

CHEMISTRY UNITS 4, 5, 6 PICK AND CHOOSE PRACTICE PROBLEMS

Unit 4: Chemical Nomenclature

- 1) Classify each compound as either: M = molecular (two nonmetals) I = Ionic (metal + nonmetal)
- a) a) FeCl_2 **Ionic** b) N_2O **Molecular** c) HBr **Molecular**
b) d) CO_2 **Molecular** e) BaI_2 **Ionic** d) K_2O **Ionic**

- 2) Complete the following table:

Element	Ion(s)	Oxidation Number(s)	Names
Iron	Fe^{2+}	+2	iron (II) or ferrous
	Fe^{3+}	+3	iron (III) or ferric
Potassium	K^+	+1	potassium
Beryllium	Be^{2+}	+2	beryllium
Tin	Sn^{2+}	+2	tin (II) or stannous
	Sn^{4+}	+4	tin (IV) or stannic
Cobalt	Co^{2+}	+2	cobalt (II)
	Co^{3+}	+3	cobalt (III)
Oxygen	O^{2-}	-2	oxide
Fluorine	F^-	-1	fluoride
Copper	Cu^+	+1	copper (I) or cuprous
	Cu^{2+}	+2	copper (II) or cupric

- 3) List 3 common examples of each of the three types of bonding:
- a) Ionic **table salt: NaCl , baking soda: NaHCO_3 , rust: Fe_2O_3**
b) Covalent **water: H_2O , carbon dioxide: CO_2 , carbon monoxide: CO**
c) Metallic **gold: Au , silver: Ag , platinum: Pt**

- 4) Circle each of the following compounds that is ionically bonded:
 CO_2 SiO_2 NaCl HBr CH_4 Rb_2O KF

- 5) Write the chemical formula for each of the following compounds:
- | | |
|--|---|
| potassium sulfate K_2SO_4 | sodium oxide Na_2O |
| aluminum nitride AlN | diphosphorus trioxide P_2O_3 |
| iron(II) perchlorate $\text{Fe}(\text{ClO}_4)_2$ | arsenic pentachloride AsCl_5 |
| calcium carbonate CaCO_3 | chromium (III) chloride CrCl_3 |
| carbonic acid H_2CO_3 | hydrobromic acid HBr |
| hypochlorous acid HClO | dihydrogen monoxide H_2O |
| cesium bromide CsBr | barium sulfate BaSO_4 |
| chlorine monoxide ClO | beryllium oxide BeO |
| sulfur difluoride SF_2 | sodium bicarbonate NaHCO_3 |
| tin (II) fluoride SnF_2 | cobalt (III) nitrate $\text{Co}(\text{NO}_3)_3$ |
| potassium chlorate KClO_3 | oxygen difluoride OF_2 |
| hydrochloric acid HCl | lithium hydroxide LiOH |
| sulfur dioxide SO_2 | copper (I) sulfide Cu_2S |
| nitrous acid HNO_2 | calcium iodide CaI_2 |

- 6) Which of the following compounds are covalently bonded?
 NO_2 PCl_3 NH_3 NaI CaCl_2 Al_2O_3 C_6H_6

- 7) Write the chemical name for each of the following compounds
- | | | | |
|-------------------------|---------------------------------|-------------------------|---------------------------------------|
| H_2 | hydrogen | H_2O | water or dihydrogen monoxide |
| CO_2 | carbon dioxide | NH_3 | ammonia or nitrogen trihydride |
| SO_3 | sulfur trioxide | CH_4 | methane or carbon tetrahydride |
| P_2S_6 | diphosphorus hexasulfide | N_2O_4 | dinitrogen tetroxide |
| C_2F_2 | dicarbon difluoride | HNO_2 | nitrous acid |
| Cu_2S | copper (I) sulfide | SnO_2 | tin (IV) oxide |
| HBrO_2 | bromous acid | HF | hydrofluoric acid |
| CrO_3 | chromium (VI) oxide | Cr_2O_3 | chromium (III) oxide |
| Al_2O_3 | aluminum oxide | SeO_2 | selenium dioxide |
| SeO_3 | selenium trioxide | NI_3 | nitrogen triiodide |
| PCl_3 | phosphorous trichloride | SF_2 | sulfur difluoride |

