8.19

(a) The ground state configuration for Sc is $[Ar](4s)^2(3d)^1$ for $[Ar]$ and $(4s)^2$, L and S are zero thus Angular momentum determines by 3d electron. $S = \frac{1}{2}$ and $L = 2$ and 3d shell is less than half full then total angular momentum Hund's third rule tell us that $J = |L - S| = \frac{3}{2}$ and we have $\boxed{{}^2D_{\frac{3}{2}}}$

(b) The ground state configuration of Cu is $[Ar](3d)^{10}(4s)^1$, for $[Ar]$ and $(3d)^{10}$ S and L are zero and total angular momentum determines by $(4s)^1$ electron, $S = \frac{1}{2}$ and $L = 0$, $J = \frac{1}{2}$

$\Rightarrow$ spectroscopic Notation for Cu is $\boxed{{}^2S_{\frac{1}{2}}}$