PHYS 301 Bohr Model Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. In the line spectrum of atomic hydrogen there is also a group of lines known as the Pfund series. These lines are produced when electrons, excited to high energy levels, make transitions to the n equals 5 level. Determine **(a)** the longest wavelength and **(b)** the shortest wavelength in this series. **(c)** Refer to the electromagnetic spectrum, and state where these lines are found.

2. The Bohr model can be applied to singly ionized helium He Superscript plus Baseline left-parenthesis Upper Z equals 2 right-parenthesis. Using this model, consider the series of lines that is produced when the electron makes a transition from higher energy levels into thex n Subscript f Baseline equals 4 level. Some of the lines in this series lie in the visible region of the spectrum (380-750 nm). What are the values of n Subscript i for the energy levels from which the electron makes the transitions corresponding to these lines?

3. The energy of the n equals 2 Bohr orbit is negative 30.6  eV for an unidentified ionized atom in which only one electron moves about the nucleus. What is the radius of the n equals 5 orbit for this species?

4. A certain species of ionized atoms produces an emission line spectrum according to the Bohr model, but the number of protons *Z* in the nucleus is unknown. A group of lines in the spectrum forms a series in which the shortest wavelength is 40.51 nm and the longest wavelength is 72.93 nm. Find the next-to-the-longest wavelength in the series of lines.