Solve:

1. $a^4 \cdot a^5 =$
   a^9

2. $(10^2 \cdot 10^3)/10^4 =$
   $10^5/10^4$
   10^1

3. $a(2a)^2 =$
   $a(4a^2)$
   $4a^3$

4. $(6^{-1})^3 =$
   6^2

5. $12y^2 / 4y^3 =$
   $3y^{-1}$

6. $(a^3)^0 =$
   1

7. $x^2y^4z^3 \cdot x^1y^2z^5 =$
   $x^1y^2z^{-2}$

Solve for x:

1. $3x - 9 = 36$
   $3x = 36 - 9$
   $3x = 27$
   $x = 27/3$
   $x = 9$

2. $192 = 3x^2$
   $192/3 = x^2$
   $64 = x^2$
   $\sqrt{64} = x$
   $x = 8$

3. $4x^3 = 108$
   $x^3 = 108/4$
   $x^3 = 27$
   $x = \sqrt[3]{27}$
   $x = 3$

4. $\frac{16 - x}{7} = 19$
   $16 - x = 19 \cdot 7$
   $16 - x = 133$
   $-x = 133-16$
   $-x = 117$
   $x = 117/-1$
   $x = 117$

SIGNIFICANT FIGURES and SCIENTIFIC NOTATION SOLUTIONS

1. SIGNIFICANT FIGURES

The precision of a measurement is expressed in terms of significant figures (**sf**). The value 0.24 has 2 sf while 0.240 has 3 sf. The extra zero at the end makes this measurement more precise and is included as a sf. A zero before the first digit does not count as significant as precision is not increased,

0.02 m is the same as 2 cm (both have 1 sf); 0.020 m is the same as 2.0 cm (both have 2 sf)

Practice: State the number of sf in each of the following

0.0420 km **(3)** 4.1 g **(2)** 3.9120 m **(5)** 0.031 W **(2)**

0.310 W **(3)** 0.00310 W **(3)** 0.037 km **(2)** 3.037 km **(4)**

2. EXPONENTIAL (SCIENTIFIC) NOTATION

Scientific notation is used to control the number of significant digits in both large & small numbers. For example **3400** has 4 digits but what if the number of sf you were allowed was only 2 . The same number could be written as **3.4×10^3** which only has **2 sf**; so does 3.4×10^{-5} (0.000034) & 3.4×10^{8} (340 000 000)

EX: 2000 km could have 1 sf, or 2, or 3, or 4; but 2×10^3 km is unambiguously expressed to 1 sf while 2.00×10^3 km is more precisely expressed with 3 sf. *(see over for practice)*

Practice: Convert the following numbers to scientific notation with the correct number of sf (in bracket)

452 100 *(3)* **4.52×10^5** 3 562 100 *(2)* **3.6×10^6** 0.0005915 *(3)* **5.92×10^{-4}** 0.000298*(1)* **3×10^{-4}**

Convert the following measurements from SN

4×10^4 = **40 000** 4.0×10^{-4} = **0.00040** 3.2×10^3 = **3200** 3.200×10^3 = **320.0**

3. WORKING WITH SIGNIFICANT FIGURES: There are *2 rules* you should remember

a) When adding or subtracting, the answer has the same number of **decimal places** as the value with the **lowest** number of decimal places.

b) When multiplying/dividing, the answer has the same number of **significant digits** as the value with the **lowest** number of significant digits. **Don't round off until the end**.

Ex 1: A farm field is **625.4 m** in **82 m**. Calculate its **area**.

area = length x width
= 625.4 m x 82 m ** 82 m is the least precise measurement – 2 sf*
= 5128.2 m^2
= **5.1×10^3** m^2 *** the answer can have no more than 2 sf of precision*

Ex 2: A teacher gives **66.0 g** of candy to each of her **28** students. How much candy does she give out?

