

The answer to these problems will be collected in class on Oct. 12.

1. Write down the 2×2 matrix that transforms the jj coupled states $|(1s_{1/2}2p_{1/2}) 1\rangle$ and $|(1s_{1/2}2p_{3/2}) 1\rangle$ into LS coupled states $(1s2p) ^1P_1$ and $(1s2p) ^3P_1$.
2. Write down the 3×3 matrix that transforms the jj coupled states $|(2p_{1/2}3d_{3/2}) 1\rangle$, $|(2p_{3/2}3d_{3/2}) 1\rangle$, and $|(2p_{3/2}3d_{5/2}) 1\rangle$ into LS coupled states $(2p3d) ^1P_1$, $(2p3d) ^3P_1$, and $(2p3d) ^3D_1$.