

Name: \_\_\_\_\_

Block: \_\_\_\_\_

Date: \_\_\_\_\_

Chemistry 11

**Uncertainty**

Assignment

(50 marks)

1. State the number of significant figures in each of the following measurements. (8 marks)

a. 520 mL \_\_\_\_\_

b. 0.0102 ms \_\_\_\_\_

c. 0.290 kg \_\_\_\_\_

d. 86,000 L \_\_\_\_\_

e. 10.002 ns \_\_\_\_\_

f. 0.458 Pa \_\_\_\_\_

g. 0.001 cm \_\_\_\_\_

h. 0.007050 cs \_\_\_\_\_

2. Perform the following calculations and report the answers to the correct number of significant figures. (8 marks)

a.  $0.3287 \text{ g} \times 45.2 \text{ g} = ?$

b.  $125.5 \text{ kg} + 52.68 \text{ kg} + 2.1 \text{ kg} = ?$

c. 
$$\frac{52.8 \text{ L} + 3.0025 \text{ L}}{253.4 \text{ L}} = ?$$

d.  $0.258 \text{ mL} \div 0.36105 \text{ mL} = ?$

e. 
$$\frac{78.26 \text{ L} - 89.50 \text{ L}}{678.2 \text{ L} + 9511 \text{ L}} = ?$$

f.  $68.32 \text{ ns} + (-1.001 \text{ ns}) + (-0.00367 \text{ ns}) + (-678.1 \text{ ns}) = ?$

g.  $(1250 \text{ cal} - (234.207 \text{ cal} \div 52.69 \text{ cal})) = ?$

h.  $(0.12 \text{ g} + 5.16 \text{ g}) \times (45.56 \text{ g} - 93.0 \text{ g}) = ?$

3. Express each of the following numbers in scientific notation. (5 marks)

a. 8960 \_\_\_\_\_

b. 0.00023 \_\_\_\_\_

c. 86,000 \_\_\_\_\_

d. 75,000,000 \_\_\_\_\_

e. 0.00000253 \_\_\_\_\_

4. Check the following equalities for errors. If an answer is correct, write “correct” in the space provided. If the answer is incorrect, rewrite the answer to make it correct. (3 marks)

a.  $45,980,000 = 4.5980 \times 10^7$  \_\_\_\_\_

b.  $0.000253 = 2.53 \times 10^{-3}$  \_\_\_\_\_

c.  $680,502,000 = 6.80502 \times 10^8$  \_\_\_\_\_

5. Solve the following density problems. Note: density = mass / volume and has units of g/mL or g/cm<sup>3</sup> (2 marks each).

a. An unknown liquid has a mass of 30.67 g and a volume of 52.3 mL. What is the density of the liquid?

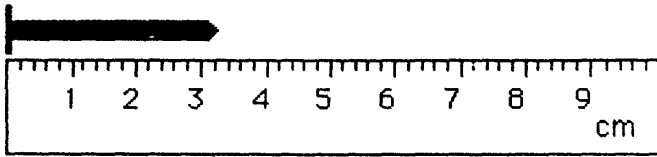
b. Iron has a density of 7.86 g/cm<sup>3</sup>. Could a block of metal with a mass of 21.4 g and a volume of 2.56 cm<sup>3</sup> be iron? Explain.

c. The density of gold is 19.3 g/cm<sup>3</sup>. What is the mass of 18.6 cm<sup>3</sup> of gold?

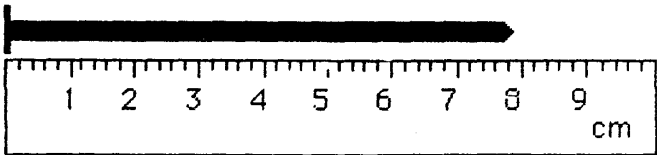
d. The density of ice is 0.917 g/cm<sup>3</sup>. How much volume does 25.3 g of ice occupy?

e. If 1.35 g of aluminum occupies 0.500 cm<sup>3</sup>, what is the density of aluminum?

