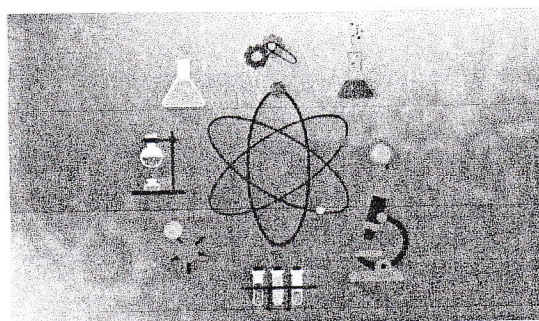


Science 1206

Unit 2: Chemistry

Practice/Review Booklet A



TEST: Thursday, December 8 (Slots 1, 2, 3, 7)

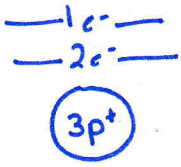
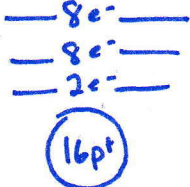
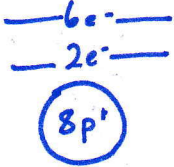
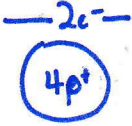
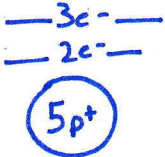
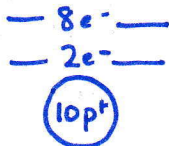
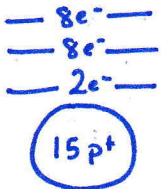
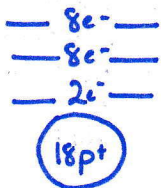
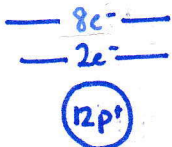
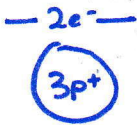
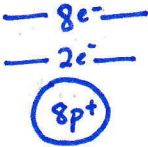
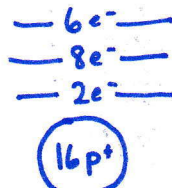
Friday, December 9 (Slots 4, 5)

Monday, December 5 @ 2:20-3:20 in Room 246

Tutorials: Wednesday, December 7 @ 2:20-3:20 in Room 246

Name: KEY

1. Draw Bohr-Rutherford models for each of the following:

<p>a) lithium atom</p>  <p>Li</p>	<p>b) sulfide ion</p>  <p>S²⁻</p>	<p>c) oxygen atom</p>  <p>O</p>
<p>d) beryllium ion</p>  <p>Be²⁺</p>	<p>e) boron atom</p>  <p>B</p>	<p>f) neon atom</p>  <p>Ne</p>
<p>g) phosphide ion</p>  <p>P³⁻</p>	<p>h) argon atom</p>  <p>Ar</p>	<p>i) magnesium ion</p>  <p>Mg²⁺</p>
<p>j) lithium ion</p>  <p>Li⁺</p>	<p>k) oxide ion</p>  <p>O²⁻</p>	<p>l) sulfur atom</p>  <p>S</p>

y) nitride ion N^{3-}	z) fluoride ion F^{-}	aa) aluminum atom Al
bb) chloride ion Cl^{-}	cc) silicon atom Si	dd) aluminum ion Al^{3+}
ee) hydrogen ion H^{+}	ff) helium atom He	gg) hydrogen atom H

2. State the number of atoms of each element that are present in each compound:

- | | |
|------------------------|--|
| a) Hydrogen Peroxide | H_2O_2 2 hydrogen atoms, 2 oxygen atoms |
| b) Sodium Nitrate | $NaNO_3$ 1 sodium atom, 1 nitrogen atom, 3 oxygen atoms |
| c) Propane | C_3H_8 3 carbon atoms, 8 hydrogen atoms |
| d) Methane | CH_4 1 carbon atom, 4 hydrogen atoms |
| e) Ozone | O_3 3 oxygen atoms |
| f) Sucrose | $C_{12}H_{22}O_{11}$ 12 carbon atoms, 22 hydrogen atoms, 11 oxygen atoms |
| g) Copper (II) Sulfate | $CuSO_4$ 1 copper atom, 1 sulfur atom, 4 oxygen atoms |

5. Identify the following compounds as ionic or molecular.

	Element 1 classification	Element 2 classification	Type of compound
LiF	Metal	Non-metal	ionic
CO	non metal	non metal	molecular
SO ₂	non metal	non metal	molecular
BeSe	metal	non metal	ionic
Na ₃ N	metal	non metal	ionic
N ₂ H ₄	non metal	non metal	molecular
boron trifluoride	non metal	non metal	molecular
zinc chloride	metal	non metal	ionic
calcium sulfide	metal	non metal	ionic
sulfur trioxide	non metal	non metal	molecular
cesium bromide	metal	non metal	ionic
carbon dioxide	non metal	non metal	molecular