Total mass = 28 x 66.0 g
= 1848 g *The number 28 is counted so does not limit the precision*
= **1.85** kg (3 sf) *of the answer – so answer can be expressed to 3 sf*

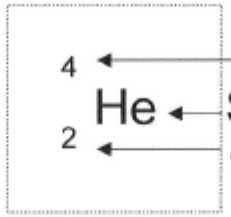
a. 3.414 s + 10.02 s + 58.325 s + 0.00098 s = **71.76 s**
b. 2.326 h – 0.10408 h = **2.222 h**
c. 10.19 m x 0.013 m = **0.13 m^2**
d. 140.01 cm x 26.042 cm x 0.0159 cm = **58.0 cm^3**
e. 80.23 m / 2.4 s = **33 m/s**
f. 4.301 kg / 1.9 cm^3= **2.3 kg/cm^3**
g. An experiment calls for 16.156 g of substance A, 28.2 g of substance B, 0.0058 g of substance C, and 9.44 g of substance D.
How many significant digits are there in each measurement? **A = 5 sf, B = 3 sf, C = 2 sf, D = 3 sf**
What is the total mass of substances in this experiment? **54 g**
How many significant digits are there in the answer to part b? **2 sf**

h. A metal block has a volume **1.000 m** x **0.504 m** x **0.025 m**. Its mass is **118.44 kg**. Calculate its density. **9400 kg/m^3**

SNC1P ATOMIC NOTATION WORKSHEET **NAME:** Answers

Use the information from the chart in the Atomic Number, Mass Number Worksheet to complete the **atomic notation** chart. The first two have been completed for you as examples.

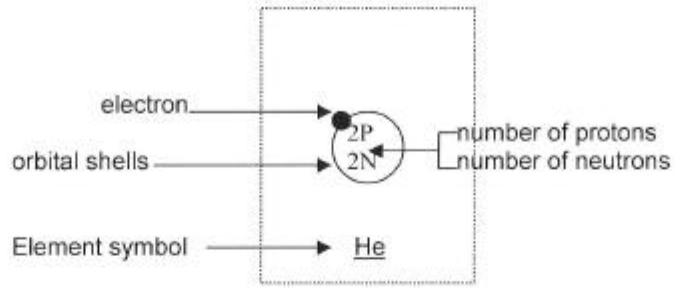
ATOMIC NOTATION

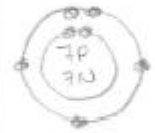
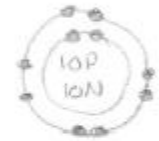
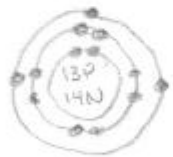
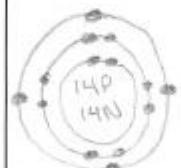
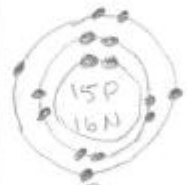
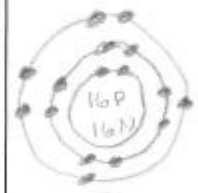
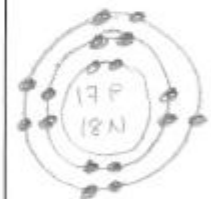
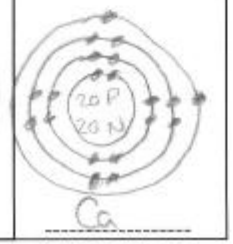


$^{1}_{1}H$							$^{4}_{2}He$
$^{7}_{3}Li$	$^{9}_{4}Be$	$^{11}_{5}B$	$^{12}_{6}C$	$^{14}_{7}N$	$^{16}_{8}O$	$^{19}_{9}F$	$^{20}_{10}Ne$
$^{23}_{11}Na$	$^{24}_{12}Mg$	$^{27}_{13}Al$	$^{28}_{14}Si$	$^{31}_{15}P$	$^{32}_{16}S$	$^{35}_{17}Cl$	$^{40}_{18}Ar$
$^{40}_{19}K$	$^{40}_{20}Ca$						

SNC1P BOHR DIAGRAM WORKSHEET **NAME:** Answers

Draw complete **Bohr Diagrams** for the following twenty elements. The first **three** have been done for you.



 H							 He
 Li	 Be	 B	 C	 N	 O	 F	 Ne
 Na	 Mg	 Al	 Si	 P	 S	 Cl	 Ar
 K	 Ca						

Counting Atoms Worksheet - Solutions

Complete the following charts by using the coefficients and subscripts listed in the in the compounds below.

