Chemistry: A Molecular Approach, Third Cdn. Ed. **(Tro)**
Chapter 1 Units of Measurement for Physical and Chemical Change

1.1 Multiple Choice Questions

1) Which of the following is an example of physical change?
A) Sugar is dissolved in water.
B) Bread is baked.
C) Fireworks explode.
D) Baking soda decomposes.
Answer: A
Diff: 1 Type: MC Var: 1 Page Ref: 1.1

2) Which of the following is an example of a physical change?
A) Burning wood
B) Melting ice
C) Digesting food
D) Souring milk
E) Making water from hydrogen gas and oxygen gas
Answer: B
Diff: 1 Type: MC Var: 1 Page Ref: 1.1

3) Which of the following is an example of a physical change?
A) Dew forms on a blade of grass.
B) A Halloween light stick glows after shaking.
C) An egg solidifies during cooking.
D) A hydrogen balloon explodes when contacted with a flame.
E) None of the above is a physical change.
Answer: A
Diff: 1 Type: MC Var: 1 Page Ref: 1.1

4) Which of the following is an example of a chemical change?
A) Copper building materials develop a green patina over time.
B) Solid ice melts.
C) Ethanol evaporates.
D) Brewing tea.
Answer: A
Diff: 1 Type: MC Var: 1 Page Ref: 1.1

5) Which of the following is an example of a chemical change?
A) Condensation of steam
B) Melting gold
C) Evaporating water
D) Burning wood
E) Sublimation of moth balls
Answer: D
Diff: 1 Type: MC Var: 1 Page Ref: 1.1

6) A physical change _____.
A) occurs when iron rusts
B) occurs when sugar is heated into caramel
C) occurs when glucose is converted into energy within your cells
D) occurs when water is evaporated
E) occurs when propane is burned for heat
Answer: D
Diff: 1 Type: MC Var: 1 Page Ref: 1.1

7) A chemical change _____.
A) occurs when methane gas is burned
B) occurs when paper is shredded
C) occurs when water is vaporized
D) occurs when sand is mixed with water
E) occurs when powdered lemonade is stirred into water
Answer: A
Diff: 1 Type: MC Var: 1 Page Ref: 1.1

8) Which of the following represents a physical property?
A) Sodium metal is extremely reactive with chlorine gas.
B) Mercury is a silvery liquid at room temperature.
C) Aluminum has a tendency to "rust."
D) Butane is highly flammable.
E) Argon has an unreactive nature.
Answer: B
Diff: 1 Type: MC Var: 1 Page Ref: 1.1

9) Which of the following represents a chemical property of hydrogen gas?
A) It is gaseous at room temperature.
B) It is less dense than air.
C) It reacts explosively with oxygen.
D) It is colourless.
E) It is tasteless.
Answer: C
Diff: 1 Type: MC Var: 1 Page Ref: 1.1

10) Total energy of an object is best defined as the sum of _____.
A) kinetic energy and potential energy
B) kinetic energy and thermal energy
C) chemical energy and potential energy
D) chemical energy and magnetic energy
E) potential energy and magnetic energy
Answer: A
Diff: 1 Type: MC Var: 1 Page Ref: 1.2

11) The energy associated with the temperature of an object is known as the _____.
A) potential energy
B) total energy
C) thermal energy
D) gravitational energy
E) magnetic energy
Answer: C
Diff: 1 Type: MC Var: 1 Page Ref: 1.2

12) _____ is the energy associated with motion of an object.
A) Potential energy
B) Kinetic energy
C) Total energy
D) Solar energy
E) Gravitational energy
Answer: B
Diff: 1 Type: MC Var: 1 Page Ref: 1.2

13) _____ is the energy associated with the position or composition of an object.
A) Kinetic energy
B) Total energy
C) Solar energy
D) Gravitational energy
E) Potential energy
Answer: E
Diff: 1 Type: MC Var: 1 Page Ref: 1.2

14) Which of the following statements is FALSE?
A) Energy is neither created nor destroyed.
B) When an object falls from a higher surface, gravitational potential energy converts into kinetic energy.
C) Physical and chemical changes are usually accompanied by energy changes.
D) The molecules that compose gasoline have chemical potential energy.
E) When gasoline undergoes combustion, the molecules that are newly formed have higher potential energy than the molecules that compose gasoline.
Answer: E
Diff: 1 Type: MC Var: 1 Page Ref: 1.2

15) Which of the following is an SI base unit?
A) volt
B) gram
C) hour
D) kelvin
E) dozen
Answer: D
Diff: 1 Type: MC Var: 1 Page Ref: 1.3

16) Identify the unit of measurement that is a SI base unit of measurement.
A) second
B) Celsius
C) cup
D) pound
E) yard
Answer: A
Diff: 1 Type: MC Var: 1 Page Ref: 1.3

17) Kilogram is a measure of _____.
A) mass
B) time
C) temperature
D) length
E) volume
Answer: A
Diff: 1 Type: MC Var: 1 Page Ref: 1.3

18) Metre is a measure of _____.
A) mass
B) time
C) temperature
D) length
E) volume
Answer: D
Diff: 1 Type: MC Var: 1 Page Ref: 1.3

19) Kelvin is a measure of _____.
A) mass
B) time
C) temperature
D) length
E) volume
Answer: C
Diff: 1 Type: MC Var: 1 Page Ref: 1.3

20) Second is a measure of _____.
A) mass
B) time
C) temperature
D) length
E) volume
Answer: B
Diff: 1 Type: MC Var: 1 Page Ref: 1.3

21) Mole is a measure of _____.
A) luminous intensity
B) amount
C) mass
D) length
E) current
Answer: B
Diff: 1 Type: MC Var: 1 Page Ref: 1.3

22) Ampere is a measure of _____.
A) luminous intensity
B) amount
C) mass
D) length
E) current
Answer: E
Diff: 1 Type: MC Var: 1 Page Ref: 1.3

23) Which of the following is an example of intensive properties?
A) density
B) volume
C) mass
D) None of the above is an example of intensive properties.
E) All of the above are examples of intensive properties.
Answer: A
Diff: 1 Type: MC Var: 1 Page Ref: 1.3

24) Which of the following is an example of extensive properties?
A) mass
B) colour
C) density
D) temperature
E) taste
Answer: A
Diff: 1 Type: MC Var: 1 Page Ref: 1.3

25) Identify the common substance that has the highest density.
A) sugar
B) water
C) glass
D) lead
E) aluminum
Answer: D
Diff: 1 Type: MC Var: 1 Page Ref: 1.3

26) Identify the common substance that has the lowest density.
A) ice
B) aluminum
C) copper
D) table salt
E) sugar
Answer: A
Diff: 1 Type: MC Var: 1 Page Ref: 1.3

