Naming Compounds Celebration #4 name: _____

multiple choice, put the best answer ABC or D on the answer sheet in the correct space. Or fill in blanks on answer sheet where appropriate. 30 multiple choice questions X 2 points each = 60 points possible.
Part 2, do four parts for 4 x 10 = 40 points = 100 total points. BE NEAT.

1. Combine the ammonium ion with the sulfite ion.
   A. NH_4SO_3 B. $N_2H_8S_2O_6$ C. $(NH_4)_2SO_3$ D. $NH_4(SO_3)_2$

2. Which of these are all polyatomic anions?
   A. NH_4^{+1}, ClO_3^{-1} , Br^{-1} B. OH^{-1}, CN^{-1}, MnO_4^{-1} C. O^{-2}, Se^{-2}, I^{-1} D. Li^{+}, Cl^{-1}, $C_2O_4^{-2}$

3. When a calcium atom becomes a calcium ion, the number of neutrons in its nucleus
   A. decreases B. increases C. stays the same D. cannot be determined

4. Group 16 atoms make ions with this net charge: A. –2 B. –1 C. +1 D. +2

5. When the electrons of an excited atom return to a lower energy state, the energy emitted can result in the production of: A. alpha particles B. isotopes C. protons D. spectra

6. What is the total number of electrons in Cu^{+2} ? A. 27 B. 29 C. 28 D. 34

7. What happens when you attempt to combine a sodium ion with the ammonium ion?
   A. they combine into sodium ammonide B. nothing, like charges repel each other
   C. the cats fight with each other D. they form a molecular compound

8. "When the elements are arranged in order of increasing atomic number, there is a periodic repetition of their physical and chemical properties" is the:
   A. Law of Ions B. Bonding Law of Atoms C. Periodic Law D. Mendeleyev Law

9 - 19. Write the FORMULAS and COMPOUND NAMES on the answer sheets.

#	cation	anion	formula	compound name
9-10	Al^{+3}	NO_2^{-1}	#9	#10
11-12	NH_4^{+1}	P^{-3}	#11	#12
☺	☺	☺	☺	☺
14-15	Mg^{+2}	PO_4^{-3}	#14	#15
16-17	Ba^{+2}	MnO_4^{-1}	#16	#17
18-19	Cs^{+1}	$Cr_2O_7^{-2}$	#18	#19

20. Fluorine is a gas that exists as a pure substance only:
A. as F atoms B. as F_2 molecules C. as F combined to other atoms D. as F^{-1} ions

21. Which statement is true?
A. molecular compounds form between ions B. ionic compounds form between atoms
C. CH_4 is an ionic compound D. $BeBr_2$ is an ionic compound

Write the formula for these compounds (on the answer sheet):

22. Iron (II) oxide
23. carbon difluoride
24. Lead (IV) phosphate
25. silicon dichloride

Write the names of these molecular compounds:

26. CF_4
27. SO_3
28. Br_2S_6

29. How many different types of cations are possible for the <u>atom</u> with 25 ground state electrons?

30. Which Group of the Periodic table are known as the alkaline earth metals?
A. group 1 B. group 2 C. group 17 D. group 18

31. The compound ZnF_2 would be properly named as:
A. zinc II fluoride B. zinc I fluoride C. zinc fluoride D. zinc difluoride

PART 2. 10 points, <u>CHOOSE JUST ONE OF THESE</u>…

A. What is the metalloid line? What are metalloids? What atoms touch it and which are not metalloids? Silicon is a metalloid. What properties does it have that make it a metalloid?

B. Explain in detail how ionic bonding works, what are the names of the (+) and (-) types of ions, describe what neutral ionically bonded compound means. Why is nitrogen dioxide NOT an ionically bonded while LiCl is ionically bonded.

C. Describe the STOCK naming system for some ionic compounds. Why is it used? What do those Roman Numerals stand for? Why do some atoms make different kinds of ions? What groups (specifically) are most the stock named compounds come from? Why don't any anions get Roman numerals in their names? Why don't any group 1 or 2 metals use roman numbers in their names?

