Chemistry 141 Name key

Dr. Cary Willard

Quiz 1a (20 points) August 27, 2012

1. (4 points) Classify each substance as a pure substance or a mixture. If it is a mixture, classify it as homogenous or heterogeneous.
	1. Carbon dioxide

Pure substance

* 1. Orange juice

Mixture – heterogeneous if can see bits of pulp floating in the juice

1. (4 points) Acetone (nail polish remover) has a density of 0.7857 g/mL. What is the volume, in L, of 3.53 kg of acetone?

$$?L=3.53 kg×\frac{1000g}{1 kg}×\frac{1 mL}{0.7857 g}×\frac{1 L}{1000 mL}=4.49 L$$

1. (6 points) A sample of gaseous neon atoms contains 3.41 x 1022 atoms per liter. The atomic radius of neon is 69 pm. What fraction of the space is occupied by the atoms themselves? (1 m = 1012 pm, 1 mL = 1 cm3, volume of a sphere = 4/3 r3)

$$radius neon=69 pm×\frac{1 m}{10^{12}pm}×\frac{100 cm}{1 m}=6.9×10^{-9}cm$$

$$volume 1 neon atom=\frac{4}{3}πr^{3}=\frac{4}{3}π\left(6.9×10^{-9}cm\right)^{3}=1.4×10^{-24}cm^{3}$$

$$total volume neon atoms in 1 L=3.41×10^{22}atoms×\frac{1.4×10^{-24}cm^{3}}{1 atom}×\frac{1 L}{1000 cm^{3} }=4.7×10^{-5}L$$

$$fraction of volume occupied by neon atoms= \frac{4.7×10^{-5}L}{1 L}=4.7×10^{-5} or 0.0047\%$$

1. (6 points) On the Grossmont temperature scale, water freezes at 47oG and boils at 265oG. Convert 38oC to oG.

1st determine how many oG above the freezing point

$$38℃×\frac{218^{o}G}{100℃}=83^{o}G above FP$$

2nd adjust for the zero point

$$47^{o}G+83^{o}G=130.^{o}G$$

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Quiz 1b (20 points) August 27, 2012

1. (4 points) Classify each substance as a pure substance or a mixture. If it is a mixture, classify it as homogenous or heterogeneous.
	1. Beach sand

Mixture – heterogeneous if can see bits of seaweed, shell, and other things in the sand

* 1. Acetic acid

Pure substance

1. (4 points) Acetone (nail polish remover) has a density of 0.7857 g/mL. What is the volume, in L, of 6.22 kg of acetone?

$$?L=6.22 kg×\frac{1000g}{1 kg}×\frac{1 mL}{0.7857 g}×\frac{1 L}{1000 mL}=7.91 L$$

1. (6 points) A sample of gaseous neon atoms contains 5.33 x 1022 atoms per liter. The atomic radius of neon is 69 pm. What fraction of the space is occupied by the atoms themselves? (1 m = 1012 pm, 1 mL = 1 cm3, volume of a sphere = 4/3 r3)

$$radius neon=69 pm×\frac{1 m}{10^{12}pm}×\frac{100 cm}{1 m}=6.9×10^{-9}cm$$

$$volume 1 neon atom=\frac{4}{3}πr^{3}=\frac{4}{3}π\left(6.9×10^{-9}cm\right)^{3}=1.4×10^{-24}cm^{3}$$

$$total volume neon atoms in 1 L=5.33×10^{22}atoms×\frac{1.4×10^{-24}cm^{3}}{1 atom}×\frac{1 L}{1000 cm^{3} }=7.3×10^{-5}L$$

$$fraction of volume occupied by neon atoms= \frac{7.3×10^{-5}L}{1 L}=7.3×10^{-5} or 0.0073\%$$

1. (6 points) On the Grossmont temperature scale, water freezes at 47oG and boils at 265oG. Convert 48oC to oG.

1st determine how many oG above the freezing point

$$48℃×\frac{218^{o}G}{100℃}=105^{o}G above FP$$

2nd adjust for the zero point

$$47^{o}G+105^{o}G=152^{o}G$$