WKS - Chem 1
Elements & Electron Configurations of Ions II

Name: Answer Key
Period: _____ Date: _____

Part I

1. Why are elements in groups 1A through 8A called representative elements?
   Because all of the different types of elements, i.e. metals, non-metals & metalloids, are found in these groups.

2. What determines the chemical behavior of an element?
   The number of its valence electrons.

3. What is an allotrope? Describe 2 allotropes of carbon.
   It is a form of an element that has a different structure and different properties. Graphite is composed of sheets of carbon hexagons held weakly together; diamond is composed of interlocking tetrahedra of carbon atoms; buckyballs are hollow spheres of interlocking hexagons and pentagons of carbon.

4. What factor determines the magnetic properties of an element and the color of its compounds?
   The presence of unpaired d electrons.

Part II For the following transition metal ions, first indicate the electron configuration of the neutral element, then determine how many electrons are lost to form the ion and write the configuration of the ion. Remember, transition metals first lose their two s-electrons, and then lose d-electrons to get to their charge.

Ion	Config of Element	#e^- lost	Config of Ion
ex Fe^{3+}	[Ar] $4s^2 3d^6$	3 e^- lost	[Ar] $3d^5$
5. Pd^{2+}	[Kr] $5s^2$ $4d^8$	2 e^- lost	[Kr] $4d^8$
6. Ti^{4+}	[Ar] $4s^2$ $3d^2$	4 e^- lost	[Ar]
7. Mn^{4+}	[Ar] $4s^2$ $3d^5$	4 e^- lost	[Ar] $3d^3$
8. Zn^{2+}	[Ar] $4s^2$ $3d^{10}$	2 e^- lost	[Ar] $3d^{10}$
9. Rh^{4+}	[Kr] $5s^2$ $4d^7$	4 e^- lost	[Kr] $4d^5$

Part III For the following transition metals, first write the electron configuration of the neutral element. From the given electron configuration of the ion, determine number of electrons lost and write the formula of the ion (including the charge on the ion).

Element	Config of Element	Config of Ion	#e^- lost	Ion w/ Charge
ex Nb	[Kr] $5s^2 4d^3$	[Kr] $4d^2$	3 e^- lost	Nb^{3+}
10. Fe	[Ar] $4s^2$ $3d^6$	[Ar] $3d^6$	2 e^- lost	Fe^{2+}
11. Cd	[Kr] $5s^2$ $4d^{10}$	[Kr] $4d^{10}$	2 e^- lost	Cd^{2+}
12. Y	[Kr] $5s^2$ $4d^1$	[Kr]	3 e^- lost	Y^{3+}
13. Cr	[Ar] $4s^2$ $3d^4$	[Ar] $3d^3$	3 e^- lost	Cr^{3+}
14. Ru	[Kr] $5s^2$ $4d^6$	[Kr] $4d^5$	3 e^- lost	Ru^{3+}