Quantum Physics, Preparation for Tuesday, Mar. 19

Study Q10.4 and Q11.1 to Q11.5

You're finishing Q10 and doing Q11, except that I'm recommending you hold off on Q11.6 just because semiconductors is a substantial subject all of its own. Moore is continuing to give you a lot of the important facts about various solutions of Schrödinger's equation without yet having given you Schrödinger's equation. Of course, I have given it to you and the write-up of my presentation is on our course website. Because this class's material is mostly phenomenological facts, not theoretical derivations, you will probably find the problems pretty easy.

Presentation

Ren and Rebecca: Using the Pauli Exclusion Principle to discover how much energy it requires to stuff $2N$ electrons in a 1-D or 3-D box, ignoring Coulomb repulsion

For Problem Set 12

An application of Heisenberg's Uncertainty Principle

1. Q10B.3, p. 163, Moore just wants you to take Δx as 8 fm and determine Δp by solving for it in the Heisenberg Uncertainty Principle. Very hand-waving, and very easy, but still useful.

An elementary application of Bohr's model of the atom

2. Q10B.6, p. 163, you can use the result quoted in Q10B.4

A creative application of Bohr's model of the atom — to the harmonic oscillator

3. Q10M.5, p. 163

A kind of muonium

4. Q10M.6, p. 164, actually the term "muonium" is reserved for a $\mu^+ - e^-$ atom, but this gets at the idea

The Pauli Exclusion Principle

5. Q11M.9, p. 180, a proton and a neutron can be in exactly the same state (because they are *intrinsically* different, so it doesn't violate the Pauli Exclusion Principle)