General Chemistry, 11e **(Petrucci)**
Chapter 1 Matter: Its Properties and Measurement

1) A theory is a model used to explain natural laws and make predictions about natural phenomena.
Answer: TRUE
Diff: 1 Type: TF Var: 1
Reference: Section 1-1

2) The scientific method is used to make theories that can no longer be changed.
Answer: FALSE
Diff: 1 Type: TF Var: 1
Reference: Section 1-1

3) The composition refers to the components of a sample of matter and their relative proportions.
Answer: TRUE
Diff: 1 Type: TF Var: 1
Reference: Section 1-2

4) A physical property is the ability of a sample of matter to undergo a change in composition under certain conditions.
Answer: FALSE
Diff: 2 Type: TF Var: 1
Reference: Section 1-2

5) On a very cold day in Alaska, the temperature was -40 °F. The temperature in Celsius on the same day was also -40 °C.
Answer: TRUE
Diff: 2 Type: TF Var: 1
Reference: Section 1-4

6) A homogeneous mixture has regions that are different in composition or phase.
Answer: FALSE
Diff: 2 Type: TF Var: 1
Reference: Section 1-3

7) The SI unit of mass is 1 gram.
Answer: FALSE
Diff: 3 Type: TF Var: 1
Reference: Section 1-4

8) An intensive property is dependent of the amount of matter observed.
Answer: FALSE
Diff: 2 Type: TF Var: 1
Reference: Section 1-5

9) Several values close together guarantee good accuracy.
Answer: FALSE
Diff: 2 Type: TF Var: 1
Reference: Section 1-6

10) Systematic errors are consequence of inherent errors in measuring devices.
Answer: TRUE
Diff: 2 Type: TF Var: 1
Reference: Section 1-6

11) The result of addition can have more significant figures than any of the numbers added.
Answer: TRUE
Diff: 2 Type: TF Var: 1
Reference: Section 1-7

12) Which statement is INCORRECT?
A) Natural laws are concise statements about natural phenomena.
B) Induction is to infer a set of naturals laws from a set of observations.
C) The key to the scientific method is valid assumptions.
D) A hypothesis is a tentative explanation of a natural law.
E) A pattern of thinking is known as a paradigm.
Answer: C
Diff: 1 Type: MC Var: 1
Reference: Section 1-1

13) A model that explains and makes predictions about natural phenomena is referred to as a:
A) natural law
B) hypothesis
C) theory
D) generalization
E) deduction
Answer: C
Diff: 1 Type: MC Var: 1
Reference: Section 1-1

14) The scientific method involves:
I) observations
II) generalizations
III) experiments
IV) deduction
V) induction
A) I, III, IV
B) I, II, III
C) I, II, III, IV
D) I, II, III, V
E) I, III, V
Answer: D
Diff: 2 Type: MC Var: 1
Reference: Section 1-1

15) Choose the INCORRECT statement.
A) A natural law is a generalization of natural phenomena.
B) A hypothesis is a conclusion that must follow logically from observations of nature.
C) A theory is a model of nature that can be used to describe natural phenomena.
D) An experiment is a test of conclusions about natural law.
E) The scientific method is the combination of observations, experimentation, and the formulation of laws, hypothesis, and theories.
Answer: B
Diff: 2 Type: MC Var: 1
Reference: Section 1-1

16) Which of the following is a physical property?
A) the density of lead
B) sulfur burns in oxygen to form sulfur trioxide
C) ozone reacts with silver to give silver oxide
D) platinum metal does not react with hydrochloric acid
Answer: A
Diff: 1 Type: MC Var: 1
Reference: Section 1-2

17) A physical property is:
A) the ability of a sample to undergo change
B) a substance comprised of a single type of atom
C) a property the sample displays without changing its composition
D) always visible
E) a property the sample displays that results in a change in composition
Answer: C
Diff: 1 Type: MC Var: 1
Reference: Section 1-2

18) A chemical change always involves a change in:
I) appearance
II) state
III) composition
IV) temperature
A) I and II
B) I, II, IV
C) III only
D) II and IV
E) all of the above
Answer: C
Diff: 2 Type: MC Var: 1
Reference: Section 1-2

