## **SNC2DI Chemistry: Review**

1. Be able to recognize and understand the importance of the following terms:

Chemistry	Stable octet	Anion	Synthesis reactions
Matter	lon	Law of Conservation of Mass	Decomposition reactions
Atom	Metal	Chemical formula	Single displacement reactions
Protons	Non-metal	Binary compounds	Double displacement reactions
Neutrons	Metalloid	Poly-atomic ions	Signs of chemical changes
Electrons	Chemical Family or Group	Covalent bond	Acids
Atomic number	Chemical Period	Covalent compound	Bases
Mass number	lonic bond	Products	pH scale
Isotopes	Ionic compound	Reactants	Neutralization reactions
Valence electrons	Cation	Word & Balanced Equations	pH indicator

2. Complete the chart for the following atoms and ions:

Element Name	Symbol		# of Protons	# of Electrons		Mass Number	Overall Charge
Phosphorus	Р	15	15	18	23	38	3 -
manganese	Mn	25	25	23	31	56	+2
magnesium			12		14		0
	F			10		19	
		18			21		0
	Mg					25	2 +
Scandium				18	23		
				21	31		4 +
			34	36		79	
				18	19		1 -

3. What relationship is there between the atoms of manganese shown in question 2?\_\_\_\_\_

4	4. What	What relationship is there between the atoms of magnesium shown in question 2?							
	5. Krypton (atomic number 36) has a stable octet arrangement of electrons in the outer shell. List four ions with 36 electrons (include their charge):								
6	6. Compare the properties of metals and non-metals with four different characteristics.								
7	7. Complete	the following	chart:						
		calcium	selenium	cesium	lead	carbon	argon	fluorine	
Ī	Period (row)								

8. Complete the following chart for the Groups (families) of elements on the Periodic Table:

Group Number	# of Valence Electrons	Metal or Non-metal ?	Lose or Gain Electrons?	Charge on Ion that Forms
1				
2				
6 (16)				
7 (17)				
8 (18)				

- 9. Would two metal atoms ever combine to form a compound? Explain why or why not.
- 10. What kinds of elements combine to make ionic compounds? What holds the compound together?
- 11. What kinds of elements combine to form covalent compounds? What holds the compound together?
- 12. What is the charge on the platinum ion in  $PtS_2$ ? The zirconium ion in  $Zr(NO_3)_4$ ?
- 13. Compare the properties of covalent and ionic compounds with regard to: melting points, presence of odours, solubility in water, and the ability of the pure substance and solution to conduct electricity.
- 14. Use Lewis dot diagrams to show the formation of the **ionic** compounds between the following atoms below. Show all three steps:
- a) sodium and oxygen

Group Number (column)

c) potassium and chloride

b) beryllium and carbon

d) aluminum and sulfur

15. Complete the following chart, assuming that hydrogen is a non-metal. Use the chemical formula to find the number of atoms or ions of each element that are present in each compound. Chemical **Ionic or Covalent** Number of Each Type of Atom in this Formula Compound? Compound  $C_2H_2F_4$ Na<sub>2</sub>O  $Ba(NO_3)_2$ NOCH<sub>3</sub> Ca(HCO<sub>3</sub>)<sub>2</sub>  $Sn_3(PO_4)_4$ 16. Name the following ionic compounds (remember to use Roman Numerals where necessary): f) Na<sub>2</sub>CO<sub>3</sub> \_\_\_\_\_ CaO a) PbCl<sub>4</sub> \_\_\_\_\_ g) Fe<sub>2</sub>O<sub>3</sub> \_\_\_\_\_ b) h) Mg(NO<sub>3</sub>)<sub>2</sub>\_\_\_\_\_ BaS c) CrCl<sub>3</sub> \_\_\_\_\_ i) Co<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>\_\_\_\_\_ d) j) NH<sub>4</sub>(HCO<sub>3</sub>) \_\_\_\_\_ e) Al(OH)<sub>3</sub> \_\_\_\_\_ 17. Write the chemical formulas for the following ionic compounds: a) silver carbonate f) manganese (II) bromide \_\_\_\_\_ b) nickel (III) hydroxide \_\_\_\_\_ g) ammonium phosphate \_\_\_\_\_ c) iron (II) sulfide \_\_\_\_\_ h) zinc carbide i) tin (IV) hydrogen sulfate \_\_\_\_ d) cobalt (III) nitrate e) molybdenum (V) oxide \_\_\_\_\_ j) gold (I) phosphide 18. Write the chemical formulas of the following **covalent compounds**: e) tricarbon octahydride a) carbon tetrachloride b) diphosphorus tetroxide \_\_\_\_\_ f) nitrogen triiodide c) bromine pentafluoride \_\_\_\_\_ g) silicon dioxide d) selenium monoxide h) iodine heptachloride 19. Write the names of the following covalent compounds. SF<sub>6</sub> \_\_\_\_\_\_ e) CH<sub>4</sub> \_\_\_\_\_ a)  $P_4O_{10}$  \_\_\_\_\_ f)  $N_2S_5$  \_\_\_\_\_ b) Cl<sub>2</sub>O<sub>7</sub> \_\_\_\_\_\_ g) OF<sub>2</sub> \_\_\_\_\_ c) SeF<sub>2</sub> \_\_\_\_\_\_ h) NH<sub>3</sub>\_\_\_\_\_ d)

