AP WORKSHEET 01E: Electronic Configuration Summary

1. Give full *and* abbreviated (noble gas core method) electronic configurations for the following. (8)

   (a) Br FULL _____

   NOBLE GAS CORE _____

   (b) Cr FULL _____

   NOBLE GAS CORE _____

   (c) Fe FULL _____

   NOBLE GAS CORE _____

   (d) S^{2-} FULL _____

   NOBLE GAS CORE _____

2. For each of the following sets of orbitals, indicate which orbital is *higher* in energy. (4)

   (a) 1s, 2s _____

   (b) 2p, 3p _____

   (c) $3p_x$, $3p_y$, $3p_z$ _____

3. Indicate the block (s, p or d) in which each of the following elements found. (5)

block

(a) Sc _____

(b) P _____

(c) Fr _____

(d) Ni _____

(e) As _____

4. An *atom* has two electrons with principal quantum number (n) = 1, eight electrons with principal quantum number (n) = 2 and seven electrons with principal quantum number (n) = 3. From these data, supply the following values (if insufficient information is given, say so).

(a) The mass number. (2) _____

(b) The atomic number. (1) _____

(c) The electron configuration. (2) _____

5. Identify the element from the electron configurations of *atoms* shown below. (3)

(a) [Ne] $3s^2\ 3p^2$ _____

(b) [Ar] $4s^2\ 3d^7$ _____

(c) [Xe] $6s^2$ _____

6. Give the symbol of the atom or ion represented by the following sets of atomic numbers and electronic configurations. (4)

	Atomic #	Electronic Configuration	Symbol of Atom or Ion
(a)	8	$1s^2\ 2s^2\ 2p^4$	_____
(b)	11	$1s^2\ 2s^2\ 2p^6$	_____
(c)	14	$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^2$	_____
(d)	22	$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^2$	_____

7. Give the electron configurations for the following transition metal ions. (3)

(a) Sc^{3+} _____

(b) Cr^{2+} _____

(c) Ni^{3+} _____

8. Consider the element Scandium, atomic # 21.

(a) If the electronic configuration of the element were constructed "from scratch", into which orbital (and into which shell) would the final electron be placed? (1) _____

(b) When scandium forms an ion with a charge of +1, from which orbital (and from which shell) would the electron be removed? (1) _____

9. Of the following species (Sc, Ca^{2+}, Cl, S^{2-}, Ti^{3+}), which are isoelectronic? (1)

_____

10. Identify the element that is composed of atoms where the **last** electron; (5)

    (a) Enters and fills the 4s sub-shell _____

    (b) Enters but does not fill the 4s sub-shell _____

    (c) Is the first to enter the 2p sub-shell _____

    (d) Is the penultimate to enter the 4p sub-shell _____

    (e) Is the second to enter the 4d sub-shell _____

11. Write the full electronic configuration for argon. (1)

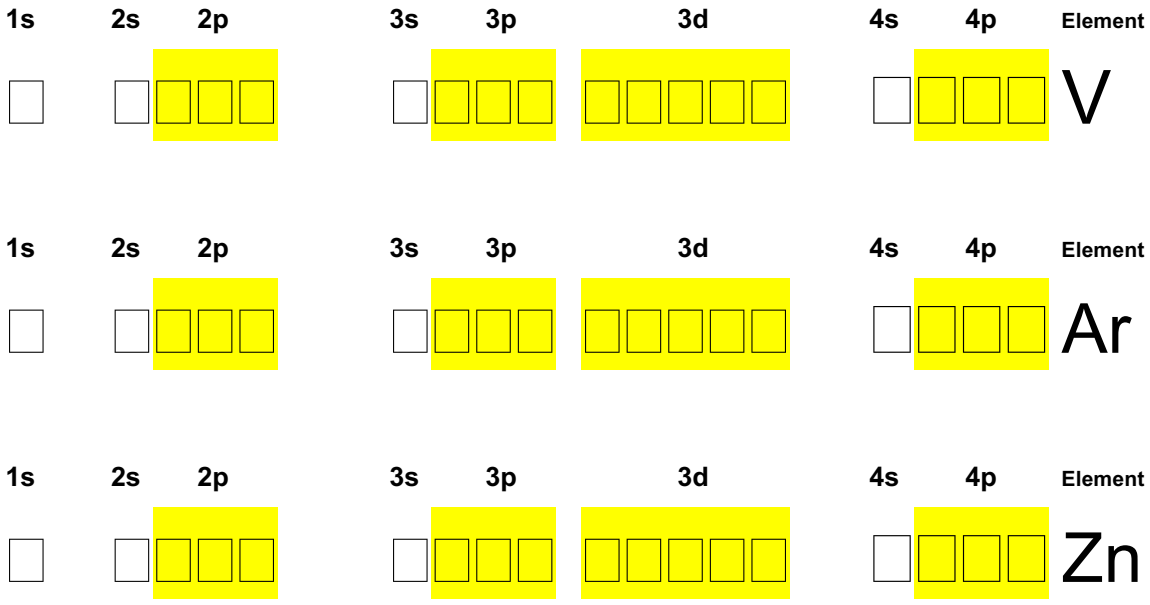
    _____

12. Identify two positive *and* two negative ions that are isoelectronic with argon. (4)

    (a) Two positive ions _____ _____

    (b) Two negative ions _____ _____

13. Using the electrons in boxes notation complete the electronic configurations of the following elements. (3)



14. State the number of *unpaired* electrons in each of the electronic configurations in question 13. (3)

# of unpaired electrons

(a) V _____

(b) Ar _____

(c) Zn _____

15. How would you expect the magnitude of the energy absorbed in the process, 1st shell ➔ 4th shell transition, to vary for a He^+ ion compared to a Li^{2+} ion? Explain your answer. (2)

_____

_____

_____

16. Identify the following atoms as either paramagnetic or diamagnetic. (3)

(a) Ga _____

(b) Cr _____

(c) Ni _____