The rules for the exam are the same as for the midterms: two sides (i.e., one sheet front and back) of your own notes, but no calculators or books. Problems on the final typically require more computation than on the midterms, but less than on the problem sets.

The exam is cumulative and covers all material covered in lecture through the middle of Thursday 5/3/2007. Although I will ask about material in chapter 5 that we covered (mostly 5.1 and 5.2), such questions will not be heavily computational as we have not had problem sets on this material yet. All material in the course will be covered roughly equally.

A good way to organize your review is to look over the list of lectures on the course website and check that you know the ideas from each lecture.

You are responsible for the few topics that we covered in class but are not in Griffiths. Some of these are in the problem sets but not in the main text. The main such topics are: gauge invariance and magnetic fields (problems 4.59-61 in Griffiths), constructing the product space out of single-particle Hilbert spaces, and exponentiating a Hermitian operator to construct a unitary one (Griffiths 3.39).

Examples of questions I could ask on Chapter 5:

1. What is the ground state energy of two electrons around a helium nucleus, in the usual approximation where the electrons do not interact? You may leave your answer in units of $E_1$, the energy of the 1s orbital state. What about three electrons? What about three bosonic particles with the charge and mass of an electron, but spin 0?

2. Write down a wavefunction, including spin, for two identical $s = 1/2$ fermions in the ground state of a harmonic oscillator. Assume that the particles do not interact with each other. If you want more work, suppose that the particles interact repulsively. What is the first excited state? (Hint: consider exchange forces and whether the first excited state of He is ortho- or para-).

3. Griffiths 5.5

4. Griffiths 5.12