NaCl	sodium chloride	MgCl ₂	magnesium chloride
NO	nitrogen monoxide	NF ₃	nitrogen trifluoride
RbBr	rubidium bromide	N ₂ F ₄	dinitrogen tetrafluoride
CsF	cesium fluoride	AlI ₃	aluminum iodide
HNO ₃	nitric acid	FePO ₄	iron (III) phosphate
NaHSO ₄	sodium hydrogen sulfate	KNO ₃	potassium nitrate
H ₂ SO ₄	sulfuric acid	SiF ₄	silicon tetrafluoride
PtCl ₄	platinum (IV) chloride	NH ₄ Cl	ammonium chloride

- 8) C₈H₁₈ contains a total of 26 atoms, including 8 atoms C and 18 atoms H.
- 9) Al(NO₃)₃ contains a total of 13 atoms, including 3 atoms N, 1 atoms Al, and 9 atoms O.
- 10) (NH₄)₂SO₄ contains a total of 15 atoms.
- 11) One particle of (NH₄)₃PO₄, ammonium phosphate, contains 3 NH₄⁺ ions, 1 PO₄³⁻ ions, 3 atoms N, 12 atoms H, 1 atoms P, 4 atoms O, and 20 total atoms.
- 12) What is the expected charge on the Ba ion? **+2**
- 13) Which of the following pairs of atoms would not be expected to combine to form an ionic compound?
 a) **a) B and H** b) Na and H c) Li and Cl d) Rb and O e) K and S
- 14) What is the expected charge on the alkaline earth metals? **+2**
- 15) Which of the following two elements would be expected to form a covalent bond?
 a) Na, O **b) H, S** c) K, Te d) Mn, F e) Ba, S
- 16) Which of the following element is classified as a metal?
 a) N b) I c) C d) H **e) Na**
- 17) Which of the following element is classified as a nonmetal?
 a) Al **b) Cl** c) Ni d) Ti e) Mo
- 18) Which of the following is not a diatomic molecule?
 a) H₂ b) N₂ **c) K₂** d) O₂ e) Cl₂
- 19) Which of the following forms a +3 ion?
 a) Na b) Mg **c) Al** d) Si e) P
- 20) Which of the following is a covalent compound?
a) SCl b) FrCl c) CaS d) BaS e) KCl
- 21) Which of the following is an ionic compound?
 a) NO b) CO c) OF₂ d) O₂ **e) K₂O**
- 22) Which of the following is a nonmetal?
 a) Al b) Na c) Cu **d) Cl** e) Mg
- 23) Which of the following is an alkali metal?
 a) Al **b) Na** c) Cu d) Cl e) Mg
- 24) Which of the following is an ionic compound?
 a) H₂O b) CS₂ **c) CaCl₂** d) CO₂ e) CH₄
- 25) Which of the following is a covalent compound?
 a) NaCl b) FeCl₃ c) BaCl₂ **d) NCl₃** e) AlCl₃

