Foundations of College Chemistry, 16e **(Hein)**
Chapter 2 Standards for Measurement

1) Which of the following is the SI prefix that means one hundredth?
A) milli
B) centi
C) deci
D) kilo
Answer: B
Diff: 1
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

2) The number, 14.74999, when rounded to three digits is _____.
A) 15.0
B) 14.8
C) 14.7
D) 10.0
Answer: C
Diff: 1
Learning Objective: Determine the number of significant figures in a given measurement and round measurements to a specific number of significant figures.
Section Reference: Section 2.3

3) How many significant figures are in the number 0.00320?
A) 2
B) 3
C) 4
D) 5
Answer: B
Diff: 1
Learning Objective: Determine the number of significant figures in a given measurement and round measurements to a specific number of significant figures.
Section Reference: Section 2.3

4) How many significant figures are in the number 1.500?
A) 1
B) 2
C) 3
D) 4
Answer: D
Diff: 1
Learning Objective: Determine the number of significant figures in a given measurement and round measurements to a specific number of significant figures.
Section Reference: Section 2.3

5) How many significant figures are in the number 14.04?
A) 1
B) 2
C) 3
D) 4
Answer: D
Diff: 1
Learning Objective: Determine the number of significant figures in a given measurement and round measurements to a specific number of significant figures.
Section Reference: Section 2.3

6) How many significant figures are in the number 0.0015070?
A) 5
B) 4
C) 7
D) 8
Answer: A
Diff: 1
Learning Objective: Determine the number of significant figures in a given measurement and round measurements to a specific number of significant figures.
Section Reference: Section 2.3

7) How many significant figures are in the number 0.0050?
A) 1
B) 2
C) 3
D) 4
Answer: B
Diff: 1
Learning Objective: Determine the number of significant figures in a given measurement and round measurements to a specific number of significant figures.
Section Reference: Section 2.3

8) How many significant digits are in the number 1.305×10^4?
A) 1
B) 2
C) 3
D) 4
Answer: D
Diff: 1
Learning Objective: Determine the number of significant figures in a given measurement and round measurements to a specific number of significant figures.
Section Reference: Section 2.3

9) The length, width and height of a box are 3.0 cm, 1.5 cm, and 2.0 cm, respectively. What is the density of a box if it has a mass of 15.0 g?
A) 1.670 g/cm3
B) 0.67 g/cm3
C) 1.7 g/cm3
D) 0.670 g/cm3
Answer: C
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

10) One kilometer is equal to _____.
A) 0.001 m
B) 0.01 m
C) 100 m
D) 1000 m
Answer: D
Diff: 1
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

11) One centigram is equal to _____.
A) 0.001 g
B) 0.01 g
C) 100 g
D) 1000 g
Answer: B
Diff: 1
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

12) The prefixes nano and mega correspond to which of the following pair, respectively?
A) 10^{9} and 10^{6}
B) 10^{6} and 10^{-9}
C) 10^{-9} and 10^{6}
D) 10^{-9} and 10^{9}
Answer: C
Diff: 1
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

13) The temperature of 295 K is equal to which Fahrenheit temperature?
A) 72 °F
B) 41 °F
C) 44 °F
D) 32 °F
Answer: A
Diff: 2
Learning Objective: Convert measurements among the Fahrenheit, Celsius, and Kelvin temperature scales.
Section Reference: Section 2.8

14) The temperature of –100. °C is equal to _____.
A) –173 K
B) –137 K
C) 137 K
D) 173 K
Answer: D
Diff: 1
Learning Objective: Convert measurements among the Fahrenheit, Celsius, and Kelvin temperature scales.
Section Reference: Section 2.8

15) A temperature of 100. K is equal to which Celsius temperature?
A) –173 °C
B) –137 °C
C) 237 °C
D) 273 °C
Answer: A
Diff: 1
Learning Objective: Convert measurements among the Fahrenheit, Celsius, and Kelvin temperature scales.
Section Reference: Section 2.8

