Grade 10 Chemistry Unit Test Review:

1. Complete the following chart:

	Composed of what elements	***Physical and Chemical Properties(conductivity, melting point, solubility)***	***Example***
Ionic Compounds	Metal & non-metal (or positive ion & negative ion)	High electrical conductivity when dissolved in water High melting points Very soluble in water	NaCl (salt)
Molecular Compounds	Non-metals only	do not conduct electricity Low melting points Tend not to be soluble in water (with some exceptions)	Glucose Lauric acid

2. What key differences are there between ionic and covalent bonds?

Ionic – transfer of electrons from one atom to another to form charged particles (ions) so that valence shell is full (metal gives away electrons to non-metal)

Covalent – sharing of electrons between 2 atoms that are non-metals; satisfies octet rule (each atom has 8 valence electrons around it)

3. What are 5 clues that a chemical change has occurred?

Heat/light produced, precipitate from 2 liquids, gas/bubbles, odour change, colour change, texture change, difficult to reverse

4. Complete the following chart:

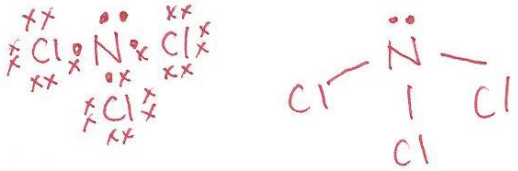
Element	**Symbol**	**# Electrons**	**# Protons**	**# Neutrons**	**Charge of Ions formed**
Sodium	Na	11	11	12	+1
Phosphorus	P	15	15	16	-3
Gallium	Ga	31	31	39	+3

5. Write the correct formulas for the following. Identify the type of compound (ionic or molecular).	6. Write the names for the following compounds. Identify the type of compound (ionic or molecular).

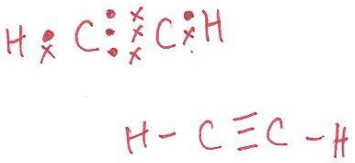
a) strontium carbonate $SrCO_3$ type: ionic	a) Li_2O Lithium Oxide type: ionic
b) magnesium fluoride MgF_2 type: ionic	b) SiO_2 Silicon dioxide type: molecular
c) arsenic trichloride $AsCl_3$ type: molecular	c) FeS Iron (II) sulfide type: ionic
d) gold (III) sulfide Au_2S_3 type: ionic	d) SrF_2 Strontium fluoride type: ionic
e) calcium oxide CaO type ionic	e) As_2S_3 Diarsenic trisulfide type: molecular
f) diphosphorus pentoxide P_2O_5 type: molecular	f) $Ba(NO_3)_2$ Barium nitrate type: ionic with molecular polyatomic ion
g) sodium hydroxide NaOH type: ionic with molecular polyatomic ion	g) Na_2S Sodium sulfide type: ionic
h) hydrogen chloride HCl type: molecular, acid	h) $Al_2(SO_4)_3$ Aluminum sulfate type: ionic with molecular polyatomic ion

7. Draw the Lewis **and** structural diagrams for the following compounds. Remember to include the lone pairs for central atoms:

a) NCl_3

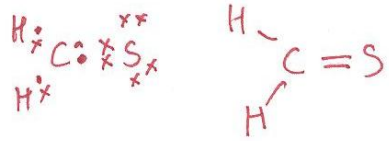


b) C_2H_2 (be careful! triple bond)

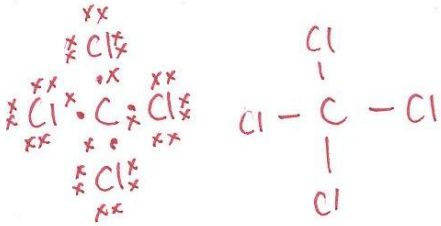


c) SBr_2

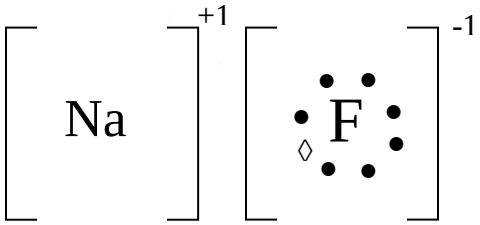
d) CH_2S (be careful! double bond)



e) CCl_4



f) NaF Ionic compound – no structural diagram



8. When balancing equations, which two elements should you **usually** balance last?

Oxygen and hydrogen (or any elements that are on their own)

9. Write the following word equations as **skeleton** chemical equations, and then as **balanced** chemical equations. Indicate the ***TYPE OF REACTION*** being presented. Don't forget about HOFBrINCl!

