

Chemistry: A Molecular Approach, 4e (Tro)

Chapter 1 Matter, Measurement, and Problem Solving

Multiple Choice Questions

1) Molecules can be described as

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

Answer: C

Diff: 1 Var: 1 Page Ref: 1.1

Global: G1

2) Identify the TRUE statement.

- A) Hydrogen peroxide is used as rocket fuel and removes color from hair.
- B) Hydrogen peroxide can be used as a drink and can be used to bathe in.
- C) Both water and hydrogen peroxide are stable molecules.
- D) Water reacts with skin.
- E) Hydrogen peroxide is smaller than water.

Answer: A

Diff: 2 Var: 1 Page Ref: 1.1

Global: G1

3) 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: 2 Var: 1 Page Ref: 1.2

Global: G2

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) 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

6) A scientific theory

- 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: G2

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: G2

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) Identify a solid.

- 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: A

Diff: 1 Var: 1 Page Ref: 1.3

Global: G1

10) Identify a gas.

- 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: D

Diff: 1 Var: 1 Page Ref: 1.3

Global: G1

11) 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 with a majority of its volume empty.
- E) All of the above statements are TRUE.

Answer: A

Diff: 1 Var: 1 Page Ref: 1.3

Global: G2

12) 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 Var: 1 Page Ref: 1.3

Global: G2

13) 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 Var: 1 Page Ref: 1.3

Global: G1

14) 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 Var: 1 Page Ref: 1.3

Global: G1

15) 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 Var: 1 Page Ref: 1.3

Global: G1

16) Distillation 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: A

Diff: 1 Var: 1 Page Ref: 1.3

Global: G1

17) Filtration 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: D

Diff: 1 Var: 1 Page Ref: 1.3

Global: G1

18) 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 Var: 1 Page Ref: 1.3

Global: G1

19) 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 Var: 1 Page Ref: 1.3

Global: G1

20) 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

LO: 1.1

Global: G2|G5

21) 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 powdered lemonade is stirred into water.

Answer: A

Diff: 1 Var: 1 Page Ref: 1.4

LO: 1.1

Global: G2|G5

22) 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) Kinetic energy is the energy associated with its position or composition.
- D) 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: G2

23) Define *thermal energy*.

- A) energy associated with the temperature of an object
- B) energy associated with the motion of an object
- C) energy associated with the force of an object
- D) energy associated with the gravity of an object
- E) energy associated with the position or composition of an object

Answer: A

Diff: 1 Var: 1 Page Ref: 1.5

Global: G1

24) Define *kinetic energy*.

- A) energy associated with the temperature of an object
- B) energy associated with the motion of an object
- C) energy associated with the force of an object
- D) energy associated with the gravity of an object
- E) energy associated with the position or composition of an object

Answer: B

Diff: 1 Var: 1 Page Ref: 1.5

Global: G1

25) Define *potential energy*.

- A) energy associated with the temperature of an object
- B) energy associated with the motion of an object
- C) energy associated with the force of an object
- D) energy associated with the gravity of an object
- E) energy associated with the position or composition of an object

Answer: E

Diff: 1 Var: 1 Page Ref: 1.5

Global: G1

26) Identify the type of energy that is NOT chemical energy.

- A) battery
- B) gasoline in a car
- C) light bulb
- D) ball rolling down the hill
- E) food

Answer: D

Diff: 2 Var: 1 Page Ref: 1.5

Global: G2|G5

27) All of the following are SI base 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: G1

28) 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 Var: 1 Page Ref: 1.6

LO: 1.2

Global: G4

29) 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

LO: 1.3

Global: G4

30) Determine the volume of an object that has a mass of 455.6 g and a density of 19.3 g/cm^3 .

- 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

LO: 1.3

Global: G4

31) Osteoporosis is a condition in which the bone density becomes low. Healthy bones in young adults have a bone density of 1.0 g/cm^3 . Identify the incorrect statement.

- A) Compression of the vertebrae can be caused by osteoporosis.
- B) Low density bones absorb less x-ray than high density bones.
- C) A bone density of 1.5 g/cm^3 is caused by osteoporosis.
- D) Exercise decreases osteoporosis.
- E) Patients with osteoporosis are more susceptible to fractures.

Answer: C

Diff: 2 Var: 1 Page Ref: 1.6

Global: G2|G5

32) *Systematic error* is defined as

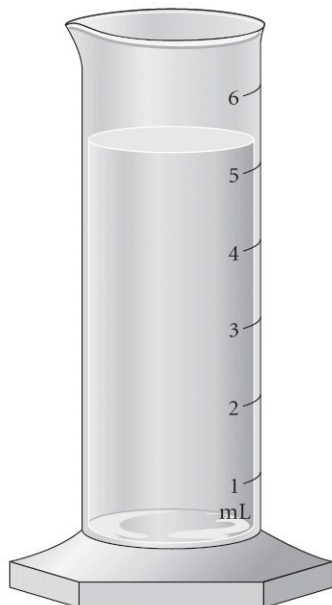
- A) error that tends to be too high or too low.
- B) error that has equal probability of being too high and too low.
- C) error that averages out with repeated trials.
- D) error that is random.

