FINAL EXAM

5. (continued)

(d) The eigenfunctions of Q can be expanded in terms of eigenfunctions of H:

$$|v_1\rangle = \frac{1}{\sqrt{2}}[|u_1\rangle + |u_2\rangle] \quad \text{and}$$
$$|v_2\rangle = \frac{1}{\sqrt{2}}[|u_1\rangle - |u_2\rangle].$$

Express the eigenfunctions of H in terms of the eigenfunctions of Q.

$$|u_1\rangle = \frac{1}{\sqrt{2}}[|v_1\rangle + |v_2\rangle]$$

$$|u_2\rangle = \frac{1}{\sqrt{2}}[|v_1\rangle - |v_2\rangle]$$

(e) At time $t = 0$ a measurement of Q yields the value $+1$. What is the state vector $|\psi(0)\rangle$ for the system just after this measurement?

$$|\psi(0)\rangle = |v_1\rangle$$