For the state

$$|\Psi\rangle = \sqrt{\frac{7}{10}}|2,1,0\rangle + \sqrt{\frac{1}{10}}|3,2,1\rangle + i\sqrt{\frac{2}{10}}|3,1,1\rangle$$

1. Convert the state to matrix notation.
2. Find $\mathcal{P}(L_z = 0\hbar)$
3. Find $\langle E \rangle$