Atomic Theory & Structure

EXERCISES

A. True or false:

1) An atomic orbital is a region in which we may expect to find an electron.
2) The maximum number of p-electrons in the first orbital shell is six.
3) In the ground state, electrons tend to occupy orbitals of the lowest possible energies.
4) The angular quantum number, ℓ, specifies the shape of the electron cloud around the nucleus.
5) Dalton's Atomic Theory states that all atoms are composed of protons, neutrons and electrons.
6) The electron was discovered by J.J. Thomson.
7) The Pauli Exclusion Principle states that atoms of two different elements can have no two quantum numbers alike.
8) The third orbital shell can contain a maximum of eight electrons.
9) The principal quantum number, n, indicates the energy levels of the electrons relative to their distance to the nucleus.
10) In a given atom, electrons in the 3s and 3p orbitals will have the same n and ℓ quantum numbers.
11) The fourth orbital shell can contain a total of 32 electrons.
12) The energy level of a 3d electron is higher than that of a 4s electron.
13) The larger the value of n, the greater the average distance of the electron from the nucleus.
14) All the elements in a group possess essentially the same outer-shell electron structure.
15) The Hund Principle states that electrons occupy the lowest-energy orbitals available before entering the higher-energy orbitals.
16) The electron structure for a carbon atom is $1s^2 2s^2 2p_x^2$.
17) The third orbital shell can contain nine electron orbitals.
18) The proton was discovered by James Chadwick in 1932.
19) A p orbital is spherically symmetrical around the nucleus.
20) The symbols for the four quantum numbers are n, ℓ, m, and s.