- 26) What do you call the following compound: Na_3PO_4 ?
- a) a molecule b) a polyatomic ion **c) a particle** d) a molecule or a particle
- 27) Give the ions present and their relative numbers in K_2SO_4 .
- a) 1 K^+ and 1 SO_4^{2-} **b) 2 K^+ and 1 SO_4^{2-}** c) 1 K^+ and 2 SO_4^{2-}
d) 2 K^+ and 2 SO_4^{2-} e) 2 K^{2+} and 1 SO_4^{2-}
- 28) Given the following ions, write the correct formula: Ba^{2+} and PO_4^{3-}
- a) BaPO_4 b) $\text{Ba}_2(\text{PO}_4)_3$ c) $\text{Ba}_2\text{PO}_{12}$ d) Ba_3PO_8 **e) $\text{Ba}_3(\text{PO}_4)_2$**
- 29) What is the correct name for N_2S ?
- a) nitrogen monosulfide b) mononitrogen disulfide c) nitrogen sulfur
d) dinitrogen disulfide **e) dinitrogen monosulfide**
- 30) What is the correct name for HCl ?
- a) hydrogen sulfur b) chloric acid c) chlorous acid
d) hydrochloric acid e) hydrogen chlorine
- 31) The formula of the compound trichlorine tetrafluoride is ____.
- a) ClF **b) Cl_3F_4** c) Cl_3F_5 d) Cl_5F_3 e) Cl_4F_3
- 32) What is the symbol for the chlorite ion?
- a) ClO^- b) CrO_4^- **c) ClO_2^-** d) ClO_3^- e) ClO_4^-
- 33) What is the symbol for the sulfite ion?
- a) SO_3^- **b) SO_3^{2-}** c) SO_4^{2-} d) SO_2^{2-} e) SO_4^-
- 34) What is the symbol for the chlorate ion?
- a) CrO_4^- b) ClO_2^{3-} c) ClO^- **d) ClO_3^-** e) ClO_4^-
- 35) The total number of atoms represented by $\text{Ba}(\text{H}_2\text{PO}_4)_2$ is:
- a) 16 b) 13 c) 14 d) 17 **e) 15**
- 36) What is the chemical formula for lead (IV) sulfide?
- a) PbS_4 b) PbS c) Pb_4S **d) PbS_2** e) Pb_2S
- 37) What is the chemical name of $\text{Fe}(\text{HSO}_3)_3$?
- a) iron (III) sulfite
b) iron (III) bisulfite
c) iron (I) bisulfite
d) iron (III) sulfate
e) iron (III) bisulfate
- 38) What is the chemical name of BaSO_4
- a) Barium sulfur
b) Barium sulfoxide
c) Barium sulfide
d) Barium sulfite
e) Barium sulfate
- 39) What is the chemical name of $\text{Mg}_3(\text{PO}_4)_2$?
- a) Magnesium phosphide
b) Magnesium phosphotatate
c) Magnesium phosphate
d) Magnesium phosphate
- 40) What is the name of H_2S ?
- a) Hydrogen sulfate
b) Sulfuric acid
c) Sulfurous acid
d) Hydrosulfuric acid
- 41) Write the chemical formulas for the following compounds:
- a) sodium acetate
b) ferric bicarbonate
c) zinc sulfite

- d) silver bicarbonate
- e) potassium iodide
- f) barium bisulfite
- g) lead(IV) chlorite
- h) nitric acid
- i) calcium sulfide
- j) lead(II) nitrite
- k) copper(I) bisulfate
- l) potassium dichromate
- m) sulfuric acid
- n) boron phosphide
- o) cobaltic chlorate

42) Write the chemical names for the following compounds:

- a) SO_3
- b) $\text{Be}(\text{ClO}_4)_2$
- c) $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$
- d) $\text{Ba}(\text{BrO}_3)_2$
- e) XeF_2
- f) Al_2S_3
- g) Na_2HPO_4
- h) $\text{Mg}_3(\text{PO}_4)_2$
- i) $\text{Al}(\text{OH})_3$
- j) CuSO_3
- k) Li_2HPO_4
- l) $\text{Ca}(\text{NO}_3)_2$
- m) $\text{Cr}_2(\text{SO}_3)_3$
- n) $\text{Ni}(\text{ClO}_4)_2$
- o) HClO

Unit 5: Chemical Formula Relationships

43) Determine the formula masses for the following compounds:

- (a) $\text{Mg}(\text{OH})_2$ **58.3 amu**
- (b) calcium hydroxide **74.1 amu**
- (c) acetic acid **60.0 amu**

44) Perform the following Calculations

- a) Determine the mass of one mole of CO_2 **44.0 g CO_2**
- b) Determine the number of atoms in one molecule of Fe_2O_3 **2 atoms Fe, 3 atoms O = 5 atoms**
- c) Determine the number of atoms in one mole of $\text{C}_6\text{H}_{12}\text{O}_6$
 6.02×10^{23} molecules $\text{C}_6\text{H}_{12}\text{O}_6 = 3.61 \times 10^{24}$ atoms C, 7.22×10^{24} atoms H, 3.61×10^{24} atoms O
- d) Determine the mass of 5.240 moles of gold **1032 g Au**
- e) Determine the number of moles of nitrogen gas in 85.4 g of nitrogen gas. **3.05 mol N_2**
- f) Determine the mass, in grams, of one atom of silver. **1.79×10^{-22} g Ag**
- g) Determine the mass, in grams, of one molecule of carbon dioxide. **7.31×10^{-23} g CO_2**