16) The temperature of 40.0 degrees Fahrenheit is equal to which Celsius temperature?
A) 4.44 °C
B) 20.0 °C
C) 45.0 °C
D) 115 °C
Answer: A
Diff: 2
Learning Objective: Convert measurements among the Fahrenheit, Celsius, and Kelvin temperature scales.
Section Reference: Section 2.8

17) The temperature of 40.0 degrees Celsius is equal to which Fahrenheit temperature?
A) 23.0 °F
B) 13.0 °F
C) 74.0 °F
D) 104 °F
Answer: D
Diff: 2
Learning Objective: Convert measurements among the Fahrenheit, Celsius, and Kelvin temperature scales.
Section Reference: Section 2.8

18) A piece of metal has a mass of 245 mg and volume of 15.3 mL. What is its density?
A) 16.0 g/cm3
B) 0.0160 g/cm3
C) 16013 g/cm3
D) 3.75×103 g/cm^3
Answer: B
Diff: 1
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

19) A piece of metal has a mass of 86.24 g and a volume of 13.4 mL. What is its density?
A) 0.155 g/mL
B) 6.44 g/mL
C) 72.8 g/mL
D) 99.6 g/mL
Answer: B
Diff: 1
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

20) What is the SI unit for temperature?
A) °C
B) K
C) °F
D) none of these choices
Answer: B
Diff: 1
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

21) A solid substance has a density of 4.36 g/mL. What is the volume of 30.0 g of this substance?
A) 0.145 mL
B) 6.88 mL
C) 34.36 mL
D) 131 mL
Answer: B
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

22) A liquid has a density of 1.27 g/mL. What is the mass of 20.0 mL of this liquid?
A) 0.0635 g
B) 15.7 g
C) 21.3 g
D) 25.4 g
Answer: D
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

23) Convert 1.00 in^2 to cm^2.
A) 2.54 cm^2
B) 6.45 cm2
C) 1.00 cm2
D) 0.16 cm2
Answer: B
Diff: 2
Learning Objective: Use dimensional analysis to solve problems involving unit conversions.
Section Reference: Section 2.6

24) The number 0.02857 rounded to three significant figures is _____.
A) 0.029
B) 0.0285
C) 0.0286
D) 0.03
Answer: C
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

25) Convert 3.00 in. to centimeters.
A) 1.18 cm
B) 2.54 cm
C) 7.62 cm
D) 10.2 cm
Answer: C
Diff: 1
Learning Objective: Use dimensional analysis to solve problems involving unit conversions.
Section Reference: Section 2.6

26) Convert 3.00 centimeters into inches.
A) 1.18 in.
B) 2.54 in.
C) 7.62 in.
D) 10.2 in.
Answer: A
Diff: 1
Learning Objective: Use dimensional analysis to solve problems involving unit conversions.
Section Reference: Section 2.6

27) Which SI unit is the most appropriate to measure the distance between Chicago and Detroit?
A) millimeter
B) centimeter
C) meter
D) kilometer
Answer: D
Diff: 2
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

28) Which SI unit is the most appropriate to measure the thickness of a dime?
A) meter
B) millimeter
C) decimeter
D) kilometer
Answer: B
Diff: 2
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

29) Multiply (40.36) by (37.40). The product expressed to the proper number of significant figures is _____.
A) 151
B) 1509
C) 1510.
D) 1509.464
Answer: B
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

30) Divide 1436 by 203. The quotient expressed to the proper number of significant figures is _____.
A) 0.141
B) 0.1414
C) 7.07
D) 7.074
Answer: C
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

31) Add 114.32 + 12.1 + 13. The sum expressed to the proper number of significant figures is _____.
A) 139
B) 139.4
C) 139.42
D) 140
Answer: A
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

32) Subtract 14.3 from 130.670. The difference expressed to the correct number of significant figures is _____.
A) 116
B) 116.3
C) 116.4
D) 116.37
Answer: C
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

33) How many significant figures should be included in the answer to the following calculation?