27) If the temperature is 178 °F, what is the temperature in degrees Celsius?
A) 352 °C
B) 451 °C
C) 67 °C
D) 81.1 °C
E) 378 °C
Answer: D
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

28) How many ns are in 16 ms?
A) 1.6×10^{-2} ns
B) 1.6×10^{7} ns
C) 1.6×10^{-5} ns
D) 1.6×10^{5} ns
E) 1.6×10^{2} ns
Answer: B
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

29) How many dm are in 345 dam?
A) 0.345 dm
B) 3.45 dm
C) 3450 dm
D) 34500 dm
E) 345000 dm
Answer: D
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

30) Convert 514 nm to m and express it in scientific notation.
A) $514*10^{-5}$ m
B) $5.14*10^{-7}$ m
C) $51.4*10^{-7}$ m
D) $5.14*10^{11}$ m
E) $5.14*10^{-9}$ m
Answer: B
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

31) Convert 12.5 μL to L and express it in scientific notation.
A) $1.25*10^{5}$ L
B) $1.25*10^{7}$ L
C) $1.25*10^{-3}$ L
D) $1.25*10^{-7}$ L
E) $1.25*10^{-5}$ L
Answer: E
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

32) Convert 8.3 mg to μg.
A) 0.0083 μg
B) 83 μg
C) 830 μg
D) 8300 μg
E) 83000 μg
Answer: D
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

33) Convert 46.9 GHz to THz.
A) 0.0469 THz
B) 46900 THz
C) 0.469 THz
D) 4690 THz
E) 0.000469 THz
Answer: A
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

34) If the speed limit on a highway is 100 km h^{-1}, what is the speed limit in m h^{-1}?
A) 1×10^{7} m h^{-1}
B) 0.1 m h^{-1}
C) 1×10^{3} m h^{-1}
D) 1×10^{5} m h^{-1}
E) 1×10^{1} m h^{-1}
Answer: D
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

35) Convert 3000 m h^{-1} to km h^{-1}.
A) 3 km h^{-1}
B) 0.3 km h^{-1}
C) 30 km h^{-1}
D) 300 km h^{-1}
E) 0.03 km h^{-1}
Answer: A
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

36) Convert 1.34 km^2 to m^2.
A) 1340000 m^2
B) 134000 m^2
C) 1.34×10^7 m^2
D) 1.34×10^4 m^2
E) 1340 m^2
Answer: A
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

37) Convert 4392 m^3 to hm^3.
A) 4.392×10^{-5} hm^3
B) 4.392×10^{-3} hm^3
C) 4.392×10^{-1} hm^3
D) 4.392×10^1 hm^3
E) 4.392×10^2 hm^3
Answer: B
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

38) If a solution has a temperature of 355 K, what is its temperature in degrees Celsius?
A) 165 °C
B) 628 °C
C) 179 °C
D) 279 °C
E) 82 °C
Answer: E
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

39) If the outside temperature is 35 °C, what is the temperature in K?
A) -238 K
B) 308 K
C) 95 K
D) 31 K
E) 63 K
Answer: B
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

40) Determine the density of an object that has a mass of 149.8 g and displaces 12.1 mL of water when placed in a graduated cylinder.
A) 8.08 g mL^{-1}
B) 1.38 g mL^{-1}
C) 12 .4 g mL^{-1}
D) 18.1 g mL^{-1}
E) 11.4 g mL^{-1}

Answer: C
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

41) Determine the volume of an object that has a mass of 455.6 g and a density of 19.3 g mL^{-1}.
A) 87.9 mL
B) 42.4 mL
C) 18.5 mL
D) 23.6 mL
E) 31.2 mL
Answer: D
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

42) Determine the volume of an object that has a mass of 100 g and a density of 9.55 g mL^{-1}.
A) 10.5 mL
B) 955 mL
C) 0.095 mL
D) 25.6 mL
E) 27.9 mL
Answer: A
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

43) Determine the mass of an object that has a volume of 88.6 mL and a density of 9.77 g mL^{-1}.
A) 298 g
B) 1100 g
C) 907 g
D) 568 g
E) 866 g
Answer: E
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

44) If the outside air temperature is 30 °F, what is the temperature in kelvin?
A) 303 K
B) 307 K
C) 274 K
D) 272 K
Answer: D
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

45) If the outside temperature is 35 °C, what is the temperature in °F?
A) 95 °F
B) 31 °F
C) 121 °F
D) 5.4 °F
E) 63 °F
Answer: A
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

46) A solution has a temperature of 68 °C. What is the temperature in K?
A) 427 K
B) 20 K
C) 154 K
D) 341 K
E) 296 K
Answer: D
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

47) A solution has a temperature of 18.65 °C. What is the temperature in K?
A) 324.80 K
B) 291.80 K
C) 301.65 K
D) 65.57 K
E) 283.15 K
Answer: B
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

48) On a cold winter day, the outside temperature is reported as being -35 °C. What is the temperature in K?
A) 98.15 K
B) 238.15 K
C) 308.15 K
D) 400.15 K
E) 283.15 K
Answer: B
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

49) On a cold winter day, the temperature was -15 °C. What is the temperature in K?
A) 288.15 K
B) 238.15 K
C) 258.15 K
D) 400.15 K
E) 283.15 K
Answer: C
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

50) A gas phase mixture has a temperature of 643 °C. Calculate the temperature in K.
A) 916 K
B) 873 K
C) 188 K
D) 1391 K
E) 370 K
Answer: A
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

51) An unknown metal is heated to 850 °F. What is the temperature in K?
A) 1350 K
B) 1120 K
C) 460 K
D) 540 K
E) 730 K
Answer: E
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

52) The melting point of copper is 1984 °F. What is the melting point in K?
A) 1724 K
B) 1631 K
C) 1358 K
D) 2257 K
E) 1286 K
Answer: C
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

53) Ethylene glycol is commonly used as antifreeze in the cooling systems of vehicles due to its low freezing point, 8.6 °F. What is the freezing point in K?
A) 280 K
B) -13 K
C) 260 K
D) 273 K
E) 240 K
Answer: C
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

54) Ethylene glycol is commonly used as antifreeze in the cooling systems of vehicles due to its low freezing point, 8.6 °F. What is the freezing point in °C?
A) 0.0°C
B) -13°C
C) -26°C
D) -45°C
E) -54°C
Answer: B
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

55) Ethanol has a boiling point of 351 K. What is the boiling point in °C?
A) 78 °C
B) -195 °C
C) 122 °C
D) 62 °C
E) 86 °C
Answer: A
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

