

Chapter 1 Exam-Blank

1. **(7 points)** In the process of attempting to characterize a substance a chemist makes the following observations:

Distinguish between the difference between a physical and chemical property.

Identify the physical properties with a **P**, and the chemical properties with **C**.

The substance is a silvery white, lustrous metal. (2) It melts at 649°C and boils at 1105°C . (3) Its density is 1.738 g/cm^3 . (4) It burns in air, producing an intense white light. (5) It reacts with chlorine gas to give a brittle, crystalline solid.

2. **(4 points)** Classify each of the following as an element [E], a compound [C] or a mixture [M]

- a) muddy water that settles on standing
- b) A filtered cup of coffee , no cream, no sugar
- c) blood
- d) Chocolate Chip Cookie
- e) Salt (NaCl)
- f) A bowl of beef noodle soup
- g) Aluminum foil
- h) Liquid bromine

3. **(4 points)** Clarify the following confusing statements using the appropriate units of either $^{\circ}\text{C}$, $^{\circ}\text{F}$ or K for temperature, oz, liters, or gal for volume, and ft, km, or mi for distance. For each value, only one of the units makes sense. [Hint: how far is 3000 ft compared to 3000 mi?] Explain your choices.
4. "I was thirsty today. I drank 8 of coke in 3 minutes. Then I ran 20 in about half a minute to catch a bus. Inside the bus it was hot. I think it was 90 because the air conditioning was not working and people were sweating."
5. **(4 points)** These values are not written in the most appropriate metric prefix. Rewrite them please. Show the math and reasoning you used to support your answer.

a) $1.234 \times 10^{12} \text{ nL}$

c) $7.564 \times 10^{17} \text{ nm}^3$

6. **(6 points)** Indicate which of the following are exact numbers or inexact numbers by designating your choice with an (E) or (I):

(1) ___ the mass of a paper clip

(2) ___ the surface area of a dime

(3) ___ The number of pennies in a nickel

(4) ___ The temperature of the surface of the sun

(5) ___ The number of toes on your feet .

(6) Differentiate between exact and inexact and explain your choices with complete sentences.

7. **(5 points)** Indicate the number of significant figures in each of the following measured quantities:

a) 8.1441 mg

b) 0.00050 m²

c) 6,480,100 s

d) -15.20°C

e) $10.0800 \times 10^{-2} \text{cg}$

8. **(5 points)** Perform the following calculation and report your answer with the correct significant figures and units.

a) $2.17 \text{ g} + 4.32 \text{ g} + 401.278 \text{ g} + 21.826 \text{ g}$

b) $2.156\,934 \times 10^{114} \text{ }^{\circ}\text{C} + 2.314\,276 \times 10^{115} \text{ }^{\circ}\text{C} + 2.954\,681 \times 10^{116} \text{ }^{\circ}\text{C}$

9. **(5 points)** 25 family members attended my birthday party. I served each member 3 hamburgers, 22 French fries, 2 cans of soda, and 1 piece of cake. The piece of cake was 1.5 in long, 1.5 in wide, and 1.5 in high. I collected 1 bag of recyclable material with a mass of 112 kg and 2 bags of compostable material each with a mass of 201 kg.

Of the following values 3, 22, 2, 1.5, 112 presented in the paragraph above, which are exact numbers? Explain

10. **(4 points)** What is the mass of the gold idol? What is the mass of sand bag? Did Indiana Jones have a reasonable chance for not activating the mass sensitive booby trap? Explain in one or two brief sentences.

11. **(7 points)** Copper can be drawn into thin wires. How many kilometers of 34gauge wire (diameter = 6.304×10^{-3} in) can be produced from the copper in 5.1256 lb of covellite, an ore that is 66.013% copper by mass. The volume of a cylinder is $\pi r^2 h$, $d_{\text{Cu}} = 8.95 \text{ g/cm}^3$.