

## SNC 2DI Exam Review: Chemistry Unit

1. Understand the meaning of the following terms. Be able to recognize their definitions:

Protons	Chemical Family or Group	Ionic compound	Double displacement reaction
Neutrons	Chemical Period	Covalent bond	Precipitate
Electrons	Group Number	Covalent Compound	Rate of reaction
Atomic number	Valence electrons	Law of Conservation of Mass	Temperature
Mass number	Stable Octet	Reactants	Acid (and its pH range)
Isotopes	Ion	Products	Base (and its pH range)
Metal	Anion and cation	Synthesis reaction	Neutralization reaction
Non-metal	Chemical formula	Decomposition reaction	Sulfuric acid (battery acid)
Metalloid	Ionic bond	Single displacement reaction	Hydrochloric acid (stomach acid)

2. Compare the sub-atomic particles:

- protons are found in the \_\_\_\_\_, have a charge of \_\_\_\_\_ and a mass of \_\_\_\_\_
- neutrons are found in the \_\_\_\_\_, have a charge of \_\_\_\_\_ and a mass of \_\_\_\_\_
- electrons are found in the \_\_\_\_\_, have a charge of \_\_\_\_\_ and a mass of \_\_\_\_\_

3. What does each of the following terms tell us about an atom?

- atomic number: \_\_\_\_\_
- mass number: \_\_\_\_\_
- Group number: \_\_\_\_\_
- neutral atom: \_\_\_\_\_

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

Name of Element	Symbol for Element	Atomic Number	Number of Protons	Number of Electrons	Number of Neutrons	Mass Number	Total Electric Charge
Phosphorus					15		3 -
		25		23		54	
			12		14		0
	F			10		19	
		18			21		0
	Mn					55	4 +
Scandium				18	23		
				18	19		1 -
				12	16	31	

5. Identify any isotopes in the chart in question 4: \_\_\_\_\_

6. Complete the following chart to compare metals and non-metals:

Property	Metal	Non-metal
Where is it on the Periodic Table?		
Usual colour		
State at room conditions		
Lustre of the solid (shiny or dull)?		
Malleable or brittle?		
Does it conduct electricity?		
Number of valence electrons		
Does it lose or gain valence electrons?		
Does it form positive or negative ions?		

7. Complete the following chart:

	calcium	bromine	cesium	magnesium	argon	fluorine
Period						
Group Number						
# of Valence Electrons						
Group Name						

8. Complete the following chart, assuming that hydrogen is a non-metal.

Chemical Formula	Ionic or Covalent Compound?	Number Of Each Type Of Atom Or Ion Present
C <sub>2</sub> H <sub>2</sub> F <sub>4</sub>		
NO <sub>2</sub>		
Ba(NO <sub>3</sub> ) <sub>2</sub>		
C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>		
Ca(HCO <sub>3</sub> ) <sub>2</sub>		
PBr <sub>3</sub>		
Sn <sub>3</sub> (PO <sub>4</sub> ) <sub>4</sub>		

9. Complete the following chart to compare the properties of ionic and covalent compounds:

Property	Ionic	Covalent
Made from what type of elements?		
Are electrons shared or transferred?		
State at room conditions		
Melting point		
Do they usually have an odour?		
Do they dissolve in water?		
Do they conduct electricity in solution?		

10. Name the following ionic compounds (remember to use Roman Numerals where necessary):

Ca <sub>3</sub> P <sub>2</sub>	Na <sub>2</sub> (CO <sub>3</sub> )
Fe <sub>2</sub> O <sub>3</sub>	PbCl <sub>4</sub>
BaS	Mg(NO <sub>3</sub> ) <sub>2</sub>
Co <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>	CrBr <sub>3</sub>
NH <sub>4</sub> (HCO <sub>3</sub> )	Al(OH) <sub>3</sub>
Ni(PO <sub>4</sub> )	MnF <sub>2</sub>

11. Write the chemical formulas for the following compounds:

iron (II) sulfide	zinc carbonate
tin (IV) nitride	manganese (II) bromide
cobalt (III) nitrate	nickel (III) hydroxide
lead (IV) oxide	ammonium phosphate
potassium sulfate	silver iodide
aluminum phosphide	mercury (II) carbide

12. Balance the following chemical reactions. Classify each reaction as a synthesis, decomposition, single displacement or double displacement reaction.

**Type of Reaction**

- |  |       |
|--|-------|
| a) $\text{Cu} + \text{O}_2 \rightarrow \text{Cu}_2\text{O}$                                | _____ |
| b) $\text{XeF}_6 + \text{H}_2\text{O} \rightarrow \text{XeO}_3 + \text{HF}$                | _____ |
| c) $\text{Al} + \text{HCl} \rightarrow \text{H}_2 + \text{AlCl}_3$                         | _____ |
| d) $\text{PCl}_3 + \text{H}_2\text{S} \rightarrow \text{P}_2\text{S}_3 + \text{HCl}$       | _____ |
| e) $\text{PH}_3 \rightarrow \text{H}_2 + \text{P}$   | _____ |
| f) $\text{Cu} + \text{S}_8 \rightarrow \text{Cu}_2\text{S}$                                | _____ |
| g) $\text{SnO} \rightarrow \text{Sn} + \text{O}_2$   | _____ |
| h) $\text{Cu}(\text{NO}_3)_2 + \text{Fe} \rightarrow \text{Fe}(\text{NO}_3)_3 + \text{Cu}$ | _____ |

13. How do you recognize each type of reaction?

- synthesis has only one \_\_\_\_\_
- decomposition has only one \_\_\_\_\_
- in \_\_\_\_\_ displacement, one element takes the place another element in a compound
- in \_\_\_\_\_ displacement, the ions from both compounds “change partners”

14. Write the Law of Conservation of Mass. How is it related to balancing chemical equations?

15. Will the following increase (↑) or decrease (↓) the rate of a chemical reaction?

- |  |  |
|--|--|
| a) increasing the temperature of the reactants: _____              | e) cooling the reactants: _____                |
| b) decreasing the surface area of reactants: _____                 | f) increasing surface area of reactants: _____ |
| c) adding water to a reactant to decrease its concentration: _____ |  |
| d) adding more reactant to make it more concentrated: _____        |  |

16. Describe three (3) ways that you could make a “chunk” of aluminum react more SLOWLY with acid.

17. Compare the properties of acids and bases:

Property	Acids	Bases
pH range		
does it react with metal? gas produced?		
colour with bromothymol blue		
colour with red or blue litmus		
colour with phenolphthalein		

18. Write the general equation that occurs when you mix an acid and base together. What is this called?

19. Refer to the information in the chart to the right.

- the strongest acid is \_\_\_\_\_
- the strongest base is \_\_\_\_\_
- the weakest acid is \_\_\_\_\_
- the weakest base is \_\_\_\_\_
- a neutral substance is \_\_\_\_\_
- which is stronger: hair remover or soap? \_\_\_\_\_ by how much? \_\_\_\_\_
- which is stronger, apple juice or folic acid? \_\_\_\_\_ by how much? \_\_\_\_\_

Substance	pH
Red wine	3.8
Hair remover	11
Apple juice	3.0
Soap	8.0
Distilled water	7.0
Folic acid	5.0
Liquid bleach	12.4