Name: Answer Key Date: _____

Science 1206

Review for Chemistry Final

Important Terms

Chemistry	Matter	Atom
Pure Substance	Element	Compound
Metals	Nonmetals	Ionic compounds
Molecular compounds	Mixture	Heterogeneous mixture
Homogeneous mixture	Physical property	Chemical property
Physical change	Chemical change	Atomic number
Mass number	Proton	Electron
Neutron	Family/group	Period
Alkali metals	Alkaline earth metals	Halogens
Noble gases	Representative elements	Transition elements
Metalloid	Cation	Anion
Duet Rule	Octet Rule	Valence Electron
Ionic Bond	Ionic Crystal Lattice	Formula Unit
Monatomic	Polyatomic	Multivalent
Hydrate	Non-electrolyte	Electrolyte
Molecule	Covalent Bond	Empirical Formula
WHMIS	MSDS	Acid
Base		

Students will be expected to:

1. Be able to understand and apply the definitions to the above terms
2. Identify the elements from the different groups (families) or series
3. Identify an element as a metal, nonmetal or metalloid
4. Give properties of metals and nonmetals
5. Draw electron energy level diagrams for atoms and ions (1st 20 elements only)
6. Write chemical formulas and names for different types of substances: ionic, molecular, acids and bases
7. Know how and why compounds form
8. Identify different substances based on their chemical formulas, names and properties
9. Give properties of acids and bases
10. Label the WHMIS symbols
11. Contrast physical, chemical and nuclear changes in terms of the substances and amounts of energy involved
12. Define and identify endothermic and exothermic reactions
13. Define the Law of Conservation of Energy and the Law of Conservation of Mass
14. Identify types of chemical reactions including formation, decomposition, single replacement, double replacement and complete hydrocarbon combustion
15. Write balanced chemical equations for the different types of reactions
16. Identify the evidence of a chemical reaction by changes in color, odor, state and energy
17. Identify the presence of chemicals based on specific tests including those for oxygen, hydrogen, carbon dioxide, water, acid and base

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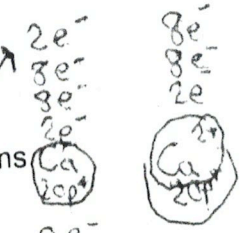
The following Practice Problems will help you prepare for your test

1. Classify the following a compound (C), an element (E), a homogeneous mixture (Ho), or a heterogeneous mixture (H).
   a. vegetable soup H
   b. calcium carbonate C
   c. oil and water mixture H
   d. water C
   e. apple juice Ho
   f. sulfur E

full valence level
- 8e⁻ - P
- 2e⁻ -
Ne
10 p⁺

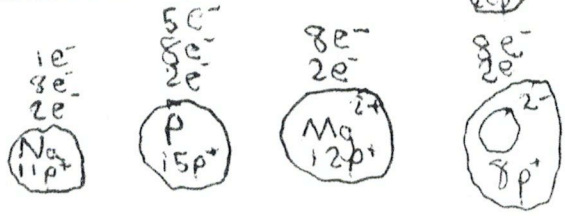
2. Explain using electron energy level diagrams why neon is chemically non-reactive.

lost 2e⁻



3. Explain using electron energy level diagrams how and why a calcium ion forms

4. Draw electron energy level diagrams for:
   a. sodium atom
   b. phosphorus atom
   c. magnesium ion
   d. oxide ion



5. Write formulas for the following:

a) disulfur trioxide S_2O_3 b) ozone O_3

c) trichlorine tetrasulfide Cl_3S_4 d) phosphorus P_4

e) ammonia NH_3 f) pentasulfur monohydride S_5H

g) ammonia NH_3 h) octacarbon difluoride C_8F_2

i) ethanol C_2H_5OH j) sulfur S_8

k) hydrogen peroxide H_2O_2 l) hydrogen H_2

6. Write the formulae for each of the following compounds

	Oxide	Sulfite	Nitrate	chloride
Silver	Ag_2O	Ag_2SO_3	$AgNO_3$	$AgCl$
Iron (III)	Fe_2O_3	$Fe_2(SO_3)_3$	$Fe(NO_3)_3$	$FeCl_3$
Ammonium	$(NH_4)_2O$	$(NH_4)_2SO_3$	NH_4NO_3	NH_4Cl
Calcium	CaO	$CaSO_3$	$Ca(NO_3)_2$	$CaCl_2$

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7. Write the names for each of the following compounds

a) KCl Potassium chloride b) V_2O_5 Vanadium(V) oxide

c) Na_2O Sodium oxide d) CaF_2 Calcium Fluoride

e) $Mg(NO_3)_2$ magnesium nitrate f) CH_4 methane

g) $FeCl_3$ iron(III) chloride h) $Al(NO_2)_3$ Aluminum nitrite

i) $Ca_3(PO_4)_2$ Calcium phosphate j) $Pb_2S_2O_3$ lead(I) trioSulfate

k) Au_2CO_3 gold(I)Carbonate l) P_3O triphosphorus oxide

m) C_2O_7 dicarbon hepta oxide n) $(NH_4)_2CO_3$ ammonium carbonate

o) Cs_3PO_4 Cesium phosphate p) NH_3 ammonia

q) SO_3 Sulfur trioxide r) $H_3BO_{3\,(aq)}$ Boric acid

s) $Cd(OH)_2$ Cadmium hydroxide t) $Cu(ClO_3)_3$ Copper(III) chlorate

8. Name the compound or write the formula. Before you fill in the name or formula, identify the type of compound to help you with the rules.

