

- Determine location on periodic table given an electron configuration
- Dot diagrams, valence electrons, HOELs
- Energy calculations in the hydrogen atom (diagram at top of p. 8 of Reference Tables)
- Ground state vs. excited state (definitions, emission & absorption of energy)
- Lowest to highest energy orbitals, sublevels, energy levels

- 33.) Write the electron configuration for nickel (Ni) and selenium (Se).
 34.) Identify the highest occupied energy level (HOEL) and # of valence electrons for nickel and selenium.
 35.) Write the noble gas configurations for nickel and selenium.
 36.) Draw the electron dot diagrams for nickel and selenium.
 37.) Draw the orbital notation for the HOEL of nickel and selenium.
 38.) Determine the four quantum numbers for the last electron added to nickel and selenium.

Unit 5 – Periodic Table & Periodic Law

- History of periodic table (Mendeleev, Moseley)
- Main group elements (valence e⁻, lose vs. gain e⁻, size difference between atom & ion, oxidation #)
- Periodic law & periodic trends (atomic radius, ionization energy, electronegativity, metallic & nonmetallic character)

- 39.) How is an element's location on the Periodic Table related to its HOEL?
 40.) How is an element's location on the Periodic Table related to its number of valence electrons?
 *Use the following Periodic Table to answer the questions that follow.

1																			18
	2																		
A	B																		
		3	4	5	6	7	8	9	10	11	12								

- 41.) Which element has an oxidation number of -1?
 42.) Which element is unreactive?
 43.) Which element(s) are metals?
 44.) Which element's electron configuration ends with 2s²?
 45.) Which element has 5 electrons in its HOEL?
 46.) Which element(s) are metalloids?

- 47.) Which element is the most reactive metal?
 48.) Which element is the most reactive nonmetal?

*Without looking at the Periodic Table, write the expected outer electron configuration for the element in...

- 49.) Period 2, Group 14 50.) Period 5, Group 17 51.) Period 3, Group 1

Unit 6 – Bonding

- Definitions of ionic and covalent bonding – types of elements involved, electronegativity differences
- Intermolecular forces (hydrogen bonding, dipole-dipole, London dispersion)
- Molecular polarity
- Properties of ionic and molecular substances
- Why atoms bond together

*Identify the predominant type of bonding in the following compounds (**ionic**, **covalent**, or **both**)...

- 52.) CO₂ 53.) Na₂SO₄ 54.) MgBr₂ 55.) Ag₂CO₃

*Between what types of substances do the following intermolecular forces (IMFs) occur?

- 56.) hydrogen bonding 57.) dipole-dipole forces 58.) London dispersion forces

Unit 7 – Chemical Formulas

- Empirical and molecular formulas (definitions, differentiating between the two, calculate using %)
- Nomenclature – writing formulas and naming compounds
- Oxidation numbers & % composition by mass of elements in a compound

*Write the formula for...

- 59.) potassium carbonate 60.) chromium (III) nitrate 61.) dinitrogen pentoxide
 62.) zinc sulfide 63.) magnesium dichromate 64.) lead (IV) sulfate

*Name the following compounds...

- 65.) Na_2CrO_4 66.) AgBr 67.) SO_3
 68.) $\text{Ca}(\text{ClO}_3)_2$ 69.) PbSO_4 70.) $\text{Fe}(\text{OH})_3$

*Which compound has the highest percent by mass of nitrogen?

- 71.) (A) NO_2 (B) $\text{Be}(\text{NO}_2)_2$ (C) NaNO_3

*Find the oxidation number of nitrogen in the following compounds...

- 72.) $\text{Zn}(\text{NO}_3)_2$ 73.) $\text{Zn}(\text{NO}_2)_2$ 74.) Mg_3N_2 75.) N_2O_4

*Solve.

76.) What is the empirical formula of a compound containing 56.5% potassium, 8.7% carbon, and 34.8% oxygen?

77.) A compound has the empirical formula CH_2O . If the molar mass of the actual formula is 180 g/mole, what is the molecular (actual) formula for the compound?

*Fill in the charts...

Unit 3

Name	Symbol	# of p ⁺	# of e ⁻	# of n ^o	Atomic #	Mass #
		50				118
iron - 56						
	$^{14}\text{N}^{-3}$					
			14	14		

Unit 4

Energy	Wavelength (long/short)	Frequency (high/low)
High		
Low		

Unit 5

	Across a Period (left to right)	Down a Group (top to bottom)	Noble Gases Included? (yes or no)
Atomic Radius			
Electronegativity			
Electron Affinity			
Ionization Energy			
Metallic Character			
Nonmetallic Character			

Unit 6

Compound	Lewis Structure	Shape	Molecular Polarity
H ₂ O			
CF ₄			
CO ₂			
NH ₃			
NO ₂ ⁻¹			