

Chem 121 pre-lab



**ASSIGN
BUSTER**

_____ Drawer number _____ Lab Day and
Time: _____ Experiment 2: PRELAB

ASSIGNMENT FOR DENSITY

1. The definition of density is Mass per Unit
Volume_____.

The word " per" indicates the arithmetic operation

Division_____.

2. When using a graduated cylinder you read the volume at the bottom of
the

Meniscus_____. It is Less accurate than a pipet.
(more or less)

3. In an experiment performed as in Part A, the following data were
collected:

mass of vial 20. 0138 g

mass of vial + water 29. 9368 g

volume of water 10. 00 mL

Then:

A. The mass of the water is 9. 923 g_____

B. The density of the water is 0. 9923 g/mL_____

C. The temperature of the lab is 40 oC (to the nearest degree, determine
from density chart on pg. 30)

4. An experiment performed as in Part C with a metal other than aluminum
gave the following data:

volume of water: 3. 72 mL

mass of metal bar: 12. 8432 g

<https://assignbuster.com/chem-121-pre-lab/>

volume of water + metal bar: 9.84 mL

Then ...

A. The volume of the metal bar is 6.12 mL.

B. The density of metal bar is 2.10 g/mL.

B. Determination of the Percent Alcohol in a Solution Unknown # _____

25% 50% 75% 100% unknown

9. Mass of vial (tare weight) 18.75 g 16.23 g 17.11 g 17.91 g 18.12 g

10. Mass of vial + liquid 28.25 g 25.18 g 25.51 g 25.81 g 26.82 g

11. Mass of liquid (#10 - #9) 9.50 g 8.95 g 8.40 g 7.90 g 8.60 g

12. Vol. of liquid pipetted 10.00 mL 10.00 mL 10.00 mL 10.00 mL 10.00 mL

13. Density (#11 ÷ #12) 0.95 g/mL 0.895 g/mL 0.84 g/mL 0.79 g/mL 0.86 g/mL

14. Create a standard curve of Density (y-axis) vs. % alcohol (x-axis) and attach to this worksheet.

Percent alcohol of the unknown

(Determined from standard curve graph) 66%

C. Density of Aluminum

15. Mass of aluminum bar 7.448 g

16. Volume of water in graduated cyl. 5.45 mL

17. Volume of water + aluminum bar 8.20 mL

18. Volume of aluminum bar (#17 - #16) 2.75 mL

19. Density of aluminum (#15 ÷ #18) 2.7054 g/mL

20. Literature value for the density of aluminum 2.6989 g/mL

<https://assignbuster.com/chem-121-pre-lab/>

21. Percent difference between your value and literature value (see p. 33)

0.24

D. Thickness of Aluminum Foil

22. Length of foil (≤ 15.0 cm) 13.1 cm

23. Width of foil (≤ 10.0 cm) 9.5 cm

24. Mass of foil 9.745 g

25. Thickness of foil (math on p. 34) 0.02901 cm

use conversions in Table 3 on p. 25 0.0002901 m

to convert the thickness of foil in cm

into m, μm , and nm 290.1 μm

290100 nm

QUESTIONS For Lab #2

Write your answers on separate paper and attach to your lab report form. For word problems: Use good scientific expression. Make your sentences short and clear. Neatness counts, as does spelling. Show your work for numerical problems. If the answer is very large or very small, express your answers in correct exponential notation. Always use the correct number of significant figures.

1. What might be done to a bar of soap during manufacturing to make the soap into a floating soap?

A bar of soap can be made as a hollow bar during manufacturing so that its density remains less than that of water and therefore, it can become a floating soap.

2. A kilogram of metallic osmium, the densest element known, occupies a volume of 44.5 mL. What is the density of osmium?

<https://assignbuster.com/chem-121-pre-lab/>

Density of Osmium is $(1000 \text{ g})/(44.5 \text{ mL}) = 22.47 \text{ g/mL}$. This means Osmium is approximately 22.47 times denser than water.

3. The density of mercury is 13.6 g/mL . What is the density of mercury in pounds/gallon?

Density of mercury in pounds/gallon is 113.4975.

4. If the density of gasoline is 0.79 g/mL , what mass of gasoline, in kilograms, is in a full 25-gallon tank?

Mass of gasoline in a full 25 gallon tank = $25 \times 3.78541178 \times 0.79 \text{ kg} = 74.762 \text{ kg}$.

5. a. Which is heavier, a pound of feathers or a pound of lead?

Both are equally heavy.

b. Which is denser, a pound of feathers or a pound of lead?

A pound of lead is denser than a pound of feathers.

6. In 1989, the supertanker Exxon Valdez spilled 250,000 barrels of crude oil (1 barrel = 42 gallons) off the coast of Alaska. What area of ocean would be polluted if this much oil spread out to a thin film with thickness of 0.10 mm? (Hints: volume = area \times thickness. $1 \text{ mL} = 1 \text{ cm}^3$) Express your answer in cm^2 and in miles^2 .

The area of the ocean that will be polluted

= $3.975 \times 10^{12} \text{ cm}^2$ which is equal to 153.46 miles^2 .

7. Let's assume that your secondary education has led you to rob armored cars. In your latest heist, if you were faced with bags of coins that weighed the same, which bag would you take: pennies, nickels, dimes, or quarters? Which bag contains more money? Important data: a penny weighs 3.09 g, a nickel weighs 4.88 g, a dime weighs 2.25 g, and a quarter weighs 5.68 g. (Naturally, show your work for full credit.) Hint: calculate the monetary

density of each coin.

Monetary density of different coins is the following:

Penny $\$0.01/3.09 \text{ g} = \$0.003/\text{g}$

Nickel $\$0.05/4.88 \text{ g} = \$0.010/\text{g}$

Dime $\$0.10/2.25 \text{ g} = \$0.0444/\text{g}$

Quarters $\$0.25/5.68 \text{ g} = \$0.0440/\text{g}$

Clearly monetary density of dimes is the highest and therefore, I would take the bag containing dimes as it contains more money. However, if I can afford to take one more bag I will not like to leave the quarters bag as well.

8. What would be the effect on your calculated value of the density of water if there was an air bubble in the pipet when you transferred the water into the empty vial? Would the value be higher or lower or would there be no change? Explain your answer

If there was an air bubble in the pipet while transferring the water in the vial for density measurement, the measured value of density will be lower than the actual value as the volume has been measured on higher side erroneously due to entrapped air bubble.

9. What would be the effect on your calculated value of the density of water if “ empty” vial had not been completely dried before weighing? Would the value be higher or lower or would there be no change? Explain your answer

The measured value of density of water will not be affected in this case as the mass of empty vial is deducted to calculate the mass of the measured volume of water. Therefore, whether the vial was completely dry or not will not affect the result.