Answer: A

Diff: 1 Var: 1 Page Ref: 1.7

Global: G1

33) 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

LO: 1.4

Global: G3

34) 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

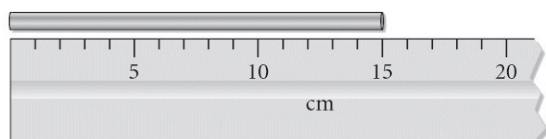
Answer: C

Diff: 2 Var: 1 Page Ref: 1.7

LO: 1.4

Global: G3

35) 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

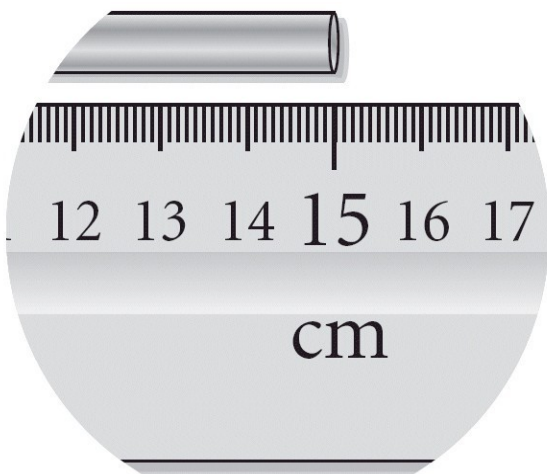
Answer: C

Diff: 2 Var: 1 Page Ref: 1.7

LO: 1.4

Global: G3

36) 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

LO: 1.4

Global: G3

37) Identify the exact number.

- A) 2
- B) 2.0
- C) 2.00
- D) 2.000
- E) 2.0000

Answer: A

Diff: 1 Var: 1 Page Ref: 1.7

Global: G2

38) 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 Var: 1 Page Ref: 1.7

LO: 1.5

Global: G4

39) 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: 2 Var: 1 Page Ref: 1.7

LO: 1.5

Global: G4

40) 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: 2 Var: 1 Page Ref: 1.7

LO: 1.5

Global: G4

41) 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

LO: 1.6

Global: G4|G5

42) 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 Canadian dollars?

- A) \$16.79
- B) \$67.15
- C) \$4.44
- D) \$63.54

Answer: D

Diff: 5 Var: 1 Page Ref: 1.8

LO: 1.6

Global: G4|G5

43) Identify the **longest** length.

- A) 3.10 ft
- B) 37.0 in
- C) 1.02 yd
- D) 1.00 m
- E) 91.44 cm

Answer: D

Diff: 3 Var: 1 Page Ref: 1.8

LO: 1.6

Global: G4

44) Identify the **shortest** length.

- A) 3.10 ft
- B) 37.0 in
- C) 1.02 yd
- D) 1.00 m
- E) 91.44 cm

Answer: E

Diff: 3 Var: 1 Page Ref: 1.8

LO: 1.6

Global: G4

Algorithmic Questions

1) Identify the composition of diamond.

- A) carbon atoms
- B) boron atoms
- C) nitrogen atoms
- D) chlorine atoms
- E) silicon atoms

Answer: A

Diff: 1 Var: 50+ Page Ref: 1.1

Global: G2

2) Give the composition of water.

- A) one hydrogen atom and two oxygen atoms
- B) one hydrogen atom and one oxygen atom
- C) two hydrogen atoms and one oxygen atom
- D) one hydrogen molecule and two oxygen molecules

Answer: C

Diff: 1 Var: 50+ Page Ref: 1.1

Global: G2

- 3) Give the composition of hydrogen peroxide.
- A) two hydrogen atoms and two oxygen atoms
 - B) one hydrogen molecule and one oxygen atom
 - C) two hydrogen molecules and one oxygen molecule
 - D) one hydrogen atom and two oxygen molecules

Answer: A

Diff: 1 Var: 50+ Page Ref: 1.1

Global: G2

- 4) Which of the following represents a valid *hypothesis*?

- A) Argon does not react with oxygen.
- B) Sodium metal reacts violently with water.
- C) Lead is soft and malleable.
- D) Nitrogen is a gas at room temperature.
- E) Metals tend to lose electrons.

Answer: E

Diff: 1 Var: 50+ Page Ref: 1.2

Global: G2

- 5) Identify a state of matter.

- A) melting point
- B) solid
- C) odor
- D) volume
- E) density

Answer: B

Diff: 1 Var: 50+ Page Ref: 1.3

Global: G2

- 6) Identify the crystalline solid.

- A) plastic
- B) cloth
- C) diamond
- D) water
- E) coffee

Answer: C

Diff: 2 Var: 50+ Page Ref: 1.3

Global: G2|G5

7) Choose the pure substance from the list below.

