Phys 448 HW 7

1) BD 6.1
2) BD 6.2
3) Consider our toy “Ammonia” molecule, no electric field, with the N atom initially on the right hand side. The tunneling frequency (cycles per second) is $f_T$. Find the wavefunction after a “$\pi$” rotation, i.e. after it tunnels fully to the left side. Then do the same after it tunnels back to the right hand side (a “$2\pi$” rotation). We will discover later how to discern the interesting factors of $i$ and $-1$.
4) This time, let the molecule undergo a $\pi/2$ rotation. Then a large electric field is switched on, causing the energy levels of the molecule to be split by a value $\eta$ and turning off the tunneling. After a time $T$, the field is switched off again and the tunneling resumes for another $\pi/2$ rotation. Calculate the probability of finding the molecule in the left side of the molecule.