

Chemistry 1410
Homework #3 (assigned 9/20, due 9/30)

1. Give the energies of the first 20 levels of the square 2d particle-in-the-box problem.
2. Apply the 2D box problem to estimate the lowest excitation energy of coronene.
3. Suppose one prepares the 1D particle in the box system with equal probabilities of the $n = 1$ and $n = 2$ levels. Write out $\psi^*\psi$ for this system, including both the position and time variables. Write your result entirely in terms of trig. functions.
4. Consider the 2D square particle-in-the-box problem. For the ground state, what is the probability of the particle being in the range of $\frac{1}{4}a \leq x \leq \frac{3}{4}a$, $\frac{1}{4}b \leq y \leq \frac{3}{4}b$ (where $a = b$?)