

Principles of Chemistry: A Molecular Approach, 3e (Tro)

Chapter 1 Matter, Measurement, and Problem Solving

1) Molecules can be described as

- A) a mixture of two or more pure substances.
- B) a mixture of two or more elements that has a specific ratio between components.
- C) two or more atoms chemically joined together.
- D) a heterogeneous mixture.
- E) a homogeneous mixture.

Answer: C

Diff: 1 Var: 1 Page Ref: 1.1

Global: G1

2) 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 Var: 1 Page Ref: 1.1

Global: G2

3) Dalton's Atomic Theory states

- A) that all elements have several isotopes.
- B) that matter is composed of small indestructible particles.
- C) that the properties of matter are determined by the properties of atoms.
- D) that energy is neither created nor destroyed during a chemical reaction.
- E) that an atom is predominantly empty space.

Answer: B

Diff: 1 Var: 1 Page Ref: 1.2

Global: G1

4) The statement, "In a chemical reaction, matter is neither created nor destroyed" is called

- A) The Law of Conservation of Mass.
- B) Dalton's Atomic Theory.
- C) The Scientific Method.
- D) The Law of Multiple Proportions.
- E) The Law of Definite Proportions.

Answer: A

Diff: 1 Var: 1 Page Ref: 1.2

Global: G1

5) Which of the following represents a *hypothesis*?

- A) Sodium reacts with water to form sodium hydroxide and hydrogen gas.
- B) Nitrogen gas is a fairly inert substance.
- C) Nickel has a silvery sheen.
- D) When a substance combusts, it combines with air.
- E) When wood burns, heat is given off.

Answer: D

Diff: 1 Var: 1 Page Ref: 1.2

Global: G2

6) The Scientific Method

- A) is just a theory.
- B) is a strict set of rules and procedures that lead to inarguable fact.
- C) isn't used much in modern chemistry.
- D) is based on continued observation and experiment.
- E) is a framework for proving an argument you know to be true.

Answer: D

Diff: 1 Var: 1 Page Ref: 1.2

Global: G1

7) Which of the following statements is **true**?

- A) A scientific law is fact.
- B) Once a theory is constructed, it is considered fact.
- C) A hypothesis is speculation that is difficult to test.
- D) An observation explains why nature does something.
- E) A scientific law summarizes a series of related observations.

Answer: E

Diff: 1 Var: 1 Page Ref: 1.2

Global: G1

8) Identify a liquid.

- A) definite volume and definite shape
- B) definite volume and no definite shape
- C) definite shape and no definite volume
- D) no definite shape and no definite volume

Answer: B

Diff: 1 Var: 1 Page Ref: 1.3

Global: G1

9) Choose the pure substance from the list below.

- A) sea water
- B) sugar
- C) air
- D) lemonade
- E) milk

Answer: B

Diff: 1 Var: 1 Page Ref: 1.3

Global: G2

10) 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 Var: 1 Page Ref: 1.3

Global: G2

11) Choose the heterogeneous mixture from the list below.

- A) Gatorade
- B) chlorine gas
- C) black coffee
- D) chicken noodle soup
- E) carbon (graphite)

Answer: D

Diff: 1 Var: 1 Page Ref: 1.3

Global: G2

12) Choose the homogeneous mixture from the list below.

- A) Kool-Aid
- B) mud
- C) ice water
- D) salad dressing
- E) salsa

Answer: A

Diff: 1 Var: 1 Page Ref: 1.3

Global: G2

13) Which of the following statements about crystalline and amorphous solids is **true**?

- A) A crystalline solid is composed of atoms or molecules arranged with long-range repeating order.
- B) An example of a crystalline solid is glass.
- C) An example of an amorphous solid is table salt (NaCl).
- D) An amorphous solid is composed of atoms or molecules arranged with long-range repeating order.
- E) An amorphous solid has the well-ordered geometric arrangements of atoms.

Answer: A

Diff: 1 Var: 1 Page Ref: 1.3

Global: G1

14) Which of the following statements about the phases of matter is **true**?

