

Department of Physics
Physics 1C – Summer Session 1 – 2011
Instructor Alexey Vlasenko

KEEP THIS HALF (along with the quiz)

My Code Number is: _____

YOUR CODE NUMBER IS YOUR IDENTITY FOR THIS COURSE; IT MUST BE WRITTEN ON EVERY TEST AND FUTURE HOMEWORK TURNED IN FOR THE COURSE.

Tear off at the line and turn in the bottom half. You are allowed to keep your quiz, but you need to turn in the bottom half of this page so that I know what exam code number corresponds to whom (it's important to write your name on the bottom half!).

On your blue book, and every future blue book and homework you turn in for the course, write your exam code number in addition to your name. Failure to do so will result in a 20% penalty.

In compliance with the Privacy Act, your scores will be posted by exam code number on the class website.

TURN IN THIS HALF
Physics 1C – Summer Quarter (1) – 2011

Print your full name below:

LAST NAME	FIRST NAME	MIDDLE INITIAL
-----------	------------	----------------

Your code number is _____. Write this number on everything you turn in for this course. Turn in this half of this page when you turn in your test.

Physics 1C, Summer 2011 (Session 1)
Midterm 1 (50+5 points)
July 7, 2011

Problem 1 (4+4+6 = 14 points)

A particle is undergoing simple harmonic motion. Its velocity is given by the equation $v(t) = (230 \text{ m/s}) \sin[(1000 \text{ s}^{-1})t]$. Give the answers to the following questions in SI units:

- a. What is the amplitude of the particle's motion?
- b. What is the period of the oscillatory motion?
- c. What is the first time t after $t = 0$ seconds that the particle will reach its equilibrium position?

Problem 2 (4+4 = 8 points)

Suppose you would like to create a pendulum with a 10 kg bob such that the period is exactly one second.

- a. What length of string should you use to create your pendulum?
- b. What length of string should you use if instead you use a 20 kg bob?

Problem 3 (4+4+4 = 12 points)

Transverse waves with a speed 50.0 m/s are to be produced in a string. The string is hanging from the ceiling with length 2 meters and total mass 5 grams.

- a. What mass should be attached to the end of the string to achieve the required tension?
- b. Draw a graph (displacement vs. position along the string) of the 2nd harmonic.
- c. What is the wavelength of the 2nd harmonic?

Problem 4 (4+4 = 8 points)

A family ice show is held in an enclosed arena. The skaters perform to music with a sound level of 80.0 dB. This is too loud for your baby, who consequently yells at a level of 75.0 dB.

- a. What total sound intensity engulfs you, assuming the intensities of the two waves add together with no interference?
- b. What is the combined sound level in dB?

Problem 5 (4+4 = 8 points)

- a. Suppose a car is driving down the street at 20 m/s relative to the road. The driver of the car sees an ambulance approaching the car from behind, going 40 m/s relative to the road. The ambulance has a siren, producing sound at a frequency of 440 Hz. What is the frequency of the siren as heard by the driver of the car?
- b. After the ambulance passes the car, what is the frequency of the siren as heard by the driver of the car?

Extra Credit (5 points)

A uniform cord of length L and mass m is hung vertically from a support. What is the speed of transverse waves in this cord as a function of h , the height above the lower end?