- A) coffee
- B) a casserole
- C) water
- D) salt water
- E) apple juice

Answer: C

Diff: 2 Var: 50+ Page Ref: 1.3

Global: G2|G5

8) A banana split 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|G5

9) Household ammonia is an example of

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

Answer: D

Diff: 2 Var: 4 Page Ref: 1.3

Global: G2

10) Diamond 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

11) Water is an example of

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

Answer: A

Diff: 2 Var: 4 Page Ref: 1.3

Global: G2

12) Identify a solid.

- A) gold
- B) helium
- C) water
- D) neon
- E) oxygen

Answer: A

Diff: 2 Var: 50+ Page Ref: 1.3

Global: G2

13) Identify a liquid.

- A) nitrogen
- B) tin
- C) potassium bromide
- D) gasoline
- E) sugar

Answer: D

Diff: 2 Var: 50+ Page Ref: 1.3

Global: G2

14) Identify a gas.

- A) silver
- B) mercury
- C) hydrogen
- D) iron
- E) phosphorus

Answer: C

Diff: 2 Var: 50+ Page Ref: 1.3

Global: G2

15) Choose the pure substance from the list below.

- A) lemonade
- B) salt
- C) air
- D) wine
- E) juice

Answer: B

Diff: 2 Var: 50+ Page Ref: 1.3

Global: G2|G5

16) Choose the element from the list below.

- A) sodium chloride
- B) table salt
- C) hydrogen peroxide
- D) iron
- E) rust

Answer: D

Diff: 2 Var: 50+ Page Ref: 1.3

Global: G2

17) Choose the compound from the list below.

- A) silver
- B) methanol
- C) helium
- D) tin
- E) sodium

Answer: B

Diff: 2 Var: 50+ Page Ref: 1.3

Global: G2

18) Choose the heterogeneous mixture from the list below.

- A) sports drink
- B) fluorine gas
- C) tea
- D) lasagna
- E) carbon (graphite)

Answer: D

Diff: 2 Var: 50+ Page Ref: 1.3

Global: G2|G5

19) Choose the homogeneous mixture from the list below.

- A) cola
- B) mud
- C) ice water
- D) a tree
- E) salsa

Answer: A

Diff: 2 Var: 50+ Page Ref: 1.3

Global: G2|G5

20) Choose the homogeneous mixture from the list below.

- A) cola float
- B) wine
- C) concrete
- D) trail mix
- E) chunky spaghetti sauce

Answer: B

Diff: 2 Var: 50+ Page Ref: 1.3

Global: G2|G5

21) Which of the following are examples of physical change?

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

Answer: E

Diff: 2 Var: 50+ Page Ref: 1.4

LO: 1.1

Global: G2|G5

22) 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) browning meat
- D) An oxygen balloon explodes when contacted with a flame.
- E) None of the above is a physical change.

Answer: A

Diff: 2 Var: 16 Page Ref: 1.4

LO: 1.1

Global: G2|G5

23) Which of the following is an example of a chemical change?

- A) dry ice sublimates
- B) charcoal burning
- C) ethanol evaporates
- D) ice melting
- E) All of the above are examples of chemical change.

Answer: B

Diff: 2 Var: 50+ Page Ref: 1.4

LO: 1.1

Global: G2|G5

24) Which of the following is an example of a chemical change?

- A) coffee brewing
- B) water boiling
- C) leaves turning color in the fall
- D) sugar dissolves in water
- E) None of the above is a chemical change.

Answer: C

Diff: 2 Var: 8 Page Ref: 1.4

LO: 1.1

Global: G2|G5

25) 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) Iron has a tendency to "rust."
- D) Butane is highly flammable.
- E) Xenon has an unreactive nature.

Answer: B

Diff: 2 Var: 50+ Page Ref: 1.4

LO: 1.1

Global: G2

26) Which of the following represents a chemical property of hydrogen gas?

- A) It is a gas at room temperature.
- B) It is less dense than air.
- C) It explodes with a flame.
- D) It is odorless.
- E) It has a low density.

Answer: C

Diff: 2 Var: 9 Page Ref: 1.4

LO: 1.1

Global: G2

27) Identify the unit of measurement which is a SI base unit of measurement.

- A) meter
- B) Celsius
- C) quart
- D) gram
- E) kilometer

Answer: A

Diff: 1 Var: 50+ Page Ref: 1.6

Global: G2

28) Kelvin is a measure of

- A) temperature.
- B) mass.
- C) time.
- D) length.
- E) volume.

Answer: A

Diff: 1 Var: 4 Page Ref: 1.6

Global: G2

29) Identify the **smallest** measurement.

- A) attometer
- B) nanometer
- C) centimeter
- D) megameter
- E) petameter

Answer: A

Diff: 2 Var: 50+ Page Ref: 1.6

Global: G2

30) Identify the **largest** measurement.

