HW# 1 -Phys273-Spring 2003 Prof. Melanie Becker

Due Friday, Feb. 7, 2003, by 9am Room 4125, (301)405-1774

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Problem 1.

A block of mass 2 Kg hangs from a spring of force constant $k = 800 N/m$. The block is pulled 20 cm from equilibrium and released.

a) What are the amplitude, angular frequency and period of the motion?

b) What are the velocity and the acceleration of the block, when it is 12cm from equilibrium? [*10 points*].

Problem 2.

Two identical springs each have a spring constant $k = 20 N/m$. A 0.3 Kg mass is connected to them, as shown in figure (a) and (b). Find the period of motion for each system. Ignore friction forces [*10 points*].

Problem 4.

The masses of the figure below slide on an essentially frictionless table. The mass m_1 is attached to the spring but not m_2. If now m_1 and m_2 are pushed to the left, so that the spring is compressed a distance d, what will be the amplitude of the oscillation of m_1, after the spring system is released?

Figure of Problem3

Problem 4.

A uniform stick represented in the figure has a mass m and a length L and is pivoted at the center. In the equilibrium position shown, the identical light springs have their natural length.

a) Show that the stick will undergo simple harmonic motion, when turned through a small angle θ from the position shown and released.

b) What is the frequency of the motion?

c) How fast will the tip of the stick be moving, when the stick passes the horizontal? [*10 points*].

Problem H1.

As shown in the figure a uniform disk of radius R and mass M is attached to the end of a uniform rigid rod of length L and mass m. When the disk is suspended from the pivot as shown, what will be the period of motion?

Figure for Problem H1

Reading Assignment

Please read chapter 9 of RHK, as many of the concepts introduced in this chapter were used in class and not explained in detail, as it is assummed, that this subject has been covered in Phys 272.