Phys 448 HW 8

1) BD 7.1
2) BD 7.2
3) BD 7.6 (worth double)
4) Take the dye Hamiltonian of BD problem 6.2. Consider the operator $\rho = |1\rangle\langle 2| + |2\rangle\langle 3| + |3\rangle\langle 1|$. Is ρ Hermitian? Is it an observable? Does ρ commute with the Hamiltonian? Find the eigenvectors of ρ. Show that they are eigenvectors of H.
5) Now consider the operator $B = ib(\rho - \rho^{\dagger})$. Is B Hermitian? Is it an observable? Does it commute with H? Do H and B constitute a CSCO? Find the eigenvectors and eigenvalues of B. Show that the eigenvectors of B are eigenvectors of H. Now that you know the eigenvalues of B and H, what are the energies of the Hamiltonian $H' = H + B$?