

Homework 10-Jan-07 due 17-Jan-07 Chapter 2 & 3

Chapter 2, p45++

In-Class Discussion: 3, 13

2 questions 4 points each

Q&P: 9, 20, 23, 43, 47, 64, 79, 80, 93, 109, 133, 156

12 questions 4 points each

Chapter 3, p75++

Q&P: 12, 18, 28, 44, 50, 54, 80, 92

8 questions 2 points each

Note: This assignment will count as ONE CPS Test and ONE Homework Assignment!

Lab Notebook, Experiment 1, p 11-12

Common Mistakes:

1. Did not do the problems In-Class Discussion: 3 & 13
2. Did not show ALL MATH and ALL UNITS in determining an answer
3. Did not show the correct number of significant digits
4. As a comment – numbers in the thousands and millions, put in the comma: 1,234 1,23
5. As a comment – for readability with a decimal with a lot of zero's, put in a space every 3 zero's

****** You MUST SHOW all Math with Units to get credit on a test!**

Chapter 2 p 45++

- b. The mass of the marble is greater than that of the water
- c. The marble weighs more than an equivalent volume of the water

$$3 \quad 65 \text{ miles} \times \frac{5280 \text{ ft}}{1 \text{ mile}} \times \frac{1 \text{ hr}}{60 \text{ min}} \times \frac{1 \text{ min}}{60 \text{ sec}} = 95.33 \text{ ft} = 95 \text{ ft}$$

Problems

- | | | | |
|---------------------------|------------|---------------------------|--------------|
| a. 6.442×10^3 | 6,442. | g. 9.721×10^{-4} | 0.0009721 |
| b. 5.991×10^{-5} | 0.00005991 | h. 2.015×10^6 | 2,015,000 |
| c. 2.001×10^4 | 20,010 | i. 5.583×10^{-2} | 0.05583 |
| d. 1.997×10^{-3} | 0.001997 | j. 4.227×10^{-6} | 0.000 004227 |
| e. 7.871×10^{-1} | 0.7871 | k. 9.734×10^3 | 9734. |
| f. 1.001×10^1 | 10.01 | l. 1.000×10^1 | 10.00 |

$$30 \quad 0.5 \text{ kilogram} \times \frac{1000 \text{ g}}{1 \text{ kilogram}} \times \frac{1 \text{ pound}}{454 \text{ g}} = 1.101 = 1 \text{ pound}$$

$$3 \quad 50 \text{ miles} \times \frac{5280 \text{ ft}}{1 \text{ mile}} \times \frac{12 \text{ inches}}{1 \text{ ft}} \times \frac{2.54 \text{ cm}}{1 \text{ inch}} \times \frac{1 \text{ Meter}}{100 \text{ cm}} \times \frac{1 \text{ Kilometer}}{1000 \text{ Meters}} = 80.46 \text{ KM} = 80 \text{ KM}$$

$$100 \text{ kilometres} \times \frac{1,000 \text{ Meters}}{1 \text{ Km}} \times \frac{100 \text{ CM}}{1 \text{ Meter}} \times \frac{1 \text{ inch}}{2.54 \text{ CM}} \times \frac{1 \text{ ft}}{12 \text{ inches}} \times \frac{1 \text{ mile}}{5280 \text{ ft}} = 62.1 \text{ mile}$$

- 3
- | | | |
|----------|-----------------|--------|
| 102.4005 | to five digits | 102.40 |
| 15.9995 | to three digits | 16.0 |
| 1.6385 | to four digits | 1.639 |
| 7.355 | to three digits | 7.36 |

7 $0.005215 * 0.08212 * 273.2 / 4.1$ - report to 2 digits – 4.1 has only 2 significant digits

- 4 a. 2.23 m to yards

$$2.23 \text{ m} \times \frac{100 \text{ cm}}{1 \text{ m}} \times \frac{1 \text{ in}}{2.54 \text{ cm}} \times \frac{1 \text{ yard}}{36 \text{ in}} = 2.4381 \text{ yards} = 2.44 \text{ yards}$$