56) Ethanol has a freezing point of 159 K. What is the freezing point in °C?
A) -81 °C
B) -78 °C
C) -62 °C
D) -114 °C
E) -195 °C
Answer: D
Diff: 2 Type: MC Var: 1 Page Ref: 1.3

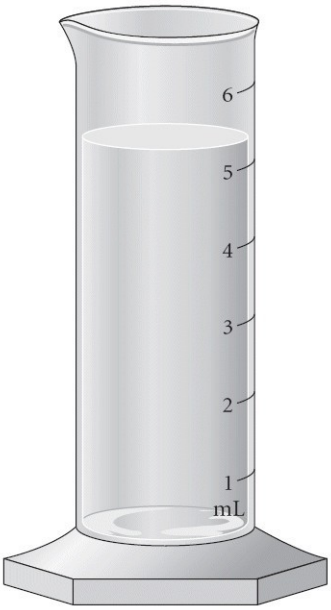
57) A student performs an experiment to determine the density of a sugar solution. She obtains the following results: 1.11 g mL^{-1}, 1.81 g mL^{-1}, 1.95 g mL^{-1}, 1.75 g mL^{-1}. If the actual value for the density of the sugar solution is 1.75 g mL^{-1}, which statement below best describes her results?
A) Her results are precise, but not accurate.
B) Her results are accurate, but not precise.
C) Her results are both precise and accurate
D) Her results are neither precise nor accurate.
E) It isn't possible to determine from the information given.
Answer: D
Diff: 1 Type: MC Var: 1 Page Ref: 1.4

58) A student performs an experiment to determine the density of a sugar solution. She obtains the following results: 1.71 g mL^{-1}, 1.73 g mL^{-1}, 1.67 g mL^{-1}, 1.69 g mL^{-1}. If the actual value for the density of the sugar solution is 1.40 g mL^{-1}, which statement below best describes her results?
A) Her results are precise, but not accurate.
B) Her results are accurate, but not precise.
C) Her results are both precise and accurate
D) Her results are neither precise nor accurate.
E) It isn't possible to determine from the information given.
Answer: A
Diff: 1 Type: MC Var: 1 Page Ref: 1.4

59) A student performs an experiment to determine the density of a sugar solution. She obtains the following results: 1.79 g mL^{-1}, 1.81 g mL^{-1}, 1.80 g mL^{-1}, 1.81 g mL^{-1}. If the actual value for the density of the sugar solution is 1.80 g mL^{-1}, which statement below best describes her results?
A) Her results are precise, but not accurate.
B) Her results are accurate, but not precise.
C) Her results are both precise and accurate
D) Her results are neither precise nor accurate.
E) It isn't possible to determine from the information given.
Answer: C
Diff: 1 Type: MC Var: 1 Page Ref: 1.4

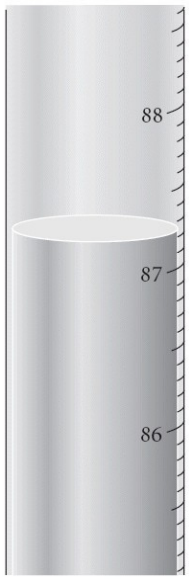
60) Systematic error is defined as
A) error that tends to be consistently too high or too low.
B) error that has equal probability of being too high or too low.
C) error that averages out with repeated trials.
D) error that is random.
Answer: A
Diff: 1 Type: MC Var: 1 Page Ref: 1.4

61) Read the water level with the correct number of significant figures.



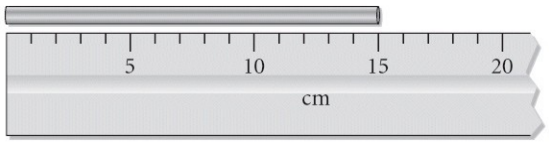
A) 5 mL
B) 5.3 mL
C) 5.32 mL
D) 5.320 mL
E) 5.3200 mL
Answer: B
Diff: 2 Type: MC Var: 1 Page Ref: 1.4

62) Read the temperature with the correct number of significant figures.



A) 87 °C
B) 87.2 °C
C) 87.20 °C
D) 87.200 °C
E) 87.2000 °C
Answer: C
Diff: 2 Type: MC Var: 1 Page Ref: 1.4

63) Read the length of the metal bar with the correct number of significant figures.



A) 20 cm
B) 15 cm
C) 15.0 cm
D) 15.00 cm
E) 15.000 cm
Answer: C
Diff: 2 Type: MC Var: 1 Page Ref: 1.4

64) Read the length of the metal bar with the correct number of significant figures.

A) 20 cm
B) 15 cm
C) 15.0 cm
D) 15.00 cm
E) 15.000 cm
Answer: D
Diff: 2 Type: MC Var: 1 Page Ref: 1.4

65) How many significant figures are in 1009.630 mL?
A) 3
B) 4
C) 5
D) 6
E) 7
Answer: E
Diff: 2 Type: MC Var: 1 Page Ref: 1.4

66) How many significant figures are in 3.408×10^4 m?
A) 3
B) 4
C) 5
D) 7
E) 8
Answer: B
Diff: 2 Type: MC Var: 1 Page Ref: 1.4

67) How many significant figures are in the measurement 463.090 m?
A) 2
B) 3
C) 4
D) 5
E) 6
Answer: E
Diff: 2 Type: MC Var: 1 Page Ref: 1.4

68) How many significant figures are in the measurement 0.0005890 g?
A) 4
B) 5
C) 6
D) 7
E) 8
Answer: A
Diff: 2 Type: MC Var: 1 Page Ref: 1.4

69) How many significant figures are in the measurement 20.300 m?
A) 3
B) 4
C) 5
D) 1
E) 2
Answer: C
Diff: 2 Type: MC Var: 1 Page Ref: 1.4

70) What answer should be reported, with the correct number of significant figures, for the following calculation?

$$(433.621 - 333.9) \times 11.900$$

A) 1.19×10^3
B) 1.187×10^3
C) 1.1868×10^3
D) 1.18680×10^3
E) 1.186799×10^3
Answer: A
Diff: 2 Type: MC Var: 1 Page Ref: 1.4

71) What answer should be reported, with the correct number of significant figures, for the following calculation?

$$(249.362 + 42) / 63.498$$

A) 4.6
B) 4.59
C) 4.589
D) 4.5885
E) 4.58852
Answer: B
Diff: 3 Type: MC Var: 1 Page Ref: 1.4

72) What answer should be reported, with the correct number of significant figures, for the following calculation?