Na_2CO_3		**$Ca_3(PO_4)_2$**	
Sodium	2	Calcium	3
Carbon	1	Phosphate	1 x 2 = 2
Oxyen	3	Oxygen	4 x 2 = 8
	6		13
K_2CrO_4		**3 $BaCl_2$**	
Potassium	2	Barium	1 x 3 = 3
Chromium	1	Chlorine	2 x 3 = 6
Oxygen	4		9
	7		
$NH_4C_2H_3O_2$		**4 $Al_2(CO_3)_3$**	
Nitrogen	1	Aluminum	2 x 4 = 8
Hydrogen	4+3=7	Carbon	1 x 3 x 4 = 12
Carbon	2	oxygen	3 x 3 x 4 = 36
oxygen	2		56
$Pb(NO_3)_2$		**2 $(NH_4)_2Cr_2O_7$**	
Lead	1	Nitrogen	1 x 2 x 2 = 4
Nitrogen	1x2 = 2	Hydrogen	4 x 2 x 2 =16
oxygen	3 x 2 = 6	Chromium	2 x 2 = 4
	9	oxygen	7 x 2 = 14
			36

Chemical formula worksheet-Solutions Name_____

In the 1st 2 columns write the correct chemical formula, in the 2nd the correct name.

Name	***Formula***	***Formula***	***Name***
Magnesium Fluoride	**MgF_2**	$Ca\ F_2$	**Calcium fluoride**
Lithium Chloride	**LiCl**	KBr	**Potassium bromide**
Calcium Chloride	**$CaCl_2$**	CuCl	**Copper (I) chloride or Cuprous chloride**
Copper (I) Iodide	**CuI**	$CuCl_2$	**Copper (II) chloride or cupric chloride**
Potassium Bromide	**KBr**	CuO	**Copper (II) chloride or cupric chloride**
Aluminum Oxide	**Al_2O_3**	$AlCl_3$	**Aluminum chloride**
Iron(II) Oxide	**FeO**	AgCl	**Silver chloride**
Aluminum Sulfide	**Al_2S_3**	MgI_2	**Magnesium iodide**
Sodium Chloride	**NaCl**	NaBr	**Sodium bromide**
Barium Chloride	**$BaCl_2$**	$ZnCl_2$	**Zinc chloride**
Sodium Acetate	**$NaC_2H_3O_2$**	FeS	**Iron (II) sulfide or ferrus sulfide**
Iron (III) Sulfate	**$Fe_2(SO_4)_3$**	LiF	**Lithium fluoride**
Iron (III) Sulfide	**Fe_2S_3**	PbO_2	**Lead (IV) oxide**
Sodium Hydroxide	**NaOH**	$AgNO_3$	**Silver nitrate**
Ammonium Bromide	**NH_4Br**	$NaCO_3$	**Sodium carbonate**
Potassium Sulfate	**K_2SO_4**	$(NH_4)_2SO_4$	**Ammonium sulfate**
Sulfuric Acid	**H_2SO_4**	KNO_3	**Potassium nitrate**
Barium Chlorate	**$Ba(ClO_3)_2$**	$NaC_2H_3O_2$	**Sodium acetate**
Potassium Nitrate	**KNO_3**	$Mg\ CO_3$	**Magnesium carbonate**
Ammonium Phosphate	**$(NH_4)_3PO_4$**	$Al\ (C_2H_3O_2)_3$	**Aluminium acetate**
Hydrogen Hydroxide	**HOH**	$Fe\ (NO_3)_3$	**Iron (III) nitrate or ferric nitrate**
Calcium Chlorate	**$Ca(ClO_3)_2$**	$Ca\ CO_3$	**Calcium carbonate**
Copper (II) Nitrate	**$Cu(NO_3)_2$**	$Ca\ SO_4 \bullet 2H_2O$	**Calcium sulfate dehydrate**
Ammonium Chloride	**NH_4Cl**	$Sr(OH)_2$	**Strontium hydroxide**

Answers – Naming Chemical Compounds

Name the following chemical compounds:

