CHEM 1050 Homework
Exam #1 Assignment-Solutions
Alan D. Earhart

1.25 a. 5.5×10^{4} b. 4.8×10^{2} c. 5×10^{-6} d. 1.4×10^{-4}
e. 7.2×10^{-3} f. 6.7×10^{5}

1.28 a. 10^{-9} is smaller b. 10^{2} is smaller
c. 10^{-7} is smaller d. 10^{2} is smaller

1.48 a. 5.6×10^{-3} b. 3.1×10^{2} c. 8.9×10^{8} d. 5.6×10^{-8}

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2.1 US (imperial/English units)/Mexico (metric)
a. pounds/kilograms b. feet/meters c. gallons/liters d. Fahrenheit/Celsius

2.3 a. meter, length b. grams, mass c. milliliters, volume
d. seconds, time e. Celsius, temperature

2.6 a. kg b. K c. qt d. m e. mL

2.8 a. exact (counting) b. measurement (time, can't really "count" years)
c. measurement d. measurement

2.9 a. 6 oz b. all counting c. both measurements d. a definition

2.13 a. 5 b. 2 c. 2 (no decimal place so all the zeroes after the 6 are placeholders)
d. e. 4 f. 3

2.14 a. 4 b. 6 c. 3 d. 3
e. 3 (no decimal place so all the zeroes after the 8 are placeholders)
f. 2

2.18 a. 5.a x 10^{6} g b. 2.6 x 10^{4} s c. 4 x 10^{5} m d. 8.2 x 10^{-4} kg

2.21 a. 1.85 kg b. 88.2 L c. 0.00474 cm d. 8810 m
e. 1.83 x 10^{5} s

2.22 a. 1.9 kg b. 88 L c. 0.0047 cm d. 8800 m
e. 1.8 x 10^{5} s

2.24 a. 5.10 x 10^{6} L b. 2.67 x 10^{4} s c. 3.38 x 10^{-3} m
d. 5.70 x 10^{1} g

2.26 a. 70 000 (1 sf due to 400) b. 0.005 (1 sf due to 4)
c. 15 (2 sf due to 3.6) d. 0.0055 (2 sf due to 3.5)

2.27 a. 53.54 cm (2 decimal places) b. 127.6 g (1 decimal place)
c. 121.5 mL (1 decimal place) d. 0.50 L (2 decimal places)

2.39 a. 100 b. 10^{9} c. 0.001 d. 1000

2.41 a. kilogram b. milliliter c. kilometer d. kiloliter e. nanometer

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2.51 a. $\left(\frac{175\,cm}{1}\right)\left(\frac{0.01\,m}{1\,cm}\right)=1.75\,m$ b. $\left(\frac{5500\,mL}{1}\right)\left(\frac{0.001\,L}{1\,mL}\right)=5.5\,L$

c. $\left(\frac{0.0018\,kg}{1}\right)\left(\frac{1000\,g}{1\,kg}\right)=1.8\,g$

2.54 a. $\left(\frac{4.0\,oz}{1}\right)\left(\frac{1\,lb}{16\,oz}\right)\left(\frac{0.4536\,kg}{1\,lb}\right)\left(\frac{1000\,g}{1\,kg}\right)=110\,g$

b. $\left(\frac{5.0\,pt}{1}\right)\left(\frac{1\,qt}{2\,pt}\right)\left(\frac{1\,L}{1.057\,qt}\right)\left(\frac{1\,mL}{0.001\,L}\right)=2400\,mL$

c. $\left(\frac{12\,mL\,alcohol}{100\,mL}\right)\left(\frac{1\,mL}{0.001\,L}\right)\left(\frac{0.750\,L}{1}\right)=9.0x10^{1}\,mL$

d. $\left(\frac{51\,g\,fiber}{100\,g}\right)\left(\frac{1000\,g}{1\,kg}\right)\left(\frac{0.4536\,kg}{1\,lb}\right)\left(\frac{12\,oz}{6\,muffins}\right)\left(\frac{1\,lb}{16\,oz}\right)\left(\frac{1\,muffin}{1}\right)=29\,g$

e. $\left(\frac{1.43\,kg}{1}\right)\left(\frac{8.0\,kg}{100\,kg}\right)\left(\frac{1\,lb}{0.4536\,kg}\right)\left(\frac{16\,oz}{1\,lb}\right)=4.0\,oz$