- A) attoL
- B) microL
- C) deciL
- D) gigaL
- E) petaL

Answer: E

Diff: 2 Var: 50+ Page Ref: 1.6

Global: G2

31) What symbol is used to represent the factor 10^{-3} ?

- A) M
- B) m
- C) μ
- D) n

Answer: B

Diff: 1 Var: 5 Page Ref: 1.6

Global: G1

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

- A) 11 cm^3
- B) 0.065 dL
- C) $2.8 \times 10^3 \text{ mL}$
- D) $5.0 \times 10^7 \text{ nL}$

Answer: A

Diff: 2 Var: 50+ Page Ref: 1.6

Global: G4

33) What symbol is used to represent the factor 10^{-2} ?

- A) M
- B) m
- C) μ
- D) c

Answer: D

Diff: 1 Var: 5 Page Ref: 1.6

Global: G1

34) The factor 0.01 corresponds to which prefix?

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

Answer: C

Diff: 1 Var: 5 Page Ref: 1.6

Global: G1

35) The factor 10^6 corresponds to which prefix?

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

Answer: C

Diff: 1 Var: 5 Page Ref: 1.6

Global: G1

36) Which multiplier does the abbreviation m represent?

- A) 1×10^3
- B) 1×10^6
- C) 1×10^9
- D) 1×10^{-3}
- E) 1×10^{-6}

Answer: D

Diff: 1 Var: 10 Page Ref: 1.6

Global: G1

37) Which multiplier does the abbreviation mega represent?

- A) 1×10^{-1}
- B) 1×10^{-3}
- C) 1×10^3
- D) 1×10^6
- E) 1×10^9

Answer: D

Diff: 1 Var: 10 Page Ref: 1.6

Global: G1

38) Which of the following is an example of intensive properties?

- A) boiling point
- B) height
- C) volume
- 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 Var: 50+ Page Ref: 1.6

Global: G2

39) Which of the following is an example of extensive properties?

- A) mass
- B) color
- C) solubility
- D) viscosity
- E) taste

Answer: A

Diff: 1 Var: 48 Page Ref: 1.6

Global: G2

40) Identify the common substance that has the **highest** density.

- A) glass
- B) ethanol
- C) aluminum
- D) lead
- E) iron

Answer: D

Diff: 2 Var: 50+ Page Ref: 1.6

Global: G2|G5

41) Identify the common substance that has the **lowest** density.

- A) water
- B) titanium
- C) copper
- D) sugar
- E) gold

Answer: A

Diff: 2 Var: 50+ Page Ref: 1.6

Global: G2|G5

42) 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) 0.425
- D) 6.65
- E) none of the above

Answer: A

Diff: 2 Var: 9 Page Ref: 1.6

LO: 1.3

Global: G4

43) A piece of metal ore weighs 9.00 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) 0.340 g/mL
- B) 0.580 g/mL
- C) 1.72 g/mL
- D) 2.94 g/mL

Answer: C

Diff: 2 Var: 5 Page Ref: 1.6

LO: 1.3

Global: G4

44) 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

LO: 1.3

Global: G4

45) If the melting point of molybdenum metal is 2623°C , what is its melting point in Kelvin?

- A) 1454 K
- B) 2350 K
- C) 2896 K
- D) 4753 K

Answer: C

Diff: 2 Var: 5 Page Ref: 1.6

LO: 1.2

Global: G4

46) If the temperature is 228°F , what is the temperature in degrees Celsius?

- A) 442.4°C
- B) 501°C
- C) 108.9°C
- D) -45°C
- E) 428°C

Answer: C

Diff: 2 Var: 5 Page Ref: 1.6

LO: 1.2

Global: G4

47) If a solution has a temperature of 255 K, what is its temperature in degrees Celsius?

- A) 491°C
- B) 528°C
- C) 123.9°C
- D) 355°C
- E) -18°C

Answer: E

Diff: 2 Var: 5 Page Ref: 1.6

LO: 1.2

Global: G4

48) Determine the mass of an object that has a volume of 88.6 mL and a density of 2.22 g/mL .

- A) 90.82 g
- B) 0.0251 g
- C) 39.9 g
- D) 86.4 g
- E) 197 g

Answer: E

Diff: 2 Var: 5 Page Ref: 1.6

LO: 1.3

Global: G4

49) The outside air temperature is 40°F, what is the temperature in Kelvin?

- A) 313 K
- B) 377 K
- C) 281 K
- D) 277 K

Answer: D

Diff: 2 Var: 5 Page Ref: 1.6

LO: 1.2

Global: G4

50) The outside temperature is 35°C, what is the temperature in °F?

- A) 95°F
- B) 1.67°F
- C) 3°F
- D) 57°F
- E) 63°F

Answer: A

Diff: 2 Var: 5 Page Ref: 1.6

LO: 1.2

Global: G4

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

- A) 48°C
- B) 75°F
- C) 313 K
- D) All of these temperatures are all equal.

