

Physics 221 – Spring 2012

Exam 1

Name: _____

This is the 2012 exam 1. Problem 2 will not be asked this year. The quizzes and workbooks in combination with the problems below should serve as adequate practice for the problems on the Exam. Also be sure to use the list of learning goals posted on the “Quiz” page.

1. Consider the 3 dB and the 6 dB rules of thumb that we learned about.
 - a. Describe the 3 dB rule.
 - b. Describe the 6 dB rule.
 - c. How are these different?
 - d. Demonstrate each rule mathematically with an example of your choosing.
- ~~2. Derive the equation for elastic potential energy from Hooke's Law.~~
3. A pendulum on earth has a period of 5 seconds.
 - a. How long is this pendulum?
 - b. If this pendulum is taken to the moon, find its new period. The moon's gravity is $1/6$ the Earth's.
4. A wave on a string is traveling in the $+x$ direction at a certain time and is shown in the figure to the right. The displacement of a single particle of the string is shown in the lower graph.
 - a. Write the equations of motion for a particle of this string.
 - b. What is the speed of the particle at 1.0 second?
 - c. What is the wave speed?