D. Describe the difference between a formula unit and a molecule. Show why there are different numbers of electrons for calcium atoms and calcium ions. Detail why calcium ions ALWAYS become +2 ions. Use some noble gas references for that explanation. Finally, show all possible compounds made from nitrogen and fluorine, name each one with proper prefixes.

E. Explain how the oxidation numbers are used to form proper molecular compounds. Count to 10 in the Latin prefixes. Write the formula for these three molecular compounds and explain how their prefixes match up to their proper names. sulfur trioxide, dihydrogen monoxide, diphosphorous pentoxide.

Practice Celebration Naming Compounds
Multiple choice 3 points each. Use CAPITAL LETTERS ONLY.
Or fill in blanks with your answers.

NAME: _____ PART 2… ON THE BACK!

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You ONLY need to choose four of the five questions to answer. 10 points each, be complete.

Use more paper if you need to (you do).

Question _____

Celebration #4 Naming Compounds answers

1	C
2	B
3	C
4	A
5	D
6	A
7	B
8	C
9	$Al(NO_2)_3$
10	aluminum nitrite
11	$(NH_3)_3P$
12	ammonium phosphide
☺ ☆ ♉	
14	$Mg_3(PO_4)_2$
15	magnesium phosphate

6	$Ba(MnO_4)_2$
17	barium permanganate
18	$Cs_2Cr_2O_7$
19	cesium dichromate
20	B
21	D
22	FeO
23	CF_2
24	$Pb_3(PO_4)_4$
25	$SiCl_2$
26	carbon tetrafluoride
27	sulfur trioxide
28	dibromine hexasulfide
29	4 (it's Mn)
30	Group 2
31	C (no RN needed)

A... The metalloid line is the dark black staircase line that separates the metals on the left from the nonmetals on the right side of the periodic table. Atoms that touch are: B, Al, Si, Ge, As, Sb, Te, Po, and At. All are metalloids except for Al & Po. Silicon is a non-metal but has luster and conducts electricity, so it is considered a metalloid.

B... A (+) charged cation combines with a (-) charged anion to form a neutral ionic compound, if they combine as they must in proper ratio. Metals only form cations by losing electrons to gain that Noble Gas electron configuration. All nonmetals gain electrons to do this same thing—to become isoelectric to a noble gas (not to become a noble gas, that's not possible). HCl is not ionic because ionic compounds require a metal cation to bond to a nonmetal anion.
H is non-metal, it makes molecular compounds only. Li is a metal, so LiCl is an ionic compound.

C...Transitional metals can make more than one cation, as indicated by their "oxidation numbers". They lose electrons to gain the Noble Gas configurations, so they all become positive cations. The number of electrons they lose is indicated by the Roman Numeral assigned to the metals. Anions never lose electrons, they only form cations, they do not get stock or Roman numeral names. Group 1 and group 2 only for +1 and +2 (respectively) ions, and since there is NEVER any chance for other cations, they do not need Roman numerals.

D... A formula unit is the smallest understanding of an ionic compound. They exist in crystals as solids, with many other ions, and so you can never actually have an individual molecule of such a substance. A molecule of a molecular compound can exist, and is the smallest bit of a molecular compound. Ca atoms have 20 protons and electrons, along with 20 neutrons. If Ca becomes Ca^{+2}, it does so by losing the 2 valence electrons, giving it a net +2 charge. The possible combinations of nitrogen and fluorine are: NF, NF_2, NF_3, NF_4, NF_5. They are named in order: nitrogen monofluoride, nitrogen difluoride, nitrogen trifluoride, nitrogen tetrafluoride, nitrogen pentafluoride.

E... Oxidation numbers are for forming molecular compounds. They need to be balanced + and -, to equal zero (like ionic charges, but these are NOT charges). They set the ratios of atoms in molecular compounds. Counting: mono, di, tri, tetra, penta, hexa, hepta (septa), octa, nona, deca.
SO_3 is sulfur trioxide
H_2O is dihydrogen monoxide
PF_5 is phosphorous penta-fluoride

The first part of a molecular compound NEVER gets a prefix if it is a "MONO", but does if it is a multiple, like in the water. The second part of the molecular compound ALWAYS gets a prefix.