1) NaBr **sodium bromide**

2) $Ca(C_2H_3O_2)_2$ **calcium acetate**

3) P_2O_5 **diphosphorus pentoxide**

4) $Ti(SO_4)_2$ **titanium(IV) sulfate**

5) $FePO_4$ **iron(III) phosphate**

6) K_3N **potassium nitride**

7) SO_2 **sulfur dioxide**

8) CuOH **copper(I) hydroxide**

9) $Zn(NO_2)_2$ **zinc nitrite**

10) V_2S_3 **vanadium(III) sulfide**

Write the formulas for the following chemical compounds:

11) silicon dioxide **SiO_2**

12) nickel (III) sulfide **Ni_2S_3**

13) manganese (II) phosphate **$Mn_3(PO_4)_2$**

14) silver acetate **$AgC_2H_3O_2$**

15) diboron tetrabromide **B_2Br_4**

16) magnesium sulfate heptahydrate **$MgSO_4 \cdot 7H_2O$**

17) potassium carbonate **K_2CO_3**

18) ammonium oxide **$(NH_4)_2O$**

19) tin (IV) selenide **$SnSe_2$**

20) carbon tetrachloride **CCl_4**

Naming Acids and Bases Answers

Name the following acids and bases:

1) NaOH **sodium hydroxide**

2) H_2SO_3 **sulfurous acid**

3) H_2S **hydrosulfuric acid**

4) H_3PO_4 **phosphoric acid**

5) NH_3 **ammonia**

6) HCN **hydrocyanic acid**

7) $Ca(OH)_2$ **calcium hydroxide**

8) $Fe(OH)_3$ **iron (III) hydroxide**

9) H_3P **hydrophosphoric acid**

Write the formulas of the following acids and bases:

10) hydrofluoric acid **HF**

11) hydroselenic acid **H_2Se**

12) carbonic acid **H_2CO_3**

13) lithium hydroxide **LiOH**

14) nitrous acid **HNO_2**

15) cobalt (II) hydroxide **$Co(OH)_2$**

16) sulfuric acid **H_2SO_4**

17) beryllium hydroxide **$Be(OH)_2$**

18) hydrobromic acid **HBr**

Solutions for the Balancing Equations Practice Worksheet

1) $2\ NaNO_3 + PbO \rightarrow Pb(NO_3)_2 + Na_2O$ double displacement

2) $6\ AgI + Fe_2(CO_3)_3 \rightarrow 2\ FeI_3 + 3\ Ag_2CO_3$ double displacement

3) $C_2H_4O_2 + 2\ O_2 \rightarrow 2\ CO_2 + 2\ H_2O$ combustion

4) $ZnSO_4 + Li_2CO_3 \rightarrow ZnCO_3 + Li_2SO_4$ double displacement

5) $V_2O_5 + 5\ CaS \rightarrow 5\ CaO + V_2S_5$ double displacement

6) $Mn(NO_2)_2 + BeCl_2 \rightarrow Be(NO_2)_2 + MnCl_2$ double displacement

7) $3\ AgBr + GaPO_4 \rightarrow Ag_3PO_4 + GaBr_3$ double displacement

8) $3\ H_2SO_4 + 2\ B(OH)_3 \rightarrow B_2(SO_4)_3 + 6\ H_2O$ neutralization

9) $S_8 + 8\ O_2 \rightarrow 8\ SO_2$ synthesis

10) $Fe + 2\ AgNO_3 \rightarrow Fe(NO_3)_2 + 2\ Ag$ single displacement

Word Equations Worksheet - Solutions

Write the word equations for each of the following chemical reactions:

1) When dissolved beryllium chloride reacts with dissolved silver nitrate in water, aqueous beryllium nitrate and silver chloride powder are made.

$$BeCl_{2(aq)} + 2\ AgNO_{3(aq)} \rightarrow Be(NO_3)_{2(aq)} + 2\ AgCl_{(s)}$$

2) When isopropanol (C_3H_8O) burns in oxygen, carbon dioxide, water, and heat are produced.