$$(965.43 \times 3.911) + 9413.4136$$

A) 13189
B) 13189.2
C) 1.32×10^4
D) 1.3×10^4
E) 1.319×10^4
Answer: A
Diff: 3 Type: MC Var: 1 Page Ref: 1.4

73) What answer should be reported, with the correct number of significant figures, for the following calculation?

$$\frac{(16.84 - 15.93)}{9.6318} \times 12.3$$

A) 1.16
B) 1
C) 1.162
D) 1.1621
E) 1.2
Answer: E
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

74) What answer should be reported, with the correct number of significant figures, for the following calculation?

$$100.0\ \text{g} \times 4.18\ \text{J g}^{-1}\ ^\circ\text{C}^{-1} \times (26.4\ ^\circ\text{C} - 25.5\ ^\circ\text{C})$$

A) 4×10^2 J
B) 3.8×10^2 J
C) 376 J
D) 376.2 J
E) 376.20 J
Answer: A
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

75) What answer should be reported, with the correct number of significant figures, for the following calculation?

$$-\log(3.28 \times 10^{-3})$$

A) 2
B) 2.484
C) 2.4841
D) 2.48
E) 2.5
Answer: B
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

76) What answer should be reported, with the correct number of significant figures, for the following calculation?

$$6.83192458 + \log(6.7831 \times 10^{4})$$

A) 11.66335
B) 11.663353
C) 11.6634
D) 11.6633528
E) 11.663
Answer: A
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

77) What answer should be reported, with the correct number of significant figures, for the following calculation?

$$10^{-4.68}$$

A) 2.1×10^{-5}
B) $2\ 09 \times 10^{-5}$
C) 2×10^{-5}
D) 2.089×10^{-5}
E) 2.0893×10^{-5}
Answer: A
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

78) What answer should be reported, with the correct number of significant figures, for the following calculation?

$$\log(4.28 \times 10^{3}) - 1$$

A) 2.63144
B) 2.6314
C) 2.631
D) 2.6
E) 3
Answer: E
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

79) What answer should be reported, with the correct number of significant figures, for the following calculation?

$$100 \times 10^{-1.4} + \log(1.6 \times 10^{2})$$

A) 6.2
B) 6.19
C) 6.18
D) 6
E) 6.185
Answer: D
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

80) What answer should be reported, with the correct number of significant figures, for the following calculation?

$$\frac{10^{-3.8214}}{e^{-5.513}}$$

A) 0.037
B) 0.0374
C) 0.03740
D) 0.037399
E) 0.0373995
Answer: B
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

81) What answer should be reported, with the correct number of significant figures, for the following calculation?

$$1.682 \times 10^{-3} + 4.311 \times 10^{-2}$$

A) 4.44792×10^{-2}
B) 4.44792×10^{-3}
C) 4.48×10^{-2}
D) 4.479×10^{-3}
E) 4.479×10^{-2}
Answer: E
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

82) What answer should be reported, with the correct number of significant figures, for the following calculation?

$$3.000 \times 10^{5} + 614283$$

A) 914283
B) 9.1428×10^{5}
C) 914300
D) 9.14283×10^{5}
E) 914000
Answer: C
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

83) What wavelength of light would you report in units of nm if the light had a wavelength of 7.60×10^{-10} m?
A) 7.60×10^{-3} nm
B) 7.60×10^{-19} nm
C) 1.32 nm
D) 0.760 nm
E) 760 nm
Answer: D
Diff: 2 Type: MC Var: 1 Page Ref: 1.5

84) How many mg does a 433 kg sample contain?
A) 4.33×10^{-4} mg
B) 4.33×10^{7} mg
C) 4.33×10^{-3} mg
D) 4.33×10^{6} mg
E) 4.33×10^{8} mg
Answer: E
Diff: 2 Type: MC Var: 1 Page Ref: 1.5

85) How many kL does a 1.25×10^{8} cL sample contain?
A) 1.25×10^{3} kL
B) 1.25×10^{13} kL
C) 1.25×10^{4} kL
D) 1.25×10^{12} kL
E) 1.25×10^{2} kL
Answer: A
Diff: 2 Type: MC Var: 1 Page Ref: 1.5

86) How many cm^3 are contained in 3.77×10^{4} mm^3?
A) 3.77×10^{4} cm^3
B) 3.77×10^{1} cm^3
C) 3.77×10^{-10} cm^3
D) 3.77×10^{20} cm^3
E) 3.77×10^{6} cm^3
Answer: B
Diff: 2 Type: MC Var: 1 Page Ref: 1.5

87) How many mL are in 2.54 L?
A) 2.54×10^{-3} mL
B) 2.54×10^{1} mL
C) 2.54×10^{3} mL
D) 2.54×10^{-1} mL
E) 2.54×10^{2} mL
Answer: C
Diff: 2 Type: MC Var: 1 Page Ref: 1.5

88) How many mm are in 3.20 cm?
A) 3.20×10^{1} mm
B) 3.20×10^{-1} mm
C) 3.20×10^{-2} mm
D) 3.20×10^{2} mm
E) 3.20×10^{3} mm
Answer: A
Diff: 2 Type: MC Var: 1 Page Ref: 1.5

89) A recipe requires 1.89 litres of milk for a soup base. How many quarts are needed?
A) 1.79 qts
B) 2.00 qts
C) 1.89 qts
D) 2.10 qts
E) 2.15 qts
Answer: B
Diff: 2 Type: MC Var: 1 Page Ref: 1.5

90) If an object has a density of 8.65 g cm^{-3}, what is its density in units of kg m^{-3}?
A) 8.65×10^{-3} kg m^{-3}
B) 8.65×10^{-7} kg m^{-3}
C) 8.65×10^{3} kg m^{-3}
D) 8.65×10^{1} kg m^{-3}
E) 8.65×10^{-1} kg m^{-3}
Answer: C
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

91) If a room requires 25.4 square yards of carpeting, what is the area of the floor in units of ft^2? (3 ft = 1 yd)
A) 76.2 ft^2
B) 8.47 ft^2
C) 282 ft^2
D) 229 ft^2
E) 68.6 ft^2
Answer: D
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

92) What is the area, in m^2, of a house that has 1236 square feet of floor space? (1 foot = 0.3048 m)
A) 376.7 m^2
B) 214.8 m^2
C) 114.8 m^2
D) 687 m^2
E) 573 m^2
Answer: C
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

93) If a car gets 43.0 miles per gallon (mpg) fuel efficiency, calculate the fuel efficiency in litres per 100 km. (1 US gal = 3.78541 L; 1 mile = 1609.34 m)
A) 5.47 L $(100\ km)^{-1}$
B) 8.17 L $(100\ km)^{-1}$
C) 3.19 L $(100\ km)^{-1}$
D) 9.40 L $(100\ km)^{-1}$
E) 4.43 L $(100\ km)^{-1}$
Answer: A
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

