# Quiz 8.2 – Multi-Electron Atoms

Name: _____

**Electronic Configurations**

List the three principles which lead to proper electronic configurations

Many of the elements break from the normal pattern for electronic configurations. There are three primary modes for these deviations. Give an example of an element, with its configuration, for each of these modes

What do these exceptions to the normal pattern tell us qualitatively about the orbital energies?

**Spin States of Multi-Electron Atoms**

Consider the excited He electronic state with a configuration $1s^1\ 2s^1$. This configuration can give rise to both singlet and triplet terms

Draw energy level diagrams which illustrate the difference between these excited states

Explain one experimental difference between the singlet and triplet states of excited He

**The Pauli Principle**

For the singlet state of excited He, give a valid total wavefunction which obeys the Pauli Principle

For the triplet state of excited He, give two valid total wavefunctions which obey the Pauli Principle (A third one exists, but it involves a new paradigm to derive it so we will leave it alone for now)

**True Multi-Electron Wavefunctions**

True electron orbitals for multi-electron atoms are not actually identical to the hydrogenic orbitals. What theory is used to approximate the true wavefunctions for multi-electron atoms, and what factor limits its accuracy?