45) Perform the following Calculations

- a) Determine the percent composition of ammonium sulfate, $(\text{NH}_4)_2\text{SO}_4$.
21% N, 6.1% H, 24.3% S, 48.4% O
- b) Determine the percent composition of urea, $\text{N}_2\text{H}_4\text{CO}$. **46.7% N, 6.7% H, 20.0% C, 26.7% O**

46) Each of the compounds listed in question 14 contains nitrogen. They are used as fertilizers. For each of the compounds, which one has the highest percentage of nitrogen? **$\text{N}_2\text{H}_4\text{CO}$**

47) Write the empirical formula for each of the following compounds.

- a) $\text{C}_{12}\text{H}_{22}\text{O}_{11}$, sugar **$\text{C}_{12}\text{H}_{22}\text{O}_{11}$**
- b) $\text{C}_2\text{H}_6\text{O}_2$, ethylene glycol (antifreeze) **CH_3O**

- 48) From the following empirical formulas and the formula masses for each compound, determine their molecular formulas.
- CH_3 ; formula mass= 30.0 amu **C_2H_6**
 - CH_2 ; formula mass= 84.0 amu **C_6H_{12}**
 - $\text{C}_3\text{H}_4\text{O}_3$ (Vitamin C); formula mass= 176 amu **$\text{C}_6\text{H}_8\text{O}_6$**
- 49) Determine the empirical formula for a compound that contains 18.6 grams of phosphorus and 14.0 grams of nitrogen. **P_3N_5**
- 50) Determine the empirical formula for a compound that contains 35.6% of phosphorus and 64.4% of sulfur. **P_4S_7**
- 51) A compound with a molecular mass of 98.0 g/mole was determined to be 24.49% carbon, 4.08% hydrogen, and 72.43% chlorine.
- Determine the empirical formula of the compound. **CH_2Cl**
 - Determine the molecular formula of the compound. **$\text{C}_2\text{H}_4\text{Cl}_2$**
- 52) The controversial artificial sweetener saccharin has the molecular formula $\text{C}_3\text{H}_5\text{O}_3\text{NS}$. What is its molecular weight?
- 123.12 amu
 - 119.88 amu
 - 135.14 amu**
 - 103.15 amu
 - 77.78 amu
- 53) Cisplatin, an anticancer drug, has the molecular formula $\text{Pt}(\text{NH}_3)_2\text{Cl}_2$. What is the molecular weight of cisplatin?
- 323.3 amu
 - 300.1 amu**
 - 332.6 amu
 - 321.2 amu
 - 340.4 amu
- 54) Nitroglycerin is $\text{C}_3\text{H}_5\text{N}_3\text{O}_9$. What is the molecular weight of nitroglycerin?
- 240.22 amu
 - 286.44 amu
 - 227.10 amu**
 - 270.42 amu
 - 256.20 amu
- 55) BaSO_4 is given as a thick slurry before X rays are taken of the intestinal tract. How many grams are in a 0.568 mole sample of BaSO_4 ?
- 62.4
 - 103
 - 56.8
 - 77.8
 - 133**
- 56) Which of the following correctly describes the mole?
- One mole is 6.022×10^{23} atoms of any element
 - One mole is the number of atoms in exactly 12.0 g of ^{12}C
 - One mole of any chemical compound is one mole of its chemical formula unit
 - All of the above are correct**
- 57) What is the mass of 1.004×10^{23} molecules of barium iodide
- 44.05 g
 - 44.12 g
 - 65.20 g**
 - 0.167 g
- 58) How many moles are in 32.0 grams of CH_4 ?
- 32.0 moles
 - 16.0 moles
 - 1.00 mole
 - 2.00 moles**
- 59) How many moles of methane molecules, CH_4 , are in 80 grams of methane?
- 1284 moles
 - 6×10^{80} moles
 - 0.2 moles
 - 5 moles**
- 60) The amount of substance having 6.022×10^{23} of any kind of chemical unit is called a(n):
- mole**
 - mass number