94) If a truck gets 13.5 miles per gallon (mpg) fuel efficiency, calculate the fuel efficiency in litres per 100 km. (1 US gal = 3.78541 L; 1 mile = 1609.34 m)
A) 8.19 L $(100\ km)^{-1}$
B) 12.9 L $(100\ km)^{-1}$
C) 17.4 L $(100\ km)^{-1}$
D) 21.3 L $(100\ km)^{-1}$
E) 24.7 L $(100\ km)^{-1}$
Answer: C
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

95) If the speed limit is 40 miles per hour, calculate the speed limit in kilometres per hour. (1 km = 0.6214 miles)
A) 95 km h^{-1}
B) 64 km h^{-1}
C) 80 km h^{-1}
D) 35 km h^{-1}
E) 60 km h^{-1}
Answer: B
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

96) If the speed limit is 65 miles per hour, calculate the speed limit in kilometres per hour. (1 mile = 1609 m)
A) 95 km h^{-1}
B) 105 km h^{-1}
C) 80 km h^{-1}
D) 65 km h^{-1}
E) 78 km h^{-1}
Answer: B
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

97) I'm on a boat. It is travelling at 5.0 knots. What is the velocity in m s^{-1}? (1 knot = 1.15078 miles per hour; 1 km = 0.6214 miles)
A) 2.6 m s^{-1}
B) 39 m s^{-1}
C) 1.9 m s^{-1}
D) 6.9 m s^{-1}
E) 0.83 m s^{-1}
Answer: A
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

98) If I wish to travel 88 mph (miles per hour) in a DeLorean. How fast would I be travelling in m s^{-1}? (1 km = 0.6214 miles)
A) 39 m s^{-1}
B) 142 m s^{-1}
C) 129 m s^{-1}
D) 76 m s^{-1}
E) 44 m s^{-1}
Answer: A
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

99) If a person buys a 1.00 US gallon jug of milk, how much milk does he have in L? (1 US gallon = 4 US quarts; 1 US quart = 2 US pints; 1 US pint = 0.473176 L.)
A) 4.00 L
B) 3.79 L
C) 4.55 L
D) 3.50 L
E) 2.00 L
Answer: B
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

100) How many square kilometres (km^2) are in 246 square miles? (1 km = 0.621371 miles)
A) 153 km^2
B) 481 km^2
C) 396 km^2
D) 95.0 km^2
E) 637 km^2
Answer: E
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

101) How many cubic metres (m^3) are in 240 cubic feet? (1 m = 3.28084 feet)
A) 73.2 m^3
B) 12.7 m^3
C) 22.3 m^3
D) 6.80 m^3
E) 2.08 m^3
Answer: D
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

102) A person is 64.00 inches tall. How tall is she in cm?
A) 162.6 cm
B) 25.20 cm
C) 25.60 cm
D) 192.0 cm
E) 128.0 cm
Answer: A
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

103) A lamp post is 120 inches tall. How tall is the post in cm?
A) 305 cm
B) 125 cm
C) 225 cm
D) 192 cm
E) 128 cm
Answer: A
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

104) A person has a mass of 77.1 kg. What is his weight in pounds?
A) 154 pounds
B) 170 pounds
C) 35.0 pounds
D) 162 pounds
Answer: B
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

105) A person has a mass of 103.5 pounds. What is her weight in kg?
A) 78.31 kg
B) 70.21 kg
C) 46.95 kg
D) 62.45 kg
Answer: C
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

106) A person is 1.890 yards tall. How tall is he in cm?
A) 172.8 cm
B) 1.728 cm
C) 2.232 cm
D) 4.801 cm
E) 14.40 cm
Answer: A
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

107) An alligator is 244.0 cm long. How long is it in feet?
A) 8.00 ft
B) 96.0 ft
C) 20.3 ft
D) 6.00 ft
E) 9.00 ft
Answer: A
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

108) A carpet is 126 cm long. How long is it in feet?
A) 8.00 ft
B) 4.13 ft
C) 22.3 ft
D) 16.00 ft
E) 9.0 ft
Answer: B
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

109) A basketball player is 189.5 cm tall. How tall is he in ft?
A) 7.281 ft
B) 6.217 ft
C) 5.832 ft
D) 6.762 ft
E) 5.143 ft
Answer: B
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

110) How many cm are in 22.2 ft?
A) 4.70 cm
B) 105 cm
C) 56.4 cm
D) 677 cm
E) 0.728 cm
Answer: D
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

111) If the walls in a room are 955 square feet in area, and a gallon of paint covers 15 square yards, how many gallons of paint are needed for the room? (3 ft = 1 yd)
A) 47 gallons
B) 21 gallons
C) 7.1 gallons
D) 24 gallons
E) 2.3 gallons
Answer: C
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

112) Gasoline is sold for $1.399 per litre in Toronto. Your car needs 12.00 gallons. How much will your credit card be charged in Canadian dollars?
A) $16.79
B) $67.15
C) $4.44
D) $63.54
Answer: D
Diff: 3 Type: MC Var: 1 Page Ref: 1.5

113) Molecules can be described as _____.
A) mixtures of two or more pure substances
B) mixtures of two or more elements that have a specific ratio between components
C) two or more atoms chemically joined together
D) heterogeneous mixtures
E) homogeneous mixtures
Answer: C
Diff: 1 Type: MC Var: 1 Page Ref: Review

114) Give the composition of water.
A) two hydrogen atoms and two oxygen atoms
B) one hydrogen atom and one oxygen atom
C) two hydrogen atoms and one oxygen atom
D) one hydrogen atom and two oxygen atoms
Answer: C
Diff: 1 Type: MC Var: 1 Page Ref: Review

115) Which of the following statements about the phases of matter is TRUE?
A) In both solids and liquids, the atoms or molecules pack closely to one another.
B) Solids are highly compressible.
C) Gaseous substances have long-range repeating order.
D) There is only one type of geometric arrangement that the atoms or molecules in any solid can adopt.
E) Liquids have a large portion of empty volume between molecules.
Answer: A
Diff: 1 Type: MC Var: 1 Page Ref: Review

116) Choose the pure substance from the list below.
A) sea water
B) sugar
C) air
D) lemonade
E) milk
Answer: B
Diff: 1 Type: MC Var: 1 Page Ref: Review

117) Choose the pure substance from the list below.
A) tea
B) a casserole
C) carbon monoxide
D) sugar water
E) pomegranate juice
Answer: C
Diff: 1 Type: MC Var: 1 Page Ref: Review