	Name	Chemical Formula	Ionic, Molecular, Acid or Base
1.	Tin(II) oxide tetrahydrate	$SnO{\cdot}4H_2O$	I
2.	Magnesium Hydroxide	$Mg(OH)_2$	B
3.	Zinc bromide	$ZnBr_2$	I
4.	Argon	Ar	Element
5.	diphosphorus tetraoxide	P_2O_4	M
6.	Ammonium Sulfate	$(NH_4)_2SO_4$	I
7.	Sulfurous acid	$H_2SO_{3\,(aq)}$	A
8.	Phosphoric Acid	$H_3PO_{4\,(aq)}$	A
9.	lead(IV) oxide	PbO_2	I
10.	Strontium Oxide	SrO	I
11.	Ammonia	NH_3	M
12.	Silver Oxide	Ag_2O	I
13.	Silver chloride	AgCl	I
14.	Chlorine	Cl_2	M

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15.	permanganic acid	$HMnO_{4\,(aq)}$	A
16.	Copper(II) Sulfate Pentahydrate	$CuSO_4 \cdot 5H_2O$	I
17.	Aluminum Oxide	Al_2O_3	I
18.	Acetic Acid	$CH_3COOH_{(aq)}$	A
19.	potassium dichromate	$K_2Cr_2O_7$	I
20.	Magnesium Phosphate	$Mg_3(PO_4)_2$	I
21.	hydrofluoric acid	$HF_{(aq)}$	A
22.	Mercury(II) Bromide	$HgBr_2$	I
23.	hydrogen peroxide	H_2O_2	M
24.	Sulfur Trioxide	SO_3	M
25.	Nickel(III) Chloride	$NiCl_3$	I
26.	Perchloric Acid	$HClO_{4\,(aq)}$	A

9. Balance each of the following equations and indicate the reaction type.

a. ___ $Cu(NO_3)_2$ + ___ ZnS → ___ $Zn(NO_3)_2$ + ___ CuS

Reaction Type: DR

b. 3 O_2 + 4 LI_3P → ___ P_4 + 6 Li_2O

Reaction Type: SR

c. 2 Fe_2O_3 → 4 Fe + 3 O_2

Reaction Type: D

d. 2 Fe + 3 Ag_2O → ___ Fe_2O_3 + 6 Ag

Reaction Type: SR

e. ___ P_4 + 6 Cl_2 → 4 PCl_3

Reaction Type: F

f. ___ H_3PO_4 (aq) + 3 NaOH → ___ Na_3PO_4 + 3 HOH

Reaction Type: DR (Neutralization)

g. 3 $Ca(NO_3)_2$ + 2 Na_3PO_4 → ___ $Ca_3(PO_4)_2$ + 6 $NaNO_3$

Reaction Type: DR

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h. 2 $KClO_3$ → 2 KCl + 3 O_2

Reaction Type: D

i. ___ S_8 + 8 O_2 → 8 SO_2

Reaction Type: F

j. 3 H_2SO_4 (aq) + ___ $Ca_3(PO_4)_2$ → 3 $CaSO_4$ + 2 H_3PO_4 (aq)

Reaction Type: DR

10. For the word equations below:
    i. write the chemical equations with correct formulas
    ii. balance the equation'
    iii. state the reaction type

a. Butane, C_4H_{10}, decomposes into its elements

$C_4H_{10} \rightarrow 4C + 5H_2$

Reaction Type: D

b. Iron(III) chloride reacts with magnesium oxide and produces magnesium chloride and iron(III) oxide

$2FeCl_3 + 3MgO \rightarrow 3MgCl_2 + Fe_2O_3$

Reaction Type: DR

c. Hydrogen sulfide reacts with lead(II)chromate to produce chromic acid and lead(II)sulfide

$H_2S + PbCrO_4 \rightarrow H_2CrO_{4(aq)} + PbS$

Reaction Type: DR

d. Propane, $C_3H_{8(g)}$ burns in air. The products are carbon dioxide and water.

$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$

Reaction Type: C

e. Ammonia is broken down into its elements

$2NH_3 \rightarrow N_2 + 3H_2$

Reaction Type: D

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f. Sodium hydroxide and sulfuric acid react in a Neutralization Reaction to produce sodium sulfate and water

$2NaOH + H_2SO_4(aq) \rightarrow Na_2SO_4 + 2HOH$

Reaction Type: DR (Neutralization)

g. Lithium reacts with nitrogen from the air to produce lithium nitride.

$6Li + N_2 \rightarrow 2Li_3N$

Reaction Type: F

h. Aluminum and iron(III)sulfate react

$2Al + Fe_2(SO_4)_3 \rightarrow Al_2(SO_4)_3 + 2Fe$

Reaction Type: SR

i. Silver cyanide reacts with nickel(II) nitrate to produce nickel(II) cyanide and silver nitrate.

$2AgCN + Ni(NO_3)_2 \rightarrow Ni(CN)_2 + 2AgNO_3$

Reaction Type: DR

11. Describe the test for oxygen gas, hydrogen gas, carbon dioxide gas, and water.

See Notes

Chemical Reactions Notes Part II
pages 1-2