- c) atomic weight
d) formula
- 61) The molar mass of sodium chloride, NaCl is:
a) **58.44 g/mol**
b) 69.71 g/mol
c) 2 g/mol
d) 6.022×10^{23} g/mol
- 62) What is the mass in grams of 10. moles of ammonia, NH₃?
a) **170 grams** b) 27.0 grams c) 1.70 grams d) 0.59 grams
- 63) The formula mass of calcium hydroxide, Ca(OH)₂ is:
a) 128 amu **b) 74 amu** c) 97 amu d) 57 amu
- 64) The formula mass of magnesium hydroxide, Mg(OH)₂ is:
a) 42.33 amu **b) 58.33 amu** c) 41.32 amu d) 5 amu
- 65) About how many atoms of helium would be found in 2 grams of helium?
a) 6×10^{23} b) 4 **c) 3×10^{23}** d) 2
- 66) The total number of OXYGEN atoms in the formula of aluminum dichromate, Al₂(Cr₂O₇)₃ is:
a) 10 b) 7 c) 29 **d) 21**
- 67) What is the mass of 4 moles of hydrogen molecules (H₂)?
a) 4 grams
b) 3 grams
c) 8 grams
d) 1 gram
- 68) What is the mass in grams of 3.00 moles of water molecules, H₂O?
a) **54.0 grams**
b) 21.0 grams
c) 6.01 grams
d) 0.166 grams
- 69) How many moles of water molecules, H₂O, are present in a 42.0 gram sample of water?
a) **2.33 moles**
b) 0.429 moles
c) 23.98 moles
d) 757 moles
- 70) Calculate the percentage composition of Ca(ClO₃)₂?
a) **a) 19.4% Ca, 34.3% Cl, 46.4% O** b) 32.4% Ca, 28.7% Cl, 38.8% O
b) c) 49.0% Ca, 21.8% Cl, 29.3% O d) 32.4% Ca, 67.6% ClO₃
c) e) 19.4% Ca, 51.0% ClO₃
- 71) What is the empirical formula for N₈O₄?
a) a) NO₂ b) NO **c) N₂O** d) ON₄ e) N₂O₂
- 72) How many molecules are there in 10.0 g of sodium chloride?
a) 58.4×10^{23} b) 5.84×10^{24}

b) 6.02×10^{24} **d) 1.03×10^{23}**

73) How many atoms are in 18 molecules of glucose, $C_6H_{12}O_6$?

a) 24 **b) 432** c) 3240 d) 1.08×10^{25} e) 2.60×10^{26}

74) In 0.250 moles of ethylene glycol (antifreeze), $HOCH_2CH_2OH$, there are

a) 1.51×10^{23} atoms **b) 1.51×10^{24} molecules**
b)c) 1.51×10^{24} atoms d) 6.02×10^{24} atoms e) 3.01×10^{24} molecules

75) Which of the following does not describe 56.0 g of butene, C_4H_8 ?

a) One mole of butene
b) The amount of butene that contains 8.0 g of hydrogen
c) The amount of butene that contains $8 \times 6.02 \times 10^{23}$ hydrogen atoms
d) The amount of butene that contains 48.0 g of carbon
e) $56.0 \times 6.02 \times 10^{23}$ molecules of butene

76) Sodium cyclamate, $C_6H_{11}NHSO_3Na$, is used as an artificial sweetener in South Africa. If $C_6H_{11}NHSO_3Na$ has a molar mass of 201.2 g/mol, how many moles of sodium cyclamate are contained in a 25.6 g sample?

a) **0.127 mol** b) 0.193 mol c) 0.245 mol d) 7.90 mol e) 5180 mol

77) How many moles of nitrogen gas (N_2 molecules) are present in 48.0 grams of nitrogen?

a) 0.58 mol b) 0.86 mol **c) 1.71 mol** d) 2.00 mol e) 3.42 moles

78) Which one of the following has the lightest mass?

a) An HF molecule
b) 20.0 g of HF
c) 10.0 mol of H_2
d) 1 mol of F_2
e) 1 mol of H_2O

79) An atom of an element masses 9.12×10^{-23} g. What is the atomic mass of this element in atomic mass units?

a) 45.0 **b) 54.9** c) 55.8 d) 58.7 e) 63.5

80) Which of the following samples contains the smallest number of molecules?

