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Chem 105 Exam 1. Jordan, Fall 2004

Name Key

By submitting this exam, I affirm that I have neither given nor received unauthorized aid on this assignment.

You must show all work for credit. Express each answer to the correct number of significant figures.

Useful information: 1 in = 2.54 cm, 1 kg = 2.20 lbs, 1m = 1.0936 yds, $K = ^\circ C + 273$,

$$^{\circ}F = \frac{9}{5}(^{\circ}C) + 32, ^{\circ}C = \frac{5}{9}(^{\circ}F - 32), 1 \text{ gal} = 3.7854 \text{ L}$$

(1) (2 points) How many microliters (μL) are in a liter?

- a. 0.01
- b. 100
- c. 1000
- d. 1,000,000

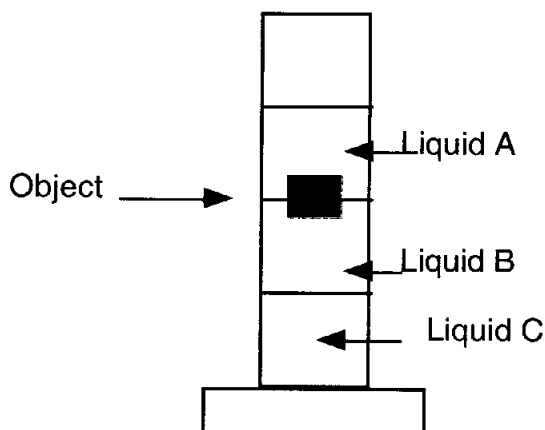
(2) (2 points) Which of the following is a derived unit?

- a. meter
- b. kilogram
- c. liter
- d. mole

(3) (2 points) The horizontal rows in the periodic table are called

- a. periods
- b. densities.
- c. groups
- d. classes

(4)(2 points) Three liquids are poured into a graduated cylinder to form a density column. The density of liquid A is 0.8g/mL , the density of liquid B is 1.1g/mL , and the density of liquid C is 1.5g/mL . An object is then dropped into the density column.



Which of the following best describes the density of the object

- (a) less than 0.8g/mL
- (b) 0.8g/mL
- (c) between 0.8g/mL and 1.1g/mL
- (d) between 1.1g/mL and 1.5g/mL

(5) (2 points) A student measured the diameter of a sphere and determined the average value. His measurements are 6.50cm , 6.49cm , 6.48cm , and 6.50cm . If the true diameter is 6.08cm , what can be said about the student's results?

- a. They are accurate and precise.
- b. They are accurate but not precise.
- (c) They are precise but not accurate.
- d. They are neither precise nor accurate.

(6) (4 points) Write the names of the elements next to their chemical symbol below.

- (a) C *carbon*
- (b) W *tungsten*
- (c) Na *sodium*
- (d) P *phosphorus*

(7)(4 points) List the answers to the following problems to the correct number of significant

figures

$$(a) \frac{(2.2334 \times 16.22)}{16.554 + 0.02} = \frac{36.22}{16.57} = \boxed{2.186}$$

$$(b) (54.2 + 244) \times (0.16 - 25.2) = (298) \times (-25.1) = -7.48 \times 10^3$$

(8)(2 points) Label each property below as a physical or chemical property.

(a) it burns in oxygen *chemical*

(b) it rusts *chemical*

(c) it is shiny *physical*

(d) it conducts electricity *physical*

(9) (2 points) List two extensive properties.

length
mass

(10)(5 points) List five base SI units and the property each one represents.

<i>meter</i>	<i>length</i>	<i>mole</i>	<i>amount of something</i>
<i>kilogram</i>	<i>mass</i>	<i>ampere</i>	<i>electrical current</i>
<i>second</i>	<i>time</i>	<i>Kelvin</i>	<i>temperature</i>
		<i>candela</i>	<i>luminous intensity</i>

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(12)(4 points) The hottest temperature in Berlin the summer Fahrenheit developed his temperature scale was 100 °F. Express this temperature in °C and K/

$$\frac{5}{9}(100^{\circ}\text{F}-32) = 38^{\circ}\text{C}$$

$$38^{\circ} + 273 = 311\text{K}$$

(13) (8 points) Perform the following conversions

(a) 20.0 gal into L

$$20.0 \cdot \frac{20.0 \text{ gal}}{1} \times \frac{3.785 \text{ L}}{1 \text{ gal}} = 75.7 \text{ L}$$

(b) 20.0 gal into mL

$$\frac{75.7 \text{ L}}{1} \times \frac{1000 \text{ mL}}{1 \text{ L}} = 7.57 \times 10^4 \text{ mL}$$

(c) 2.55 km into yards

$$\frac{2.55 \text{ km}}{1} \times \frac{1000 \text{ m}}{1 \text{ km}} = 2.55 \times 10^3 \text{ m}$$

$$\frac{2.55 \times 10^3 \text{ m}}{1} \times \frac{1.0936 \text{ yd}}{1 \text{ m}} = 2.79 \times 10^3 \text{ yds}$$

(d) 2.55 km into inches

$$\frac{2.79 \times 10^3 \text{ yds}}{1} \times \frac{36 \text{ in}}{1 \text{ yd}} = 1.00 \times 10^5 \text{ in}$$

(14)(4 points) A car travels at 65 m/s.

(a) How far does the car travel in 3600 s?

$$\frac{65 \text{ m}}{1} \times \frac{3600 \text{ s}}{1} = 2.34 \times 10^5 \text{ m}$$

(b) How long will it take the car to travel $3.00 \times 10^4 \text{ m}$

$$\frac{3.00 \times 10^4 \text{ m}}{1} \times \frac{1 \text{ s}}{65 \text{ m}} = 462 \text{ s}$$

Extra Credit: (4 points) Thieves are stealing a stack of gold bars from a safe. The bars are 25 cm long, 12 cm wide, and 5 cm tall. If the density of gold is 19 g/cm^3 , what is the mass of one of the gold bars?

$$\text{Volume of bars} = (25 \text{ cm} \times 12 \text{ cm} \times 5 \text{ cm}) = 1.5 \times 10^3 \text{ cm}^3$$

$$\frac{1.5 \times 10^3 \text{ cm}^3}{1} \times \frac{19 \text{ g}}{\text{cm}^3} = 2.85 \times 10^4 \text{ g}$$

Could a thief realistically carry 10 bars in a bag?

each bar is 28 kg.

$$\frac{28 \text{ kg}}{1} \times \frac{2.20 \text{ lbs}}{1 \text{ kg}} = 63 \text{ lbs}$$

10 bars would weigh 630 lbs!

NO!