19) Which of the following is a chemical property of gold?
A) does not react with hydrochloric acid
B) is a good conductor of electricity
C) is malleable
D) is a good conductor of heat
Answer: A
Diff: 2 Type: MC Var: 1
Reference: Section 1-2

20) Which of the following is a physical change?
A) the freezing of water to form ice
B) the burning of paper
C) the sodium metal reacts vigorously with water
D) the reaction of zinc with hydrochloric acid
E) the inability of gold to react with water
Answer: A
Diff: 2 Type: MC Var: 1
Reference: Section 1-2

21) Oxygen is:
A) a mixture
B) a compound
C) an element
D) a solution
E) always combined with hydrogen
Answer: C
Diff: 1 Type: MC Var: 1
Reference: Section 1-3

22) Sulfur dioxide gas is:
A) a homogeneous mixture
B) a compound
C) an element
D) a heterogeneous mixture
E) a solid at room temperature
Answer: B
Diff: 1 Type: MC Var: 1
Reference: Section 1-3

23) Sulfuric acid is:
A) a homogeneous mixture
B) a compound
C) an element
D) a heterogeneous mixture
E) an atom
Answer: B
Diff: 1 Type: MC Var: 1
Reference: Section 1-3

24) The term *substance* should be used for:
A) chemical elements
B) compounds
C) both chemical elements and compounds
D) chemical elements, compounds, and mixtures
E) any mixture
Answer: C
Diff: 1 Type: MC Var: 1
Reference: Section 1-3

25) Choose the INCORRECT statement.
A) Matter is made of tiny units called atoms.
B) An element is a substance made of one type of atom.
C) A compound contains regions that are unlike other regions of the compound.
D) Homogeneous mixtures are solutions.
E) Elements and compounds are substances.
Answer: C
Diff: 1 Type: MC Var: 1
Reference: Section 1-3

26) Which of the following are forms of matter?
I) hydrogen gas
II) sunlight
III) ice
IV) wind
V) iron
A) III and V
B) I, III and V
C) I and V
D) II and IV
E) all of the above
Answer: B
Diff: 2 Type: MC Var: 1
Reference: Section 1-3

27) Which one of the following would be classified as a heterogeneous mixture?
A) salt water
B) copper nitrate solution
C) brass
D) mix of table salt and black pepper
E) a sugar solution
Answer: D
Diff: 2 Type: MC Var: 1
Reference: Section 1-3

28) Which of the following is a chemical change?
A) the freezing of water to form ice
B) hammering zinc into a thin film
C) crushing of lump of sulfur into yellow powder
D) the boiling of water to form steam
E) the reaction of chlorine gas and sodium to form salt
Answer: E
Diff: 2 Type: MC Var: 1
Reference: Section 1-3

29) From ammonia gas, one can obtain two different gases, each of which is a pure substance. Using only this information, it can be said with certainty that:
A) one of the products is an element
B) neither of the products can be an element
C) ammonia cannot be an element
D) both products are elements
E) gases do not produce solids
Answer: C
Diff: 3 Type: MC Var: 1
Reference: Section 1-3

30) Which of the following is a compound?
A) water
B) oxygen
C) heat
D) salad dressing
E) nitrogen
Answer: A
Diff: 2 Type: MC Var: 1
Reference: Section 1-3

31) The content of a container filled with sand and water would best be described as:
A) elements
B) a homogeneous mixture
C) a heterogeneous mixture
D) a compound
E) a solution
Answer: C
Diff: 2 Type: MC Var: 1
Reference: Section 1-3

32) Water is:
A) a mixture
B) a compound
C) an element
D) a molecule
E) an atom
Answer: B
Diff: 2 Type: MC Var: 1
Reference: Section 1-3

33) Saltwater is:
A) a mixture
B) only one compound
C) an element
D) a molecule
E) an atom
Answer: A
Diff: 2 Type: MC Var: 1
Reference: Section 1-3