8. Write the formulas for the following ionic compounds. Be sure to note the charges of any multivalent ions.

Name	Cation	Anion	Formula
chromium (II) chloride	Cr^{2+}	Cl^{-}	CrCl_2
lithium oxide	Li^{+}	O^{2-}	Li_2O
mercury (I) fluoride	Hg^{+}	F^{-}	HgF
mercury (II) fluoride	Hg^{2+}	F^{-}	HgF_2
tin (IV) oxide	Sn^{4+}	O^{2-}	SnO_2
tin (II) oxide	Sn^{2+}	O^{2-}	SnO
lead (IV) chloride	Pb^{4+}	Cl^{-}	PbCl_4
potassium oxide	K^{+}	O^{2-}	K_2O
nickel (II) nitride	Ni^{2+}	N^{3-}	Ni_3N_2
antimony (V) chloride	Sb^{5+}	Cl^{-}	SbCl_5
cobalt (III) oxide	Co^{3+}	O^{2-}	Co_2O_3
bismuth (III) chloride	Bi^{3+}	Cl^{-}	BiCl_3
mercury (II) nitride	Hg^{2+}	N^{3-}	Hg_3N_2
tungsten fluoride	W^{6+}	F^{-}	WF_6

10. Write the prefixes from 1 – 10 below:

1 – mono
2 – di
3 – tri
4 – tetra
5 – penta

6 – hexa
7 – hepta
8 – octa
9 – nona
10 – deca

11. Complete the following table of hydrated compounds:

Name	Formula
copper (II) nitrate hexahydrate	$\text{Cu}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$
mercury(II) nitrate monohydrate	$\text{Hg}(\text{NO}_3)_2 \cdot \text{H}_2\text{O}$
copper(II) nitrate trihydrate	$\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$
zinc sulfate heptahydrate	$\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$
magnesium sulfate heptahydrate	$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$
iron (II) sulfate heptahydrate	$\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$
calcium sulfate dihydrate	$\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
beryllium sulfite tetrahydrate	$\text{BeSO}_3 \cdot 4\text{H}_2\text{O}$
tin (IV) chloride pentahydrate	$\text{SnCl}_4 \cdot 5\text{H}_2\text{O}$
nickel (II) bromide hexahydrate	$\text{NiBr}_2 \cdot 6\text{H}_2\text{O}$
zinc nitrate hexahydrate	$\text{Zn}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$
sodium carbonate decahydrate	$\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
beryllium sulfite tetrahydrate	$\text{BeSO}_3 \cdot 4\text{H}_2\text{O}$
tin(IV) chloride pentahydrate	$\text{SnCl}_4 \cdot 5\text{H}_2\text{O}$
nickel(II) nitrate hexahydrate	$\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$
sodium sulfate pentahydrate	$\text{Na}_2\text{SO}_4 \cdot 5\text{H}_2\text{O}$

* Do not need to know for test

13. Complete the following table on acids and bases:

Name	Workings	Formulas
		HBr _(aq)
nitrous acid		
hydrosulfuric acid		
		NH ₄ OH _(aq)
phosphoric acid		
hydrochloric acid		
nitric acid		
		H ₂ SO _{4(aq)}
		H ₂ CO _{3(aq)}
sodium bicarbonate		
		NaOH _(aq)
		HNO _{2(aq)}
hydrofluoric acid		
hypochlorous acid		
		H ₂ S _(aq)
perchloric acid		
boric acid		
		KOH _(aq)
calcium hydroxide		
		Mg(OH) _{2(aq)}