Answer: B

Diff: 2 Var: 50+ Page Ref: 1.6

LO: 1.2

Global: G4

52) Which of the following is the **highest** temperature?

- A) 42°C
- B) 61°F
- C) 365 K
- D) All of these temperatures are all equal.

Answer: C

Diff: 2 Var: 50+ Page Ref: 1.6

LO: 1.2

Global: G4

53) Identify the boiling point of water.

- A) 373 Kelvin
- B) 32 degrees Fahrenheit
- C) -459 degrees Fahrenheit
- D) None of the above

Answer: A

Diff: 1 Var: 27 Page Ref: 1.6

Global: G1

54) Identify the freezing point of water.

- A) 373 Kelvin
- B) 32 degrees Fahrenheit
- C) -273 degrees Celsius
- D) None of the above

Answer: B

Diff: 1 Var: 27 Page Ref: 1.6

Global: G1

55) Identify absolute zero.

- A) 212 degrees Fahrenheit
- B) 0.00 degrees Celsius
- C) -273 degrees Celsius
- D) None of the above

Answer: C

Diff: 1 Var: 27 Page Ref: 1.6

Global: G1

56) How many significant figures are in the measurement 5.3 g?

- A) 1
- B) 4
- C) 3
- D) 2
- E) 5

Answer: D

Diff: 2 Var: 10 Page Ref: 1.7

LO: 1.5

Global: G2

57) How many significant figures are in 0.00226500 mL?

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

Answer: D

Diff: 2 Var: 50+ Page Ref: 1.7

LO: 1.5

Global: G2

58) How many significant figures are in 4.930×10^4 m?

- A) 2
- B) 4
- C) 3
- D) 1
- E) 5

Answer: B

Diff: 2 Var: 50+ Page Ref: 1.7

LO: 1.5

Global: G2

59) How many significant figures are in the measurement, 263.900 m?

- A) 2
- B) 3
- C) 4
- D) 5
- E) 6

Answer: E

Diff: 2 Var: 50+ Page Ref: 1.7

LO: 1.5

Global: G2

60) How many significant figures are in the measurement, 0.003800 g?

- A) 4
- B) 5
- C) 6
- D) 7
- E) 8

Answer: A

Diff: 2 Var: 50+ Page Ref: 1.7

LO: 1.5

Global: G2

61) The correct answer (reported to the proper number of significant figures) to the following is:

$$12.5 \times 9.68 = \underline{\hspace{2cm}}$$

- A) 121
- B) 121.0000
- C) 121.000
- D) 121.00
- E) 121.0

Answer: A

Diff: 2 Var: 9 Page Ref: 1.7

LO: 1.5

Global: G4

62) Round the following number to four significant figures and express the result in standard exponential notation: 442,722

- A) 0.4427×10^6
- B) 442,700
- C) 4.427×10^{-5}
- D) 4.427×10^5
- E) 44.27×10^4

Answer: D

Diff: 2 Var: 10 Page Ref: 1.7

LO: 1.5

Global: G2

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

- A) 0.6080
- B) 0.504
- C) 529000
- D) 1.06×10^{24}

Answer: A

Diff: 2 Var: 50+ Page Ref: 1.7

LO: 1.5

Global: G2

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

0.509 9.040 0.0300 7.03×10^{24}

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

Answer: C

Diff: 2 Var: 50+ Page Ref: 1.7

LO: 1.5

Global: G2

65) 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 Var: 5 Page Ref: 1.7

LO: 1.5

Global: G2

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

$$57.5 + 0.9933 + 32 = ?$$

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

Answer: B

Diff: 2 Var: 5 Page Ref: 1.7

LO: 1.5

Global: G2

67) 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

LO: 1.5

Global: G2

68) 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

LO: 1.5

Global: G2

69) Round off 00507506 to four significant figures.

- A) 0051
- B) 5076
- C) 5100
- D) 5.075×10^5

Answer: D

Diff: 2 Var: 5 Page Ref: 1.7

LO: 1.5

Global: G2

70) The width, length, and height of a large, custom-made shipping crate are 1.32 m, 2.50 m, and 0.83 m, respectively. The volume of the box using the correct number of significant figures is _____ m³.

- A) 2.73900
- B) 2.7
- C) 2.74
- D) 2.739
- E) 2.7390

Answer: B

Diff: 2 Var: 10 Page Ref: 1.7

LO: 1.5

Global: G4

71) The correct answer (reported to the proper number of significant figures) to the following is:

$$(1612 - 1501) \times (8.56 \times 8.86) = \underline{\hspace{2cm}}$$

- A) 8.4×10^3
- B) -1.1×10^5
- C) 1.7×10^5
- D) 2.0×10^3
- E) 1.6×10^4

Answer: A

Diff: 3 Var: 50+ Page Ref: 1.7

LO: 1.5

Global: G4

72) How many significant figures are in the measurement, 31.600 m?