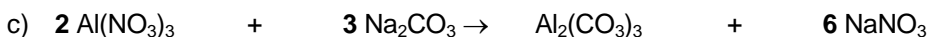
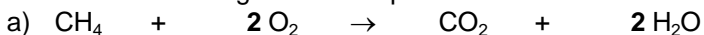
a) 1 g phosphorus, P_4
b) 1 g chlorine, Cl_2
c) 1 g nitrogen, N_2
d) 1 g arsenic, As_4
e) 1 g sulfur, S_8

81) One mole is ____.

a) the amount of molecules in any substance.
b) the amount of particles in any substance.
c) the amount of atoms in any substance.
d) the amount of ions in any substance.
e) just a number.

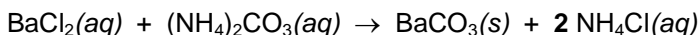
Unit 6: Reactions and Equations

82) Balance the following chemical equations.

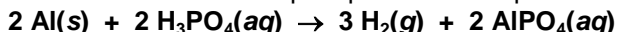


83) According to the following unbalanced reactions:

a) Balance the equations
b) Determine the amount of reactants and products (in moles)
c) Explain the phase labels



aluminum metal reacts with phosphoric acid to produce hydrogen gas and solid aluminum phosphate.



84) Classify the following chemical reactions as:

- | | | |
|---|----------------|---------------------------|
| a) combination | decomposition | single replacement |
| b) double replacement | neutralization | combustion |
| c) $\text{Fe}(\text{s}) + 2 \text{HCl} = \text{H}_2(\text{g}) + \text{FeCl}_2$ | | <u>single replacement</u> |
| d) $4 \text{NH}_3 + 5 \text{O}_2(\text{g}) = 4 \text{NO} + 6 \text{H}_2\text{O}$ | | <u>combustion</u> |
| e) $\text{C}_2\text{H}_2 + \text{HCl} = \text{C}_2\text{H}_3\text{Cl}$ | | <u>combination</u> |
| f) $\text{NaBr}(\text{aq}) + \text{AgNO}_3(\text{aq}) = \text{AgBr}(\text{s}) + \text{NaNO}_3(\text{aq})$ | | <u>double replacement</u> |
| g) $\text{C}_6\text{H}_{12}\text{O}_6 = 2 \text{C}_2\text{H}_5\text{OH} + 2 \text{CO}_2$ | | <u>decomposition</u> |
| h) $\text{NaOH} + \text{CH}_3\text{COOH} = \text{NaCH}_3\text{COO} + \text{H}_2\text{O}$ | | <u>neutralization</u> |

85) Based upon the type of reaction, determine the products. Write the balanced chemical equation.

- a) Combination: Calcium and bromine combine.
 $\text{Ca}(\text{s}) + \text{Br}_2(\text{l}) \rightarrow \text{CaBr}_2(\text{s})$
- b) Decomposition: Water breaks apart by electrolysis.
 $2 \text{H}_2\text{O}(\text{g}) \rightarrow 2 \text{H}_2(\text{g}) + \text{O}_2(\text{g})$
- c) Combustion: Natural gas (CH_4) is burned in furnaces.
 $\text{CH}_4(\text{g}) + 2 \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2 \text{H}_2\text{O}(\text{l})$
- d) Single Replacement: Chlorine gas is bubbled through an aqueous solution of potassium iodide.
 $\text{Cl}_2(\text{g}) + 2 \text{KI}(\text{aq}) \rightarrow 2 \text{KCl}(\text{aq}) + \text{I}_2(\text{g})$
- e) Double Replacement: Calcium nitrate and potassium fluoride combine to form a precipitate.
 $\text{Ca}(\text{NO}_3)_2(\text{aq}) + 2 \text{KF}(\text{aq}) \rightarrow \text{CaF}_2(\text{s}) + 2 \text{KNO}_3(\text{aq})$
- f) Double Replacement – Neutralization: Sodium hydroxide is added to phosphoric acid.
 $3 \text{NaOH}(\text{aq}) + \text{H}_3\text{PO}_4(\text{aq}) \rightarrow \text{Na}_3\text{PO}_4(\text{aq}) + 3 \text{H}_2\text{O}(\text{l})$

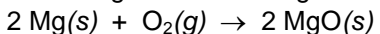
86) What is the coefficient for H_2 when the equation $\text{Ba} + \text{H}_3\text{AsO}_4 \rightarrow \text{H}_2 + \text{Ba}_3(\text{AsO}_4)_2$ is properly balanced?

