Problem W15:

List the quantum numbers (n, ℓ, m) for each of the $n = 3$ states in hydrogen. How many states are there in all for $n = 3$?

Problem W16:

Substitute the wave function

$$R(r) = Are^{-r/2a_0}$$

into the radial Schrodinger equation (8.17) and show that the equation can be satisfied for $\ell = 1$. What value of E is required to solve the equation?

Problem W17:

Make a sketch of the radial wave function $R(r)$ and the radial probability density $P(r)$ for an electron in the 2s state of hydrogen.

Problem W18:

Find the most probable value of r for electrons in the 2s state and the 2p state.

Problem W19:

(a) Find the average potential energy, $\langle V \rangle$, for an electron in the ground state of hydrogen (a numerical answer is desired).

(b) Find the average kinetic energy by making use of the fact that $\langle K \rangle + \langle V \rangle$ must be the total energy E.