Chemistry 115 Name key

Dr. Cary Willard

Quiz 4a (20 points) September 24, 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. (4 points each) Phenylalanine, an amino acid, has the chemical formula C9H11NO2.
	1. Calculate the molar mass of phenylalanine.

$$9\left(C\right)+11\left(H\right)+N+2\left(O\right)$$

$$=9\left(12.01 amu\right)+11\left(1.008 amu\right)+14.01 amu+2\left(16.00 amu\right)$$

$$=108.09 amu+11.09amu+14.01 amu+32.00 amu$$

$$=165.19 amu$$

* 1. What is the mass in grams of 3.53 moles of phenylalanine?

$$?g C\_{9}H\_{11}NO\_{2}=3.53 mol C\_{9}H\_{11}NO\_{2}×\frac{165.19 g C\_{9}H\_{11}NO\_{2}}{1 mol C\_{9}H\_{11}NO\_{2}}=583 g C\_{9}H\_{11}NO\_{2}$$

* 1. How many molecules of phenylalanine are present in 3.53 moles of phenylalanine?

$$?molec C\_{9}H\_{11}NO\_{2}=3.53 mol C\_{9}H\_{11}NO\_{2}×\frac{6.022×10^{23} molec C\_{9}H\_{11}NO\_{2}}{1 mol C\_{9}H\_{11}NO\_{2}}=2.13×10^{24}molec C\_{9}H\_{11}NO\_{2}$$

* 1. How many atoms of hydrogen are in 35 molecules of phenylalanine?

$$?atom H=35 molec C\_{9}H\_{11}NO\_{2}×\frac{11 atom H}{1 molec C\_{9}H\_{11}NO\_{2}}=385 atom H$$

* 1. What is the mass in grams of 3.92 x 1022 molecules of phenylalanine?

$$?gC\_{9}H\_{11}NO\_{2}=3.92×10^{22}molec C\_{9}H\_{11}NO\_{2}×\frac{1 mol C\_{9}H\_{11}NO\_{2}}{6.022×10^{23} molec C\_{9}H\_{11}NO\_{2}}×\frac{165.19 g C\_{9}H\_{11}NO\_{2}}{1 mol C\_{9}H\_{11}NO\_{2}}=10.8 g C\_{9}H\_{11}NO\_{2}$$

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Quiz 4b (20 points) September 24, 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. (4 points each) Phenylalanine, an amino acid, has the chemical formula C9H11NO2.
	1. Calculate the molar mass of phenylalanine.

$$9\left(C\right)+11\left(H\right)+N+2\left(O\right)$$

$$=9\left(12.01 amu\right)+11\left(1.008 amu\right)+14.01 amu+2\left(16.00 amu\right)$$

$$=108.09 amu+11.09amu+14.01 amu+32.00 amu$$

$$=165.19 amu$$

* 1. What is the mass in grams of 5.06 moles of phenylalanine?

$$?g C\_{9}H\_{11}NO\_{2}=5.06 mol C\_{9}H\_{11}NO\_{2}×\frac{165.19 g C\_{9}H\_{11}NO\_{2}}{1 mol C\_{9}H\_{11}NO\_{2}}=836 g C\_{9}H\_{11}NO\_{2}$$

* 1. How many molecules of phenylalanine are present in 5.06 moles of phenylalanine?

$$?molec C\_{9}H\_{11}NO\_{2}=5.06 mol C\_{9}H\_{11}NO\_{2}×\frac{6.022×10^{23} molec C\_{9}H\_{11}NO\_{2}}{1 mol C\_{9}H\_{11}NO\_{2}}=3.05×10^{24}molec C\_{9}H\_{11}NO\_{2}$$

* 1. How many atoms of hydrogen are in 21 molecules of phenylalanine?

$$?atom H=21 molec C\_{9}H\_{11}NO\_{2}×\frac{11 atom H}{1 molec C\_{9}H\_{11}NO\_{2}}=231 atom H$$

* 1. What is the mass in grams of 6.72 x 1022 molecules of phenylalanine?

$$?gC\_{9}H\_{11}NO\_{2}=6.72×10^{22}molec C\_{9}H\_{11}NO\_{2}×\frac{1 mol C\_{9}H\_{11}NO\_{2}}{6.022×10^{23} molec C\_{9}H\_{11}NO\_{2}}×\frac{165.19 g C\_{9}H\_{11}NO\_{2}}{1 mol C\_{9}H\_{11}NO\_{2}}=18.4 g C\_{9}H\_{11}NO\_{2}$$

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Quiz 4c (20 points) September 24, 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. (4 points each) Asparagine, an amino acid, has the chemical formula C4H8N2O3.
	1. Calculate the molar mass of asparagine.

