

- 1) What elements are composed of atoms having the following electron configurations? Also determine # valance electrons and number of unpaired electrons for each.

	Element	# of Valence electrons	# of unpaired electrons
a) $1s^2 2s^2 2p^6 3s^2 3p^3$	P	5	3
b) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5$	Mn	2/?	5
c) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^4$	Se	6	2
d) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^6$	Ru	2/?	4
e) $[\text{Kr}]5s^2 4d^{10}$	Cd	2/?	0
f) $[\text{Xe}]6s^2 4f^{14} 5d^3$	Ta	2/?	3

- 2) Write the Noble Gas Notation ground-state electron configurations of the following elements:

- Chromium (#24) $[\text{Ar}]4s^2 3d^4$
- Molybdenum (#42) $[\text{Kr}]5s^2 4d^4$
- Tellurium (#52) $[\text{Kr}]5s^2 4d^{10} 5p^4$
- Platinum (#78) $[\text{Xe}]6s^2 4f^{14} 5d^8$
- Radon (#86) $[\text{Xe}]6s^2 4f^{14} 5d^{10} 6p^6$
- Bohrium (#107) $[\text{Rn}]7s^2 5f^{14} 6d^5$

- 3) Why does the 4s sublevel fill with electrons before electrons are found in the 3d sublevel?

The 4s sublevel becomes lower in energy than the 3d sublevel when the sublevels split in a many-electron atom.

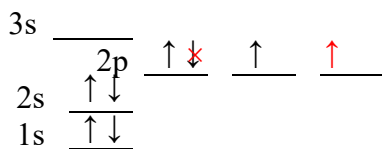
- 4) The following are **not** valid ground-state electron configurations. **Circle the error(s)** in each configuration and **correct what is wrong**. There may be multiple errors.

- Al (#13): $1s^2 2s^2 2p^6 3s^3$ $1s^2 2s^2 2p^6 3s^2 3p^1$ (3s can hold only 1 e⁻)
- S (#16) $1s^2 2s^2 2p^6 3s^3 2d^4$ $1s^2 2s^2 2p^6 3s^2 3p^4$ (only 2 electrons in 3s; 2d orbital—3p follows 3s)
- Br (#35) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 4d^{10} 4p^5$ $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^5$ (3d comes after 4s)
- Zr (#40): $[\text{Ar}]4s^2 3d^{10} 4p^5 5s^2 5p^2$ $[\text{Kr}] 5s^2 4d^2$ ([Ar] is wrong gas; would be 4p⁶; 4d follows 5s)
- Rf (#104) $[\text{Ra}] 5f^{14} 6d^1$ $[\text{Rn}] 6s^2 5f^{14} 6d^2$ (Ra is not a noble gas; Rf ends at 6d²)
- Xe (#54) $[\text{Xe}]$ $[\text{Kr}]5s^2 4d^{10} 5p^6$ (an element can't be its own Noble gas configuration)

More on back...

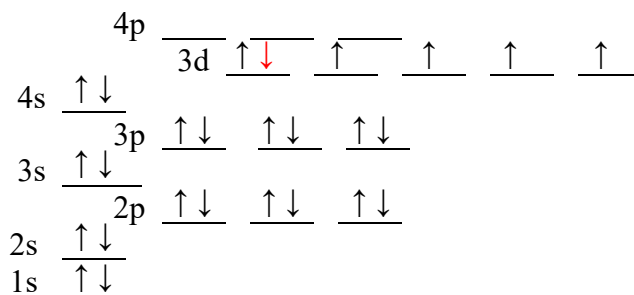
5) Shown here are arrow diagrams for the elements named. Each diagram is incorrect in some way. Explain the error in each and correct each diagram.

a) Element: Nitrogen



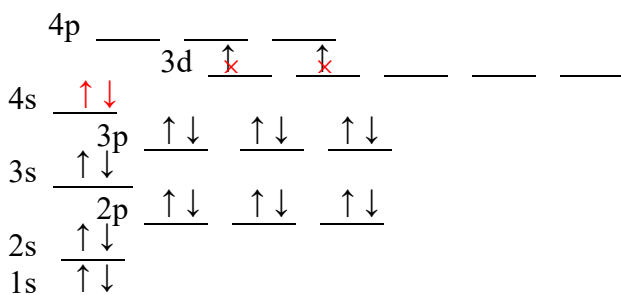
Explain error: Electrons in orbitals of equal energy were not arranged with the maximum unpaired electrons.

c) Element: Iron



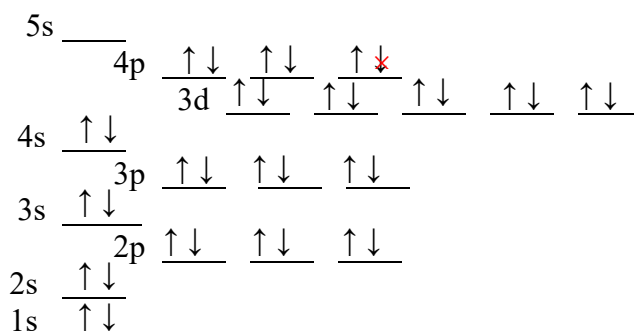
Explain Error: There are too few electrons. Only 25 electrons were entered rather than the 26 electrons needed in Fe.

b) Element: calcium



Explain error: Electrons were entered into the 3d orbital rather than the lower energy 4s.

d) Element: bromine



Explain Error: There was one extra electron. 36 electrons were entered rather than the 35 that Br has.