41.	tin (II) oxide	SnO_2	51.	uranium(IV) oxide	UO_2
42.	copper (I) sulfide	Cu_2S	52.	lead(IV) sulfide	PbS_2
43.	antimony (III) sulfide	Sb_2S_3	53.	manganese(IV) oxide	MnO_2
44.	mercury (II) sulfide	HgS	54.	ferric oxide	Fe_2O_3
45.	iron (II) sulfide	FeS	55.	copper(II) sulfide	CuS
46.	mercury (II) oxide	HgO	56.	lead(IV) oxide	PbO_2
47.	vanadium(V) oxide	V_2O_5	57.	tin(II) fluoride	SnF_2
48.	titanium (IV) oxide	TiO_2	58.	chromic oxide	Cr_2O_3
49.	gold (III) chloride	AuCl_3	59.	uranium(VI) fluoride	UF_6
50.	nickel (II) bromide	NiBr_2	60.	cobalt(III) sulfide	Co_2S_3
61.	potassium carbonate	K_2CO_3	76.	calcium hydroxide	Ca(OH)_2
62.	ammonium sulfide	$(\text{NH}_4)_2\text{S}$	77.	magnesium silicate	MgSiO_3
63.	chromium (III) nitrate	$\text{Cr(NO}_3)_3$	78.	iron(II) chlorite	$\text{Fe(ClO}_2)_2$
64.	sodium nitrite	NaNO_2	79.	potassium dichromate	K_2CrO_7
65.	potassium phosphate	K_3PO_4	80.	ammonium sulfate	$(\text{NH}_4)_2\text{SO}_4$
66.	potassium permanganate	KMnO_4	81.	sodium bicarbonate	NaHCO_3
67.	ammonium dihydrogen phosphate	$\text{NH}_4\text{H}_2\text{PO}_4$	82.	calcium stearate	Omit
68.	sodium sulfate	Na_2SO_4	83.	sodium nitrate	NaNO_3
69.	sodium hydrogen sulfate	NaHSO_4	84.	sodium thiosulfate	$\text{Na}_2\text{S}_2\text{O}_3$
70.	sodium nitrite	NaNO_2	85.	barium perchlorate	$\text{Ba(ClO}_4)_2$
71.	calcium nitrate	$\text{Ca(NO}_3)_2$	86.	sodium hydrogen sulfide	NaHSO_3
72.	lithium phosphate	Li_3PO_4	87.	potassium cyanide	KCN

73. chromium (II) sulfate	$\text{Cr}_2(\text{SO}_4)_3$	88. potassium thiocyanate	KSCN
74. manganese (IV) hydrogen phosphate	$\text{Mn}(\text{HPO}_4)_2$	89. ammonium phosphate	$(\text{NH}_4)_3\text{PO}_4$
75. sodium tetraborate	$\text{Na}_2\text{B}_4\text{O}_7$	90. magnesium perchlorate	$\text{Mg}(\text{ClO}_4)_2$
91. magnesium sulfate heptahydrate	$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$	101. copper(II) sulfate pentahydrate	$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
92. iron(II) sulfate pentahydrate	$\text{FeSO}_4 \cdot 5\text{H}_2\text{O}$	102. lithium chloride monohydrate	$\text{LiCl} \cdot \text{H}_2\text{O}$
93. sodium sulfite heptahydrate	$\text{Na}_2\text{SO}_3 \cdot 7\text{H}_2\text{O}$	103. copper(II) nitrate tetrahydrate	$\text{Cu}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$
94. nickel(II) phosphate octahydrate	$\text{Ni}_3(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$	104. magnesium sulfate heptahydrate	$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$
95.	$\text{HClO}_3(\text{aq})$	105. hydrofluoric acid	
96.	$\text{H}_2\text{SO}_3(\text{aq})$	106. chloric acid	
97.	$\text{HCN}(\text{aq})$	107. nitrous acid	
98.	$\text{H}_2\text{SO}_4(\text{aq})$	108. hydrobromic acid	
99.	$\text{CH}_3\text{COOH}(\text{aq})$	109. nitric acid	
100.	$\text{H}_3\text{BO}_3(\text{aq})$	110. hypochlorous acid	

Do not need to know for test!

14. Write the following chemical formulas or the chemical name:

Name	Formula	Name	Formula
1. tetraphosphorus hexoxide	P_4O_6	11. iodine trifluoride	IF_3
2. disulfur decafluoride	S_2F_{10}	12. chlorine dioxide	ClO_2
3. dinitrogen tetraoxide	N_2O_4	13. methane	CH_4
4. iodine pentachloride	ICl_5	14. boron trifluoride	BF_3
5. sulfur hexafluoride	SF_6	15. diboron hexahydride	B_2H_6
6. methanol	CH_3OH	16. phosphorous trihydride	PH_3
7. tetrasulfur dinitride	S_4N_2	17. ethanol	C_2H_5OH
8. hydrogen peroxide	H_2O_2	18. carbon disulfide	CS_2
9. dinitrogen trioxide	N_2O_3	19. sulfur trioxide	SO_3
10. nitrogen trihydride	NH_3	20. diarsenic trioxide	As_2O_3
21. calcium chloride	$CaCl_2$	31. potassium iodide	KI
22. magnesium oxide	MgO	32. aluminum chloride	$AlCl_3$
23. sodium bromide	$NaBr$	33. lithium nitride	Li_3N
24. aluminum oxide	Al_2O_3	34. barium chloride	$BaCl_2$
25. calcium oxide	CaO	35. magnesium hydride	MgH_2
26. zinc oxide	ZnO	36. magnesium chloride	$MgCl_2$
27. silver sulfide	Ag_2S	37. sodium sulfide	Na_2S
28. calcium fluoride	CaF_2	38. zinc sulfide	ZnS
29. calcium hydride	CaH_2	39. potassium chloride	KCl
30. potassium sulfide	K_2S	40. silver bromide	$AgBr$