- A) 3
- B) 4
- C) 5
- D) 1
- E) 2

Answer: C

Diff: 2 Var: 50+ Page Ref: 1.7

LO: 1.5

Global: G2

73) A student performs an experiment to determine the density of a sugar solution. She obtains the following results: 1.07 g/mL, 1.81 g/mL, 1.93 g/mL, and 1.75 g/mL. If the actual value for the density of the sugar solution is 1.75 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: 50+ Page Ref: 1.7

Global: G9

74) A student performs an experiment to determine the density of a sugar solution. She obtains the following results: 1.70 g/mL, 1.73 g/mL, 1.66 g/mL, 1.68 g/mL. If the actual value for the density of the sugar solution is 1.40 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: 50+ Page Ref: 1.7

Global: G9

75) A student performs an experiment to determine the density of a sugar solution. She obtains the following results: 1.81 g/mL, 1.81 g/mL, 1.80 g/mL, 1.81 g/mL. If the actual value for the density of the sugar solution is 1.79 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: C

Diff: 1 Var: 50+ Page Ref: 1.7

Global: G9

76) Identify a unit that is used for volume.

- A) cm^3
- B) g
- C) in^2
- D) degrees Fahrenheit
- E) km

Answer: A

Diff: 2 Var: 50+ Page Ref: 1.8

Global: G2

77) Identify a unit that is used for area.

- A) L
- B) yd
- C) yd^2
- D) Kelvin
- E) m

Answer: C

Diff: 2 Var: 50+ Page Ref: 1.8

Global: G2

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

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

A) 1×10^{-6}

B) 1×10^4

C) 1×10^{24}

D) 1×10^{34}

Answer: C

Diff: 2 Var: 5 Page Ref: 1.8

Global: G4

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

$$\frac{[(1 \times 10^{-9}) \times (1 \times 10^6)]^2}{(1 \times 10^7)}$$

A) 1×10^8

B) 1×10^1

C) 1×10^{-13}

D) 1×10^{-20}

Answer: C

Diff: 2 Var: 5 Page Ref: 1.8

Global: G4

80) Which of the following is the **greatest** mass?

A) 100,000 μg

B) $1.000 \times 10^{-2} \text{ kg}$

C) $1.000 \times 10^{-2} \text{ cg}$

D) $1.000 \times 10^{-6} \text{ Mg}$

Answer: B

Diff: 2 Var: 5 Page Ref: 1.8

LO: 1.6

Global: G4

81) The mass of a proton is $1.67 \times 10^{-27} \text{ kg}$. What is the mass of a proton in nanograms?

A) $1.67 \times 10^{-21} \text{ ng}$

B) $1.67 \times 10^{-18} \text{ ng}$

C) $1.67 \times 10^{-15} \text{ ng}$

D) $1.67 \times 10^{-12} \text{ ng}$

Answer: C

Diff: 2 Var: 5 Page Ref: 1.8

LO: 1.6

Global: G4

82) The mass of a single arsenic atom is 1.244×10^{-22} g. This is the same mass as

A) 1.244×10^{-16} mg.

B) 1.244×10^{-25} kg.

C) 1.244×10^{-28} μ g.

D) 1.244×10^{-31} ng.

Answer: B

Diff: 2 Var: 5 Page Ref: 1.8

LO: 1.6

Global: G4

83) 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

LO: 1.6

Global: G4

84) Convert 3.3 μ m to meters.

A) 3.3×10^{-9} m

B) 3.3×10^{-6} m

C) 3.3×10^{-3} m

D) 3.3×10^6 m

Answer: B

Diff: 2 Var: 50+ Page Ref: 1.8

LO: 1.6

Global: G4

85) The average distance between nitrogen and oxygen atoms is 115 pm in a compound called nitric oxide. What is this distance in centimeters?

A) 1.15×10^{-9} cm

B) 1.15×10^{-8} cm

C) 1.15×10^{12} cm

D) 1.15×10^{16} cm

Answer: B

Diff: 2 Var: 5 Page Ref: 1.8

LO: 1.6

Global: G4

86) 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

LO: 1.6

Global: G4

87) Which of the following volumes is equal to 41 mL?

A) 41 cm³

B) 41 dm³

C) 0.41 L

D) 0.00041 kL

Answer: A

Diff: 2 Var: 50+ Page Ref: 1.8

LO: 1.6

Global: G4

88) Convert 90 cm³ to m³.

A) 9×10^{-5} m³

B) 9×10^{-1} m³

C) 9×10^3 m³

D) 9×10^7 m³

Answer: A

Diff: 2 Var: 45 Page Ref: 1.8

LO: 1.6

Global: G4

89) Convert 22 m³ to liters.

A) 2.2×10^{-2} L

B) 2.2 L

C) 2.2×10^2 L

D) 2.2×10^4 L

Answer: D

Diff: 2 Var: 50+ Page Ref: 1.8

LO: 1.6

Global: G4

90) What wavelength of light would you report in units of nm, if the light had a wavelength of 1.65×10^{-10} m?