60 / 2.470

A) 1
B) 2
C) 3
D) 4
Answer: A
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

34) How many significant figures should be included in the answer to the following calculation?

(3.48) (3.6) / 2.470

A) 1
B) 2
C) 3
D) 4
Answer: B
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

35) The answer expressed to the proper number of significant figures is _____.

(3.60) (2.489)/ (5.1110)

A) 1.7532
B) 1.75
C) 1.76
D) 1.8
Answer: B
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

36) How many significant figures should be included in the answer to the following calculation?

(3.4876) / (4.11+ 1.2)

A) 2
B) 3
C) 4
D) 5
Answer: A
Diff: 2
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

37) How many zeros are significant in the number 0.0040?
A) 1
B) 2
C) 3
D) 4
Answer: A
Diff: 2
Learning Objective: Determine the number of significant figures in a given measurement and round measurements to a specific number of significant figures.
Section Reference: Section 2.3

38) How many zeros are significant in the number 0.030030?
A) 1
B) 2
C) 3
D) 4
Answer: C
Diff: 2
Learning Objective: Determine the number of significant figures in a given measurement and round measurements to a specific number of significant figures.
Section Reference: Section 2.3

39) How many zeros are significant in the number 40400302?
A) 1
B) 2
C) 3
D) 4
Answer: D
Diff: 2
Learning Objective: Determine the number of significant figures in a given measurement and round measurements to a specific number of significant figures.
Section Reference: Section 2.3

40) How many zeros are significant in the number 0.030?
A) 1
B) 2
C) 3
D) 4
Answer: A
Diff: 2
Learning Objective: Determine the number of significant figures in a given measurement and round measurements to a specific number of significant figures.
Section Reference: Section 2.3

41) What numerical value is indicated by the SI prefix milli?
A) 1/100
B) 1/1000
C) 100
D) 1000
Answer: B
Diff: 1
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

42) Convert 4.30 feet into centimeters.
A) 10.9 cm
B) 30.5 cm
C) 131 cm
D) 151 cm
Answer: C
Diff: 2
Learning Objective: Use dimensional analysis to solve problems involving unit conversions.
Section Reference: Section 2.6

43) Convert 10.00 centigrams into milligrams.
A) 1.000 mg
B) 100 mg
C) 100.0 mg
D) 100. mg
Answer: C
Diff: 2
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

44) The density of copper is 8.96 g/mL. The mass of 7.00 mL of copper is _____.
A) 62.7 g
B) 1.28 g
C) 0.781 g
D) 1.96 g
Answer: A
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

45) The density of copper is 8.96 g/mL. The volume of 12 mg of copper is _____.
A) 1.3 mL
B) 0.0013 mL
C) 13 mL
D) 1300 mL
Answer: B
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

46) The mass of a substance is 17.46 g and its volume is 3.42 mL. What is the density of the substance rounded to the correct number of significant figures?
A) 0.1959 g/mL
B) 0.196 g/mL
C) 5.105 g/mL
D) 5.11 g/mL
Answer: D
Diff: 2
Learning Objective: Determine the number of significant figures in a given measurement and round measurements to a specific number of significant figures.; Solve problems involving density.
Section Reference: Section 2.3, Section 2.9

47) Convert 30.0 ml to liters.
A) 0.0300 L
B) 0.00300 L
C) 300. L
D) 30000 L
Answer: A
Diff: 1
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

48) The space occupied by a sample is its _____.
A) mass
B) volume
C) length
D) temperature
Answer: B
Diff: 1
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

49) If the Celsius temperature of a sample changes twenty degrees, how many degrees does its Kelvin temperature change?
A) 20
B) 257
C) 273
D) 293
Answer: A
Diff: 1
Learning Objective: Convert measurements among the Fahrenheit, Celsius, and Kelvin temperature scales.
Section Reference: Section 2.8