- A) In both solids and liquids, the atoms or molecules are loosely packed.
- B) Solids are highly compressible.
- C) Gases are highly compressible.
- D) Atoms in solids, liquids and gases can move freely
- E) Liquids have a fixed volume.

Answer: C

Diff: 1 Var: 1 Page Ref: 1.3

Global: G1

15) A substance that can't be chemically broken down into simpler substances is considered to be

- A) a homogeneous mixture.
- B) an element.
- C) a heterogeneous mixture.
- D) a compound.
- E) water.

Answer: B

Diff: 1 Var: 1 Page Ref: 1.3

Global: G1

16) A substance composed of 2 or more elements in a fixed, definite proportion is considered

- A) a homogeneous mixture.
- B) a heterogeneous mixture.
- C) a compound.
- D) a solution.
- E) an alloy.

Answer: C

Diff: 1 Var: 1 Page Ref: 1.3

Global: G1

17) Two or more substances in variable proportions, where the composition is constant throughout are considered

- A) a compound.
- B) an element.
- C) a heterogeneous mixture.
- D) a homogeneous mixture.
- E) a crystalline solid.

Answer: D

Diff: 1 Var: 1 Page Ref: 1.3

Global: G1

18) Two or more substances in variable proportions, where the composition is variable throughout are considered

- A) a solution.
- B) a homogeneous mixture.
- C) a compound.
- D) an amorphous solid.
- E) a heterogeneous mixture.

Answer: E

Diff: 1 Var: 1 Page Ref: 1.3

Global: G1

19) Choose the homogeneous mixture from the list below.

- A) cola
- B) air
- C) concrete
- D) trail mix
- E) blood

Answer: B

Diff: 2 Var: 1 Page Ref: 1.3

Global: G2

20) Which of the following is an example of physical change?

- A) Sugar is dissolved in water.
- B) Coffee is brewed.
- C) Dry ice sublimates.
- D) Ice (solid water) melts.
- E) All of these are examples of physical change.

Answer: E

Diff: 1 Var: 1 Page Ref: 1.4

Global: G2

LO: 1.4

21) Which of the following is an example of 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) An iron pipe rusts in the yard.

Answer: A

Diff: 1 Var: 1 Page Ref: 1.4

Global: G2

LO: 1.4

- 22) Which of the following is an example of chemical change?
- A) Copper building materials develop a green patina over time.
 - B) Water vapor condenses on the window.
 - C) Ethanol evaporates.
 - D) A mixture of hydrogen and oxygen gas explodes on ignition.
 - E) A helium balloon goes up in the air.

Answer: D

Diff: 1 Var: 1 Page Ref: 1.4

Global: G2

LO: 1.4

- 23) Which of the following is an example of a chemical change?
- A) coffee brewing
 - B) water boiling
 - C) nails rusting
 - D) salt dissolving in water
 - E) freezing of water

Answer: C

Diff: 1 Var: 1 Page Ref: 1.4

Global: G2

LO: 1.4

- 24) 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 Var: 1 Page Ref: 1.4

Global: G2

LO: 1.4

- 25) 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 salt is dissolved in water.
 - E) occurs when Kool-Aid is stirred into water.

Answer: A

Diff: 1 Var: 1 Page Ref: 1.4

Global: G2

LO: 1.4

26) Which of the following represents a physical property?

- A) Sodium metal is extremely reactive with chlorine gas.
- B) Mercury is a silver liquid at room temperature.
- C) the tendency of aluminum to "rust"
- D) the flammability of butane fuel
- E) the unreactive nature of argon gas

Answer: B

Diff: 1 Var: 1 Page Ref: 1.4

Global: G2

LO: 1.4

27) 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 colorless.
- E) It is tasteless.

Answer: C

Diff: 1 Var: 1 Page Ref: 1.4

Global: G2

LO: 1.4

28) Which of the following statements about energy is **false**?

