Chemistry 115 Name key

Dr. Cary Willard

Quiz 4a (20 points) March 6, 2013

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. (18 points)Trinitrotoluene or TNT has the chemical formula C7H4(NO2)3.
	1. Calculate the molar mass of TNT.

$$7\left(C\right)+4\left(H\right)+3\left(N\right)+6\left(O\right)$$

$$=7\left(12.01 amu\right)+4\left(1.008 amu\right)+3\left(14.01 amu\right)+6\left(16.00 amu\right)$$

$$=84.07 amu+4.03 amu+42.03 amu+96.00 amu$$

$$=226.13 amu$$

* 1. Calculate the percent carbon in TNT.

$$\% C=\left(\frac{mass C}{mass TNT}\right)×100=\left(\frac{84.07 g C}{226.13 g TNT}\right)×100=37.18 \% C$$

* 1. Calculate the mass of 6.47 mol of TNT.

$$?g TNT=6.47 mol TNT×\frac{226.13 g TNT}{1 mol TNT}=1460 g TNT$$

* 1. Calculate the number of molecules of TNT in 8.34 mol of TNT.

$$?molecules DMSO=8.34 mol TNT×\frac{6.022 ×10^{23}molec TNT}{1 mol TNT}=5.02×10^{24}molec TNT$$

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

$$?atoms H=16 molec TNT×\frac{4 atoms H}{1 molec TNT}=64 atom H$$

* 1. Calculate the mass of one molecule of TNT.

$$?g TNT=1 molec TNT×\frac{1 mol TNT}{6.022 ×10^{23}molec TNT}×\frac{226.13 g TNT}{1 mol TNT}=3.755×10^{-22}g TNT$$

1. (2 points) The molecular formula of benzene is C6H6. What is its empirical formula?

 CH

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Quiz 4b (20 points) March 6, 2013

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1. (18 points)Trinitrotoluene or TNT has the chemical formula C7H4(NO2)3.
	1. Calculate the molar mass of TNT.

$$7\left(C\right)+4\left(H\right)+3\left(N\right)+6\left(O\right)$$

$$=7\left(12.01 amu\right)+4\left(1.008 amu\right)+3\left(14.01 amu\right)+6\left(16.00 amu\right)$$

$$=84.07 amu+4.03 amu+42.03 amu+96.00 amu$$

$$=226.13 amu$$

* 1. Calculate the percent hydrogen in TNT.

$$\% H=\left(\frac{mass H}{mass TNT}\right)×100=\left(\frac{4.03 g C}{226.13 g TNT}\right)×100=1.78 \% C$$

* 1. Calculate the mass of 9.45 mol of TNT.

$$?g TNT=9.45 mol TNT×\frac{226.13 g TNT}{1 mol TNT}=2143 g TNT$$

* 1. Calculate the number of molecules of TNT in 2.17 mol of TNT.

$$?molecules DMSO=2.17 mol TNT×\frac{6.022 ×10^{23}molec TNT}{1 mol TNT}=1.31×10^{24}molec TNT$$

* 1. Calculate the number of atoms of hydrogen in 52 molecules of TNT.

$$?atoms H=52 molec TNT×\frac{4 atoms H}{1 molec TNT}=208 atom H$$

* 1. Calculate the mass of one molecule of TNT.

$$?g TNT=1 molec TNT×\frac{1 mol TNT}{6.022 ×10^{23}molec TNT}×\frac{226.13 g TNT}{1 mol TNT}=3.755×10^{-22}g TNT$$

1. (2 points) The molecular formula of hydrazine is N2H4. What is its empirical formula?

 NH2

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Quiz 4c (20 points) March 6, 2013

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. (18 points)Trinitrotoluene or TNT has the chemical formula C7H4(NO2)3.
	1. Calculate the molar mass of TNT.

$$7\left(C\right)+4\left(H\right)+3\left(N\right)+6\left(O\right)$$

$$=7\left(12.01 amu\right)+4\left(1.008 amu\right)+3\left(14.01 amu\right)+6\left(16.00 amu\right)$$

$$=84.07 amu+4.03 amu+42.03 amu+96.00 amu$$

$$=226.13 amu$$

* 1. Calculate the percent nitrogen in TNT.

$$\% N=\left(\frac{mass N}{mass TNT}\right)×100=\left(\frac{42.03 g N}{226.13 g TNT}\right)×100=18.59 \% C$$

* 1. Calculate the mass of 3.84 mol of TNT.

$$?g TNT=7.84 mol TNT×\frac{226.13 g TNT}{1 mol TNT}=1770 g TNT$$

* 1. Calculate the number of molecules of TNT in 3.59 mol of TNT.

$$?molecules DMSO=3.59 mol TNT×\frac{6.022 ×10^{23}molec TNT}{1 mol TNT}=2.16×10^{24}molec TNT$$

* 1. Calculate the number of atoms of hydrogen in 83 molecules of TNT.

$$?atoms H=83 molec TNT×\frac{4 atoms H}{1 molec TNT}=332 atom H$$

* 1. Calculate the mass of one molecule of TNT.

$$?g TNT=1 molec TNT×\frac{1 mol TNT}{6.022 ×10^{23}molec TNT}×\frac{226.13 g TNT}{1 mol TNT}=3.755×10^{-22}g TNT$$

1. (2 points) The molecular formula of octene is C8H16. What is its empirical formula?

 CH2

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Quiz 4d (20 points) March 6, 2013

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. (18 points)Trinitrotoluene or TNT has the chemical formula C7H4(NO2)3.
	1. Calculate the molar mass of TNT.

$$7\left(C\right)+4\left(H\right)+3\left(N\right)+6\left(O\right)$$

$$=7\left(12.01 amu\right)+4\left(1.008 amu\right)+3\left(14.01 amu\right)+6\left(16.00 amu\right)$$

$$=84.07 amu+4.03 amu+42.03 amu+96.00 amu$$

$$=226.13 amu$$

* 1. Calculate the percent oxygen in TNT.

$$\% O=\left(\frac{mass O}{mass TNT}\right)×100=\left(\frac{96.00 g O}{226.13 g TNT}\right)×100=42.45 \% O$$

* 1. Calculate the mass of 8.41 mol of TNT.

$$?g TNT=8.01 mol TNT×\frac{226.13 g TNT}{1 mol TNT}=1810 g TNT$$

* 1. Calculate the number of molecules of TNT in 3.71 mol of TNT.

$$?molecules DMSO=3.71 mol TNT×\frac{6.022 ×10^{23}molec TNT}{1 mol TNT}=2.23×10^{24}molec TNT$$

* 1. Calculate the number of atoms of hydrogen in 19 molecules of TNT.

$$?atoms H=19 molec TNT×\frac{4 atoms H}{1 molec TNT}=76 atom H$$

* 1. Calculate the mass of one molecule of TNT.

$$?g TNT=1 molec TNT×\frac{1 mol TNT}{6.022 ×10^{23}molec TNT}×\frac{226.13 g TNT}{1 mol TNT}=3.755×10^{-22}g TNT$$

1. (2 points) The molecular formula of ethane is C2H6. What is its empirical formula?

 CH3