the form

$$y(t) = R \cos(\omega t - \delta).$$

In your calculations, if the acceleration of gravity is needed, use 10 meters per second per second to approximate the acceleration due to gravity.