$$2\ C_3H_8O_{(l)} + 9\ O_{2(g)} \rightarrow 6\ CO_{2(g)} + 8\ H_2O_{(g)}$$

3) When dissolved sodium hydroxide reacts with sulfuric acid, aqueous sodium sulfate, water, and heat are formed.

$$2\ NaOH_{(aq)} + H_2SO_{4(l)} \rightarrow Na_2SO_4 + 2\ H_2O_{(l)}$$

4) When fluorine gas is put into contact with calcium metal at high temperatures, calcium fluoride powder is created in an exothermic reaction.

$$F_{2(g)} + Ca_{(s)} \xrightarrow{\Delta} CaF_{2(s)}$$

5) When sodium metal reacts with iron (II) chloride, iron metal and sodium chloride are formed.

$$2\ Na_{(s)} + FeCl_{2(s)} \rightarrow 2\ NaCl_{(s)} + Fe_{(s)}$$

SCH 3U1 Unit 4: PRACTICE: MANIPULATING MOLES-1

1. Complete the blanks in the following chart. (watch the conditions when calculating volumes)

substance	conditions	molar mass	# of moles	mass	Volume	# of molecules
Ne (g)	**–83°C/ 650kPa**	20 g	3.5	70 g	8.5 L	2.1×10^{24}
N_2O (g)	**690°C/ 22kPa**	44 g	0.33	14.5 g	120 L	2.0×10^{23}
SO_3 (g)	**128°C/2600kPa**	80 g	0.05	4.0 g	0.06 L	3.0×10^{22}
C_4H_{10} (g)	**25°C/ 99kPa**	58 g	0.73	42.3 g	18.5 L	4.4×10^{23}
F_2 (g)	**–25°C/ 410kPa**	38 g	7	265 g	35 L	4.2×10^{24}
N_2O_4 (g)	**–196°C/ 85kPa**	92 g	14.9	1.4 kg	112 L	8.9×10^{24}
CH_2Cl_2 (g)	**160°C/ 110kPa**	85 g	10	850 g	327 L	6.0×10^{24}
NaCl (s)	**0°C/ 101.3kPa**	58.5 g	0.24	14 g	NA	1.4×10^{23}
UF_6 (g)	**20°C/ 5420kPa**	352 g	4	1.4 kg	1.8 L	2.4×10^{24}

* Multi-stepped mole problems **(use your mole map & show all your work / steps)**

2. Calculate:

a) the mass **of** 1.0 L **of carbon dioxide gas @ STP**

n = 1.0 L / 22.4 L (@ STP)
$= 4.46 \times 10^{-2}$

mass $= 4.46 \times 10^{-2} * 44$ g/ mol
$= 1.96$ **g**

b) the mass **of** 1.0 L **of carbon dioxide gas @ 20°C and 2250 kPa**

n = 1.0 L * 2250 kPa / 8.314 * 293 K
$= 9.24 \times 10^{-1}$

mass $= 9.24 \times 10^{-1} * 44$ g/ mol
$= 40.6$ g

c) the volume **of** 350 mg **of sulfur dioxide gas @ 225 °C and 900 kPa**

n = 0.350 g / 64 g/mol
$= 5.47 \times 10^{-3}$

vol $= 5.47 \times 10^{-3} * 8.314 * 498$ K/ 900 kPa
$= 2.52 \times 10^{-2}$ L or 25.2 mL