12. Complete the following table of molecular compounds:

Name	Formula
Carbon monoxide	CO
Carbon dioxide	CO ₂
carbon tetrafluoride	CF ₄
nitrogen	N ₂
nitrogen monophosphide	NP
silicon dioxide	SiO ₂
dinitrogen trisulfide	N ₂ S ₃
sulfur dichloride	SCl ₂
dinitrogen trioxide	N ₂ O ₃
phosphorus mononitride	PN
hydrogen	H ₂
carbon disulfide	CS ₂
water	H ₂ O
diphosphorus pentoxide	P ₂ O ₅
nitrogen trichloride	NCl ₃
nitrogen tribromide	NBr ₃
silicon tetrabromide	SiBr ₄
chlorine	Cl ₂
Carbon tetrachloride	CCl ₄
phosphorus pentafluoride	PF ₅
carbon dioxide	CO ₂
phosphorus trifluoride	PF ₃
nitrogen trifluoride	NF ₃
boron trisulfide	BS ₃
oxygen monosulfide	OS
diphosphorous pentasulfide	P ₂ S ₅
tellurium dibromide	TeBr ₂
fluorine	F ₂

9. Complete the following table:

Name	Formula
potassium oxide	K_2O
tin (II) sulfite	$SnSO_3$
magnesium phosphate	$Mg_3(PO_4)_2$
ammonium fluoride	NH_4F
manganese (IV) phosphide	Mn_3P_4
chromium (II) chlorate	$Cr(ClO_3)_2$
vandium (V) chloride	VCl_5
potassium hypochlorite	$KClO$
niobium (III) nitrate	$Nb(NO_2)_3$
ammonium oxide	$(NH_4)_2O$
sodium astatide	$NaAt$
platinum (II) borate	$Pt_3(BO_3)_2$
lithium sulfite	Li_2SO_3
magnesium chlorate	$Mg(ClO_3)_2$
gold (I) sulfate	Au_2SO_4
cobalt (II) bromate	$Co(BrO_3)_2$
sodium hydroxide	$NaOH$
aluminum permanganate	$Al(MnO_4)_3$
mercury (II) nitrite	$Hg(NO_2)_2$
scandium fluoride	ScF_3
manganese (II) phosphate	$Mn_3(PO_4)_2$
palladium (IV) nitrate	$Pd(NO_3)_4$
tin (II) nitrite	$Sn(NO_2)_2$
beryllium sulfate	$BeSO_4$

6. Complete the following table:

calcium chloride	CaCl ₂	potassium iodide	KI
magnesium oxide	MgO	aluminum chloride	AlCl ₃
sodium bromide	NaBr	lithium nitride	Li ₃ N
aluminum oxide	Al ₂ O ₃	barium chloride	BaCl ₂
calcium oxide	CaO	magnesium hydride	MgH ₂
zinc oxide	ZnO	magnesium chloride	MgCl ₂
silver sulfide	Ag ₂ S	sodium sulfide	Na ₂ S
calcium fluoride	CaF ₂	zinc sulfide	ZnS
calcium hydride	CaH ₂	potassium chloride	KCl
potassium sulfide	K ₂ S	silver bromide	AgBr

7. Write the formulas for the following ionic compounds. Be sure to note the charges of any multivalent ions.

Name	Cation	Anion	Formula
barium oxide	Ba ²⁺	O ²⁻	BaO
aluminum fluoride	Al ³⁺	F ⁻	AlF ₃
calcium chloride	Ca ²⁺	Cl ⁻	CaCl ₂
mercury (II) fluoride	Hg ²⁺	F ⁻	HgF ₂
tin (IV) phosphide	Sn ⁴⁺	P ³⁻	Sn ₃ P ₄
potassium sulfide	K ⁺	S ²⁻	K ₂ S
tin (II) oxide	Sn ²⁺	O ²⁻	SnO
magnesium fluoride	Mg ²⁺	F ⁻	MgF ₂
copper (I) fluoride	Cu ⁺	F ⁻	CuF