34) The SI unit for mass is:
A) kilogram
B) gram
C) pound
D) ounce
E) newton
Answer: A
Diff: 1 Type: MC Var: 1
Reference: Section 1-4

35) Which of the following represents a base unit in the SI system of measurements?
A) m^2
B) kg
C) g/cm^3
D) m/s
E) liter
Answer: B
Diff: 1 Type: MC Var: 1
Reference: Section 1-4

36) The quantity of matter in an object is the object's _____ and is measured on a _____.
A) weight, scale
B) mass, scale
C) weight, balance
D) mass, balance
E) Any of the above since the terms are interchangeable.
Answer: D
Diff: 1 Type: MC Var: 1
Reference: Section 1-4

37) One inch is equal to:
A) 2.54 cm
B) 2.54 m
C) 1/(2.54) cm
D) 1.09 m
E) 100 cm
Answer: A
Diff: 1 Type: MC Var: 1
Reference: Section 1-4

38) The prefix "milli" and the prefix "micro" correspond, respectively, to the factors:
A) 10^{-3} and 10^{-6}
B) 10^{-6} and 10^{-9}
C) 10^{-3} and 10^{-12}
D) 10^{-1} and 10^{-6}
E) 10^{3} and 10^{6}
Answer: A
Diff: 1 Type: MC Var: 1
Reference: Section 1-4

39) Which of the following is longest?
A) 3.0 nm
B) 300 pm
C) 3.0×10^{-4} m
D) 3.0×10^{-10} cm
E) 3.00×10^{-9} km
Answer: C
Diff: 2 Type: MC Var: 1
Reference: Section 1-4

40) If gasoline costs 98.5 cents per liter in Canada, what is the price in dollars per gallon?
A) $3.73
B) $3.94
C) $1.04
D) $4.16
Answer: A
Diff: 2 Type: MC Var: 1
Reference: Section 1-4

41) In Europe, the volume of soda is given in cL. How many mL are contained in a can of soda labeled "75 cL"?
A) 750 mL
B) 75 mL
C) 7.5 mL
D) 7500 mL
E) 0.75 mL
Answer: A
Diff: 2 Type: MC Var: 1
Reference: Section 1-4

42) Which of the following is the proper set of conversion factors for changing lb/in^2 to pascals? (Hint: A pascal is a unit of force equal to 1 N/m^2.)
A) (1 lb/4.45 N)(1 m^2/1550 in^2)
B) (4.45 N/1 lb)(1 m^2/1550 in^2)
C) (1 lb/4.45 N)(1550 in^2/1 m^2)
D) (4.45 N/1 lb)(1550 in^2/1 m^2)
E) (1 lb/4.45 N)
Answer: D
Diff: 3 Type: MC Var: 1
Reference: Section 1-4

43) Without doing a calculation, find which of the following represents the highest temperature.
A) 20 °F
B) 0 °C
C) 0 K
D) 270 K
E) 0 °F
Answer: B
Diff: 2 Type: MC Var: 1
Reference: Section 1-4

44) Convert 82 °F to the Kelvin scale.
A) 452 K
B) 245 K
C) 195 K
D) 301 K
E) 373 K
Answer: D
Diff: 2 Type: MC Var: 1
Reference: Section 1-4

45) One centimeter is equal to:
A) 1.09 yards
B) 0.30 ft
C) 2.54 inches
D) 0.0109 yards
E) 0.109 yards
Answer: D
Diff: 3 Type: MC Var: 1
Reference: Section 1-4

46) If the density of aviation fuel is 1.77 lb/L, how many liters must be added to a tank to give 16,131 kg?