Calculating the CONCENTRATION of an Aqueous Solution-ANSWERS

1a) 3.65 g of hydrochloric acid dissolved in 200 mL of water

[HCl] = mass / molar mass / # L

= 3.65 g / 36.5 g / 0.200 L

= 0.5 M

b) 235 g of sodium chloride dissolved in 2.2 L of water

[NaCl] = m / m mass / # L

= 235 g / 58.5 g / 2.2 L

= 1.8 M

c) 4.5 g of potassium hydroxide dissolved in 250 mL of water

[KOH] = m / m mass / # L

= 4.5 g/ 56 g/0.250 L

= 0.32 M

d) 25 g of potassium bisulfate dissolved in 800 mL of water

[$KHSO_4$] = mass / mm / # L

= 25 g / 136 g / 0.800 L

= 0.225 M

e) 1.8 g of sodium hydroxide dissolved in 50 mL of water

[NaOH] = m / m mass / # L

= 1.8 g / 40 g / 0.05 L

= 0.9 M

f) 20 g of magnesium hydroxide dissolved in 500 mL of water

[$Mg(OH)_2$] = m / m m / # L

= 20 g/ 58 g/0.5 L

= 0.69 M

g) 15.0 g of sodium sulfate dissolved in 100 mL of water

[Na_2SO_4] = mass / mm / # L

= 15 g / 142 g / 0.100 L

= 1.1 M

h) 22 g of potassium nitrite are dissolved in 500 mL of water. What is the concen-tration of the potassium ion in this sol'n ?

[KNO_2] =22 g / 85 g / 0.5 L

= 0.52 M

[K^+] = 0.52 M (1:1 ratio)

i) 4.0 g of sugar ($C_6H_{12}O_6$) dissolved in 450 mL of Pepsi

[sugar] = m / m m / # L

= 4.0 g/ 180 g/0.45 L

= 0.05 M

j) 1.5 g of sodium phosphate are dissolved in 100 mL. What is the concentration of the sodium ion in the resulting sol'n ?

[Na_3PO_4] =1.50 g / 164 g / 0.1 L

= 0.092 M

[Na^+] = 0.274 M (3:1 ratio)

k) The solubility of calcium bromide is 32 g / 100 mL

What is the **molar** solubility ?

[$CaBr_2$] = m / m mass / # L

= 32 g / 198 g / 0.1 L

= 1.6 Moles/litre

l) The solubility of lead iodide is 0.09 g / 100 mL. What is the **molar** solubility ?

[PbI_2] = m / m mass / # L

= 0.09 g/461 g/0.1 L

= 1.95×10^{-2} Mol/L

2. You calculate the masses required to make the following solutions !!

a) 100 mL of 0.15 M potassium hydroxide sol'n

mass req'd = conc * # L * m m

= 0.15 M * 0.1L * 56 g/mol

= 0.84 g

b) 250 mL of 2.5 M copper nitrate sol'n

mass = [ ] * # L * m m

= 2.5 M * 0.25L * 187.5

= 117.2 g

c) 500 mL of 0.01 M potassium permanganate

mass = [ ] * # L * m m

= 0.01 M * 0.5L * 158

= 0.79 g

d) 3.5 L of 0.4 M sodium carbonate sol'n

mass = 0.4 M * 3.5L * 106

= 148 g

e) 2.0 L of 0.4 M ferrous diammonium disulfate hexahydrate sol'n $(Fe(NH_4)_2(SO_4)_2 .6H_2O)$

mass = 0.4 M * 2.0L * 392

= 313.6 g

f) 250 mL of 0.12 M sodium hydroxide sol'n

mass = [ ] * # L * m m

= 0.12 M * 0.25L * 40

= 1.2 g

g) 125 mL of 0.50 M Ba^{2+} sol'n using barium nitrate **mass = $[Ba^{2+}]$ * # L * m m**

$Ba(NO_3)_2$ = 0.5 M * 0.125L * 261

= 16.3 g

note $[Ba^{2+}] = Ba(NO_3)_2$ - 1:1 ratio

h) 250 mL of 0.025 M cobalt nitrate sol'n using cobalt(II) nitrate hexahydrate

mass = 0.025 M * 0.250L* 291.2

$Co(NO_3)_2$ **= 1.82 g**

$.6H_2O$ note $[Co^{2+}] = Co(NO_3)_2.6H_2O$

i) 225 mL of 0.2 M OH^- solution using calcium hydroxide

mass = **0.1** M * 0.225L *74 g/mol

$Ca(OH)_2$ **= 1.67 g**

note $[OH^-]$: $Ca(OH)_2$ 2:1 ratio

Dilutions (*using* **[stock] * # L (stock) = [diluted] * # L (dil)**

3. A student prepares **400 mL** of **0.05 M** HCl . His lab partner spills 100 mL of water into it. What is the [HCl] now ?