- A) Energy can be converted from one type to another.
- B) The total energy of a system remains constant.
- C) Thermal energy is the energy associated with its position or composition.
- D) Kinetic energy is the capacity to do work.
- E) Systems tend to change in order to lower their potential energy.

Answer: C

Diff: 1 Var: 1 Page Ref: 1.5

Global: G1

29) All of the following are SI units of measurement, **except**

- A) meter.
- B) gram.
- C) second.
- D) kelvin.
- E) mole.

Answer: B

Diff: 1 Var: 1 Page Ref: 1.6

Global: G2

30) Which of the following are examples of intensive properties?

- A) density
- B) volume
- C) mass
- D) None of the above are examples of intensive properties.
- E) All of the above are examples of intensive properties.

Answer: A

Diff: 1 Var: 1 Page Ref: 1.6

Global: G2

31) 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 Var: 1 Page Ref: 1.6

Global: G4

LO: 1.6b

32) 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) 79°C
- E) 82°C

Answer: E

Diff: 2 Var: 1 Page Ref: 1.6

Global: G4

LO: 1.6b

33) 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: 3 Var: 1 Page Ref: 1.6

Global: G4

LO: 1.6b

34) If the temperature is 25°C, what is the temperature in °F?

- A) 45°F
- B) 298.15°F
- C) 77°F
- D) -3.89°F

Answer: C

Diff: 3 Var: 1 Page Ref: 1.6

Global: G4

LO: 1.6b

35) If the temperature is 25°C, what is the temperature in K?

- A) 45 K
- B) 298 K
- C) 77 K
- D) -3.89 K

Answer: B

Diff: 3 Var: 1 Page Ref: 1.6

Global: G4

LO: 1.6b

36) 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
- B) 1.38 g/mL
- C) 12.4 g/mL
- D) 18.1 g/mL
- E) 11.4 g/mL

Answer: C

Diff: 2 Var: 1 Page Ref: 1.6

Global: G4

LO: 1.6a

37) Determine the volume of an object that has a mass of 455.6 g and a density of 19.3 g/cm³.

- A) 87.9 mL
- B) 42.4 mL
- C) 18.5 mL
- D) 23.6 mL
- E) 31.2 mL

Answer: D

Diff: 2 Var: 1 Page Ref: 1.6

Global: G4

LO: 1.6a

38) Determine the mass of an object that has a volume of 88.6 mL and a density of 9.77 g/mL.

- A) 298 g
- B) 1100 g
- C) 907 g
- D) 568 g
- E) 866 g

Answer: E

Diff: 2 Var: 1 Page Ref: 1.6

Global: G4

LO: 1.6a

39) A student performs an experiment to determine the density of a sugar solution. She obtains the following results: 4.11 g/mL, 4.81 g/mL, 4.95 g/mL, 3.75 g/mL. If the actual value for the density of the sugar solution is 4.75 g/mL, 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 with the information given.

Answer: D

Diff: 1 Var: 1 Page Ref: 1.7

Global: G9

40) A student performs an experiment to determine the density of a sugar solution. She obtains the following results: 4.71 g/mL, 4.73 g/mL, 4.67 g/mL, 4.69 g/mL. If the actual value for the density of the sugar solution is 4.40 g/mL, 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 with the information given.

