

Exam 2 Monday

Monday, November 23, 2015 10:16

- a) Solve eigenfunctions, energy spectrum for both bound and scattering states of the Hamiltonian:
- i) infinite square well (§2.2)
 - ii) harmonic oscillator (§2.3)
 - iii) free particle (§2.4)
 - iv) δ -potential (§2.5)
 - v) finite square well (§2.6)
 - vi) step potential (prob #2.34)
 - vii) 2-state system (H08)
- b) Calculate time-evolution $|\Psi(x,t)\rangle$ of an initial state $|\Psi(x,0)\rangle$
- c) Calculate the probability of measuring a certain value of x , p , or E in a state $|\Psi\rangle$, and calculate expectation values. Describe what would happen to the probabilities when subsequently measuring the same or a different observable.
- d) Calculate scattering & transfer matrices for scattering states.
- e) recognize compatible observables $[\hat{A}, \hat{B}] = 0$ and conserved quantities $[\hat{H}, \hat{A}] = 0$.
- f) qualitative aspects of Fourier transforms and minimum uncertainty packets.