[stock] * # L(stock) = [diluted] * # L (dil)

0.05 * 0.400 L = [diluted HCl] * 0.500 L

[diluted HCl] = 0.04 M

4. What volume of **0.1 M** KCl sol'n should be diluted to prepare 750 mL of **0.04 M** KCl sol'n?

[stock] * # L (stock) = [diluted] * # L (dil)

0.1 M * # L (stock) = 0.04 M * 0.750 L

 # L (stock) = 0.300 L or 300 mL

5. Concentrated. H_3PO_4 is 14.6 M. How would you prepare 4.5 L of 0.375 M H_3PO_4 sol'n ?

[stock] * # L (stock) = [diluted] * # L (dil))

14.6 M * # L (stock) = 0.375 M * 4.5 L

 # L (stock) = 0.1156 L or 115.6 mL

6. Find the final concentration when the following solutions are **mixed**

a) 100 mL of 0.4 M HCl and 150 mL of 0.75 M HCl

[mixture] = ([sol'n A] * #L_A) + ([sol'n B] * #L_B) / #L_A + #L_B

= (0.4 M * 0.100 L) + (0.75 M * 0.150 L) / 0.250 L

= 0.04 + 0.1125 / 0.250

= 0.61 M *note: [final] lies between [initial]*

b) 50 mL of 1.2 M H_2SO_4 and 150 mL of 0.3 M H_2SO_4

[H_2SO_4]= (1.2 M * 0.050 L) + (0.3 M * 0.150 L) / 0.200 L

= 0.06 + 0.045 / 0.200

= 0.525 M

c) 5 mL of 3.5 M HNO_3 and 95 mL of 0.2 M HNO_3

[HNO_3] =(3.5 M * 0.005 L) + (0.2 M * 0.095 L) / 0.100 L

= 0.0175 + 0.019 / 0.100

= 0.365 M

7. If 90 mL of 0.35 M HNO_3 is added to 50 mL of 0.40 M $NaNO_3$, what is the [NO_3^-] in the final sol'n

[NO3–] = (0.35 M * 0.090 L) + (0.4 M * 0.050 L) / 0.140 L note **[HNO_3] =[NO_3^-]** 1:1 ratio

= 0.0315 + 0.02 / 0.140 and **[$NaNO_3$] =[NO_3^-]**

= **0.368 M**

---

8. A sol'n is made by mixing 200 mL of 0.2 M $CaCl_2$ and 300 mL of 0.1 M $CaCl_2$. What is the concentration of **$CaCl_2$** in the final sol'n? What would the [Ca^{2+}] and [Cl^-] be in this mixture ?

[$CaCl_2$] = (0.2 M * 0.200 L) + (0.1 M * 0.300 L) / 0.500 L

= 0.04 + 0.03 / 0.500

= 0.14 M

so [Ca^{2+}] = 0.14 M (1:1 ratio) and [Cl^-]= 0.28 M (1:2 ratio)

---

*9. Solution "**A**" is 0.475 M NaOH. Solution "**B**" also contains NaOH. When 250 mL of solution **A** is mixed with 400 mL of sol'n **B** , the resulting sol'n is 0.325 M NaOH. What is the **[B] ?**

[mixture]= (0.475 M * 0.250 L) + ([B] * 0.400 L) / 0.650 L

0.325 M = 0.11875 + ([B] * 0.400 L) / 0.650

(0.325 * 0.650) - 0.11875 = ([B] * 0.400 L)

so [B] = 0.0925 / 0.40

= 0.23 M

Exercise 4.1
a) 1 mg/mL b) 6 mg/mL
c) 2 mg/mL d) 50 mg/mL
e) 0.2 mg/mL f) 1000 mg/mL
g) 20 mg/mL h) 40 mg/mL
i) 0.1 mg/mL

Exercise 4.2
a) 0.5 mg b) 21 mg
c) 0.4 mg d) 10.0 mg
e) 1.0 mg f) 1000 mg
g) 50 mg h) 160mg
i) 0.9 mg

Exercise 4.3
a) 7.3 mL b) 2.0 mL
c) 0.5 mL d) 1.5 mL
e) 4.0 mL f) 6.5 mL
g) 4.25 mL h) 0.75 mL
i) 4.0 mL

5.2 2 tablets
5.3 5 mL
5.6 3.5 mL