Chem15, Spring 2014, SJCC, Test1 38-2=36 69 105/110 Name KEY

Please read all the questions VERY carefully before answering. Start from number 7 on your scantron for multiple choice questions. Write neatly. If I cannot read your answer, you will not receive any point. Use the attached periodic table and constant chart. No outside paper is allowed. Total points = 38 + (24x3=)72 = 110

SHORT ANSWER. In all calculations, write the set up equation first, then put the raw data with units. Then do your calculations. Points will be deducted if your answer is not clearly written.

1) Show calculations with units to convert 16.32 pounds (lb) into grams (g) (given 1 kg = 2.205 lb and 1 kg = 1000g). (6 pts.)

1) 7.401×10^3 g

$$16.32 \text{ lb} = \frac{1 \text{ kg}}{2.205 \text{ lb}} \cdot \frac{1000 \text{ g}}{1 \text{ kg}}$$

$$= 7401.4$$

$$= 7.401 \times 10^3 \text{ g}$$

2) Calculate (with units) how many m^2 are in 2659 cm^2 (given 1 m = 100 cm.)? (6 pts.)

2) 0.2659 m^2

$$2659 \text{ cm}^2 \cdot \frac{1 \text{ m}}{100 \text{ cm}} \cdot \frac{1 \text{ m}}{100 \text{ cm}}$$

$$= 0.2659 \text{ m}^2$$

3) Calculate the volume of 12.8 g of a liquid that has a density of 0.789 g/mL. with correct numbers of significant figures (6 pts.)

3) 1.63×10^1 mL

$\rho = \frac{m}{V}$

$$V = \frac{m}{\rho}$$

$$= \frac{12.89}{0.789}$$

$$= 16.3 \text{ mL}$$

$$= 1.63 \times 10^1 \text{ mL}$$

4) Show your calculation to find how many kilojoules are there in 95.0 Calories with correct numbers of significant figures? (Note the capital C in Calorie and given 1 cal = 4.18 joules) (6 pts.)

4) 3.97×10^2 KJ

$$95.0 \text{ Cal} \cdot \frac{1000 \text{ cal}}{1 \text{ Cal}} \cdot \frac{4.18 \text{ J}}{1 \text{ cal}}$$

$$= 397100$$

$$= 3.97 \times 10^5 \text{ J}$$

$$= 3.97 \times 10^2 \text{ KJ}$$

5) Suppose it took 108 joules of energy to raise a bar of gold from 25.0°C to 29.7°C. Given that the specific heat capacity of gold is 0.128 J/g·°C, what is the mass (in grams) of the bar of gold? Show all your calculations with set up equation and units. Given q = m.C. ΔT. (8 pts.)

5) 1.80×10^2 g

$q = m \cdot c \cdot \Delta T$

$m = \frac{q}{c \cdot \Delta T}$

$= \frac{108 \text{ J}}{0.128 \text{ J/g°C} \cdot 4.7 \text{°C}}$

$= 180 \text{ g}$

$q = 108 \text{ J}$

$\Delta T = 29.7 \text{°C} - 25.0 \text{°C}$

$= 4.7 \text{°C}$

$c = 0.128 \text{ J/g°C}$

6) Density of a metal A is 1.7 g/ cc and that of metal B is 7.9 g/cc. If a ball made from metal B has a mass of 409.5 grams, then what would be the mass of a ball, made from metal A. The balls have the same volume. (6 pts.)

6) ~~1.808×10^3~~ 88.12 g

$\rho_2 = \frac{m_2}{V_2}$

$7.9 \text{ g/cc} = \frac{409.5 \text{ g}}{x \text{ cc}}$

$x = \frac{409.5 \text{ g}}{7.9 \text{ g/cc}} = 51.8354$

Volume$_1$ = 228.8 cc = Volume$_2$

$\rho_1 = \frac{m_1}{V} = m_1 = \rho_1 \times \text{Volume}$

$= 1.7 \text{ g/cc} \times 51.8354 \text{ cc}$

$= 1.808 \text{ g} = 88.120 2$

$= 1.808 \times 10^3 \text{ g} = 88.12 \text{ g}$

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