$$4\left(C\right)+8\left(H\right)+2\left(N\right)+3\left(O\right)$$

$$=4\left(12.01 amu\right)+8\left(1.008 amu\right)+2\left(14.01 amu\right)+3\left(16.00 amu\right)$$

$$=48.04 amu+8.06amu+28.02 amu+48.00 amu$$

$$=132.12 amu$$

* 1. How many moles of asparagines are in 684 g of asparagine?

$$?mol C\_{4}H\_{8}N\_{2}O\_{3}=684 g C\_{4}H\_{8}N\_{2}O\_{3}×\frac{1 mol C\_{4}H\_{8}N\_{2}O\_{3}}{132.12 g C\_{4}H\_{8}N\_{2}O\_{3}}=5.18 mol C\_{4}H\_{8}N\_{2}O\_{3}$$

* 1. How many molecules of asparagine are present in 6.24 moles of asparagine?

$$?molec C\_{4}H\_{8}N\_{2}O\_{3}=6.24 mol C\_{4}H\_{8}N\_{2}O\_{3}×\frac{6.022×10^{23} molec C\_{4}H\_{8}N\_{2}O\_{3}}{1 mol C\_{4}H\_{8}N\_{2}O\_{3}}=3.76×10^{24}molec C\_{4}H\_{8}N\_{2}O\_{3}$$

* 1. How many atoms of hydrogen are in 21 molecules of asparagine?

$$?atom H=21 molec C\_{4}H\_{8}N\_{2}O\_{3}×\frac{8 atom H}{1 molec C\_{4}H\_{8}N\_{2}O\_{3}}=168 atom H$$

* 1. What is the mass in grams of 8.44 x 1022 molecules of asparagine?

$$?gC\_{4}H\_{8}N\_{2}O\_{3}=8.44×10^{22}molec C\_{4}H\_{8}N\_{2}O\_{3}×\frac{1 mol C\_{4}H\_{8}N\_{2}O\_{3}}{6.022×10^{23} molec C\_{4}H\_{8}N\_{2}O\_{3}}×\frac{132.12 g C\_{4}H\_{8}N\_{2}O\_{3}}{1 mol C\_{4}H\_{8}N\_{2}O\_{3}}=18.5 g C\_{4}H\_{8}N\_{2}O\_{3}$$

Chemistry 115 Name key

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Quiz 4d (20 points) September 24, 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. (4 points each) Asparagine, an amino acid, has the chemical formula C4H8N2O3.
	1. Calculate the molar mass of asparagine.

$$4\left(C\right)+8\left(H\right)+2\left(N\right)+3\left(O\right)$$

$$=4\left(12.01 amu\right)+8\left(1.008 amu\right)+2\left(14.01 amu\right)+3\left(16.00 amu\right)$$

$$=48.04 amu+8.06amu+28.02 amu+48.00 amu$$

$$=132.12 amu$$

* 1. How many moles of asparagines are in 857 g of asparagine?

$$?mol C\_{4}H\_{8}N\_{2}O\_{3}=857 g C\_{4}H\_{8}N\_{2}O\_{3}×\frac{1 mol C\_{4}H\_{8}N\_{2}O\_{3}}{132.12 g C\_{4}H\_{8}N\_{2}O\_{3}}=6.49 mol C\_{4}H\_{8}N\_{2}O\_{3}$$

* 1. How many molecules of asparagine are present in 8.25 moles of asparagine?

$$?molec C\_{4}H\_{8}N\_{2}O\_{3}=8.25 mol C\_{4}H\_{8}N\_{2}O\_{3}×\frac{6.022×10^{23} molec C\_{4}H\_{8}N\_{2}O\_{3}}{1 mol C\_{4}H\_{8}N\_{2}O\_{3}}=4.97×10^{24}molec C\_{4}H\_{8}N\_{2}O\_{3}$$

* 1. How many atoms of hydrogen are in 36 molecules of asparagine?

$$?atom H=36 molec C\_{4}H\_{8}N\_{2}O\_{3}×\frac{8 atom H}{1 molec C\_{4}H\_{8}N\_{2}O\_{3}}=288 atom H$$

* 1. What is the mass in grams of 6.87 x 1022 molecules of asparagine?

$$?gC\_{4}H\_{8}N\_{2}O\_{3}=6.87×10^{22}molec C\_{4}H\_{8}N\_{2}O\_{3}×\frac{1 mol C\_{4}H\_{8}N\_{2}O\_{3}}{6.022×10^{23} molec C\_{4}H\_{8}N\_{2}O\_{3}}×\frac{132.12 g C\_{4}H\_{8}N\_{2}O\_{3}}{1 mol C\_{4}H\_{8}N\_{2}O\_{3}}=15.1 g C\_{4}H\_{8}N\_{2}O\_{3}$$