a) potassium chlorate ⟶ potassium chloride + oxygen gas

Skeleton equation:

$KClO_3 \rightarrow KCl + O_2$

Balanced chemical equation:

$2KClO_3 \rightarrow 2KCl + 3O_2$

Reactants		Products	
K	2	K	2
Cl	2	Cl	2
O	6	O	6

Reaction Type: decomposition

b) iron (III) oxide + carbon ⟶ iron + carbon dioxide

Skeleton equation:

$Fe_2O_3 + C \rightarrow Fe + CO_2$

Balanced chemical equation:

$2Fe_2O_3 + 3C \rightarrow 4Fe + 3CO_2$

Reactants		Products	
Fe	4	Fe	4
O	6	O	6
C	3	C	3

Reaction Type: single displacement

c) aluminum + copper (II) sulfate ⟶ copper + aluminum sulfate

Skeleton equation:

$Al + CuSO_4 \rightarrow Cu + Al_2(SO_4)_3$

Balanced chemical equation:

$2Al + 3CuSO_4 \rightarrow 3Cu + Al_2(SO_4)_3$

Reactants		Products	
Al	2	Al	2
Cu	3	Cu	3
S	3	S	3
O	12	O	12

Reaction Type: double displacement

d) octane (C_8H_{18}) + oxygen ⟶ carbon dioxide + water

Skeleton equation:

$C_8H_{18} + O_2 \rightarrow CO_2 + H_2O$

Balanced chemical equation:

$2C_8H_{18} + 25O_2 \rightarrow 16CO_2 + 18H_2O$

Reactants		Products	
C	16	C	16
H	36	H	36
O	50	O	50

Reaction Type: combustion

10. State the Law of Conservation of Mass, and explain how it is related to balanced chemical equations.

The mass of reactants is the same as the mass of the products of a chemical reaction, so the number of atoms of each element must be the same before and after a reaction

11. Complete the following chart on acids and basses:

	Acids	***Bases***
Physical Properties	Good electrical conductors Sour taste Water soluble	Good electrical conductors Bitter taste Slippery feel Water soluble
Chemical Properties	Corrosive, reactive Release H^+ ions when dissolved in water	Corrosive, reactive and can break down proteins Releases OH^- ions when dissolved in water

a) What does the pH scale measure? Acidity – the concentration of hydrogen ions

b) Consider a solution with a pH of 3 and a solution with a pH of 5. Which is more acidic? How much more acidic is it (i.e. How many times is it more acidic)?

pH of 3 is more acidic by 100x (10 x 10)

c) Consider a solution with a pH of 10.8 and a solution of 9.8. Which is more basic? How much more basic is it?

pH of 10.8 is more basic by 10x

12. What is the general equation of a neutralization reaction? Write the balanced chemical equation for the neutralization reaction of hydrochloric acid (HCl) and sodium hydroxide.

Acid + Base → Water + a salt

$HCl + NaOH \rightarrow NaCl + H_2O$

13. Identify each of the following substances as acidic, basic (alkaline) or neither when dissolved in water, and write the corresponding name or formula for each substance:

Substance	Acidic or Basic
potassium bicarbonate	basic
$NH_4OH_{(aq)}$	Basic
$H_2SO_{4(aq)}$	Acid
$HNO_{3(aq)}$	Acid
sodium hydroxide	Base
A solution with a pH of 3	Acid

14. How are baking soda and Alka-Seltzer tablets similar?

They are both bases and act to neutralize acid

15. What would you expect as an approximate pH value for:

(a) a very concentrated base 13-14

(b) a dilute acid solution 5-6

(c) distilled water 7

16. Balance and name the type of reaction: Type

a) _2__CuO → _2__Cu + ___O_2 Decomposition

b) _2__P + _3__H_2 → _2__PH_3 Synthesis

c) _2__Al + _3__$CuSO_4$ → ___$Al_2(SO_4)_3$ + _3__Cu Single Displacement

d) ___N_2 + _3__H_2 → _2_NH_3 Synthesis

e) _3__NaOH + ___H_3PO_4 → ___Na_3PO_4 + _3__H_2O Double Displacement

f) _2__$(NH_4)_3PO_4$ + _3__$ZnCl_2$ → _6__NH_4Cl + ___$Zn_3(PO_4)_2$ Double Displa.

17. Complete the chart:

Indicator	Acid	Base
Litmus	Red	Blue
Phenolphthalein	Colourless	Pink
Bromothymol Blue	Yellow	Blue