2.56 a. $\left(\frac{1.0\,g}{6\,h}\right)\left(\frac{1\,mg}{0.001\,g}\right)\left(\frac{24\,h}{1\,day}\right)\left(\frac{1\,tablet}{500\,mg}\right)=8\,tablets$

b. $\left(\frac{5.00\,mg}{1\,kg\,body\,weight}\right)\left(\frac{0.4536\,kg}{1\,lb}\right)\left(\frac{180\,lb\,body\,weight}{1}\right)=408\,mg$

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2.59 a. $\left(\frac{24.0\,g}{20.0\,mL}\right) = 1.20\,g/mL$ b. $\left(\frac{1.65\,lb}{170\,mL}\right)\left(\frac{0.4536\,kg}{1\,lb}\right)\left(\frac{1000\,g}{1\,kg}\right) = 4.40\,g/mL$

c. volume = 21.45 mL – 20.00 mL = 1.45 mL $\left(\frac{4.50\,g}{1.45\,mL}\right) = 3.10\,g/mL$

d. 114 cm^3 = 114 mL $\left(\frac{514.1\,g}{114\,mL}\right) = 4.51\,g/mL$

2.62 a. $\left(\frac{1\,mL}{10.5\,g}\right)\left(\frac{35.6\,g}{1}\right) = 3.39\,mL$ 18.0 mL + 3.39 mL = 21.39 mL

b. $\left(\frac{1\,mL}{13.6\,g}\right)\left(\frac{8.3\,g}{1}\right) = 0.61\,mL$

c. $\left(\frac{1.00\,g}{1\,mL}\right)\left(\frac{1\,mL}{0.001\,L}\right)\left(\frac{3.785\,L}{1\,gal}\right)\left(\frac{1\,kg}{1000\,g}\right)\left(\frac{1\,lb}{0.4536\,kg}\right)\left(\frac{35\,gal}{1}\right) = 290\,lb$

2.79 a. $\left(\frac{6\,\text{crackers}}{0.50\,oz}\right)\left(\frac{8.0\,oz}{1}\right) = 96\,\text{crackers}$

b. $\left(\frac{4\,g\,fat}{1\,serving}\right)\left(\frac{1\,serving}{6\,\text{crackers}}\right)\left(\frac{10\,\text{crackers}}{1}\right) = 7\,g\,fat$

c. $\left(\frac{140\,mg\,sodium}{1\,serving}\right)\left(\frac{1\,serving}{0.50\,oz}\right)\left(\frac{8.0\,oz}{1}\right) = 2200\,mg\,sodium$

2.84 $\left(\frac{3.15\,oz}{0.1173\,L}\right)\left(\frac{0.001\,L}{1\,mL}\right)\left(\frac{1\,lb}{16\,oz}\right)\left(\frac{0.4536\,kg}{1\,lb}\right)\left(\frac{1000\,g}{1\,kg}\right) = 0.761\,g/mL$

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3.1	a. substance	b. mixture	c. substance	d. substance	e. mixture
3.2	a. mixture	b. substance	c. mixture	d. substance	e. substance
3.4	a. element	b. element	c. compound	d. element	e. compound
3.9	a. physical	b. chemical	c. physical	d. chemical	e. chemical
3.11	a. physical	b. chemical	c. physical	d. physical	e. physical
3.14	a. physical	b. chemical	c. physical	d. chemical	e. physical
3.18	a. 77 °F	b. 311 °F	c. -32 °F	d. -49 °C	e. 418 K

3.26 a. $\left(\frac{750\,kcal}{1}\right)\left(\frac{1000\,cal}{1\,kcal}\right)\left(\frac{4.184\,J}{1\,cal}\right) = 3.1x10^{6}\,J$

b. $\left(\frac{750\,kcal}{1}\right)\left(\frac{4.184\,kJ}{1\,kcal}\right) = 3100\,kJ$

3.35 a. $\left(\frac{1.00\,cal}{g\,°C}\right)\left(\frac{8.5\,g}{1}\right)\left(\frac{21°C}{1}\right) = 180\,cal$

d. $\left(\frac{0.385\,J}{g\,°C}\right)\left(\frac{1\,kJ}{1000\,J}\right)\left(\frac{175\,g}{1}\right)\left(\frac{160.°C}{1}\right) = 10.8\,kJ$

3.38 c. $\left(\frac{0.0562\,cal}{g\,°C}\right)\left(\frac{10.0\,g}{1}\right)\left(\frac{163°C}{1}\right) = 91.1\,cal$

$\left(\frac{0.235\,cal}{g\,°C}\right)\left(\frac{10.0\,g}{1}\right)\left(\frac{163°C}{1}\right) = 383\,J$

3.43 a. condensation b. evaporation
c. evaporation d. condensation