- b. 46.2 yd to meters

$$46.2 \text{ yd} \times \frac{36 \text{ in}}{1 \text{ yd}} \times \frac{2.54 \text{ cm}}{1 \text{ in}} \times \frac{1 \text{ m}}{100 \text{ cm}} = 42.245 \text{ m} = 42.2 \text{ m}$$

- c. 292 cm to inches

$$292 \text{ cm} \times \frac{1 \text{ in}}{2.54 \text{ cm}} = 114.96 \text{ in} = 115 \text{ in}$$

- d. 881.2 in to centimeters

$$881.2 \text{ in} \times \frac{2.540 \text{ cm}}{1 \text{ in}} = 2238.248 \text{ cm} = 2238 \text{ cm} \quad [\text{Note I put in an extra zero on the } 2.54 \text{ cm/in to keep}]$$

- e. 1043 km to miles

$$1043 \text{ km} \times \frac{1000 \text{ m}}{1 \text{ km}} \times \frac{100 \text{ cm}}{1 \text{ m}} \times \frac{1 \text{ in}}{2.54 \text{ cm}} \times \frac{1 \text{ ft}}{12 \text{ in}} \times \frac{1 \text{ mi}}{5280 \text{ ft}} = 648.090 \text{ mi} = 648.1 \text{ mi}$$

- f. 445.5 mi to kilometers

$$445.5 \text{ mi} \times \frac{5280 \text{ ft}}{1 \text{ mi}} \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{2.54 \text{ cm}}{1 \text{ in}} \times \frac{1 \text{ m}}{100 \text{ cm}} \times \frac{1 \text{ km}}{1000 \text{ m}} = 716.962 = 717.0$$

- g. 36.2 m to kilometers

$$36.2 \text{ m} \times \frac{1 \text{ km}}{1000 \text{ m}} = 0.0362 \text{ km}$$

- h. 0.501 km to centimeters

$$0.501 \text{ km} \times \frac{1000 \text{ m}}{1 \text{ km}} \times \frac{100 \text{ cm}}{1 \text{ m}} = 50,100 = 5.01 \times 10^4 \text{ cm}$$

9 $(45 \text{ F} - 32) \times 5/9 = 7.222 \text{ C} = 7.2 \text{ C}$ or $T_c = [F - 32] / 1.80$

$$(115 \text{ F} - 32) \times 5/9 = 46.111 \text{ C} = 46.1 \text{ C}$$

$$(-10 \text{ F} - 32) \times 5/9 = -23.3333 \text{ C} = -23 \text{ C}$$

$$(10,000 \text{ F} - 32) \times 5/9 = 5537.777 = 5,537.7 \text{ C} \quad [\text{assumed all zero's are significant}]$$

0 $(78.1 \text{ C} * 9/5) + 32 = 172.58 \text{ F} = 173 \text{ F}$

$(40. \text{ C} * 9/5) + 32 = 104 \text{ C} = 100 \text{ C}$

$(-273 \text{ C} * 9/5) + 32 = -459.4 \text{ F} = -459 \text{ F}$

$(32 \text{ C} * 9/5) + 32 = 89.6 \text{ F} = 90 \text{ F}$

3 $\text{CH}_3\text{CH}_2\text{OH}$ [Ethanol] den of 0.785 g/ml $82.5 \text{ g} \times \frac{1 \text{ ml}}{0.785 \text{ g}} = 105.095 \text{ ml} = 105 \text{ ml}$

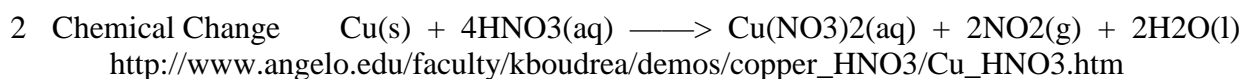
09 $45 \text{ mi} \times \frac{5280 \text{ ft}}{\text{Mi}} \times \frac{12 \text{ in}}{\text{ft}} \times \frac{2.54 \text{ cm}}{\text{in}} \times \frac{1 \text{ m}}{100 \text{ cm}} \times \frac{1 \text{ km}}{1000 \text{ m}} \times \frac{1 \text{ gal}}{4 \text{ qts}} \times \frac{1.057 \text{ qts}}{1 \text{ l}} = 19.1$