50) A rectangular piece of metal measures 8.0 cm by 1.20 m by 15.0 mm. What is its volume rounded to the correct number of significant figures?
A) 14 cm3
B) 144 cm3
C) 1400 cm3
D) 1440 cm3
Answer: C
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.; Use dimensional analysis to solve problems involving unit conversions.
Section Reference: Section 2.4, Section 2.6

51) A cube measures 13.00 cm on edge. What is its volume?
A) 13.00 cm3
B) 169.0 cm3
C) 2197 cm3
D) 28600 cm3
Answer: C
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.; Use dimensional analysis to solve problems involving unit conversions.
Section Reference: Section 2.4, Section 2.6

52) A metal cube measures 8.60 cm on edge and has a density of 11.4 g/mL. What is its mass?
A) 98.0 g
B) 843 g
C) 7250 g
D) 62400 g
Answer: C
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

53) A 48.0-g piece of metal is dropped into 50.0 mL of water in a graduated cylinder. The water level rises to 62.4 mL. What is the density of the metal?
A) 12.4 g/mL
B) 0.258 g/ml
C) 3.87 g/mL
D) 595 g/ml
Answer: C
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

54) One centimeter is equal to _____.
A) 2.54 in.
B) 0.394 in.
C) 12.0 in.
D) 0.100 in.
Answer: B
Diff: 1
Learning Objective: Use dimensional analysis to solve problems involving unit conversions.
Section Reference: Section 2.6

55) An empty graduated cylinder has a mass of 68.00 g. 50.0 mL of a liquid is added to the cylinder and the mass increases to 109.5 g. What is the density of the liquid?
A) 41.5 g/ml
B) 1.20 g/mL
C) 0.830 g/mL
D) 1.36 g/mL
Answer: C
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

56) A car gets 25.6 miles per gallon of gasoline. A full tank of gasoline contains 56.8 L. How many miles can this car travel on a full tank of gasoline? (1.000 L = 0.264 gal)
A) 1454 mi
B) 96.9 mi
C) 1.71 mi
D) 384 mi
Answer: D
Diff: 2
Learning Objective: Use dimensional analysis to solve problems involving unit conversions.
Section Reference: Section 2.6

57) Convert 4.34 yds to centimeters.
A) 4.34 cm
B) 132 cm
C) 264 cm
D) 397 cm
Answer: D
Diff: 1
Learning Objective: Use dimensional analysis to solve problems involving unit conversions.
Section Reference: Section 2.6

58) The number of centimeters in one inch is _____.
A) 0.109 cm
B) 0.328 cm
C) 0.394 cm
D) 2.54 cm
Answer: D
Diff: 1
Learning Objective: Use dimensional analysis to solve problems involving unit conversions.
Section Reference: Section 2.6

59) Add: 3.604 m + 104.29 m + 3.1 m + 17.41 m. The sum expressed in the correct number of significant figures is _____.
A) 13 m
B) 128 m
C) 130 m
D) 128.4 m
Answer: D
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

60) Subtract: 14.278 m from 106.31 m. The difference expressed in the correct number of significant figures is _____.
A) 92.032 m
B) 92.03 m
C) 92.0 m
D) 92 m
Answer: B
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

61) Multiply: (3.687) (14.1) (36.22). The product expressed in the correct number of significant figures is _____.
A) 1882.9583
B) 188
C) 1883.0
D) 1880
Answer: D
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

62) Divide: 34.72 by 4.7. The quotient expressed to the correct number of significant figures is _____.
A) 0.14
B) 0.1
C) 7.39
D) 7.4
Answer: D
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

63) Divide: 32.14 by 0.204. The quotient expressed to the correct number of significant figures is _____.
A) 157.55
B) 158
C) 6347
D) 6350
Answer: B
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

64) When expressed in proper scientific notation the number 4289 is _____.
A) 4.289 × 10–4
B) 4.289 × 10^{-3}
C) 4.289 × 103
D) 4.289 × 104
Answer: C
Diff: 1
Learning Objective: Write decimal numbers in scientific notation.
Section Reference: Section 2.1

