KEY

Chapter 3: SCIENTIFIC MEASUREMENT

Multiple Choice

Choose the best answer and write its letter on the line.

C **1.** The number of seconds in a 40-hour work week can be calculated as follows:

a. $60\,\text{s} \times \frac{1\,\text{min}}{60\,\text{s}} \times \frac{1\,\text{h}}{60\,\text{min}} =$

b. $1\,\text{s} \times \frac{1\,\text{min}}{60\,\text{s}} \times \frac{40\,\text{h}}{60\,\text{min}} =$

c. $40\,\text{h} \times \frac{60\,\text{min}}{1\,\text{h}} \times \frac{60\,\text{s}}{1\,\text{min}} =$

d. $40\,\text{h} \times \frac{60\,\text{min}}{40\,\text{h}} \times \frac{60\,\text{s}}{60\,\text{min}} =$

D **2.** Which of the following is the correct scientific notation for 0.000 008 62?

a. 86.2×10^{7}
b. 8.62×10^{6}
c. 86.2×10^{-7}
d. 8.62×10^{-6}

A **3.** The measurement 4.06×10^{-5} g represents:

a. 0.000 040 6 g.
b. 0.000 004 06 g.
c. 406 000 g.
d. 40 600 000 g.

C **4.** The largest number from among the following is:

a. 1.80×10^{-4}.
b. 1.80×10^{-6}.
c. 1.80×10^{-2}.
d. 1.80×10^{-8}.

D **5.** How many significant figures are in the measurement 603.040 g?

a. 3
b. 4
c. 5
d. 6

C **6.** How many of the zeros in the measurement 0.050 060 m are significant?

a. 1
b. 2
c. 3
d. 4

D **7.** Which of these measurements is expressed to four significant figures?

a. 0.108 m
b. 16.530 m
c. 2.6×10^{4} m
d. 5.300×10^{-7} m

C **8.** Which of these equalities is correct?

a. 1 g = 1000 kg
b. 1 cm = 100 m
c. 1 L = 1000 mL
d. 1 mm = 10 cm

D **9.** How many centimeters are in 25 kilometers?

a. 2.5×10^{3} cm
b. 2.5×10^{4} cm
c. 2.5×10^{5} cm
d. 2.5×10^{6} cm

B **10.** The metric prefix *milli-* means:

a. 100 times smaller.
b. 1000 times smaller.
c. 1000 times larger.
d. 100 times larger.

A **11.** The smallest volume from among the following is:

a. 0.012 L.
b. 25 mL.
c. 18 cm^3.
d. 1.6×10^{-2} L.

0.01L

A

12. What is the density of an object with a mass of 40.0 g and a volume of 80.0 cm^3?

a. 0.500 g/cm^3 **c.** 3.20×10^3 g/cm^3

b. 2.00 cm^3/g **d.** 1.20×10^2 g/cm^3

A

13. What is the volume of 25.0 g of copper if the density of copper is 8.9 g/cm^3?

a. 2.8 cm^3 **c.** 220 cm^3

b. 0.36 cm^3 **d.** 34 cm^3

B

14. What is the mass of 72 cm^3 of silver if the density of silver is 10.5 g/cm^3?

a. 6.8 g **c.** 0.15 g

b. 760 g **d.** 83 g

C

15. If water boils at 100°C, this is a Kelvin reading of:

a. 100 K. **c.** 373 K.

b. 273 K. **d.** 173 K.

A

16. A Kelvin reading of 50 K is the same as a Celsius reading of:

a. -223°C. **c.** 223°C.

b. 323°C. **d.** 50°C.

X

17. A student estimated a mass to be 250 g but, upon carefully measuring it, found the value to be 240 g. What is the percent error of the estimated mass if the measured value is the accepted one?

a. 4.0% **c.** -4.0%

b. -4.2% **d.** 4.2%

D. Problems

Solve the following problems in the space provided. Show your work.

40. Perform the following operations. Express your answers in the correct number of significant figures.

a. 36.47 + 2.721 cm + 15.1 cm 54.3 cm

b. 148.576 g - 35.41 g 113.17 g

c. $(5.6\times10^7\ m)\times(3.60\times10^{-2}\ m)$ $2.0\times10^6\ m^2$

d. $(8.74\times10^9\ m) / (4.2\times10^{-6})$ 2.1×10^{15}

41. a. Find the volume, in both cm^3 (mL) and L, of a metal box 0.60 m long (60.cm), 10.0 cm wide, and 50.0 mm deep (5.00 cm).

$V = (60.\,cm)\times(10.0\,cm)\times(5.00\,cm) = 3000\,cm^3\ (3.0\times10^3)$ → 3.0×10^3 cm or 3.0×10^3 mL or 3.0 L

b. If the box is filled with water, what would be the mass of the water inside?

$3.0\times10^3\ mL \times \frac{1.000\,g}{1\,mL} = 3.0\times10^3\ g$

42. A block of silver-colored metal with a volume of 65.0 cm^3 has a mass of 750.0 g. The density of pure silver is 10.5 g/cm^3. Is the metal pure silver?

$Dens = \frac{750.0\,g}{65.0\,cm} = 11.5\ \frac{g}{cm^3}$ NO