$38 \text{ mi} \times \frac{5280 \text{ ft}}{\text{Mi}} \times \frac{12 \text{ in}}{\text{ft}} \times \frac{2.54 \text{ cm}}{\text{in}} \times \frac{1 \text{ m}}{100 \text{ cm}} \times \frac{1 \text{ km}}{1000 \text{ m}} \times \frac{1 \text{ gal}}{4 \text{ qts}} \times \frac{1.057 \text{ qts}}{1 \text{ l}} = 16.1$

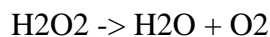
33 Is 100 km/h > 65 mph $\frac{100 \text{ km}}{\text{Hr}} \times \frac{1000 \text{ m}}{1 \text{ km}} \times \frac{100 \text{ cm}}{1 \text{ m}} \times \frac{1 \text{ in}}{2.54 \text{ cm}} \times \frac{1 \text{ ft}}{12 \text{ in}} \times \frac{1 \text{ mi}}{5280 \text{ ft}} = 62.1$

56 $4.2 \text{ Ft}^3, 155 \text{ lb}$ $\frac{155 \text{ lb}}{4.2 \text{ ft}^3} \times \frac{453.6 \text{ g}}{1 \text{ lb}} \times \frac{1 \text{ ft}^3}{12 \text{ in} \times 12 \text{ in} \times 12 \text{ in}} \times \frac{1 \text{ in}^3}{2.54 \text{ cm} \times 2.54 \text{ cm} \times 2.54 \text{ cm}} =$
Den = mass / vol

Chapter 3, p75++



- 8 A Shirt scorches Chemical
- B Tires flat in cold Physical
- C Silver gets black Chemical
- D Wine to vinegar Chemical
- E Cleaner grease to soap Chemical
- F Battery leaks Chemical
- G Acids produce bacteria Chemical
- H sugar will char Chemical
- I Hydrogen Peroxide fizzes Chemical
- J Dry ice evaporates Physical
- K Bleach changes color Chemical



8 3 examples of heterogeneous mixtures
Solutions vs Mixtures

4 526 J to warm 7.40 g water by 17 deg C

$$\frac{17 \text{ deg C}}{526 \text{ J}} = \frac{55 \text{ deg C}}{X}$$

How much heat to warm 7.40 g by 55 deg C

$$X = 1701 \text{ J}$$

0 76.52 cal -> Kjoules

$$76.52 \text{ cal} \times \frac{1 \text{ kcal}}{1000 \text{ cal}} \times \frac{4.184 \text{ kJ}}{1 \text{ kcal}} = 0.3202 \text{ kJ}$$

7.824 Kj -> Kcal

$$7.824 \text{ Kj} \times \frac{1 \text{ kcal}}{4.184 \text{ kJ}} = 1.870 \text{ kcal}$$

489.4 j -> cal

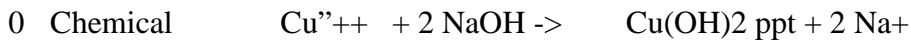
$$489.4 \text{ j} \times \frac{1 \text{ cal}}{4.184 \text{ J}} = 117.0 \text{ cal}$$

$1.598 \times 10^4 \text{ j} \rightarrow \text{kcal}$

$$1.598 \times 10^4 \times \frac{1 \text{ kJ}}{1000 \text{ J}} \times \frac{1 \text{ kcal}}{4.184 \text{ kJ}} = 3.819 \text{ kcal}$$

4 Iron 562 J for temp 25.0 C -> 50.0 C. What is it's mass?

$$0.45 \text{ j/g C} \quad 562 \text{ J} = (x \text{ mass of iron}) \times 0.45 \text{ J/g C} \times 25.0 \text{ C} \quad x \text{ Mass of iron} = 50. \text{ g}$$



2 75 g of water from 25 C to 39 C. Water 4.184 J / g deg C
 Temp increase = $39 \text{ C} - 25 \text{ C} = 14 \text{ C}$

$$75 \text{ g} \times 4.184 \text{ J/g C} \times 14 \text{ C} = 4400 \text{ J} \quad [2 \text{ sig}]$$