65) When expressed in proper scientific notation the number 286 is _____.
A) 2.86 × 101
B) 2.86 × 10^{2}
C) 2.86 × 10–2
D) 28.6 × 101
Answer: B
Diff: 1
Learning Objective: Write decimal numbers in scientific notation.
Section Reference: Section 2.1

66) When expressed in proper scientific notation the number 0.00364 is _____.
A) 3.64 × 103
B) 3.64 × 102
C) 3.64 × 10–2
D) 3.64 × 10–3
Answer: D
Diff: 1
Learning Objective: Write decimal numbers in scientific notation.
Section Reference: Section 2.1

67) When expressed in proper scientific notation the number 0.000034 is _____.
A) 3.4 × 104
B) 3.4 × 10–4
C) 3.4 × 103
D) 3.4 × 10–5
Answer: D
Diff: 1
Learning Objective: Write decimal numbers in scientific notation.
Section Reference: Section 2.1

68) The number of significant figures in 45,000,000 is _____.
A) 2
B) 4
C) 6
D) 7
Answer: A
Diff: 1
Learning Objective: Write decimal numbers in scientific notation.
Section Reference: Section 2.1

69) Express the number 2.64×10^{4} in decimal notation.
A) 0.000264
B) 0.0000264
C) 26400
D) 2640
Answer: C
Diff: 1
Learning Objective: Write decimal numbers in scientific notation.
Section Reference: Section 2.1

70) Express the number 3.00×10^{-3} in decimal notation.
A) 0.00300
B) 0.003
C) 3000.
D) 300.
Answer: A
Diff: 1
Learning Objective: Write decimal numbers in scientific notation.
Section Reference: Section 2.1

71) Express the number 4.3170×10^{-4} in decimal notation.
A) 0.0043170
B) 0.00043170
C) 0.0004317
D) 43170
Answer: B
Diff: 1
Learning Objective: Write decimal numbers in scientific notation.
Section Reference: Section 2.1

72) Express the number 5.00×10^{-2} in decimal notation.
A) 500
B) 500.
C) 0.0500
D) 0.0050
Answer: C
Diff: 1
Learning Objective: Write decimal numbers in scientific notation.
Section Reference: Section 2.1

73) Multiply: $(4.36 \times 10^{-2})(3.17 \times 10^{4})$. When expressed with the proper number of significant figures, the product is _____.
A) 1.38×103
B) 1.38×102
C) $1.38 \times 10–2$
D) 1.38×105
Answer: A
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

74) Multiply: $(5.24 \times 10^{4})(2.36 \times 10^{-5})$. When expressed with the proper number of significant figures, the product is _____.
A) $1.24 \times 10–1$
B) 1.24×100
C) 1.24×101
D) 1.24×109
Answer: B
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

75) Divide: 3.724×10^{-3} by 2.46×10^{4}. When expressed with the proper number of significant figures, the result is _____.
A) 1.51×101
B) $1.51 \times 10–7$
C) 6.61×101
D) 6.61×102
Answer: B
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

76) Divide: 4.863×10^4 by 2.12×10^4. When expressed with the proper number of significant figures, the result is _____.
A) $4.36 \times 10–1$
B) 4.36×108
C) 2.29×108
D) 2.29×100
E) 2.294×100
Answer: D
Diff: 1
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

77) Perform the following set of operations and choose the answer that expresses the result to the proper number of significant figures.