A) 2.01×10^4 L

B) 9.11×10^3 L

C) 1.30×10^3 L

D) 1.61×10^4 L

E) 1.30×10^4 L

Answer: A

Diff: 2 Type: MC Var: 1

Reference: Section 1-5

47) 1.00 oz of gold (density = 19.3 g/mL) can be hammered into a sheet that would cover a 1.00×10^2 ft^2 area. How thick would such a sheet be in centimeters? (1 oz= 28.350 g)

A) 1.58×10^{-5} cm

B) 4.82×10^{-4} cm

C) 4.02×10^{-5} cm

D) 6.33×10^4 cm

E) 2.11×10^{-5} cm

Answer: A

Diff: 3 Type: MC Var: 1

Reference: Section 1-5

48) An extensive property is:

A) dependent on the quantity of matter observed

B) difficult to measure

C) independent of the quantity of matter observed

D) is a unique value regardless of the measurement conditions

E) always strongly dependent on the external conditions

Answer: A

Diff: 3 Type: MC Var: 1

Reference: Section 1-5

49) Which of the following defines or expresses the concept of accuracy?

A) the closest value to the expected answer

B) deviation of the average

C) average of the data

D) reproducibility of a measurement

E) difference between the accepted answer and the average value of the data

Answer: E

Diff: 1 Type: MC Var: 1

Reference: Section 1-6

50) The following measurements were made by a group of students using the same balance and a 25.00 gram weight.

Trial	Mass (g)
1	23.96
2	24.01
3	23.98
4	23.97

The data would be considered:
I) accurate and precise
II) accurate but not precise
III) precise but not accurate
IV) neither precise nor accurate
V) evidence of a systematic error
VI) evidence of large random errors
A) I only
B) II and VI
C) III and V
D) IV and VI
E) IV, V, VI
Answer: C
Diff: 2 Type: MC Var: 1
Reference: Section 1-6

51) The definition of pH is pH = -log[H_3O^+], where [H_3O^+] is the hydronium ion concentration.

If [H_3O^+] = 1.2×10^{-5}, the pH, expressed to the correct number of significant figures, is:
A) 4.92
B) 4.9
C) 5.08
D) 5.1
Answer: A
Diff: 3 Type: MC Var: 1
Reference: Section 1-7

52) How many significant figures should the answer to the following calculation have?

$(1.4312 - 1.1 \times 10^{-2}) \div (1.0712 \times 10^{-4})$

A) 4
B) 5
C) 2
D) 3
Answer: A
Diff: 3 Type: MC Var: 1
Reference: Section 1-7

53) One centimeter is equal to how many meters?
A) 100 m
B) 1000 m
C) 10 m
D) 0.10 m
E) 0.01 m
Answer: E
Diff: 1 Type: BI Var: 1
Reference: Section 1-4

54) During a winter blizzard the temperature was -20 °F. What temperature is this on the Celsius scale?
A) -29 °C
B) -94 °C
C) -6.2 °C
D) -22 °C
E) -20 °C
Answer: A
Diff: 1 Type: BI Var: 1
Reference: Section 1-4

55) Convert 1400 mm to inches.
A) 5500 in
B) 550 in
C) 36 in
D) 360 in
E) 55 in
Answer: E
Diff: 1 Type: BI Var: 1
Reference: Section 1-4

56) A sprinter runs exactly 200 meters in 19.98 seconds. What is his/her average speed in miles per hour?
A) 22.39 miles/h
B) 22.4 miles/h
C) 10.01 miles/h
D) 0.373 miles/h
E) 10.0 miles/h
Answer: B
Diff: 2 Type: BI Var: 1
Reference: Section 1-4

57) It takes light one second to travel 2.998×10^8 m. How many kilometers does light travel in a day?
A) 1.086×10^9 km
B) 2.590×10^{10} km
C) 7.195×10^9 km
D) 4.317×10^8 km
E) 1.086×10^8 km
Answer: B
Diff: 2 Type: BI Var: 1

Reference: Section 1-4

58) A track star ran exactly 400 meters in 45.23 seconds. What was the average speed in miles per hour?
A) 19.8 miles/h
B) 19.78 miles/h
C) 8.844 miles/h
D) 0.3297 miles/h
E) 8.84 miles/h
Answer: B
Diff: 2 Type: BI Var: 1
Reference: Section 1-4

59) What is 21.1 miles/hour in furlongs/fortnight? (8 furlongs = 1 mile; 14 days = 1 fortnight)
A) 0.502 furlongs/fortnight
B) 8.862×10^3 furlongs/fortnight
C) 5.67×10^4 furlongs/fortnight
D) 8.86×10^3 furlongs/fortnight
E) 5.672×10^4 furlongs/fortnight
Answer: C
Diff: 2 Type: BI Var: 1
Reference: Section 1-4