Answer: A

Diff: 1 Var: 1 Page Ref: 1.7

Global: G9

41) 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

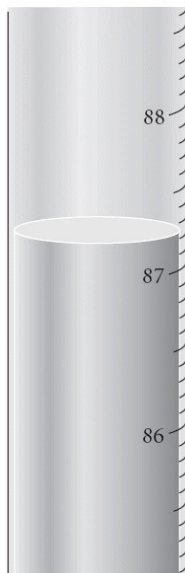
Answer: B

Diff: 2 Var: 1 Page Ref: 1.7

Global: G3

LO: 1.7a

42) 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

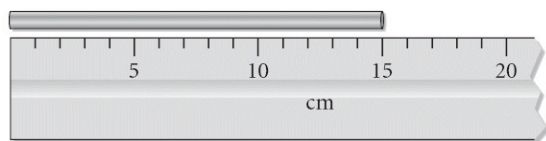
Answer: C

Diff: 2 Var: 1 Page Ref: 1.7

Global: G3

LO: 1.7a

43) 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

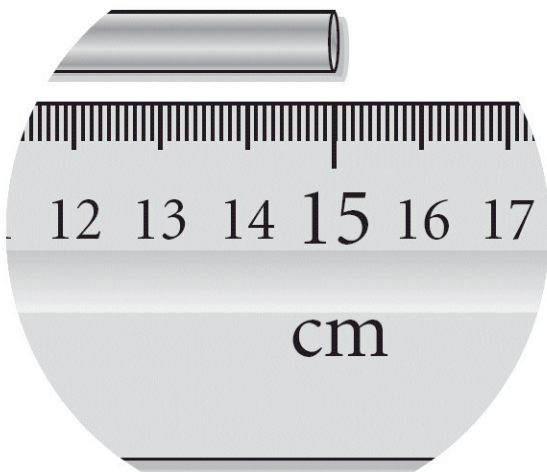
Answer: C

Diff: 2 Var: 1 Page Ref: 1.7

Global: G3

LO: 1.7a

44) 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 Var: 1 Page Ref: 1.7

Global: G3

LO: 1.7a

45) How many significant figures are in 1009.630 mL?

- A) 3
- B) 4
- C) 5
- D) 6
- E) 7

Answer: E

Diff: 2 Var: 1 Page Ref: 1.7

Global: G2

LO: 1.7a

46) 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 Var: 1 Page Ref: 1.7

Global: G2

LO: 1.7a

47) 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 Var: 1 Page Ref: 1.7

Global: G2

LO: 1.7a

48) 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 Var: 1 Page Ref: 1.7

Global: G2

LO: 1.7a

49) 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: B

Diff: 2 Var: 1 Page Ref: 1.7

Global: G4

LO: 1.7b

50) What answer should be reported, with the correct number of significant figures, for the following calculation? $(249.362 + 41) / 63.498$

- A) 4.6
- B) 4.57
- C) 4.573
- D) 4.5728
- E) 4.57277

Answer: B

Diff: 3 Var: 1 Page Ref: 1.7

Global: G4

LO: 1.7b

51) 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: E

Diff: 3 Var: 1 Page Ref: 1.7

Global: G4

LO: 1.7b

52) 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 Var: 1 Page Ref: 1.8

Global: G4

LO: 1.8b

53) 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 Var: 1 Page Ref: 1.8

Global: G4

LO: 1.8b

54) 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 Var: 1 Page Ref: 1.8

Global: G4

LO: 1.8b

55) How many cm^3 are contained in $3.77 \times 10^4 \text{ mm}^3$?

- A) $3.77 \times 10^4 \text{ cm}^3$
- B) $3.77 \times 10^1 \text{ cm}^3$
- C) $3.77 \times 10^{-10} \text{ cm}^3$
- D) $3.77 \times 10^{20} \text{ cm}^3$
- E) $3.77 \times 10^6 \text{ cm}^3$

Answer: B

Diff: 2 Var: 1 Page Ref: 1.8

Global: G4

LO: 1.8b

56) If an object has a density of 8.65 g/cm^3 , what is its density in units of kg/m^3 ?

- A) $8.65 \times 10^{-3} \text{ kg/m}^3$
- B) $8.65 \times 10^{-7} \text{ kg/m}^3$
- C) $8.65 \times 10^3 \text{ kg/m}^3$
- D) $8.65 \times 10^1 \text{ kg/m}^3$
- E) $8.65 \times 10^{-1} \text{ kg/m}^3$

Answer: C

Diff: 3 Var: 1 Page Ref: 1.8

Global: G4

LO: 1.8b

57) 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 Var: 1 Page Ref: 1.8

Global: G4

LO: 1.8b

58) A person weighs 77.1 kg. What is their weight in pounds?

