

Physics 106b
Problem set number 4
Due Wednesday, February 3, 1999

Notes about course:

- Note that there is a “Ph106” box in room 335, which can be used for submitting homework sets.
- TAs:

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- Web page URL:
<http://www.cithec.caltech.edu/~fcp/ph106/>

Reading: Goldstein chapter 11. You may skip sections 5 and 6.

15. Suppose a particle moves in one dimension in a potential $V = k|x|^\gamma$, where $k > 0$, $\gamma > 0$. Find the form of the power law giving the frequency of oscillation in terms of the energy. Show that it gives the right result for the simple harmonic oscillator, and comment on the dependence on energy (“stiffness”) for other values of γ , in comparison with the simple harmonic oscillator.
16. Goldstein problem 11-1.
17. Goldstein problem 11-6.
 - (a) Do this problem using “variation of constants”.
 - (b) Do this problem using time-independent perturbation theory.
 - (c) Do your results in b) agree with a)?
18. Goldstein problem 11-12.