60) At what temperature will the numerical values of the Celsius and Fahrenheit scales be the same?
A) 0 °
B) -40 °
C) 40 °
D) -273 °
E) 80 °
Answer: B
Diff: 2 Type: BI Var: 1
Reference: Section 1-4

61) Convert -41.0 °F to degrees Celsius.
A) -40.6 °C
B) -57.6 °C
C) -73.0 °C
D) -9.0 °C
E) -117 °C
Answer: A
Diff: 2 Type: BI Var: 1
Reference: Section 1-4

62) A field is 100.0 yd long and 50.0 yd wide. If covered with water to a uniform depth of 2.00 in, what volume of water is present in U.S. gallons?

A) 8.70×10^3 gal

B) 5.61×10^4 gal

C) 5.31×10^4 gal

D) 2.42×10^2 gal

E) 1.56×10^3 gal

Answer: B

Diff: 2 Type: BI Var: 1

Reference: Section 1-4

63) The temperature in the core of the warp drive of the starship Enterprise is supposedly 3 million (3.00×10^6) degrees Celsius. What is this in degrees Fahrenheit?

A) 5.40×10^6 °F

B) 2.99×10^6 °F

C) 1.67×10^6 °F

D) 3.27×10^6 °F

E) 8.13×10^6 °F

Answer: A

Diff: 2 Type: BI Var: 1

Reference: Section 1-4

64) A weatherman incorrectly stated that the temperature was 85 °F, 35 °C. If the Fahrenheit temperature was correct, how far off was the Celsius temperature?

A) 8 °C

B) 6 °C

C) 29 °C

D) 31 °C

E) 3 °C

Answer: B

Diff: 2 Type: BI Var: 1

Reference: Section 1-4

65) Determine the number of cm^2 in one in^2.

A) 64.5 cm^2

B) 6.45 cm^2

C) 100 cm^2

D) 8.95 cm^2

E) 39.7 cm^2

Answer: B

Diff: 2 Type: BI Var: 1

Reference: Section 1-4

66) Determine the number of cm^3 in 21.0 U.S. qt.
A) 19,900
B) 5.548
C) 20.0
D) 0.0199
E) 10.0
Answer: A
Diff: 2 Type: BI Var: 1
Reference: Section 1-4

67) Convert 35 ft/s to SI derived units.
A) 4.2 m/s
B) 1100 m/s
C) 1.65 m/s
D) 0.074 m/s
E) 11 m/s
Answer: E
Diff: 2 Type: BI Var: 1
Reference: Section 1-4

68) An elephant's bathtub is 8.0 feet long, 2.5 yards wide, and 70 inches deep. What is the capacity of the elephant's bathtub in U.S. quarts?
A) 9.3×10^3 qt
B) 1.1×10^4 qt
C) 3.4×10^4 qt
D) 34 qt
E) 2.2×10^4 qt
Answer: B
Diff: 3 Type: BI Var: 1
Reference: Section 1-4

69) At what temperature does the Fahrenheit reading equal twice the Celsius temperature?
A) 160 °C, 320 °F
B) 12 °C, 24 °F
C) -12 °C, -24 °F
D) -288 °C, -576 °F
E) 40 °C, 80 °F
Answer: A
Diff: 2 Type: BI Var: 1
Reference: Section 1-4

70) Convert 21.8 in^3 to liters. (2.54 cm = 1.00 in)
A) 0.0554 L
B) 1.33×10^3 L
C) 8.58 L
D) 0.357 L
E) 8.58×10^3 L
Answer: D
Diff: 3 Type: BI Var: 1
Reference: Section 1-4

71) Ethylene glycol has a density of 1.11 g/mL. What is the volume occupied by 30.0 g of ethylene glycol?
A) 33.3 mL
B) 27.0 mL
C) 31.1 mL
D) 0.037 mL
E) 30.0 mL
Answer: B
Diff: 1 Type: BI Var: 1
Reference: Section 1-5