- A) 1.65×10^{-3} nm
- B) 1.65×10^{-19} nm
- C) 1.65 nm
- D) 0.165 nm
- E) 165 nm

Answer: D

Diff: 2 Var: 50+ Page Ref: 1.8

LO: 1.6

Global: G4

91) How many mg does an 830 kg sample contain?

- A) 8.30×10^{-4} mg
- B) 8.30×10^7 mg
- C) 8.30×10^{-3} mg
- D) 8.30×10^6 mg
- E) 8.30×10^8 mg

Answer: E

Diff: 2 Var: 50+ Page Ref: 1.8

LO: 1.6

Global: G4

92) How many kL does a 9.51×10^9 cL sample contain?

- A) 9.51×10^4 kL
- B) 9.51×10^{14} kL
- C) 9.51×10^5 kL
- D) 9.51×10^{13} kL
- E) 9.51×10^3 kL

Answer: A

Diff: 2 Var: 50+ Page Ref: 1.8

LO: 1.6

Global: G4

93) How many cm^3 are contained in $5.83 \times 10^6 \text{ mm}^3$?

- A) $5.83 \times 10^6 \text{ cm}^3$
- B) $5.83 \times 10^3 \text{ cm}^3$
- C) $5.83 \times 10^{-10} \text{ cm}^3$
- D) $5.83 \times 10^{18} \text{ cm}^3$
- E) $5.83 \times 10^{12} \text{ cm}^3$

Answer: B

Diff: 2 Var: 50+ Page Ref: 1.8

LO: 1.6

Global: G4

94) How many mL are in 4.08 L?

- A) $4.08 \times 10^{-3} \text{ mL}$
- B) $4.08 \times 10^1 \text{ mL}$
- C) $4.08 \times 10^3 \text{ mL}$
- D) $4.08 \times 10^{-1} \text{ mL}$
- E) $4.08 \times 10^6 \text{ mL}$

Answer: C

Diff: 2 Var: 50+ Page Ref: 1.8

LO: 1.6

Global: G4

95) $5.621 \text{ lb} =$ _____ grams. (1 lb = 454 g)

- A) 2550×10^3
- B) 1.24×10^{-2}
- C) 1.28×10^3
- D) 8.00×10^3
- E) 1.70×10^3

Answer: A

Diff: 3 Var: 50+ Page Ref: 1.8

LO: 1.6

Global: G4

96) If 1.4% of the mass of a human body is calcium, how many kilograms of calcium are there in a 165-pound man?

- A) 1.0 kg Ca
- B) 5.1 kg Ca
- C) $1.0 \times 10^2 \text{ kg Ca}$
- D) $5.1 \times 10^2 \text{ kg Ca}$

Answer: A

Diff: 5 Var: 5 Page Ref: 1.8

LO: 1.6

Global: G4|G5

97) 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 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

LO: 1.6

Global: G4|G5

98) 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 15 kilometers in Death Valley.

- A) 4.4 L
- B) 18 L
- C) 46 L
- D) 70 L

Answer: A

Diff: 5 Var: 5 Page Ref: 1.8

LO: 1.6

Global: G4|G5

99) 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 \$12.22 each, and \$145 for a helper. The total estimated cost with the appropriate significant figures is \$_____.

- A) 209.10
- B) 2.1×10^2
- C) 209
- D) 2×10^2
- E) 209.1

Answer: C

Diff: 5 Var: 10 Page Ref: 1.8

LO: 1.6

Global: G4|G5

100) How many liters of wine can be held in a wine barrel whose capacity is 28.0 gal?

1 gal = 4 qt = 3.7854 L.

A) 1.35×10^{-4}

B) 0.135

C) 106

D) 7.40×10^3

E) 7.40

Answer: C

Diff: 5 Var: 10 Page Ref: 1.8

LO: 1.6

Global: G4|G5

101) 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

LO: 1.6

Global: G4|G5

102) 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 × 12.0 ft and has a 10.0 ft ceiling? 1 in. = 2.54 cm

(exactly); 1 L = 10^3 cm^3

A) 3.99

B) 0.166

C) 4.45×10^4

D) 0.1145

E) 44.5

Answer: E

Diff: 5 Var: 12 Page Ref: 1.8

LO: 1.6

Global: G4|G5

103) How many liters of air are in a room that measures $9.0\text{ ft} \times 11.0\text{ ft}$ and has a 10.0 ft ceiling?

$1\text{ in.} = 2.54\text{ cm}$ (exactly); $1\text{ L} = 10^3\text{ cm}^3$

A) 2.80×10^4

B) 104

C) 30.2

D) 3.02×10^7

E) 9.14×10^5

Answer: A

Diff: 5 Var: 12 Page Ref: 1.8

LO: 1.6

Global: G4|G5

104) A recipe requires 1.89 liters of milk for a soup base. How many quarts are needed?

A) 1.79 qt.

B) 2.00 qt.

C) 1.89 qt.

D) 4.16 qt.