3. Place a P or C in each blank to indicate a physical or chemical change.

C Susan pours vinegar into a beaker full of baking soda

P Greg boils water on a stove

P Lily dissolves Kool-aid in water

C Bob notices rust on his truck

P Heidi saws a piece of wood

C Jim cracks a glow stick

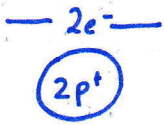
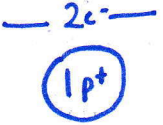
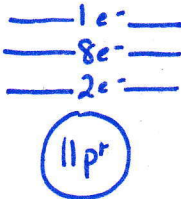
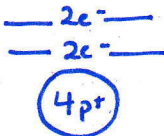
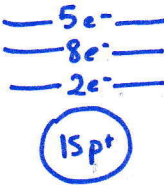
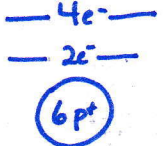
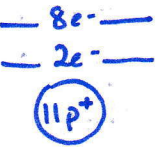
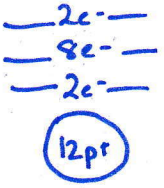
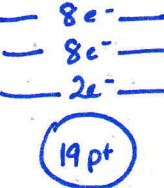
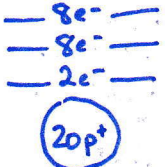
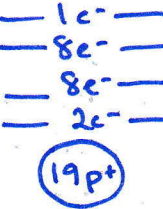
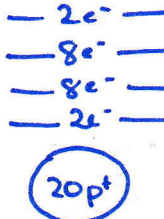
C Judy starts a fire

P Frankie freezes water to make ice

P Sadie tears a piece of paper

4. Complete the following table:

	Name	Symbol	# Protons	# Electrons	# electrons gained or lost	Net Charge
1	hydrogen ion	H ⁺	1	0	lost 1	1+
2	phosphide ion	P ³⁻	15	18	gain 3	3-
3	iron atom	Fe	26	26	—	—
4	oxygen atom	O	8	8	—	—
5	argon atom	Ar	18	18	—	0
6	calcium ion	Ca ²⁺	20	18	lost 2	2+
7	aluminum ion	Al ³⁺	13	10	lost 3	3+
8	helium atom	He	2	2	—	—
9	magnesium ion	Mg ²⁺	12	10	Lost 2	2+
10	rhodium atom	Rh	45	45	—	—
11	sulfide ion	S ²⁻	16	18	gain 2	2-

<p>m) helium atom</p>  <p>He</p>	<p>n) hydride ion</p>  <p>H⁻</p>	<p>o) sodium atom</p>  <p>Na</p>
<p>p) beryllium atom</p>  <p>Be</p>	<p>q) phosphorus atom</p>  <p>P</p>	<p>r) carbon atom</p>  <p>C</p>
<p>s) sodium ion</p>  <p>Na⁺</p>	<p>t) magnesium atom</p>  <p>Mg</p>	<p>u) potassium ion</p>  <p>K⁺</p>
<p>v) calcium ion</p>  <p>Ca²⁺</p>	<p>w) potassium ion atom</p>  <p>K</p>	<p>x) calcium ion atom</p>  <p>Ca</p>

1. Define the following terms

chemistry	matter	mass	pure substance	element
compounds	mixtures	homogeneous mixtures	heterogeneous mixtures	metalloids

2. List chemical and physical properties
3. Define and give examples for physical and chemical change
4. Know how the periodic table is divided into families/groups and periods
5. Know the names of the different groups: alkali metals, alkaline earth metals, halogens, and noble gases
6. Know the properties of metals and non-metals
7. List the parts of the atom and list their symbols, charge, and location
8. Know how to determine atomic number and mass number of an atom
9. Know how to draw electron energy diagrams/ Bohr diagrams for atoms AND ions
10. What are valence electrons?
11. Know what energy levels are? How many electrons in each level?
12. Know how positive ions form and how negative ions form
13. Know the difference between a cation and an anion
14. What are polyatomic ions?
15. Name the various types of ionic compounds and write the formulas when given the name (Binary ionic compounds, multivalent ionic compounds, polyatomic ionic compounds, hydrates)
16. Compare and contrast molecular and ionic compounds
17. Compare and contrast ionic and covalent bonds
18. Which elements are diatomic?
19. Know how to name and write formulas for the molecular compounds (Know your prefixes)
20. Memorize the common molecular compounds