72) What is the mass of a 468 mL sample of ethanol? The density of ethanol is 0.789 g/mL.
A) 234 g
B) 739 g
C) 468 g
D) 593 g
E) 369 g
Answer: E
Diff: 1 Type: BI Var: 1
Reference: Section 1-5

73) Two hundred mL of solution has a mass of 198 g. What is the density of the solution?
A) 1.01 g/mL
B) 3.98 g/mL
C) 99.0 g/mL
D) 0.990 g/mL
E) 1.98 g/mL
Answer: D
Diff: 1 Type: BI Var: 1
Reference: Section 1-5

74) A 14-karat gold ring contains 58.3% gold and weighs 12.41 g. If gold sells for $308.00/ounce, what is the value of the gold in the ring?
A) $116
B) $135
C) $231
D) $58.90
E) $78.60
Answer: E
Diff: 2 Type: BI Var: 1
Reference: Section 1-5

75) A briefcase 4.5 in × 22 in × 11 in is filled with gold, which has a density of 19.3 g/cm^3 and costs $308/oz. What is the dollar value of this gold?
A) $\$5.80 \times 10^5$
B) $\$1.56 \times 10^3$
C) $\$3.74 \times 10^6$
D) $\$1.00 \times 10^4$
E) $\$2.81 \times 10^6$
Answer: C
Diff: 2 Type: BI Var: 1
Reference: Section 1-5

76) A briefcase 4.5 in × 22 in × 11 in is filled with gold, which has a density of 19.3 g/cm^3 and costs $308/oz. What is the mass of this gold in kg?
A) 460 kg
B) 53.5 kg
C) 136 kg
D) 344 kg
E) 17.9 kg
Answer: D
Diff: 2 Type: BI Var: 1
Reference: Section 1-5

77) What mass, in g, of a solution containing 12% by mass sodium chloride is needed for a process that requires 8 g of sodium chloride?
A) 12 g
B) 150 g
C) 67 g
D) 0.96 g
E) 8 g
Answer: C
Diff: 3 Type: BI Var: 1
Reference: Section 1-5

78) A jewelry alloy has a density of 12.412 g/mL and is 75.0% gold by weight. If 522 g of gold are available, what volume of this alloy can be produced?

A) 8.64×10^3 mL
B) 31.5 mL
C) 4.86×10^3 mL
D) 335 mL
E) 56.1 mL
Answer: E
Diff: 2 Type: BI Var: 1
Reference: Section 1-5

79) What mass of sugar, in grams, would be obtained from the evaporation of water from 1.5 kg of a sugar solution which is 10.5% sugar by mass?

A) 0.1575 g
B) 0.158 g
C) 157.5 g
D) 15.8 g
E) 160 g
Answer: E
Diff: 2 Type: BI Var: 1
Reference: Section 1-5

80) A solution of 34.5% sulfuric acid by weight in water has a density of 1.26 g/mL. How many grams of sulfuric acid are needed to make 3.22 L of this solution?

A) 1.20×10^5 g
B) 882 g
C) 135 g
D) 1.40×10^3 g
E) 1.40×10^5 g
Answer: D
Diff: 2 Type: BI Var: 1
Reference: Section 1-5

81) A block of wood has dimensions of $1.2\ \text{m} \times 5.0\ \text{cm} \times 7.0\ \text{cm}$ and has a mass of 3.0 kg. What is the density of the wood?