E) 0.859 qt.

Answer: B

Diff: 2 Var: 5 Page Ref: 1.8

LO: 1.6

Global: G4|G5

105) If a room requires 25.4 square yards of carpeting, what is the area of the floor in units of ft^2 ? ($3\text{ ft.} = 1\text{ yd.}$)

A) 76.2 ft^2

B) 8.47 ft^2

C) 152.4 ft^2

D) 229 ft^2

E) 64.5 ft^2

Answer: D

Diff: 3 Var: 5 Page Ref: 1.8

LO: 1.6

Global: G4|G5

106) 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) 204.0 cm

E) 136.0 cm

Answer: A

Diff: 2 Var: 50+ Page Ref: 1.8

LO: 1.6

Global: G4|G5

107) A person weighs 72.6 kg. What is his weight in pounds?

- A) 145 pounds
- B) 160 pounds
- C) 32.9 pounds
- D) 29.0 pounds
- E) 181 pounds

Answer: B

Diff: 2 Var: 5 Page Ref: 1.8

LO: 1.6

Global: G4|G5

108) A person is 1.721 yards tall. How tall is he in cm?

- A) 157.4 cm
- B) 24.39 cm
- C) 0.1214 cm
- D) 4.371 cm
- E) 13.11 cm

Answer: A

Diff: 2 Var: 5 Page Ref: 1.8

LO: 1.6

Global: G4|G5

109) An alligator is 213.4 cm long. How long is he in feet?

- A) 7.000 ft.
- B) 84.00 ft.
- C) 17.80 ft.
- D) 45.20 ft.
- E) 1009 ft.

Answer: A

Diff: 2 Var: 5 Page Ref: 1.8

LO: 1.6

Global: G4|G5

110) How many cm are in 20.2 ft?

- A) 7.95 cm
- B) 242 cm
- C) 51.2 cm
- D) 616 cm
- E) 0.663 cm

Answer: D

Diff: 2 Var: 5 Page Ref: 1.8

LO: 1.6

Global: G4

111) Identify the **largest** volume.

- A) 2.32 qt
- B) 2.11 L
- C) 1950 mL
- D) 2015 cm³
- E) 122 in³

Answer: A

Diff: 2 Var: 50+ Page Ref: 1.8

LO: 1.6

Global: G4

112) Identify the **smallest** volume.

- A) 2.30 qt
- B) 2.11 L
- C) 1950 mL
- D) 2015 cm³
- E) 124 in³

Answer: C

Diff: 2 Var: 50+ Page Ref: 1.8

LO: 1.6

Global: G4

113) How many mm are in 5.705 cm?

- A) 5.705×10^1 mm
- B) 5.705×10^{-1} mm
- C) 5.705×10^{-2} mm
- D) 5.705×10^2 mm
- E) 5.705×10^3 mm

Answer: A

Diff: 2 Var: 50+ Page Ref: 1.8

LO: 1.6

Global: G4

114) If an object has a density of 4.00 g/cm³, what is its density in units of kg/m³?

- A) 4.00×10^{-3} kg/m³
- B) 4.00×10^{-7} kg/m³
- C) 4.00×10^3 kg/m³
- D) 4.00×10^1 kg/m³
- E) 4.00×10^{-1} kg/m³

Answer: C

Diff: 3 Var: 50+ Page Ref: 1.8

LO: 1.6

Global: G4

Matching Questions

Match the following.

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

1) kilo
Diff: 1 Var: 1 Page Ref: 1.6
Global: G1

2) centi
Diff: 1 Var: 1 Page Ref: 1.6
Global: G1

3) milli
Diff: 1 Var: 1 Page Ref: 1.6
Global: G1

4) nano
Diff: 1 Var: 1 Page Ref: 1.6
Global: G1

5) micro
Diff: 1 Var: 1 Page Ref: 1.6
Global: G1

6) deci
Diff: 1 Var: 1 Page Ref: 1.6
Global: G1

7) mega
Diff: 1 Var: 1 Page Ref: 1.6
Global: G1

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

Short Answer Questions

1) Define an *atom*.

Answer: An atom is the submicroscopic particle that constitutes the fundamental building block of ordinary matter.

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Global: G1|G8

2) Define *matter*.

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

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3) 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.

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Global: G2|G8

4) 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 color or scent. A chemical property can only be observed while the chemical identity of a substance is changing, such as sodium metals tendency to react with water to form hydrogen gas and sodium hydroxide.

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Global: G1|G8

5) Define *energy*.

Answer: Energy is the capacity to do work.

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Global: G1|G8

6) Define the *law of the conservation of energy*.

Answer: Energy is neither created nor destroyed.

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Global: G1|G8

7) 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 someone is computer literate

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LO: 1.6

Global: G4

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

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Global: G1|G8

9) 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.

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Global: G2|G8

10) 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.

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Global: G1|G8

11) Define *random error*.

Answer: Random error has an equal probability of being too high or too low.

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Global: G1|G8