118) A substance that can't be chemically broken down into simpler substances is _____.
A) a homogeneous mixture
B) an element
C) a heterogeneous mixture
D) a compound
E) an electron
Answer: B
Diff: 1 Type: MC Var: 1 Page Ref: Review

119) A substance composed of two or more elements in a fixed, definite proportion is _____.
A) a homogeneous mixture
B) a heterogeneous mixture
C) a compound
D) a solution
E) an alloy
Answer: C
Diff: 1 Type: MC Var: 1 Page Ref: Review

120) Choose the element from the list below.
A) sodium chloride
B) water
C) carbon dioxide
D) helium
E) rust
Answer: D
Diff: 1 Type: MC Var: 1 Page Ref: Review

121) Choose the compound from the list below.
A) magnesium
B) water
C) neon
D) helium
E) lithium
Answer: B
Diff: 1 Type: MC Var: 1 Page Ref: Review

122) Decanting is _____.
A) a process in which the more volatile liquid is boiled off
B) dissolving a solid into a liquid
C) separating a solid from a liquid by pouring off the liquid
D) pouring a mixture through a filter paper to separate the solid from the liquid
E) heating a mixture of two solids to fuse them together
Answer: C
Diff: 1 Type: MC Var: 1 Page Ref: Review

123) Two or more substances in variable proportions, where the composition is constant throughout, are _____.
A) a compound
B) an element
C) a heterogeneous mixture
D) a homogeneous mixture
E) a crystalline solid
Answer: D
Diff: 1 Type: MC Var: 1 Page Ref: Review

124) Two or more substances in variable proportions, where the composition is variable throughout, are _____.
A) a solution
B) a homogeneous mixture
C) a compound
D) an amorphous solid
E) a heterogeneous mixture
Answer: E
Diff: 1 Type: MC Var: 1 Page Ref: Review

125) Choose the heterogeneous mixture from the list below.
A) sports drink
B) chlorine gas
C) black coffee
D) chicken noodle soup
E) carbon (graphite)
Answer: D
Diff: 1 Type: MC Var: 1 Page Ref: Review

126) Choose the homogeneous mixture from the list below.
A) lemonade
B) mud
C) ice water
D) salad dressing
E) salsa
Answer: A
Diff: 1 Type: MC Var: 1 Page Ref: Review

127) Choose the homogeneous mixture from the list below.
A) chicken noodle soup
B) air
C) concrete
D) trail mix
E) blood
Answer: B
Diff: 2 Type: MC Var: 1 Page Ref: Review

1.2 Algorithmic Questions

1) What symbol is used to represent the factor 10^1?
A) M
B) da
C) μ
D) n
Answer: B
Diff: 1 Type: MC Var: 5 Page Ref: 1.3

2) Which of the following is the SMALLEST volume?
A) 44 cm^3
B) 1.0 dL
C) 5.5×10^3 mL
D) 1.0×10^8 nL
Answer: A
Diff: 1 Type: MC Var: 5 Page Ref: 1.3

3) What symbol is used to represent the factor 10^{-1}?
A) M
B) m
C) μ
D) d
Answer: D
Diff: 1 Type: MC Var: 5 Page Ref: 1.3

4) The factor 1,000,000 corresponds to which prefix?
A) deka
B) deci
C) mega
D) milli
Answer: C
Diff: 1 Type: MC Var: 5 Page Ref: 1.3

5) The factor 10^{-3} corresponds to which prefix?
A) deka
B) deci
C) milli
D) centi
Answer: C
Diff: 1 Type: MC Var: 5 Page Ref: 1.3

6) What decimal power does the abbreviation n represent?
A) 1×10^{15}
B) 1×10^{2}
C) 1×10^{-1}
D) 1×10^{-9}
E) 1×10^{-12}
Answer: D
Diff: 1 Type: MC Var: 4 Page Ref: 1.3

7) What decimal power does the abbreviation pico represent?
A) 1×10^{10}
B) 1×10^{3}
C) 1×10^{-4}
D) 1×10^{-12}
E) 1×10^{-10}
Answer: D
Diff: 1 Type: MC Var: 4 Page Ref: 1.3

8) What is the volume (in cm^3) of a 43.6 g piece of metal with a density of 2.71 g cm^{-3}?
A) 16.1
B) 19.5
C) .425
D) 6.65
E) none of the above
Answer: A
Diff: 2 Type: MC Var: 9 Page Ref: 1.3

9) A piece of metal ore weighs 8.25 g. When a student places it into a graduated cylinder containing water, the liquid level rises from 21.25 mL to 26.47 mL. What is the density of the ore?
A) 0.3 12 g mL^{-1}
B) 0. 633 g mL^{-1}
C) 1. 58 g mL^{-1}
D) 3.21 g mL^{-1}
Answer: C
Diff: 2 Type: MC Var: 5 Page Ref: 1.3

10) A mass of mercury occupies 0. 750 L. What volume would an equal mass of ethanol occupy? The density of mercury is $13.546\ g\ mL^{-1}$ and the density of ethanol is $0.789\ g\ mL^{-1}$.
A) 0.0 437 L
B) 0. 0777 L
C) 12.9 L
D) 22.9 L
Answer: C
Diff: 2 Type: MC Var: 5 Page Ref: 1.3

11) If the melting point of vanadium metal is 1910 °C, what is its melting point in kelvin?
A) 1029 K
B) 1637 K
C) 2183 K
D) 3470 K
Answer: C
Diff: 3 Type: MC Var: 5 Page Ref: 1.3

12) Which of the following is the LOWEST temperature?
A) 42 °C
B) 57 °F
C) 318 K
D) All of these temperatures are equal.
Answer: B
Diff: 3 Type: MC Var: 5 Page Ref: 1.3

13) How many significant figures are in the measurement 210 g?
A) 2
B) 1
C) 3
D) 4
E) 5
Answer: A
Diff: 1 Type: MC Var: 6 Page Ref: 1.4

14) What is the correct answer, with the proper number of significant figures, for the following calculation?
11.5×8.78
Answer: 101
Diff: 2 Type: SA Var: 10 Page Ref: 1.4

15) Round the following number to four significant figures and express the result in standard exponential notation: 229.613

A) 2.296×10^{2}

B) 22.96×10^{-1}

C) 2.296×10^{-2}

D) 0.2296×10^{3}

E) 229.6

Answer: A

Diff: 2 Type: MC Var: 5 Page Ref: 1.4

16) Which of the following numbers has the greatest number of significant figures?

A) 0. 5070

B) 0 .201

C) 418000

D) 6.02×10^{24}

Answer: A

Diff: 2 Type: MC Var: 5 Page Ref: 1.4

17) How many of the following numbers contain three significant figures?

