PHYS 321 Chap-2 Hwk-1 Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2.1 Cite the difference between atomic mass and atomic weight.

2.3 *Zinc has five naturally occurring isotopes: 48.63% of 64Zn with an atomic weight of 63.929 amu; 27.90% of 66Zn with an atomic weight of 65.926 amu; 4.10% of 67Zn with an atomic weight of 66.927 amu; 18.75% of 68Zn with an atomic weight of 67.925 amu; and 0.62% of 70Zn with an atomic weight of 69.925 amu. Calculate the average atomic weight of Zn.*

2.4 (a) Cite two important quantum-mechanical concepts associated with the Bohr model of the atom.

(b) Cite two important additional refinements that resulted from the wave-mechanical atomic model.

2.7 Give the electron configurations for the following ions: Fe, Fe2+, Fe3+, Al3+, Cu+, Ba2+, Br-, and O2-.

P 2.15: For a K+-Cl- ion pair, attractive and repulsive energies *EA* and *ER*, respectively, depend on the distance between the ions *r*, according to

|  |
| --- |
| http://edugen.wileyplus.com/edugen/courses/crs4676/common/art/pixel.gif |
| http://edugen.wileyplus.com/edugen/courses/crs4676/callister9977/callister9977c02/math/math025.gif |  |
| http://edugen.wileyplus.com/edugen/courses/crs4676/common/art/pixel.gif |

For these expressions, energies are expressed in electron volts per K+-Cl- pair, and *r* is the distance in nanometers. The net energy *EN* is just the sum of the preceding two expressions.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| http://edugen.wileyplus.com/edugen/courses/crs4676/common/art/pixel.gif |

|  |  |
| --- | --- |
| (a)   | Superimpose on a single plot *EN*, *ER*, and *EA* versus *r* up to 1.0 nm (Use Excel). |
| http://edugen.wileyplus.com/edugen/courses/crs4676/common/art/pixel.gif |
| (b)   | On the basis of this plot, determine (i) the equilibrium spacing *r*0 between the K+ and Cl- ions, and (ii) the magnitude of the bonding energy *E*0 between the two ions. |
| http://edugen.wileyplus.com/edugen/courses/crs4676/common/art/pixel.gif |
| (c)   | Mathematically determine the *r*0 and *E*0 values using the solutions to Problem [2.14](http://edugen.wileyplus.com/edugen/courses/crs4676/callister9977/callister9977c02/callister9977/callister9977c02/callister9977c02xlinks.xform?id=callister9977c02-prob-0017) and compare these with the graphical results from part (b). |

 |