

REVIEW QUESTIONS

Chapter 1

1. Determine the number of significant digits in each of the following numbers:

a) 503 3 b) 63,000 2

c) 0.0051 2 d) 0.03002 4

e) 4.100 4 f) 0.0810 3

2. Round each of the following numbers to 2 significant figures:

a) 93.643 94 b) 0.02857 0.029

c) 12153 12000 d) 158.35 160

3. Perform the following operations with the correct number of significant digits:

a) $(0.0394)(12.85) = 0.506$

b) $\frac{42.7853}{59.6} = 0.718$

c) $12.62 + 1.5 + 0.25 = 14.4$

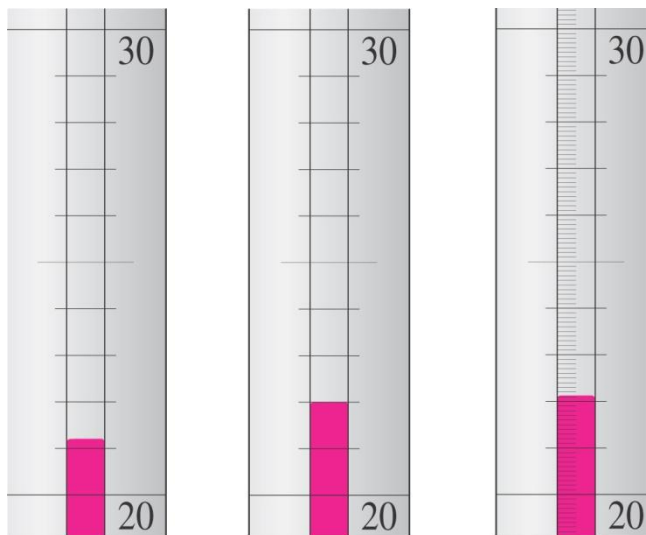
d) $\frac{284 \times 0.293}{45} = 1.8$

4. Express each of the following numbers in scientific notation, with 3 significant figures:

a) 2,900,000 2.90×10^6 b) 0.005865 5.87×10^{-3}

c) 0.000004563 4.56×10^{-6} d) 410870 4.11×10^5

5. Record each of the following measurements to the correct number of digits:



(a)

21.2
(1 decimal)

(b)

22.0
(1 decimal)

(c)

22.11
(2 decimals)

6. Convert each of the following units:

a) 1.78 kg to μg

$$1.78 \text{ kg} \times \frac{10^3 \text{ g}}{1 \text{ kg}} \times \frac{10^6 \mu\text{g}}{1 \text{ g}} = 1.78 \times 10^9 \mu\text{g} \quad (3 \text{ sig figs})$$

b) 0.85 g to mg

$$0.85 \text{ g} \times \frac{10^3 \text{ mg}}{1 \text{ g}} = 850 \text{ mg} \quad (2 \text{ sig figs})$$

c) 1.65 lbs to g (1 lb = 454 g)

$$1.65 \text{ lb} \times \frac{454 \text{ g}}{1 \text{ lb}} = 749 \text{ g} \quad (3 \text{ sig figs})$$

d) 2.34 gal to mL (1 gal = 3.78 L)

$$2.34 \text{ gal} \times \frac{3.78 \text{ L}}{1 \text{ gal}} \times \frac{10^3 \text{ mL}}{1 \text{ L}} = 8850 \text{ mL} \quad (3 \text{ sig figs})$$

7. A 13.5 mL sample of an unknown liquid has a mass of 12.4 g. What is the density of the liquid?

$$\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{12.4 \text{ g}}{13.5 \text{ mL}} = 0.919 \text{ g/mL} \quad (3 \text{ sig figs})$$

8. The density of ether is 0.714 g/mL. What is the mass of 1.45 L of ether?

$$1.45 \text{ L} \times \frac{10^3 \text{ mL}}{1 \text{ L}} \times \frac{0.714 \text{ g}}{1 \text{ mL}} = 1040 \text{ g} \quad (3 \text{ sig figs})$$

9. What is the capacity of a gasoline container (in gal) if it contains 117 lb of gasoline with a density of 0.60 g/mL? (1lb=454 g; 1 gal=3.78 L)

$$117 \text{ lb} \times \frac{454 \text{ g}}{1 \text{ lb}} \times \frac{1 \text{ mL}}{0.60 \text{ g}} \times \frac{1 \text{ L}}{10^3 \text{ mL}} \times \frac{1 \text{ gal}}{3.78 \text{ L}} = 23 \text{ gal} \quad (2 \text{ sig figs})$$

10. A car travels at 55 miles per hour and gets 11 km/L of gasoline. How many gallons of gasoline are needed for a 3.0-hour trip? (1 mi=1.609 km; 1 gal=3.78 L)

$$3.0 \text{ h} \times \frac{55 \text{ mi}}{1 \text{ h}} \times \frac{1.609 \text{ km}}{1 \text{ mi}} \times \frac{1 \text{ L}}{11 \text{ km}} \times \frac{1 \text{ gal}}{3.78 \text{ L}} = 6.4 \text{ gal} \quad (2 \text{ sig figs})$$

11. Sterling silver is 92.5% silver by mass with a density of 10.3 g/cm³. If a cube of sterling silver has a volume of 27.0 cm³, how many ounces of pure silver are present? (1 oz=28.4 g)

$$27.0 \text{ cm}^3 \text{ sterling} \times \frac{10.3 \text{ g}}{1 \text{ cm}^3} \times \frac{92.5 \text{ g silver}}{100 \text{ g sterling}} \times \frac{1 \text{ oz}}{28.4 \text{ g}} = 9.07 \text{ oz} \quad (3 \text{ sig figs})$$

12. The following nutrition information is listed on a box of crackers:

Serving size: 0.5 oz (6 crackers)

Fat: 4 g per serving

Sodium: 140 mg per serving

- a) If the box has a net weight of 8.0 oz, how many crackers are in a box?

$$8.0 \text{ oz} \times \frac{6 \text{ crackers}}{0.5 \text{ oz}} = 96 \text{ crackers} \quad (2 \text{ sig figs})$$

- b) If you ate 10 crackers, how many ounces of fat are you consuming?

$$10 \text{ crackers} \times \frac{1 \text{ serving}}{6 \text{ crackers}} \times \frac{4 \text{ g fat}}{1 \text{ serving}} \times \frac{1 \text{ oz}}{28.4 \text{ g}} = 0.2 \text{ oz} \quad (1 \text{ sig figs})$$

- c) How many grams of sodium are used to prepare 50 boxes of crackers?

$$50 \text{ boxes} \times \frac{96 \text{ crackers}}{1 \text{ box}} \times \frac{1 \text{ serving}}{6 \text{ crackers}} \times \frac{140 \text{ mg sodium}}{1 \text{ serving}} \times \frac{1 \text{ g}}{10^3 \text{ mg}} = 110 \text{ g sodium} \quad (2 \text{ sig figs})$$