0. 408 9.040 0.0 400 9.05×10^{24}

A) one

B) two

C) three

D) four

Answer: C

Diff: 2 Type: MC Var: 5 Page Ref: 1.4

18) How many significant figures are there in the answer to the following problem?

$(9.992 \times 3.200) + 0.610$

A) one

B) two

C) three

D) four

Answer: D

Diff: 2 Type: MC Var: 5 Page Ref: 1.4

19) How many significant figures are there in the answer to the following problem?

$$56.4 + 0.\ 8822 + \ 21$$

A) one
B) two
C) three
D) four
Answer: B
Diff: 2 Type: MC Var: 5 Page Ref: 1.4

20) How many significant figures are there in the answer to the following problem?

$$\frac{[(143.7 - 121) \times 2.06]}{0.600}$$

A) one
B) two
C) three
D) four
Answer: B
Diff: 2 Type: MC Var: 5 Page Ref: 1.4

21) An acetylene molecule contains 2 atoms of carbon. The number 2 represents how many significant figures?
A) one
B) two
C) three
D) infinite
Answer: D
Diff: 2 Type: MC Var: 5 Page Ref: 1.4

22) Round off 00 907506 to four significant figures.
A) 00 91
B) 9076
C) 9100
D) 9.075×10^5
Answer: D
Diff: 2 Type: MC Var: 5 Page Ref: 1.4

23) The width, length, and height of a large, custom-made shipping crate are 1.31 m, 3.26 m, and 0.88 m respectively. The volume of the box using the correct number of significant figures is _____ m^3.
A) 3.8
B) 3.76
C) 3.758
D) 3.75813
E) 3.7558
Answer: A
Diff: 2 Type: MC Var: 5 Page Ref: 1.4

24) What is the correct answer, with the proper number of significant figures, for the following calculation?

$$(1815 - 1806) \times (9.11 \times 7.92)$$

Answer: 600
Diff: 3 Type: SA Var: 10 Page Ref: 1.4

25) Without using a calculator, solve the following problem:

$$\frac{[(1 \times 10^4) \times (1 \times 10^3)]^2}{(1 \times 10^{-9})}$$

A) 1×10^{-4}
B) 1×10^5
C) 1×10^{23}
D) 1×10^{32}
Answer: C
Diff: 1 Type: MC Var: 5 Page Ref: 1.5

26) Without using a calculator, solve the following problem:

$$\frac{[(1 \times 10^{-8}) \times (1 \times 10^5)]^2}{(1 \times 10^6)}$$

A) 1×10^6
B) 1×10^0
C) 1×10^{-12}
D) 1×10^{-18}
Answer: C
Diff: 1 Type: MC Var: 5 Page Ref: 1.5

27) Which of the following is the greatest mass?
A) 1000 μg
B) 1.000×10^{-4} kg
C) 1.000×10^{-4} cg
D) 1.000×10^{-8} mg
Answer: B
Diff: 2 Type: MC Var: 5 Page Ref: 1.5

28) The mass of a proton is 1.67×10^{-27} kg. What is the mass of a proton in nanograms?
A) 1.67×10^{-21} ng
B) 1.67×10^{-18} ng
C) 1.67×10^{-15} ng
D) 1.67×10^{-12} ng
Answer: C
Diff: 2 Type: MC Var: 5 Page Ref: 1.5

29) The mass of a single zinc atom is 1.086×10^{-22} g. This is the same mass as _____.
A) 1.086×10^{-16} mg
B) 1.086×10^{-25} kg
C) 1.086×10^{-28} μg
D) 1.086×10^{-31} ng
Answer: B
Diff: 2 Type: MC Var: 5 Page Ref: 1.5

30) A student weighed 30.00 μg of sulfur in the lab. This is the same mass as _____.
A) 3.000×10^{-8} g
B) 3.000×10^{-5} kg
C) 3.000×10^{-5} mg
D) 3.000×10^{4} ng
Answer: D
Diff: 2 Type: MC Var: 5 Page Ref: 1.5

31) Convert 4 μm to metres.
A) 4×10^{-9} m
B) 4×10^{-6} m
C) 4×10^{-3} m
D) 4×10^{6} m
Answer: B
Diff: 2 Type: MC Var: 5 Page Ref: 1.5

32) The average distance between nitrogen and oxygen atoms is 115 pm in a compound called nitric oxide. What is this distance in millimeters?
A) 1.15×10^{-8} mm
B) 1.15×10^{-7} mm
C) 1.15×10^{13} mm
D) 1.15×10^{17} mm
Answer: B
Diff: 2 Type: MC Var: 5 Page Ref: 1.5

33) The diameter of an atom is approximately 1×10^{-10} m. What is the diameter in millimeters?
A) 1×10^{-16} mm
B) 1×10^{-13} mm
C) 1×10^{-7} mm
D) 1×10^{-4} mm
Answer: C
Diff: 2 Type: MC Var: 5 Page Ref: 1.5

34) Which of the following volumes is equal to 40 mL?
A) 40 cm^3
B) 40 dm^3
C) 0. 40 L
D) 0.000 40 kL
Answer: A
Diff: 2 Type: MC Var: 5 Page Ref: 1.5

35) Convert 10 cm^3 to m^3.
A) 1×10^{-5} m^3
B) 1×10^{-1} m^3
C) 1×10^{3} m^3
D) 1×10^{7} m^3
Answer: A
Diff: 2 Type: MC Var: 5 Page Ref: 1.5

36) Convert 35 m^3 to litres.
A) 3.5×10^{-2} L
B) 3.5 L
C) 3.5×10^{2} L
D) 3.5×10^{4} L
Answer: D
Diff: 2 Type: MC Var: 5 Page Ref: 1.5

37) 38.325 lbs = _____ grams. (1 lb = 454 g)
Answer: 17400
Diff: 3 Type: SA Var: 10 Page Ref: 1.5

38) If 1.4% of the mass of a human body is calcium, how many kilograms of calcium are there in a 185-pound man?
A) 1.2 kg Ca
B) 5.7 kg Ca
C) 1.2×10^2 kg Ca
D) 5.7×10^2 kg
Answer: A
Diff: 3 Type: MC Var: 5 Page Ref: 1.5

39) A fishing boat accidentally spills 3.0 barrels of diesel oil into the ocean. Each barrel contains 42 gallons. If the oil film on the ocean is 2.5×10^2 nm thick, how many square metres will the oil slick cover?
A) 1.9×10^{-3} m^2
B) 1.9×10^6 m^2
C) 1.9×10^7 m^2
D) none of the above
Answer: B
Diff: 3 Type: MC Var: 5 Page Ref: 1.5

