Quantum Atom Questions

PART 1

1. Which is incorrect in this group? (3p, 2d, 4s, 6f)
2. What is the maximum number of electrons that can be found in the following orbitals? 4p, 5f, 7s, 6d, 2p
3. What must be done to a 2s electron to make it a 3s electron? What must happen for a 3s electron to become a 2s electron?
4. Identify the groups containing the elements composed of atoms whose last electron:
    a. enters or fills a s level
    b. enters or fills a p level
    c. half fills a d level

5. Write the full and abbreviated electron configurations for the following: Si, Br, and K
6. Name the element that corresponds to the following configurations:
    a. $1s^2 2s^2 2p^1$
    b. $1s^2 2s^2 2p^6 3s^2$
    c. $1s^2\ 2s^2 2p^6 3s^2 3p^6 3d^3 4s^2$

7. What is characteristic about the electron configurations of the alkali metals, the alkaline earths, the halogens, and the inerts?

PART 2

8. Consider the following electron configurations:
    a. $1s^2 2s^2 2p^6 3s^2$
    b. $1s^2 2s^2 2p^6 3s^1$
    c. $1s^2 2s^2 2p^6$
    d. $1s^2 2s^2 2p^5$
    e. $1s^2 2s^2 2p^3$

    a. Which of these configurations would you expect to have the lowest ionization energy?
    b. Which of these configurations would you expect to have the highest ionization energy?
    c. Which of these configurations would you expect to have the lowest electron affinity?
    d. Which of these configurations would you expect to have the highest electron affinity?
    e. Which of these configurations would you expect to have the highest second ionization energy?

9. Write the electronic configurations for Ne and Ar. Why do they have negative electron affinities?
10. Write the electronic configurations for Ca and Zn. Why are their electron affinities less positive than anticipated (actually negative)?
11. Write the electronic configurations for K and Ca. Why does K have a higher electron affinity than Ca?
12. Write the electronic configurations for N and O. Why does nitrogen have a greater ionization energy than oxygen?
13. Look at the short-hand electronic configuration for Mn (on the periodic table under the symbol). Why does it have a negative electron affinity?
14. Look at the short-hand electronic configurations for Mn, Tc and Re. Why does Re have a highest electron affinity.