$(1.5 \times 10^{-4} \times 61.3) + 2.01$

A) 2.0192
B) 2.0
C) 2.019
D) 2.02
Answer: D
Diff: 2
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

78) Perform the following set of operations and choose the answer that expresses the result to the proper number of significant figures.

$$\frac{3.45 \times 10^{-2} + 2.31 \times 10^{-1}}{0.044}$$

A) 6.0
B) 6.03
C) 6.034
D) 6
Answer: A
Diff: 2
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

79) Perform the following set of operations and choose the answer that expresses the result to the proper number of significant figures.

$$\frac{54.331}{2.345 - 1.521}$$

A) 65.94
B) 65
C) 70
D) 65.9
Answer: D
Diff: 2
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

80) Convert 12.5 m^3 to cm^3.
A) 1.25×103 cm^3
B) 1.25×107 cm^3
C) 1.25×105 cm^3
D) $1.25 \times 10–3$ cm^3
Answer: B
Diff: 1
Learning Objective: Use dimensional analysis to solve problems involving unit conversions.
Section Reference: Section 2.6

81) Convert 76.9 L to cm^3.
A) 76900 cm3
B) 7690 cm3
C) 76900000 cm3
D) 769000 cm3
Answer: A
Diff: 2
Learning Objective: Use dimensional analysis to solve problems involving unit conversions.
Section Reference: Section 2.6

82) Convert 33.0 $inch^2$ to mm^2.
A) 2.13×103 mm^2
B) 8.38×102 mm^2
C) 2.13×104 mm^2
D) 5.12×102 mm^2
Answer: C
Diff: 3
Learning Objective: Use dimensional analysis to solve problems involving unit conversions.
Section Reference: Section 2.6

83) 9.0 g of sodium is present in 250. g of a compound. Calculate the percent sodium in the compound.
A) 3.5%
B) 3.6%
C) 97%
D) 28%
Answer: A
Diff: 1
Learning Objective: Solve problems involving percent.
Section Reference: Section 2.7

84) Calculate the percent iron in a 20.6 g sample of an oxide that contains 5.4 g of Fe.
A) 21%
B) 79%
C) 97%
D) 26%
Answer: D
Diff: 1
Learning Objective: Solve problems involving percent.
Section Reference: Section 2.7

85) A 15.6 g sample of magnesium carbonate contains 3.2 g of magnesium. What is the percent magnesium in the sample?
A) 17%
B) 21%
C) 31%
D) 35%
Answer: B
Diff: 1
Learning Objective: Solve problems involving percent.
Section Reference: Section 2.7

86) What is the percent oxygen in limestone that contains 2.5 g of calcium, 1.4 g of carbon and 2.3 g of oxygen?
A) 40%
B) 23%
C) 37%
D) 35%
Answer: C
Diff: 1
Learning Objective: Solve problems involving percent.
Section Reference: Section 2.7

87) Quartz (SiO_2) contains 46.7% silicon. Calculate the mass of silicon present in 254 g of quartz?
A) 544 g
B) 120 g
C) 119 g
D) 5.44 g
Answer: C
Diff: 1
Learning Objective: Solve problems involving percent.
Section Reference: Section 2.7

88) A sample of nickel oxide contains 35.5% oxygen. Calculate the mass of oxygen present in 146 g of nickel oxide?
A) 52 g
B) 51.8 g
C) 411 g
D) 4.11 g
Answer: B
Diff: 1
Learning Objective: Solve problems involving percent.
Section Reference: Section 2.7

89) Chrysocolla is a copper mineral that contains .016% silicon. What is the mass of silicon present in 1.5 kg of this mineral?
A) .24 g
B) 23 g
C) 1.1 g
D) .011 g
Answer: A
Diff: 1
Learning Objective: Solve problems involving percent.
Section Reference: Section 2.7

90) An empty jar weighs 1.43 lb. How much will it weigh when 1.00 L of a homogenized milk is poured into it? The density of the homogenized milk is 1.03 g/mL. (1 lb = 453.6 g)
A) 442 lb
B) 3.57 lb
C) 2.46 lb
D) 3.70 lb
Answer: D
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

91) An empty glass tube weighs 37.3 g. When filled to the rim with water, it weighs 54.1 g. What is the volume of the glass tube? Assume the density of water is 1.00 g/mL.
A) 16.8 cm3
B) 54.1 cm3
C) 37.3 cm3
D) 91.4 cm3
Answer: A
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

