

Physics 621 Homework Assignment 5

due Tuesday October 20 2009

Unless otherwise indicated, the problems are from the textbook (Merzbacher, 3rd edition).

1. Exercise 5.4 (pg 84).
2. Prove relationship (5.42) from the text (this is the first half of Exercise 5.5).
3. For the 1D harmonic oscillator, show that $\langle p \rangle_n = 0$ for any stationary state ψ_n . Hint: the result from question 1 above may be useful.
4. For the 1D harmonic oscillator, show that $\langle V \rangle_n = \frac{E_n}{2}$, where V is the potential and E_n is the total energy, for any stationary state ψ_n .
5. Exercise 5.8 (pg 90).