Final Exam Study Guide

1. Be able to properly identify the number of sig figs in a measurement.

2. Know the rules for adding, subtracting, multiplying and dividing with significant figures.

3. Be able to convert between scientific notation and standard notation.

4. Be able to multiply and divide with scientific notation.

5. Be able to properly read and explain how to read rulers, balances and graduated cylinders.

6. How do you determine the volume of a regular shaped object?

    a. How would you find the volume of a cube with an edge of 2.0 cm^3?

7. How do you determine the volume of an irregular shaped object?

8. During the sand lab, why was the total volume (sand and water) smaller than the sum of the individual volumes of the sand, and water?

9. Know how to do the calculations of the sand lab. See #'s 9 – 11 on page 27 of the book.

10. In each of the mass labs, why did we take the class data and not just 1 trial?

11. What is the law of conservation of mass? And under what conditions must it be in order to prove it?

12. How did we prove the law of conservation of mass the labs that we did?

13. What is the difference between an open system and a closed system? Why is this important when looking at the law of conservation of mass?

14. What were possible sources of error in the salt lab and the ice lab?

15. What are laws of nature?

16. Is there any difference between finding the volume of a marble using alcohol instead of water? Why or why not?

Significant Figures and Scientific Notation Review

Determine how many significant figures are in the following.

1. 56 m   _____
2. 9000 mg   _____
3. 0.024010 km _____

4. 0.10 km   _____
5. 8090 hrs   _____
6. 800.0 days   _____

Perform the following calculations. DO NOT FORGET UNITS!

7. 2.25 cm * 2.251 cm * 2.0000 cm = _____

8. 45.214 mg – 90.93 g = _____

9. 125 mm^2 / 25 mm = _____

10. 310.500 min - 9.0 min – 53.21 min = _____

Convert each number to scientific notation to 2 decimal points. DO NOT FORGET UNITS!

11. 0.0452 mm   _____
12. 90000 L   _____

13. 0.00000314 _____
14. 13.5 s _____

Convert each number to standard form. DO NOT FORGET UNITS!

15. 9.98×10^4 kg _____
16. 6.67×10^8 mi _____

17. 2.15×10^{-1} g _____
18. 8.52×10^2 L _____

Solve the following using significant figures and place in scientific notation. DO NOT FORGET UNITS!

19. 3.76×10^9 m * 4.14×10^{-9} m = _____

20. $\dfrac{5.00 \times 10^{16} \text{ km}^2}{2.00 \times 10^{14} \text{ km}}$ _____

21. 5.50×10^{-6} m * 1.15×10^6 m * 1.00×10^1 m = _____

22. $\dfrac{6.25 \times 10^{-4} \text{ m}^2}{2.25 \times 10^9 \text{ m}}$ _____

1. What is density?

2. What are the units for density?

3. What is the formula for density?

4. How do you determine the density of a solid?
    a. Regular Shaped Objects
    b. Irregular Shaped Objects

5. How do you determine the density of a liquid?

6. How do you determine the density of a gas?

7. What is the general relationship between the densities of solids, liquids and gases?

8. What is the density of water?
    a. How do you know if an object will float or sink?

9. What can be said about the densities of a 10 g piece of lead and a 50 g piece of lead?

Solve the problems below. Make sure to SHOW ALL YOUR WORK, use sig figs, and box your answer.

1. A platinum bar measures 5.0 cm long, 0.040 m wide, and 150 mm thick. It has a mass of 7000. grams. Calculate the density of the bar. Does the bar float or sink in water??

2. A lead cylinder has a mass of 540 grams and a density of 2.70 g/ml. Calculate the volume of the lead cylinder.

3. A cork has a density of 0.1875 g/cm^3 and a volume of 16 cm^3. Calculate the mass of the cork.

4. A thin glass bottle holds 25 ml of liquid and has a mass of 0.019 kg. Calculate the density. Does the bottle float or sink in water?

5. A student performs the density of a gas experiment and finds the following information.

    Mass of solid, test tube, and water before reaction…………. 40.24 g
    Mass of test tube and contents after reaction……………………39.67 g
    Volume of gas collected………………………………………………..444 cm^3

    Determine the density of the gas.

6. A bar of soap is 2.3 in tall, 0.060 m wide, and 0.034 yards long. It has a mass of 415 grams. What is the density of the bar of soap? Does the soap float or sink in water?

7. A graduated cylinder was filled with 8.90 mL of water. A piece of metal was dropped in the cylinder and the water level rose 7.5 mL. If the mass of the metal was 50.3 g, what is the density of the metal? Does the metal float or sink in water?

8. A pencil has a density of .875 g/ml. It has a mass of 3.5 grams. What is the volume?

9. Find the mass of a 0.050 L quantity of water if the density of water is 1.00 g/ml.

10. What are characteristic properties? Name the ones that we have talked about.

10. What is freezing point?

11. How did we determine the freezing point in the lab?

12. Why did we use the water bath during the experiment?

13. Did the freezing point depend on the amount of material we had in the lab? What about boiling point?

14. What is melting point?

15. What can be said about the freezing point and the melting point?

16. How did we determine the boiling point in the lab?

17. Why did we place the empty test tube in experiment 3.4 in the beaker of water?

18. Why were boiling chips added to the test tube?

19. Be able to DRAW and label a change of state graph of water.

20. Draw and label a change of state graph for a substance that boils at 450 degrees Celsius and melts at 145 degrees Celsius.

21. What does the plateau represent on the change of state graph?

22. How would you know if 2 objects are made of the same material? Is there more than one way to determine that?

23. Make sure to check out the powerpoint that are posted on my website about the freezing and boiling labs.

24. What are the 4 equations for temperature conversions?

25. What are mixtures? What are the 2 different types of mixtures?

26. Explain the difference between the 2 different types of mixtures.

27. What are solutions? And what are the 2 different parts to a solution?

28. Explain what the solute and solvent are.

29. Give 5 examples of homogeneous mixtures and 5 examples of heterogeneous mixtures.

30. What is solubility?

31. Explain the 3 different types of solutions.

32. How did we define concentration?

33. What are the units for concentration?

34. Be able to solve problems involving concentration.

35. How many grams of sugar must be added to 450 mL of water to make a solution with a concentration of 0.12 g/mL?

36. Determine the concentration of a solution that contains 0.034 lbs of salt and 300. mL of water.