Chemistry 115 Name key

Dr. Cary Willard

Quiz 4a (20 points) October 3, 2012

All work must be shown to receive credit. Give answers to the correct number of significant figures. Avogadro’s number = 6.022 x 1023/mol

1. (6 points) Complete the following table with the correct name or formula for each compound.

|  |  |
| --- | --- |
| IUPAC name | Chemical formula |
| potassium nitride | K3N |
| iron(III) sulfide | Fe2S3 |
| dibromine octoxide | Br2O8 |
| carbon tetrabromide | CBr4 |
| calcium chloride | CaCl2 |
| chromium(IV) oxide | CrO2 |

1. (14 points) Dimethyl sulfoxide also known as DMSO has the chemical formula (CH3)2SO.
	1. Calculate the molar mass of DMSO.

$$2\left(C\right)+6\left(H\right)+S+O$$

$$=2\left(12.01 amu\right)+6\left(1.008 amu\right)+32.07 amu+16.00 amu$$

$$=78.14 amu$$

* 1. Calculate the percent sulfur in DMSO.

$$\% S=\left(\frac{mass S}{mass DMSO}\right)×100=\left(\frac{32.07}{78.14}\right)×100=41.04\% S$$

* 1. Calculate the mass of 4.63 mol of DMSO.

$$?g DMSO=4.63 mol DMSO×\frac{78.14 g DMSO}{1 mol DMSO}=362 g DMSO$$

* 1. Calculate the number of molecules of DMSO in 2.53 mol of DMSO.

$$?molecules DMSO=2.53 mol DMSO×\frac{6.022 ×10^{23}molec DMSO}{1 mol DMSO}=1.52×10^{24}molec DMSO$$

* 1. Calculate the number of atoms of hydrogen in 6 molecules of DMSO.

$$?atoms H=6 molec DMSO×\frac{6 atoms H}{1 molec DMSO}=36 atom H$$

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Quiz 4b (20 points) October 3, 2012

All work must be shown to receive credit. Give answers to the correct number of significant figures. Avogadro’s number = 6.022 x 1023/mol

1. (6 points) Complete the following table with the correct name or formula for each compound.

|  |  |
| --- | --- |
| IUPAC name | Chemical formula |
| silver sulfide | Ag2S |
| copper(I)nitride | Cu3N |
| triphosphorus pentachloride | P3Cl5 |
| sulfur dioxide | SO2 |
| titanium(IV) oxide | TiO2 |
| magnesium fluoride | MgF2 |

1. (14 points) Dimethyl sulfoxide also known as DMSO has the chemical formula (CH3)2SO.
	1. Calculate the molar mass of DMSO.

$$2\left(C\right)+6\left(H\right)+S+O$$

$$=2\left(12.01 amu\right)+6\left(1.008 amu\right)+32.07 amu+16.00 amu$$

$$=78.14 amu$$

* 1. Calculate the percent oxygen in DMSO.

$$\% O=\left(\frac{mass O}{mass DMSO}\right)×100=\left(\frac{16.00}{78.14}\right)×100=20.48\% S$$

* 1. Calculate the mass of 3.67 mol of DMSO.

$$?g DMSO=3.67 mol DMSO×\frac{78.14 g DMSO}{1 mol DMSO}=287 g DMSO$$

* 1. Calculate the number of molecules of DMSO in 5.81 mol of DMSO.

$$?molecules DMSO=5.81 mol DMSO×\frac{6.022 ×10^{23}molec DMSO}{1 mol DMSO}=3.50×10^{24}molec DMSO$$

* 1. Calculate the number of atoms of hydrogen in 8 molecules of DMSO.

$$?atoms H=8 molec DMSO×\frac{6 atoms H}{1 molec DMSO}=48 atom H$$

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Quiz 4c (20 points) October 3, 2012

All work must be shown to receive credit. Give answers to the correct number of significant figures. Avogadro’s number = 6.022 x 1023/mol

1. (6 points) Complete the following table with the correct name or formula for each compound.

|  |  |
| --- | --- |
| IUPAC name | Chemical formula |
| lithium phosphide | Li3P |
| cobalt(III) sulfide | Co2S3 |
| pentasulfur dioxide | S5O2 |
| phosphorus pentachloride | PCl5 |
| zinc bromide | ZnBr2 |
| manganese(IV) sulfide | MnS2 |

1. (14 points) Trinitrotoluene or TNT has the chemical formula C6H6(NO3)3.
	1. Calculate the molar mass of TNT.

$$6\left(C\right)+6\left(H\right)+3(N)+9(O)$$

$$=6\left(12.01 amu\right)+6\left(1.008 amu\right)+3(14.01 amu)+9(16.00 amu)$$

$$=264.1 amu$$

* 1. Calculate the percent carbon in TNT.

$$\% C=\left(\frac{mass C}{mass TNT}\right)×100=\left(\frac{72.06}{264.1}\right)×100=27.29\% C$$

* 1. Calculate the mass of 2.63 mol of TNT.

$$?g TNT=2.63 mol TNT×\frac{264.1g TNT}{1 mol TNT}=695 g TNT$$

* 1. Calculate the number of molecules of TNT in 6.78 mol of TNT.

$$?molecules TNT=6.78 mol TNT×\frac{6.022 ×10^{23}molec TNT}{1 mol TNT}=4.08×10^{24}molec TNT$$

* 1. Calculate the number of atoms of nitrogen in 6 molecules of TNT.

$$?atoms N=6 molec TNT×\frac{3 atoms N}{1 molec TNT}=18 atom N$$

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Quiz 4d (20 points) October 3, 2012

All work must be shown to receive credit. Give answers to the correct number of significant figures. Avogadro’s number = 6.022 x 1023/mol

1. (6 points) Complete the following table with the correct name or formula for each compound.

|  |  |
| --- | --- |
| IUPAC name | Chemical formula |
| aluminum fluoride | AlF3 |
| nitrogen triiodide | NI3 |
| titanium(II) sulfide | TiS |
| disulfur tetroxide | S2O4 |
| potassium nitride | K3N |
| copper(I) sulfide | Cu2S |

1. (14 points) Trinitrotoluene or TNT has the chemical formula C6H6(NO3)3.
	1. Calculate the molar mass of TNT.

$$6\left(C\right)+6\left(H\right)+3(N)+9(O)$$

$$=6\left(12.01 amu\right)+6\left(1.008 amu\right)+3(14.01 amu)+9(16.00 amu)$$

$$=264.1 amu$$

* 1. Calculate the percent hydrogen in TNT.

$$\% H=\left(\frac{mass H}{mass TNT}\right)×100=\left(\frac{6.048}{264.1}\right)×100=2.290\% C$$

* 1. Calculate the mass of 1.57 mol of TNT.

$$?g TNT=1.57 mol TNT×\frac{264.1g TNT}{1 mol TNT}=415 g TNT$$

* 1. Calculate the number of molecules of TNT in 4.18 mol of TNT.

$$?molecules TNT=4.18 mol TNT×\frac{6.022 ×10^{23}molec TNT}{1 mol TNT}=2.52×10^{24}molec TNT$$

* 1. Calculate the number of atoms of nitrogen in 8 molecules of TNT.

$$?atoms N=8 molec TNT×\frac{3 atoms N}{1 molec TNT}=24 atom N$$