- A) 154 pounds
- B) 170 pounds
- C) 35.0 pounds
- D) 162 pounds

Answer: B

Diff: 3 Var: 1 Page Ref: 1.8

Global: G4

LO: 1.8b

59) Convert 15.0 km to miles.

A) 24.1 miles

B) 9.32 miles

C) 591 miles

D) 33.1 miles

Answer: B

Diff: 3 Var: 1 Page Ref: 1.8

Global: G4

LO: 1.8b

60) 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: 4 Var: 1 Page Ref: 1.8

Global: G5

LO: 1.8a

61) Gas is sold for \$1.399 per liter in Toronto, Canada. Your car needs 12.00 gallons. How much will your credit card be charged in dollars?

A) \$16.79

B) \$67.15

C) \$4.44

D) \$63.54

Answer: D

Diff: 5 Var: 1 Page Ref: 1.8

Global: G5

LO: 1.8b

62) Define matter.

Answer: Matter is anything that occupies space and has mass.

Diff: 1 Var: 1 Page Ref: 1.3

Global: G1, G8

63) What is the difference between a physical property and a chemical property? Give an example of each.

Answer: A physical property is one that a substance displays without changing its composition, whereas a chemical property is one that a substance displays only by changing its composition via a chemical change. Physical properties include color, appearance, melting point, boiling point, and density.

Chemical properties include corrosiveness, flammability, acidity, and toxicity.

Diff: 1 Var: 1 Page Ref: 1.4

Global: G1, G8

LO: 1.4

64) Define the law of the conservation of energy.

Answer: Energy is neither created nor destroyed.

Diff: 1 Var: 1 Page Ref: 1.5

Global: G1, G8

65) 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 Var: 1 Page Ref: 1.6

Global: G7

66) A flash drive contains 4 gigabytes. How many bytes does it contain?

Answer: 4,000,000,000 bytes, 4×10^9 bytes, or 4,292,967,296 byte if someone is computer literate

Diff: 1 Var: 1 Page Ref: 1.8

Global: G4

LO: 1.8b

67) 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 temperature or density. An extensive property is one that does depend on the amount of the substance, such as mass or volume.

Diff: 1 Var: 1 Page Ref: 1.6

Global: G1, G8

68) 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 Var: 1 Page Ref: 1.6

Global: G1, G8

69) Define precision.

Answer: How close a series of measurements are to one another.

Diff: 1 Var: 1 Page Ref: 1.7

Global: G1, G8

70) Crude oil is an example of

A) a compound.

B) an element.

C) a heterogeneous mixture.

D) a homogeneous mixture.

Answer: C

Diff: 2 Var: 5 Page Ref: 1.3

Global: G2

71) Gasoline is an example of

- A) a compound.
- B) an element.
- C) a heterogeneous mixture.
- D) a homogeneous mixture.

Answer: D

Diff: 2 Var: 5 Page Ref: 1.3

Global: G2

72) Gold is an example of

- A) a compound.
- B) an element.
- C) a heterogeneous mixture.
- D) a homogeneous mixture.

Answer: B

Diff: 2 Var: 5 Page Ref: 1.3

Global: G2

73) NaN is an example of

- A) a compound.
- B) an element.
- C) a heterogeneous mixture.
- D) a homogeneous mixture.

Answer: A

Diff: 2 Var: 5 Page Ref: 1.3

Global: G2

74) Which of the following is the **smallest** volume?

- A) 44 cm^3
- B) 1.0 dL
- C) $5.5 \times 10^3 \text{ mL}$
- D) $1.0 \times 10^8 \text{ nL}$

Answer: A

Diff: 1 Var: 5 Page Ref: 1.8

Global: G4

LO: 1.8b

75) What symbol is used to represent the factor 10^{-1} ?

- A) M
- B) m
- C) μ
- D) d

Answer: D

Diff: 1 Var: 5 Page Ref: 1.6

Global: G2

76) The factor 1,000,000 corresponds to which prefix?

