Physics 100 HW 5 (Due 2/14/07) Name_____

1. (For this question, use the center of the Earth, which is 6.4×10^6 m straight down, as the pivot point.) Suppose you start from rest and then run due east at a speed of 3 m/s.

   a) What is your angular momentum?

   b) Angular momentum is conserved. What compensates for your change in angular momentum?

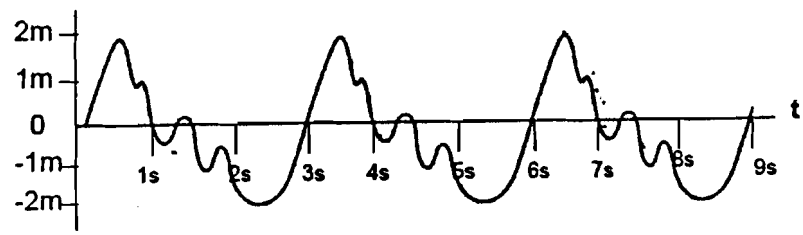
2. A pendulum oscillates back and forth with a frequency of 0.3 Hz. How long does it take it to make 50 full swings?

3. An object oscillates with a motion that is indicated in the graph. What is the

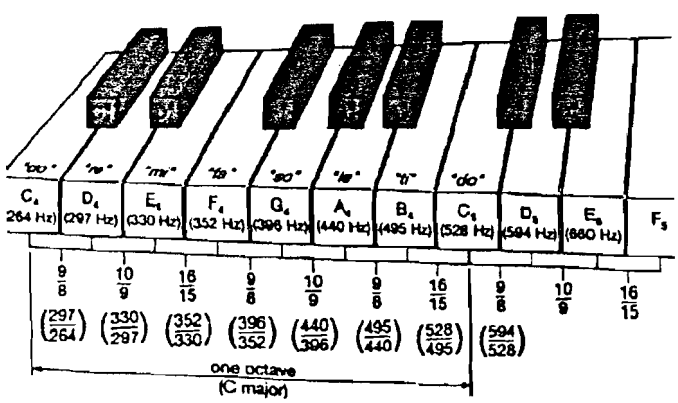
   a) Amplitude,

   b) Period, and

   c) Frequency of this oscillation?



4. The frequency for some of the musical scale starting at middle C are indicated in the accompanying figure. Using a speed of sound in air of 340 m/s, compute the the wavelengths of the sound notes for the eight notes (do-re-mi-fa-so-la-ti-do).

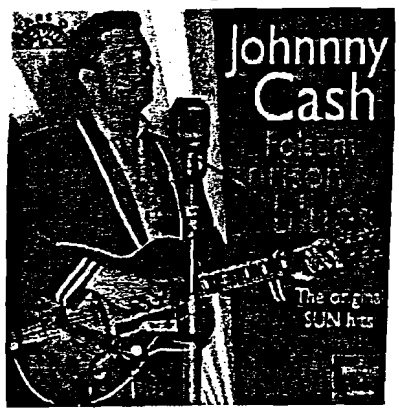


5. What is the velocity of waves in a 0.5 m long ukulele string that has a fundamental tone of 440 Hz?

6. In the late-great Johnny Cash's famous song *Folsom Prison Blues*, he sings:

   I *hear* that train a comin, a rollin roun da bend,
   I ain't had no lovin since I don't know when,...

   How do you think he can tell by *hearing* that the train is going around a turn?



7. When you run, you bend your arms sharply at the elbows; it is awkward to run with your arms fully extended, as they usually are when you walking. Why the difference?

8. Make a pendulum by hanging a weight from a string that is about 1 meter long.

   a) What is its frequency?

   b) You can make the frequency higher by shortening the string. At what length is the frequency twice as high?

   c) What happens to the frequency if you increase the weight?