A) 1400 g/mL
B) 0.071 g/mL
C) 0.71 g/mL
D) 1.4 g/mL
E) 140 g/mL
Answer: C
Diff: 2 Type: BI Var: 1
Reference: Section 1-5

82) A 2.0 gal flask weighs 4.0 lbs when empty. When it is filled with liquid, the flask weighs 4536.0 g. What is the density of the liquid in g/mL? (1 gal = 3.785 L, 1 lb = 453.6 g)
A) 0.36 g/mL
B) 0.72 g/mL
C) 0.60 g/mL
D) 0.14 g/mL
E) 0.071 g/mL
Answer: A
Diff: 3 Type: BI Var: 1
Reference: Section 1-5

83) Calculate the density in g/cm^3 of a 15 lb block of aluminum with a displacement volume of 0.6657 U.S. gal.
A) 22.5 g/cm^3
B) 11.47 g/cm^3
C) 0.371 g/cm^3
D) 2.25 g/cm^3
E) 2.70 g/cm^3
Answer: E
Diff: 3 Type: BI Var: 1
Reference: Section 1-5

84) Two hundred thirty-seven pounds of ethanol with a density of 0.789 g/cm^3 occupies what volume in U.S. quarts?
A) 144 qt
B) 108 qt
C) 136 qt
D) 84.9 qt
E) 129 qt
Answer: A
Diff: 3 Type: BI Var: 1
Reference: Section 1-5

85) A 16.0 g sample of iron has a volume of 2.035 cm^3. What is its density expressed to the correct number of significant figures?
A) 0.127 g/cm^3
B) 32.6 g/cm^3
C) 7.86 g/cm^3
D) 7.862 g/cm^3
E) 7.9 g/cm^3
Answer: C
Diff: 1 Type: BI Var: 1
Reference: Section 1-7

86) Perform the following calculation and express the result with the appropriate number of significant figures: $(1.302 + 953.2)/(2.0) = ?$

A) 4.80×10^2
B) 477
C) 4.8×10^2
D) 477.3
E) 477.25
Answer: C
Diff: 1 Type: BI Var: 1
Reference: Section 1-7

87) What is the correct number of significant figures in the answer to the following multiplication: 1.022×0.0011.
A) one
B) three
C) four
D) two
E) cannot be determined
Answer: D
Diff: 1 Type: BI Var: 1
Reference: Section 1-7

88) Using the proper number of significant figures, how should the answer to the multiplication of the measurements $200.1 \times 8.550 \times 0.04899$ be written?
A) 83.8148
B) 83.8
C) 83.81
D) 83.815
E) 83.82
Answer: C
Diff: 2 Type: BI Var: 1
Reference: Section 1-7

89) Calculate the length of a steel cable (density 7.91 g/cm^3) with a mass of 160.0 g and cross-sectional area of 0.500 cm^2.
A) 40.5 cm
B) 20.23 cm
C) 40.46 cm
D) 20.2 cm
E) 10.1 cm
Answer: A
Diff: 2 Type: BI Var: 1
Reference: Section 1-7

90) What is the answer, to the correct number of significant figures, of the following calculation?

$$\frac{1.61 \times 2.434}{0.23456}$$

A) 16.7068
B) 16.707
C) 16.71
D) 16.7
E) 16
Answer: D
Diff: 2 Type: BI Var: 1
Reference: Section 1-7

91) A 15.0 g sample of hydrated copper sulfate was heated to dryness and the new mass measured to be 9.59 g. Calculate the percentage of water in the hydrated crystal. Express your answer to the correct number of significant digits.
A) 36.1%
B) 36%
C) 63.3%
D) 63%
E) 45%
Answer: B
Diff: 3 Type: BI Var: 1
Reference: Section 1-7

92) What is the answer to the correct number of significant figures of the following calculation?

$$\frac{41.02 + 0.02 + 0.003 + 63.00}{45.2340}$$

A) 2.3
B) 2.3001
C) 2.300
D) 2.30004
E) 2.30011
Answer: B
Diff: 3 Type: BI Var: 1
Reference: Section 1-7

93) What is the answer to the correct number of significant figures of the following calculation?

$$\frac{75.032 + 2.3 + 0.0046}{10.2}$$

A) 7.6
B) 7.57
C) 7.58
D) 7.578
E) 7.582
Answer: C
Diff: 3 Type: BI Var: 1
Reference: Section 1-7

94) What is the answer to the correct number of significant figures of the following calculation?

$$\frac{37.1 + 7.1 + 8.32}{10.3 - 8.2}$$

A) 2.84
B) 30
C) 25.01
D) 25.0
E) 25
Answer: E
Diff: 3 Type: BI Var: 1
Reference: Section 1-7