40) Because of the high heat and low humidity in the summer in Death Valley, California, a visitor requires about one quart of water for every two miles travelled on foot. Calculate the approximate number of litres required for a person to walk 10. kilometres in Death Valley.
A) 2.9 L
B) 12 L
C) 30 L
D) 47 L
Answer: A
Diff: 3 Type: MC Var: 5 Page Ref: 1.5

41) The estimated costs for remodelling the interior of an apartment are three 1-gallon cans of paint at $ 15.84 each, two paint brushes at $ 4.68 each, and $ 152 for a helper. The total estimated cost with the appropriate significant figures is $_____.
A) 208.88
B) 2.1×10^2
C) 209
D) 208.9
Answer: C
Diff: 3 Type: MC Var: 4 Page Ref: 1.5

42) How many litres of wine can be held in a wine barrel whose capacity is 22.0 gal?
(1 gal = 4 qt = 3.7854 L)
A) 1.72×10^{-4}
B) 0.172
C) 83.3
D) 5.81×10^{3}
E) 5.81
Answer: C
Diff: 3 Type: MC Var: 4 Page Ref: 1.5

43) The recommended adult dose of Elixophyllin®, a drug used to treat asthma, is 105 mg kg^{-1} of body mass. Calculate the dose in milligrams for a 105-lb person. (1 lb = 453.59 g)
A) 22
B) 1,389
C) 1.4
D) 286
E) 2.9×10^{5}
Answer: D
Diff: 3 Type: MC Var: 4 Page Ref: 1.5

44) The density of air under ordinary conditions at 25° C is 1.19 g L^{-1}. How many kilograms of air are in a room that measures 12.0 ft × 12.0 ft and has a 11.0 ft ceiling? (1 in. = 2.54 cm (exactly); 1 L = 10^{3} cm^{3})
A) 37.69
B) 1.33
C) 5.34×10^{4}
D) 0.00188
E) 53.4
Answer: E
Diff: 3 Type: MC Var: 4 Page Ref: 1.5

45) How many litres of air are in a room that measures 11.0 ft × 12.0 ft and has an 7.00 ft ceiling?
(1 in. = 2.54 cm (exactly); 1 L = 10^{3} cm^{3})
A) 2.62×10^{4}
B) 2347.0
C) 28.2
D) 2.82×10^{7}
E) 9.24×10^{5}
Answer: A
Diff: 3 Type: MC Var: 4 Page Ref: 1.5

46) Crude oil is an example of _____.
A) a compound
B) an element
C) a heterogeneous mixture
D) a homogeneous mixture
Answer: C
Diff: 2 Type: MC Var: 5 Page Ref: Review

47) Gasoline is an example of _____.
A) a compound
B) an element
C) a heterogeneous mixture
D) a homogeneous mixture
Answer: D
Diff: 2 Type: MC Var: 5 Page Ref: Review

48) Gold is an example of _____.
A) a compound
B) an element
C) a heterogeneous mixture
D) a homogeneous mixture
Answer: B
Diff: 2 Type: MC Var: 5 Page Ref: Review

1.3 Matching Questions

Match the following.

A) 10^{-9}
B) 10^{3}
C) 10^{-6}
D) 10^{6}
E) 10^{-1}
F) 10^{-3}
G) 10^{-2}

1) kilo
Diff: 1 Type: MA Var: 1 Page Ref: 1.3

2) centi
Diff: 1 Type: MA Var: 1 Page Ref: 1.3

3) milli
Diff: 1 Type: MA Var: 1 Page Ref: 1.3

4) nano
Diff: 1 Type: MA Var: 1 Page Ref: 1.3

5) micro
Diff: 1 Type: MA Var: 1 Page Ref: 1.3

6) deci
Diff: 1 Type: MA Var: 1 Page Ref: 1.3

7) mega
Diff: 1 Type: MA Var: 1 Page Ref: 1.3

Answers: 1) B 2) G 3) F 4) A 5) C 6) E 7) D

1.4 Short Answer Questions

1) Define matter.
Answer: Matter is anything that occupies space and has mass.
Diff: 1 Type: SA Var: 1 Page Ref: 1.1

2) A sample of liquid isopropyl alcohol is placed in a sealed container. Some of the volatile isopropyl alcohol vaporizes. Does the mass of the sealed container and its contents change during the vaporization? Explain.
Answer: No. The vaporized isopropyl alcohol is just in a different physical state. It still has mass and therefore the gas plus the remaining liquid and container have the same total mass after the vaporization of some of the isopropyl alcohol.
Diff: 1 Type: SA Var: 1 Page Ref: 1.1

3) What is the difference between a physical property and a chemical property? Give an example of each.
Answer: A physical property is something that can be observed without changing the chemical identity of the substance, such as colour or scent. A chemical property can only be observed while the chemical identity of a substance is changing, such as the tendency of sodium metals to react with water to form hydrogen gas and sodium hydroxide.
Diff: 1 Type: SA Var: 1 Page Ref: 1.1

4) Define energy.
Answer: Energy is the capacity to do work.
Diff: 1 Type: SA Var: 1 Page Ref: 1.2

5) Define the law of the conservation of energy.
Answer: Energy is neither created nor destroyed, only transferred.
Diff: 1 Type: SA Var: 1 Page Ref: 1.2

6) A flash drive contains 4 gigabytes. How many bytes does it contain?
Answer: 4 000 000 000 bytes, or 4 292 967 296 bytes if you are computer literate.
Diff: 1 Type: SA Var: 1 Page Ref: 1.3

7) Describe the difference between an intensive and extensive property using examples.
Answer: An intensive property does NOT depend on the amount of the substance present, such as colour or density. An extensive property is one that does depend on the amount of the substance, such as mass or volume.
Diff: 1 Type: SA Var: 1 Page Ref: 1.3

8) What happens to the density of a sample of iron metal as it is heated from room temperature to 100 °C? (This is below the melting point of iron.)
Answer: Since the mass of the iron stays constant, but the volume increases as the temperature is raised, the density of the iron decreases upon heating.
Diff: 1 Type: SA Var: 1 Page Ref: 1.3

9) What does it mean to be an exact number? Give an example of an exact number.
Answer: An exact number has an infinite number of significant figures even though we typically don't write many of them out. If there are 26 people in a classroom, there are exactly 26.00000.... people in that room. There is no possibility of a half person, so this is an exact whole number with no ambiguity.
Diff: 1 Type: SA Var: 1 Page Ref: 1.4

10) Define random error.
Answer: Random error has an equal probability of being too high or too low.
Diff: 1 Type: SA Var: 1 Page Ref: 1.4