

## AP Chemistry Summer Assignment 2011 - 2012

Welcome to AP Chemistry. This is a short summer assignment to get your chemistry brain warmed up. All these questions are geared to things you should be able to do when you step into AP Chem. Please complete the questions on a separate sheet of paper and ALWAYS show your work. If you get stuck, don't hesitate emailing us ([jennifer\\_k\\_heck@mcpsmd.org](mailto:jennifer_k_heck@mcpsmd.org), [puja\\_v\\_luthra@mcpsmd.org](mailto:puja_v_luthra@mcpsmd.org)) - we will be checking email off and on all summer.

### Part 1 - Naming & Formula Writing

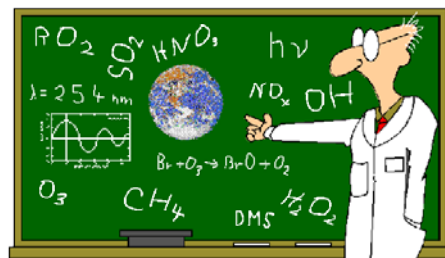
For the following compounds write the name or formula for the following compounds. Remember to look at charges and use roman numerals as appropriate.

1. Nitrous Acid
2. Hydrofluoric Acid
3. HCl
4.  $\text{HC}_2\text{H}_3\text{O}_2$
5.  $\text{C}_8\text{H}_{18}$
6.  $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-CH}_3$
7. nonane
8. propane
9. calcium hydroxide
10. aluminum sulfite
11. tin (II) permanganate
12. BaO
13.  $\text{K}_3\text{PO}_4$
14.  $\text{PbCl}_4$
15. carbon dioxide
16. pentanitrogen nonafluoride
17.  $\text{C}_2\text{Br}_4$
18.  $\text{As}_2(\text{SO}_4)_5$

### Part 2 - Reactions

For reactions 19-21 - balance the reactions

19.  $\text{H}_2\text{SO}_4 + \text{NaCN} \rightarrow \text{HCN} + \text{Na}_2\text{SO}_4$
20.  $\text{Fe}_2\text{O}_3 + \text{Zn} \rightarrow \text{ZnO} + \text{Fe}$
21.  $\text{HC}_2\text{H}_3\text{O}_2 + \text{Al}_2\text{O}_3 \rightarrow \text{H}_2\text{O} + \text{Al}(\text{C}_2\text{H}_3\text{O}_2)_3$



For reactions 22 & 23 - write the following reactions in symbols and balance

22. Aqueous silver nitrate reacts with solid copper metal to produce aqueous copper II nitrate and solid silver.
23. Solid calcium and chlorine gas react to produce solid calcium chloride.

For reactions 24-28 - predict the products for the following reactions, then write a complete balanced symbol reaction as seen in #19

24. Solid zinc reactions with hydrochloric acid
25. Liquid water decomposes
26. Solid sodium reacts with chlorine gas
27. Aqueous lead (II) nitrate reactions with aqueous calcium chloride
28. Butane burns in oxygen

### Part 3 - Factor Label

Using a factor label - show a chart for your work.

29. Aiden is 32 inches tall, how many feet tall is he?
30. Double period AP chemistry class is 1.5 hours long, how many seconds is that?
31. Cole's car holds 22.5 gallons of gas, how much will it cost to fill the tank completely?  
(1 gallon of gas = \$2.89)

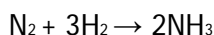
32. There are 1805 students in QO, if each student takes 7 classes and each class hands out two textbooks how many books are passed out to students each year?

## Part 4 - Stoichiometry

33. Tin (II) fluoride,  $\text{SnF}_2$ , is used in some toothpastes. It is made by reacting tin and hydrogen fluoride.

- Balance the following reaction:  $\text{___Sn} + \text{___HF} \rightarrow \text{___SnF}_2 + \text{___H}_2$
- How many moles of Sn react with 10 moles of HF?
- How many moles of  $\text{SnF}_2$  are produced from the reaction of 30.00g of HF with Sn?
- How many grams of HF are needed to produce 4.6 moles of hydrogen?
- How many moles of hydrogen are produced when 6.75 moles of Sn react?
- How many moles of hydrogen are produced when 146g of Sn react with HF?

34. In a reaction 44.5 g of  $\text{N}_2$  are mixed with 10.5 grams of  $\text{H}_2$  according to the following equation.



- Theoretically, how many grams of  $\text{NH}_3$  will be produced?
  - Which reactant is limiting?
  - If 9.41 g of  $\text{NH}_3$  are actually produced, what is the percent yield?
35. Some sulfuric acid ( $\text{H}_2\text{SO}_4$ ) is spilled on a lab bench. It can be neutralized by sprinkling sodium bicarbonate ( $\text{NaHCO}_3$ ) on it creating liquid water ( $\text{H}_2\text{O}$ ), carbon dioxide ( $\text{CO}_2$ ) gas and aqueous sodium sulfate ( $\text{Na}_2\text{SO}_4$ ).
- Write the balanced chemical equation with all phases (*s*, *aq*, *l*, *g*).
  - If 25 mL of 6.0 M  $\text{H}_2\text{SO}_4$  was spilled, how many moles of  $\text{NaHCO}_3$  must be added to neutralize the spill?
36. One method used commercially peel potatoes is to soak them in a solution of NaOH for a short time, removed them from the NaOH and spray off the peel. The concentration of NaOH is periodically checked with the reaction of NaOH and  $\text{H}_2\text{SO}_4$ . One time 45.7 ml of 0.500 M  $\text{H}_2\text{SO}_4$  was used to react with all 20.0 mL of NaOH.
- Write the balanced reaction.
  - What was the concentration (M) of NaOH?