95) Which of the following is the smallest volume?
A) 11 cm^3
B) 0.25 dL
C) 1.4×10^3 mL
D) 2.5×10^7 nL
Answer: A
Diff: 1 Type: MC Var: 5

96) 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 cm^3
B) 19.5 cm^3
C) .425 cm^3
D) 6.65 cm^3
E) none of the above
Answer: A
Diff: 2 Type: MC Var: 9

97) 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^{-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

98) 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) 0.0437 L

B) 0.0777 L

C) 12.9 L

D) 22.9 L

Answer: C

Diff: 2 Type: MC Var: 5

99) 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

100) 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

101) How many significant figures are in the measurement 5 g?

A) 1

B) 3

C) 5

D) 4

E) 2

Answer: A

Diff: 1 Type: MC Var: 4

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

6.3×3.78

Answer: 24
Diff: 2 Type: SA Var: 10

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

29,724.33

A) 29,720
B) 29.72×10^3
C) 0.2972×10^5
D) 2.972×10^4
E) 2.972×10^{-4}
Answer: D
Diff: 2 Type: MC Var: 4

104) 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

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

0.408 9.040 0.0400 9.05×10^{24}

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

106) 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

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

$$57.5 + 0.9933 + 31$$

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

108) 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

109) 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

110) Round off 00907506 to four significant figures.
A) 0091
B) 9076
C) 9100
D) 9.075×10^5
Answer: D
Diff: 2 Type: MC Var: 5

111) 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 _____ m^3.
A) 3.26057
B) 3.3
C) 3.26
D) 3.261
E) 3.2606
Answer: B
Diff: 2 Type: MC Var: 10

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

(1815 - 1806) × (9.11 × 7.92)
Answer: 600
Diff: 3 Type: SA Var: 10

113) 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

114) 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

115) 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

116) 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 Type: MC Var: 5

117) 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

118) 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

119) 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

120) 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

121) 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

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

A) 40 cm^3

B) 40 dm^3

C) 0.40 L

D) 0.00040 kL

Answer: A

Diff: 2 Type: MC Var: 5

123) 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

124) 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

125) 38.325 lbs = _____ grams. (1 lb = 454 g)

Answer: 17400

Diff: 3 Type: SA Var: 10

126) 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

127) 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

128) 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) 7.4 L
B) 295 L
C) 76 L
D) 117 L
Answer: A
Diff: 3 Type: MC Var: 5

129) The estimated costs for remodelling 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: 3 Type: MC Var: 10

130) How many litres of wine can be held in a wine barrel whose capacity is 25.0 gal?
(1 gal = 4 qt = 3.7854 L)
A) 1.51×10^{-4} L
B) 0.151 L
C) 94.6 L
D) 6.60×10^{3} L
E) 6.60 L
Answer: C
Diff: 3 Type: MC Var: 10

131) The recommended adult dose of Elixophyllin®, a drug used to treat asthma, is 6.00 mg kg^{-1} of body mass. Calculate the dose in milligrams for a 112-lb person. (1 lb = 453.59 g)
A) 24 mg
B) 1,482 mg
C) 1.5 mg
D) 305 mg
E) 3.0×10^{5} mg
Answer: D
Diff: 3 Type: MC Var: 10

132) 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 11.0 ft × 11.0 ft and has a 8.00 ft ceiling? (1 in. = 2.54 cm (exactly); 1 L = 10^{3} cm^{3})
A) 2.93
B) 0.121
C) 3.26×10^{4}
D) 0.0770
E) 32.6
Answer: E
Diff: 3 Type: MC Var: 12

133) How many litres of air are in a room that measures 12.0 ft × 12.0 ft and has an 8.00 ft ceiling?
(1 in. = 2.54 cm (exactly); 1 L = 10^{3} cm^{3})
A) 3.26×10^{4}
B) 121
C) 35.1
D) 3.51×10^{7}
E) 9.75×10^{5}
Answer: A
Diff: 3 Type: MC Var: 12

134) 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

135) 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

136) 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