- A) deka
- B) deci
- C) mega
- D) milli

Answer: C

Diff: 1 Var: 5 Page Ref: 1.6

Global: G2

77) The factor 10^{-3} corresponds to which prefix?

- A) deka
- B) deci
- C) milli
- D) centi

Answer: C

Diff: 1 Var: 5 Page Ref: 1.6

Global: G2

78) What decimal power does the abbreviation f represent?

- A) 1×10^6
- B) 1×10^3
- C) 1×10^{-1}
- D) 1×10^{-15}
- E) 1×10^{-12}

Answer: D

Diff: 1 Var: 10 Page Ref: 1.6

Global: G2

79) What decimal power does the abbreviation pico represent?

- A) 1×10^6
- B) 1×10^9
- C) 1×10^{-1}
- D) 1×10^{-12}
- E) 1×10^{-15}

Answer: D

Diff: 1 Var: 10 Page Ref: 1.6

Global: G2

80) 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 Var: 9 Page Ref: 1.6

Global: G4

LO: 1.6b

81) 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) 0.312 g/mL
- B) 0.633 g/mL
- C) 1.58 g/mL
- D) 3.21 g/mL

Answer: C

Diff: 2 Var: 5 Page Ref: 1.6

Global: G4

LO: 1.6a

82) A mass of mercury occupies 0.950 L. What volume would an equal mass of ethanol occupy? The density of mercury is 13.546 g/mL and the density of ethanol is 0.789 g/mL .

- A) 0.0553 L
- B) 0.0613 L
- C) 16.3 L
- D) 18.1 L

Answer: C

Diff: 2 Var: 5 Page Ref: 1.6

Global: G4

LO: 1.6a

83) 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 Var: 5 Page Ref: 1.6

Global: G4

LO: 1.6b

84) Which of the following is the **lowest** temperature?

A) 42°C

B) 57°F

C) 318 K

D) All of these temperatures are all equal.

Answer: B

Diff: 3 Var: 5 Page Ref: 1.6

Global: G4

LO: 1.6b

85) How many significant figures are in the measurement 5.34 g?

A) 1

B) 2

C) 4

D) 3

E) 5

Answer: D

Diff: 1 Var: 10 Page Ref: 1.7

Global: G4

LO: 1.7a

86) The correct answer (reported to the proper number of significant figures) to the following is _____.

$$11.5 \times 8.78 = \underline{\hspace{2cm}}$$

Answer: 101

Diff: 2 Var: 10 Page Ref: 1.7

Global: G4

LO: 1.7b

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

A) 0.2296×10^3

B) 229.6

C) 2.296×10^{-2}

D) 2.296×10^2

E) 22.96×10^{-1}

Answer: D

Diff: 2 Var: 10 Page Ref: 1.7

Global: G2

LO: 1.7b

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

- A) 0.8010
- B) 0.504
- C) 742000
- D) 9.05×10^{24}

Answer: A

Diff: 2 Var: 5 Page Ref: 1.7

Global: G2

LO: 1.7a

89) How many of the following numbers contain 3 significant figures?

0.408 9.040 0.0400 9.05×10^{24}

- A) one
- B) two
- C) three
- D) four

Answer: C

Diff: 2 Var: 5 Page Ref: 1.7

Global: G2

LO: 1.7a

90) 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: C

Diff: 2 Var: 5 Page Ref: 1.7

Global: G2

LO: 1.7b

91) How many significant figures are there in the answer for the following problem?

$$56.4 + 0.8822 + 21 = ?$$

- A) one
- B) two
- C) three
- D) four

Answer: B

Diff: 2 Var: 5 Page Ref: 1.7

Global: G2

LO: 1.7b

92) How many significant figures are there in the answer for the following problem?

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

- A) one
- B) two
- C) three
- D) four

Answer: B

Diff: 2 Var: 5 Page Ref: 1.7

Global: G2

LO: 1.7b

93) 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 Var: 5 Page Ref: 1.7

Global: G2

LO: 1.7a

94) Round off 00907506 to four significant figures.

