**Solution to Marathon Problem 2**

a) **Assign the spectra for set #1, e.g., determine what the initial and final quantum numbers (n­initial and nfinal) are for all the lines in set #1 assuming Bohr’s theoretical relationship for H atoms below, which connects emission line wavelength, λ, with initial and final quantum states ninitial and nfinal**.

λ(nm) = 91.13278

(1/nfinal2  - 1/ninitial2)

**set #1**

**observed line wavelength, nm relative intensity of line\* ninitial nfinal**

97.208 5 4 1

102.524 10 3 1

121.510 100 2 1

486.042 3 4 2

656.156 7 3 2

1874.731 1 4 3

**\*assumes maximum intensity line of set #1 = 100**