Physics 8.322, Spring 2003
Homework #6

Due **Monday, March 31** by 4:00 PM in the 8.322 homework box in 4-339B.

1. Sakurai: Problem 11, Chapter 4 (page 283)

2. Sakurai: Problem 12, Chapter 4 (page 284)

3. Kramer's theorem shows that for a time-reversal invariant system for which $\Theta^2 = -1$, the energy levels must be at least doubly degenerate. Show that 3-fold degeneracy is not possible.

4. Solve the Schrödinger equation in the Kronig-Penney periodic potential

$$V(x) = \lambda \sum_{n=-\infty}^{\infty} \delta(x - na).$$

You may set $\hbar = m = 1$. Find an analytic description of the conduction bands. Graph them for $0 \leq \lambda, \sqrt{2E} \leq 100$. Describe the results qualitatively for fixed λ, large E and for fixed E, large λ.