- A) 0091
- B) 9076
- C) 9100
- D) 9.075×10^5

Answer: D

Diff: 2 Var: 5 Page Ref: 1.7

Global: G2

LO: 1.7a

95) The width, length, and height of a large, custom-made shipping crate are 1.22 m, 3.22 m, and 0.83 m, respectively. The volume of the box using the correct number of significant figures is _____ m³.

- A) 3.26057
- B) 3.3
- C) 3.26
- D) 3.261
- E) 3.2606

Answer: B

Diff: 2 Var: 10 Page Ref: 1.7

Global: G4

LO: 1.7b

96) The correct answer (reported to the proper number of significant figures) to the following is _____.

$$(1815 - 1806) \times (9.11 \times 7.92) = \underline{\hspace{2cm}}$$

Answer: 600

Diff: 4 Var: 10 Page Ref: 1.7

Global: G4

LO: 1.7b

97) 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 Var: 5 Page Ref: 1.7

Global: G4

LO: 1.7b

98) 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 Var: 5 Page Ref: 1.7

Global: G4

LO: 1.7b

99) Which of the following is the greatest mass?

A) 1000 μg

B) $1.000 \times 10^{-4} \text{ kg}$

C) $1.000 \times 10^{-4} \text{ cg}$

D) $1.000 \times 10^{-8} \text{ mg}$

Answer: B

Diff: 2 Var: 5 Page Ref: 1.8

Global: G4

LO: 1.8b

100) The mass of a proton is 1.67×10^{-27} kg. What is the mass of a proton in picograms?

A) 1.67×10^{-18} pg

B) 1.67×10^{-15} pg

C) 1.67×10^{-12} pg

D) 1.67×10^{-9} pg

Answer: C

Diff: 2 Var: 5 Page Ref: 1.8

Global: G4

LO: 1.8b

101) 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} μ g.

D) 1.086×10^{-31} ng.

Answer: B

Diff: 2 Var: 5 Page Ref: 1.8

Global: G4

LO: 1.8b

102) A student weighed 30.00 μ g 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 Var: 5 Page Ref: 1.8

Global: G4

LO: 1.8b

103) Convert 4 μ m to meters.

A) 4×10^{-9} m

B) 4×10^{-6} m

C) 4×10^{-3} m

D) 4×10^6 m

Answer: B

Diff: 2 Var: 5 Page Ref: 1.8

Global: G4

LO: 1.8b

104) 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 Var: 5 Page Ref: 1.8

Global: G4

LO: 1.8b

105) 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 Var: 5 Page Ref: 1.8

Global: G4

LO: 1.8b

106) Which of the following volumes is equal to 40 mL?

- A) 40 cm³
- B) 40 dm³
- C) 0.40 L
- D) 0.00040 kL

Answer: A

Diff: 2 Var: 5 Page Ref: 1.8

Global: G4

LO: 1.8b

107) Convert 10 cm³ to m³.

- A) 1×10^{-5} m³
- B) 1×10^{-1} m³
- C) 1×10^3 m³
- D) 1×10^7 m³

Answer: A

Diff: 2 Var: 5 Page Ref: 1.8

Global: G4

LO: 1.8b

108) Convert 35 m^3 to liters.

A) $3.5 \times 10^{-2} \text{ L}$

B) 3.5 L

C) $3.5 \times 10^2 \text{ L}$

D) $3.5 \times 10^4 \text{ L}$

Answer: D

Diff: 2 Var: 5 Page Ref: 1.8

Global: G4

LO: 1.8b

109) $38.325 \text{ lbs} = \underline{\hspace{2cm}}$ grams. ($1 \text{ lb} = 454 \text{ g}$)

Answer: 17400

Diff: 4 Var: 10 Page Ref: 1.8

Global: G4

LO: 1.8b

110) 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) $1.2 \times 10^2 \text{ kg Ca}$

D) $5.7 \times 10^2 \text{ kg}$

Answer: A

Diff: 5 Var: 5 Page Ref: 1.8

Global: G5

LO: 1.8b

111) 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 $2.5 \times 10^2 \text{ nm}$ thick, how many square meters will the oil slick cover?