## The Periodic Table of the Elements

1	<b>H</b> Hydrogen 1.00794	2	<b>He</b> Helium 4.003
3	<b>Li</b> Lithium 6.941	4	<b>Be</b> Beryllium 9.012182
11	<b>Na</b> Sodium 22.989770	12	<b>Mg</b> Magnesium 24.3050
19	<b>K</b> Potassium 39.0983	20	<b>Ca</b> Calcium 40.078
37	<b>Rb</b> Rubidium 85.4678	38	<b>Sr</b> Strontium 87.62
55	<b>Cs</b> Cesium 132.90545	56	<b>Ba</b> Barium 137.327
87	<b>Fr</b> Francium (223)	88	<b>Ra</b> Radium (226)
21	<b>Sc</b> Scandium 44.955910	22	<b>Ti</b> Titanium 47.867
23	<b>V</b> Vanadium 50.9415	24	<b>Cr</b> Chromium 51.9961
41	<b>Nb</b> Niobium 92.90638	42	<b>Mo</b> Molybdenum 95.94
73	<b>Ta</b> Tantalum 180.9479	74	<b>W</b> Tungsten 183.84
105	<b>Db</b> Dubnium (262)	106	<b>Sg</b> Seaborgium (263)
25	<b>Mn</b> Manganese 54.938049	26	<b>Fe</b> Iron 55.845
43	<b>Tc</b> Technetium (98)	44	<b>Ru</b> Ruthenium 101.07
75	<b>Re</b> Rhenium 186.207	76	<b>Os</b> Osmium 190.23
107	<b>Bh</b> Bohrium (262)	108	<b>Hs</b> Hassium (265)
27	<b>Co</b> Cobalt 58.933200	28	<b>Ni</b> Nickel 58.6934
45	<b>Rh</b> Rhodium 102.90550	46	<b>Pd</b> Palladium 106.42
77	<b>Ir</b> Iridium 192.227	78	<b>Pt</b> Platinum 195.078
109	<b>Mt</b> Meitnerium (266)	110	
29	<b>Cu</b> Copper 63.546	30	<b>Zn</b> Zinc 65.39
47	<b>Ag</b> Silver 107.8682	48	<b>Cd</b> Cadmium 112.411
79	<b>Au</b> Gold 196.96655	80	<b>Hg</b> Mercury 200.59
111		112	
31	<b>Ga</b> Gallium 69.723	32	<b>Ge</b> Germanium 72.61
49	<b>In</b> Indium 114.818	50	<b>Sn</b> Tin 118.710
81	<b>Tl</b> Thallium 204.3833	82	<b>Pb</b> Lead 207.2
113		114	
5	<b>B</b> Boron 10.811	6	<b>C</b> Carbon 12.0107
13	<b>Al</b> Aluminum 26.981538	14	<b>Si</b> Silicon 28.0855
15	<b>P</b> Phosphorus 30.973761	16	<b>S</b> Sulfur 32.066
33	<b>As</b> Arsenic 74.92160	34	<b>Se</b> Selenium 78.96
51	<b>Sb</b> Antimony 121.760	52	<b>Te</b> Tellurium 127.60
83	<b>Bi</b> Bismuth 208.98038	84	<b>Po</b> Polonium (209)
85		86	
7	<b>N</b> Nitrogen 14.00674	8	<b>O</b> Oxygen 15.9994
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85		86	
9	<b>F</b> Fluorine 18.9984032	10	<b>Ne</b> Neon 20.1797
17	<b>Cl</b> Chlorine 35.4527	18	<b>Ar</b> Argon 39.948
35	<b>Br</b> Bromine 79.904	36	<b>Kr</b> Krypton 83.80
53	<b>I</b> Iodine 126.90447	54	<b>Xe</b> Xenon 131.29
85	<b>At</b> Astatine (210)	86	<b>Rn</b> Radon (222)
58	<b>Ce</b> Cerium 140.116	59	<b>Pr</b> Praseodymium 140.90768
90	<b>Th</b> Thorium 232.0381	91	<b>Pa</b> Protactinium 231.03588
60	<b>Nd</b> Neodymium 144.24	61	<b>Pm</b> Promethium (145)
62	<b>Sm</b> Samarium 150.36	63	<b>Eu</b> Europium 151.964
64	<b>Gd</b> Gadolinium 157.25	65	<b>Tb</b> Terbium 158.92534
66	<b>Dy</b> Dysprosium 162.50	67	<b>Ho</b> Holmium 164.93032
68	<b>Er</b> Erbium 167.26	69	<b>Tm</b> Thulium 168.93421
70	<b>Yb</b> Ytterbium 173.04	71	<b>Lu</b> Lutetium 174.967
90		91	
92		93	
94		95	
96		97	
98		99	
100		101	
102		103	