92) How many grams of iron (density = 7.87 g/mL) would occupy the same volume as 96.4 g of aluminum (density = 2.70 g/mL)?
A) 4.54 g
B) 33.1 g
C) 281 g
D) 220. g
Answer: C
Diff: 3
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

93) If you travel to Canada, speed limits are posted in km/hr. For a speed limit of 70. mi/hr, what would be the speed limit posted on a Canadian highway? (1 mile = 1.609 km)
A) 110 km/hr
B) 44 km/hr
C) 68 km/hr
D) 72 km/hr
Answer: A
Diff: 1
Learning Objective: Use dimensional analysis to solve problems involving unit conversions.
Section Reference: Section 2.6

94) A police car on a high-speed chase travels at a speed of 85 mi/hr. The chase covered 82.3 miles of roadway. For how long were the police chasing the suspects?
A) 63 minutes
B) 58 minutes
C) 291 minutes
D) 97 minutes
Answer: B
Diff: 1
Learning Objective: Use dimensional analysis to solve problems involving unit conversions.
Section Reference: Section 2.6

95) The speed of light is 2.9987×10^8 m/s. Convert this speed to km/hr.
A) 1.0795×10^9 km/hr
B) 1.7992×10^7 km/hr
C) 8.3297×10^1 km/hr
D) 8.3297×10^4 km/hr
Answer: A
Diff: 3
Learning Objective: Use dimensional analysis to solve problems involving unit conversions.
Section Reference: Section 2.6

96) Calculate the density (in g/mL) of an unknown substance if 0.897 pounds occupy 13.5 inch^3. (1 pound = 453.6 g, 1 inch = 2.54 cm)
A) 1.84 g/mL
B) 11.9 g/mL
C) 2.29 g/mL
D) 1.09 g/mL
Answer: A
Diff: 3
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

97) A student is rounding numbers to three significant figures. Which of the following roundings is expressed incorrectly?
A) 45.7899 to 45.8
B) 890.332 to 891
C) 0.002346 to 0.00235
D) 1543456 to 1.54 × 106
Answer: B
Diff: 2
Learning Objective: Apply the rules for significant figures in calculations involving addition, subtraction, multiplication and division.
Section Reference: Section 2.4

98) The mass of a substance depends on gravity.
Answer: FALSE
Diff: 1
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

99) The weight of a substance depends on gravity.
Answer: TRUE
Diff: 1
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

100) A solid with a lower density will float on a liquid with a higher density.
Answer: TRUE
Diff: 1
Learning Objective: Convert measurements among the Fahrenheit, Celsius, and Kelvin temperature scales.
Section Reference: Section 2.8

101) If two substances have the same mass, the one with the greater volume will have the greater density.
Answer: FALSE
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

102) The prefix kilo means 1000.
Answer: TRUE
Diff: 1
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

103) A solid with a density of 0.800 g/mL will float in water.
Answer: TRUE
Diff: 1
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

104) The centimeter is the SI unit of length.
Answer: FALSE
Diff: 1
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

105) The mass of a substance is independent of its location.
Answer: TRUE
Diff: 1
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

106) Percent is defined as parts per hundred.
Answer: TRUE
Diff: 1
Learning Objective: Solve problems involving percent.
Section Reference: Section 2.7

107) The density of liquid A is 2.14 g/mL and the density of liquid B is 1.46 g/mL. When equal masses of these liquids are compared, liquid A will have the greater volume.
Answer: FALSE
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

108) A volume of 300. mL is the same as a volume of 30.0 cm^3.
Answer: FALSE
Diff: 1
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

109) Two substances A and B occupy the same volume. The mass of substance A is half that of substance B. Therefore, the density of substance A is lower than the density of substance B.
Answer: TRUE
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

110) Two substances A and B have the same mass. Substance A occupies half the volume of substance B. Therefore, the density of substance A is lower than the density of substance B.
Answer: FALSE
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