20. Balance the following chemical reactions. Classify each reaction.

a)	Cu +	$O_2$	$\rightarrow$	Cu <sub>2</sub> O						
b)	XeF <sub>6</sub>	+	H <sub>2</sub> O	$\rightarrow$	XeO <sub>3</sub>		+	HF		
c)	Al +	HCl	$\rightarrow$	$H_2$	+	AlCl <sub>3</sub>				
d)	$PCl_3$	+	$H_2S$	$\rightarrow$	$P_2S_3$		+	HCl		
e)	$PH_3$	$\rightarrow$	$H_2$	+	Р				 	
f)	Cu	+	S <sub>8</sub>		$\rightarrow$	Cu <sub>2</sub> S			 	
g)	SnO →	Sn	+	$O_2$					 	_
h)	Cu(NO <sub>a</sub> ) <sub>a</sub>	+ Fe	$\rightarrow$	Fe(N	O.).	+	Cu			

- 21. Write word equations and balanced chemical equations for the following reactions:
- a) chromium (II) sulfate reacts with calcium nitride to form chromium (II) nitride and calcium sulfate
- b) propane (C<sub>3</sub>H<sub>8</sub>) burns in air to produce carbon dioxide and water
- c) hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) breaks down to form water and oxygen gas
- d) aluminum metal reacts with iron (III) oxide to form iron metal and aluminum oxide
- 22. What are the four signs that a chemical change has taken place?
- 23. What causes a substance to be acidic, basic or neutral?
- 24. Identify the following as acids, bases or neutral substances from their chemical formulas and write their names:

HCIO <sub>3</sub>	H <sub>3</sub> PO <sub>3</sub>	NH₄OH	Cd(OH) <sub>2</sub>
H <sub>2</sub> O	NaCl	Mg(OH) <sub>2</sub>	HBr

Toothpaste	(pH 8.1)
Window cleaner	(pH 11.6)
Mouthwash	(pH 7.2)
Vinegar	(pH 2.5)
Grape juice	(pH 3.5)
Hair remover	(pH 11.7)
Oven cleaner	(pH 13.7)
Coke	(pH 3.1)

- 25. A student tested the pH of several household items. She found the pH values shown in the chart to the right. Write acid or base in the space beside each substance.
- 26. Referring to the pH values in question 34:
- a) How many times stronger is vinegar than grape juice?

b)	Which is stronger: hair remover or oven cleaner?
	By how many times?
c)	Which substance is the strongest acid?
d)	Which substance is the strongest base?

- 27. What are three chemical indicators that can be used to identify acids and bases? What colour does each indicator turn in an acidic solution and in a basic solution?
- 28. Write the general word equation for the reaction that occurs when an acid and a base are mixed.
- 29. What happens to the **properties** of acids and bases when they are mixed together?