



- D 13. Which of these equalities is **NOT** correct?
- |                 |                             |
|-----------------|-----------------------------|
| a. 100 cg = 1 g | c. 1 cm <sup>3</sup> = 1 ml |
| b. 1000 mm = 1m | d. 10 kg = 1 g              |

- B 14. How many of the zeros in the measurement 0.000040200 m are significant?
- |      |      |
|------|------|
| a. 2 | c. 7 |
| b. 3 | d. 8 |

- A 15. How many milligrams are in 2.5 kg?
- |                             |                              |
|-----------------------------|------------------------------|
| a. 2.5 x 10 <sup>6</sup> mg | c. 2.5 x 10 <sup>-4</sup> mg |
| b. 25 mg                    | d. 2.5 x 10 <sup>2</sup> mg  |

- C 16. The closeness of a measurement to its true value is a measure of its:
- |               |                    |
|---------------|--------------------|
| a. usefulness | c. accuracy        |
| b. precision  | d. reproducibility |

- B 17. Which of these measurements is expressed to three significant figures?
- |                               |            |
|-------------------------------|------------|
| a. 0.070 mm                   | c. 7077 mg |
| b. 7.30 x 10 <sup>-7</sup> km | d. 0.007 m |

- A 18. A metric unit of volume is the
- |       |       |
|-------|-------|
| a. L  | c. km |
| b. mg | d. K  |

- D 19. The temperature at which the molecules in a substance would stop completely is
- |                  |                             |
|------------------|-----------------------------|
| a. absolute zero | c. -273°C                   |
| b. 0 Kelvins     | d. all of these are correct |

- B 20. The metric prefix *kilo-* means
- |                      |                       |
|----------------------|-----------------------|
| a. 100 times smaller | c. 1000 times smaller |
| b. 1000 times larger | d. 100 times larger   |

$$\textcircled{21} D = \frac{m}{V} \Rightarrow 0.70 \text{ g/ml} = \frac{60.0 \text{ g}}{V} \Rightarrow V = \frac{60.0 \text{ g}}{0.70 \text{ g/ml}} = 86 \text{ ml}$$

A 21. What is the volume of 60.0 g of ether if the density of ether is 0.70 g/ml?

- a. 86 ml  
b.  $1.2 \times 10^{-2}$  ml  
c.  $2.4 \times 10^{-2}$  ml  
d. 42 ml

D 22. The temperature reading of  $-14^\circ\text{C}$  corresponds to a Kelvin reading of:

- a. 296.7 K  
b.  $-287$  K  
c. 287 K  
d. 259 K

$$K = ^\circ\text{C} + 273$$

B 23. Concentrated hydrochloric acid has a density of 1.19 g/ml. What is the mass, in grams, of 2.00 liters of this acid?

- a.  $2.38 \times 10^{-3}$  g  
b.  $2.38 \times 10^3$  g  
c.  $4.20 \times 10^{-4}$  g  
d.  $4.20 \times 10^4$  g

$$2.00 \text{ L} \times \frac{1000 \text{ ml}}{1 \text{ L}} = 2000 \text{ ml}$$

$$1.19 \text{ g/ml} = \frac{m}{2000 \text{ ml}}$$

$$m = 2380 \text{ g}$$

A 24. What is the mass, in grams, of a cubic centimeter of balsa wood if the density of balsa wood is 0.02 g/ml?

- a.  $2.0 \times 10^{-2}$  g  
b.  $2.0 \times 10^5$  g  
c.  $2.0 \times 10^3$  g  
d.  $2.0 \times 10^{-1}$  g

$$1 \text{ cm}^3 = V$$

$$D = \frac{m}{V} \quad 0.02 \text{ g/ml} = \frac{m}{1 \text{ ml}}$$

D 25. Chlorine boils at 239 K. What is the boiling point of chlorine expressed in degrees Celsius?

- a.  $93^\circ\text{C}$   
b.  $34^\circ\text{C}$

$$K = ^\circ\text{C} + 273$$

$$239 \text{ K} = ^\circ\text{C} + 273$$

$$^\circ\text{C} = -34^\circ\text{C}$$

B 26. A student measures the density of metal ball bearings (BBs) 6 times. The density that was determined was the exact same each time. From this information alone, it can be said that the student's measurements showed a high degree of

- a. error  
b. precision  
c. accuracy  
d. none of these answers

$$D = \frac{m}{V}$$

"m"

**C. Problems**

Solve the following problems. Show your work for #27 & # 28. Circle or put a box around your final answer.

27. A cube of gold-colored metal with a volume of  $64 \text{ cm}^3$  has a mass of 980 g. The density of pure gold is  $19.3 \text{ g/cm}^3$ . (a) Is the metal pure gold? (b) Why or why not?

Work: 
$$D = \frac{m}{V} = \frac{980 \text{ g}}{64 \text{ cm}^3} = 15.39 \text{ g/cm}^3$$

(a) Answer: **NO**

(b) Reason: **The  $D$  of the metal  $\neq D$  of gold.**

28. (a) Calculate the density of a mystery liquid that has a mass of 14.0 g and a volume of  $18.0 \text{ cm}^3$ .

(b) Assuming that the density of water is  $1.00 \text{ g/cm}^3$ , will this mystery liquid float or sink in water?

(c) Why?

(a) Work and answer:

$$D = \frac{14.0 \text{ g}}{18.0 \text{ cm}^3} = 0.778 \text{ g/cm}^3$$

(b) Will it sink or float in water?

**FLOAT**

(c) What is your reason for your answer to (b)?

**The  $D$  of the liquid is less than that of water.**

29. Perform the following operations, giving the answers to the correct number of significant figures. No work needs to be shown.

(a)  $36.47 \text{ cm} + 2.721 \text{ cm} + 15.1 \text{ cm} = \frac{54.291 \text{ cm}}{\text{cm}}$   
 2 to the right    3 to the right    1 to the right    → 1 to the right

(b)  $(5.6 \times 10^3 \text{ m}) \times (3.60 \times 10^{-2} \text{ m}) = \frac{201.6 \text{ m}^2}{\text{m}^2}$   
 ↓ 2 total    ↓ 3 total    → 2 sig figs total

"200" is incorrect,  
 "200" does not have the correct # of sig figs