111) The significant figures in a number include all the digits that are certain plus the first uncertain digit.
Answer: TRUE
Diff: 1
Learning Objective: Determine the number of significant figures in a given measurement and round measurements to a specific number of significant figures.
Section Reference: Section 2.3

112) The kilogram is the SI unit for mass.
Answer: TRUE
Diff: 1
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

113) A student determines the density of a solid by determining its mass and then immersing it in 50.0 mL of water in a graduated cylinder.
The following data is obtained:
Mass of the solid object 39.364 g
Volume of water and solid 58.0 mL

Answer the following based on the preceding information. Answers should have units and be rounded to the proper number of significant figures.
a) What is the volume of the solid?
b) What is the density of the solid?
c) Will the solid float or sink in water?
Answer: a) The volume of the solid is 8.0 mL; b) The density of the solid is 4.9 g/mL; c) The solid will sink in water.
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

114) A student determines the density of a liquid by determining the mass of an empty graduated cylinder, adding 50.0 mL of liquid to the cylinder and weighing the cylinder and liquid.
The following data is obtained:
Mass of the empty cylinder 63.416 g
Mass of the cylinder and liquid 104.312 g

Answer the following based on the preceding information. Answers should have units and be rounded to the proper number of significant figures.
a) What is the mass of the liquid?
b) What is the density of the liquid?
c) Will the liquid float or sink in water?
Answer: a) The mass of the liquid is 40.896 g; b) The density of the liquid is 0.818 g/mL; c) The liquid will float on water.
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

115) a) What is the difference between mass and weight?
b) Which property, mass or weight, is better to use in science to describe a substance? Why is this true?
c) What instruments are used to measure mass and weight?
Answer: a) Mass is the amount of matter present in an object. Weight is a measure of the earth's gravitational attraction on an object; b) It is better to use mass to describe a substance. Mass is better to use because it does not vary in different gravitational fields. Weight varies as the force of gravity changes; c) Mass is measured with a balance. Weight is measured with a scale.
Diff: 2
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

116) The density of ethanol is 0.7893 g/mL. What is the mass of one pint of ethanol?
Answer: The mass of one pint of ethanol is 373.4 g.
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

117) A rectangular solid has a mass of 1.490 kg. The solid measures 4.3 cm by 10.6 cm by 13.6 cm. Calculate the density of the solid and express it to the correct number of significant figures in g/cm^3.
Answer: The density of the solid is 2.4 g/cm^3.
Diff: 2
Learning Objective: Solve problems involving density.
Section Reference: Section 2.9

118) Of these three: 4 °F, 4 K, and –4 °C, which is the warmest?
Answer: The warmest temperature is –4 °C.
Diff: 2
Learning Objective: Convert measurements among the Fahrenheit, Celsius, and Kelvin temperature scales.
Section Reference: Section 2.8

119) What is the appropriate SI unit to express each of the following properties?

a) The surface area of a gymnasium floor.
b) The volume of air in a dining room.
c) The thickness of a quarter.
d) The volume of liquid in a wine bottle.
e) The height of a redwood tree.
f) The heat energy in a thermos of hot coffee.
g) The mass of a large chemistry textbook.
Answer: a) m^2; b) m^3; c) mm; d) mL or cm^3; d) m; f) kJ; g) kg
Diff: 2
Learning Objective: Name the units for mass, length, and volume in the metric system and convert from one unit to another.
Section Reference: Section 2.5

120) Explain how an ocean of water and a cup of the same ocean water can have the same temperature but contain different amounts of heat.
Answer: Temperature is the average kinetic energy of the molecules in a sample. If both samples have the same temperature they consist of molecules with the same average kinetic energy. The sample with more molecules, the ocean, must have the greater total amount of energy.
Diff: 3
Learning Objective: Convert measurements among the Fahrenheit, Celsius, and Kelvin temperature scales.
Section Reference: Section 2.8