A) $1.9 \times 10^{-3} \text{ m}^2$

B) $1.9 \times 10^6 \text{ m}^2$

C) $1.9 \times 10^7 \text{ m}^2$

D) none of these

Answer: B

Diff: 5 Var: 5 Page Ref: 1.8

Global: G5

LO: 1.8b

112) 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 traveled on foot. Calculate the approximate number of liters required for a person to walk 10. kilometers in Death Valley.

- A) 2.9 L
- B) 12 L
- C) 30 L
- D) 47 L

Answer: A

Diff: 5 Var: 5 Page Ref: 1.8

Global: G5

LO: 1.8a

113) The estimated costs for remodeling the interior of an apartment are: three 1-gallon cans of paint at \$13.22 each, two paint brushes at \$9.53 each, and \$135 for a helper. The total estimated cost with the appropriate significant figures is \$_____.

- A) 193.72
- B) 1.9×10^2
- C) 194
- D) 2×10^2
- E) 193.7

Answer: C

Diff: 5 Var: 10 Page Ref: 1.8

Global: G5

LO: 1.8a

114) How many liters of wine can be held in a wine barrel whose capacity is 26.0 gal?

1 gal = 4 qt = 3.7854 L.

- A) 1.46×10^{-4}
- B) 0.146
- C) 98.4
- D) 6.87×10^3
- E) 6.87

Answer: C

Diff: 5 Var: 10 Page Ref: 1.8

Global: G5

LO: 1.8b

115) The recommended adult dose of Elixophyllin[®], a drug used to treat asthma, is 6.00 mg/kg of body mass. Calculate the dose in milligrams for a 115-lb person. 1 lb = 453.59 g.

- A) 24
- B) 1,521
- C) 1.5
- D) 313
- E) 3.1×10^5

Answer: D

Diff: 5 Var: 10 Page Ref: 1.8

Global: G5

LO: 1.8b

116) The density of air under ordinary conditions at 25°C is 1.19 g/L. How many kilograms of air are in a room that measures 11.0 ft × 11.0 ft and has a(n) 10.0 ft ceiling? 1 in. = 2.54 cm (exactly); 1 L = 10³ cm³.

- A) 3.66
- B) 0.152
- C) 4.08×10^4
- D) 0.0962
- E) 40.8

Answer: E

Diff: 5 Var: 12 Page Ref: 1.8

Global: G5

LO: 1.8a

117) How many liters of air are in a room that measures 10.0 ft × 11.0 ft and has a(n) 8.00 ft ceiling? 1 in. = 2.54 cm (exactly); 1 L = 10³ cm³.

- A) 2.49×10^4
- B) 92.8
- C) 26.8
- D) 2.68×10^7
- E) 8.84×10^5

Answer: A

Diff: 5 Var: 12 Page Ref: 1.8

Global: G5

LO: 1.8a

118) Identify the crystalline solid.

- A) plastic
- B) glass
- C) table salt
- D) water
- E) bleach

Answer: C

Diff: 1 Var: 8 Page Ref: 1.3

Global: G1

119) Choose the heterogeneous mixture from the list below.

- A) sports drink
- B) chlorine gas
- C) beer
- D) lasagna
- E) carbon (graphite)

Answer: D

Diff: 1 Var: 12 Page Ref: 1.3

Global: G1

120) Which glassware is best to measure 10.5 mL of a liquid?

- A) a graduated buret (with marking every 0.1 mL)
- B) a graduated cylinder (with marking every 1 mL)
- C) a fixed volume pipet (with only one marking)
- D) a graduated beaker (with marking every 10 mL)

Answer: A

Diff: 1 Var: 1 Page Ref: 1.7

Global: G4

LO: 1.4