- a) a) 1 **b) 3** c) 5 d) 2 e) 4

87) Calcium combines with bromine to make calcium bromide. Write the balanced chemical equation for the reaction. What is the coefficient for bromine?

- a) 1** b) 2 c) 3 d) 4 e) 5

88) According to the following reaction:



What is the phase of the product?

- a) solid** b) gas c) solid and gas d) liquid e) liquid and gas

89) Barium peroxide, BaO_2 , breaks down into barium oxide and oxygen. Write the balanced chemical equation for this reaction. What is the coefficient for barium oxide?

- a) 3 b) 1 c) 5 d) 6 **e) 2**

90) Lithium combines with oxygen to form lithium oxide. Write the balanced chemical equation for this reaction. What is the coefficient for lithium?

- a) 4** b) 3 c) 5 d) 1 e) none of the above

91) The decomposition by heating of solid potassium chlorate yields solid potassium chloride and oxygen gas as products. Write a balanced equation for this reaction.

- a) $\text{KClO}_4 \rightarrow \text{KCl}(\text{s}) + 2 \text{O}_2(\text{g})$
- b) $2 \text{KClO}_3(\text{s}) \rightarrow 2 \text{KCl}(\text{s}) + 3 \text{O}_2(\text{g})$**
- c) $\text{KClO}_3(\text{s}) \rightarrow \text{KCl}(\text{s}) + 3 \text{O}(\text{g})$
- d) $2 \text{KClO}_3(\text{s}) \rightarrow 2 \text{KClO}_2(\text{s}) + \text{O}(\text{g})$
- e) $\text{KClO}_2(\text{s}) \rightarrow \text{KCl}(\text{s}) + \text{O}_2(\text{g})$

92) $2 \text{Al} + 3 \text{Sn}(\text{NO}_3)_2 \rightarrow 2 \text{Al}(\text{NO}_3)_3 + 3 \text{Sn}$ This equation is an example of which type of reaction?

- a) **single replacement** b) double replacement c) combination d) decomposition

93) $6 \text{K}_2\text{O} + \text{P}_4\text{O}_{10} \rightarrow 4 \text{K}_3\text{PO}_4$ This equation is an example of which type of reaction?

- a) single replacement b) double replacement **c) combination** d) decomposition

94) In class a double displacement reaction was done as a demonstration. A solution of potassium iodide and a solution of lead (II) nitrate were combined. A yellow precipitate formed as a product. What was the precipitate?

- a) KI b) $\text{Pb}(\text{NO}_3)_2$ c) KNO_3 **d) PbI_2** e) KPb

95) $2 \text{H}_2(\text{g}) + \text{CO}(\text{g}) \rightarrow \text{CH}_3\text{OH}(\text{l})$ This equation is an example of which type of reaction?

- a) single replacement b) double replacement **c) combination** d) decomposition

96) Interpret the following sentence:

a) "Sodium bicarbonate reacts with acetic acid to produce sodium acetate, carbon dioxide and water."

b) $\text{Na}_2\text{CO}_3 + \text{H}_2\text{C}_2\text{H}_3\text{O}_2 \rightarrow \text{H}_2 + \text{CO}_3 + \text{Na}_2\text{C}_2\text{H}_3\text{O}_2$

c) $\text{NaCO}_3 + \text{HC}_2\text{H}_3\text{O}_2 \rightarrow \text{NaHC}_2\text{H}_3\text{O}_2 + \text{CO}_2 + \text{H}_2\text{O}$

d) $\text{NaHCO}_3 + \text{H}_2\text{O} + \text{CO}_2 \rightarrow \text{NaC}_2\text{H}_3\text{O}_2 + 2\text{O}_2$

e) $\text{NaHCO}_3 + \text{HC}_2\text{H}_3\text{O}_2 \rightarrow \text{NaC}_2\text{H}_3\text{O}_2 + \text{H}_2\text{O} + \text{CO}_2$