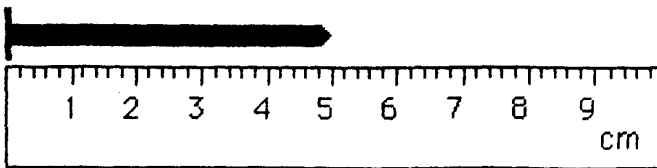
6. Estimate the measurement of each nail with uncertainty. (3 marks)



a. Length of nail \_\_\_\_\_ ± \_\_\_\_\_ cm

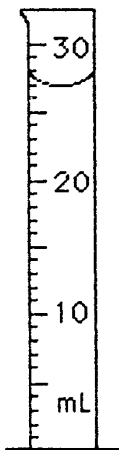


b. Length of nail \_\_\_\_\_ ± \_\_\_\_\_ cm



c. Length of nail \_\_\_\_\_ ± \_\_\_\_\_ cm

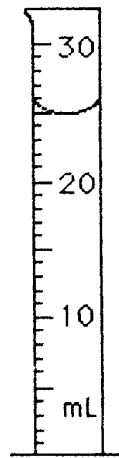
7. Estimate the volume of liquid in each of the graduated cylinders with uncertainty. (4 marks)



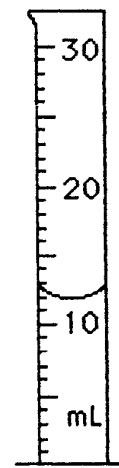
a. \_\_\_\_\_ ± \_\_\_\_\_ mL



b. \_\_\_\_\_ ± \_\_\_\_\_ mL

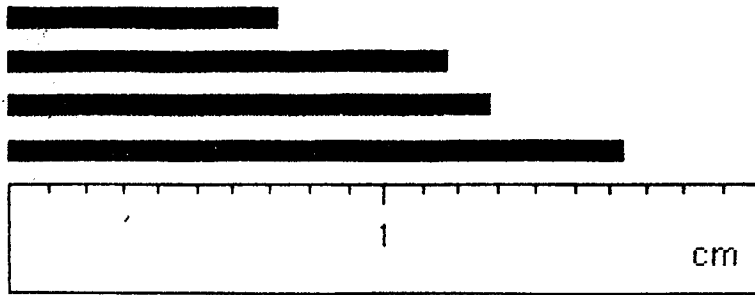


c. \_\_\_\_\_ ± \_\_\_\_\_ mL



d. \_\_\_\_\_ ± \_\_\_\_\_ mL

8. Estimate the length of each bar to 3 significant figures with uncertainty. (4 marks)

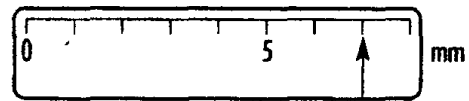


a. \_\_\_ ± \_\_\_ cm    b. \_\_\_ ± \_\_\_ cm    c. \_\_\_ ± \_\_\_ cm    d. \_\_\_ ± \_\_\_ cm

9. Represent the measurements indicated by the arrow on the ruler (include the units). (2 marks)

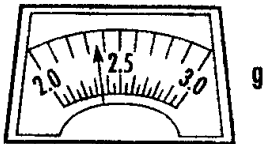


a. \_\_\_\_\_

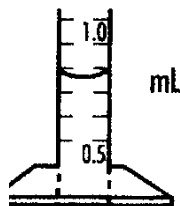


b. \_\_\_\_\_

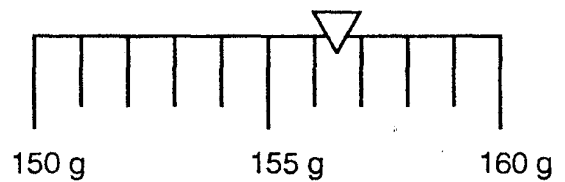
10. Read and record the following measurements (include the units and uncertainty). (4 marks)



a. \_\_\_\_\_



b. \_\_\_\_\_



c. \_\_\_\_\_