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Name:_____ Class:_____ Date:_____

Chapter 01 - Matter, Measurements, and Calculations

1. The mass of an object is
   a. the force between the object and the earth.
   b. a measure of the amount of matter in the object.
   c. the amount of space the object occupies.
   d. depends on the location of the object on the earth.

ANSWER: b

2. Any two objects are attracted to each other by _____.
   a. gravity
   b. electrostatic forces
   c. magnetism
   d. all of them

ANSWER: a

3. How is the weight of an object influenced when the gravitational force on the object is increased?
   a. it decreases
   b. it increases
   c. it is unchanged
   d. it equals the mass

ANSWER: b

4. The weight of an object is
   a. a measure of the gravitational force pulling the object toward the earth.
   b. equal to the mass of the matter in the object.
   c. a measure of the space occupied by the object.
   d. the same at any location on the earth.

ANSWER: a

5. The fact that gold does not corrode is a _____ property
   a. physical
   b. personal
   c. real
   d. chemical

ANSWER: d

6. Which of the following represents a physical change in matter?
   a. A substance solidifies at 443 K.
   b. A substance produces a gas and a solid when heated.
   c. A substance burns when heated.
   d. A substance changes color when exposed to air.

ANSWER: a

7. The melting of ice to liquid water is correctly classified as
   a. a chemical change

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Chapter 01 - Matter, Measurements, and Calculations

b. a physical change
c. both a chemical and a physical change.
d. neither a chemical nor physical change.

ANSWER: b

8. Which of the following is a physical property of matter?
a. it does not burn
b. produces a gas when placed in an acid
c. freezes at −10°F
d. the surface turns black in air

ANSWER: c

9. Which of the following is a chemical property of matter?
a. color
b. density
c. freezing point
d. flammability

ANSWER: d

10. As two clear liquid solutions are thoroughly mixed, a red solid forms. This change is most likely _____.
a. physical
b. chemical
c. neither chemical nor physical.
d. both chemical and physical.

ANSWER: b

11. The limit of chemical subdivision of an element is the _____.
a. atom
b. molecule
c. proton
d. compound

ANSWER: a

12. Which of the following substances are composed of heteroatomic molecules?
a. an iron nail
b. oxygen
c. copper wire
d. water

ANSWER: d

13. A molecule represented by O-O-O must be classified as
a. homoatomic and polyatomic.
b. homoatomic and monoatomic.
c. heteroatomic and polyatomic.

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d. heteroatomic and monoatomic.

ANSWER: a

14. Which of the following terms correctly applies to a molecule of CO_2?
    a. triatomic, heteroatomic
    b. polyatomic, diatomic
    c. triatomic, homoatomic
    d. diatomic, heteroatomic

ANSWER: a

15. Table salt, NaCl is best classified as a(n) _____.
    a. compound
    b. element
    c. homogeneous mixture
    d. heterogenous mixture

ANSWER: a

16. The limit of physical subdivision of pure H_2O is _____ .
    a. the atom
    b. the molecule
    c. the element
    d. a proton

ANSWER: b

17. Homoatomic pure substances are known as _____ .
    a. protons
    b. elements
    c. compounds
    d. molecules

ANSWER: b

18. After heating, a pure substance, A, is found to produce both B and C. What can be said about the substance A?
    a. It is an element
    b. It is a compound
    c. It is either an element or compound
    d. Impossible to predict

ANSWER: b

19. Two pure substances A and B react to form a new pure substance C. From this, we may conclude that
    a. A and B are both elements
    b. C is a compound, A and B may or may not be elements
    c. C is an element, A and B are compounds
    d. A, B, and C are all compounds

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ANSWER: b

20. Which of the following is an example of a homogeneous mixture?
    a. NaOH solution
    b. mortar (mixture of water, sand and cement)
    c. vinegar and oil salad dressing
    d. more than one response is correct

ANSWER: a

21. Which of the following consists of a single chemical species?
    a. solution
    b. homogeneous mixture
    c. heterogenous mixture
    d. compound

ANSWER: d

22. Early measurements of length were based on
    a. dimensions of astronomical bodies.
    b. dimensions of the human body.
    c. dimensions of bodies of water.
    d. distances between cities.

ANSWER: b

23. The basic unit of length in the metric system is the _____
    a. mile
    b. millimeter
    c. foot
    d. meter

ANSWER: d

24. The prefix centi- denotes what fraction of a basic unit?
    a. $\frac{1}{10}$
    b. $\frac{1}{100}$
    c. $\frac{1}{1000}$
    d. 1000

ANSWER: b

25. Convert a temperature of 76°F to a Celsius value.
    a. 10
    b. 24

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c. 44

d. 169

ANSWER: b

26. Which of the following numbers is correctly expressed using scientific notation?

a. 3489

b. 5.248×10^{4}

c. 45.78×10^{6}

d. $.0987 \times 10^{3}$

ANSWER: b

27. Do the following calculation and express the answer using correct scientific notation.

$_____ = (2.97 \times 10^{2}) \times (6.09 \times 10^{-7})$

a. 5.53×10^{3}

b. 1.81×10^{-4}

c. 4.88×10^{8}

d. 2.05×10^{-9}

ANSWER: b

28. Do the following calculation, and express the answer using correct scientific notation.

$_____ = (6.00 \times 10^{23}) \times \frac{3.00}{284}$

a. 6.34×10^{21}

b. 1.58×10^{-22}

c. 6.34×10^{-2}

d. 15.8

ANSWER: a

29. The number 0.00816 expressed correctly using scientific notation is _____ .

a. 8.16×10^{2}

b. 8.16×10^{3}

c. 8.16×10^{-2}

d. 8.16×10^{-3}

ANSWER: d

30. How many significant figures are justified in a measurement of a length that is between 9 and 10 centimeters if the

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measuring device (ruler) has smallest divisions of 0.1 cm?

a. one
b. two
c. three
d. four

ANSWER: c

31. How many significant figures are used in expressing a measurement as 0.2503 L?

a. one
b. two
c. three
d. four

ANSWER: d

32. Which number has the greatest number of significant digits?

a. 1.0035
b. 17.5000
c. 0.0000625
d. 6.022×10^{23}

ANSWER: b

33. Do the following calculation and express the answer using the correct number of significant figures.
_____ = $(342) \times (0.0012) \div 100.0$

a. 0.00410
b. 0.0041
c. 4.10×10^{-3}
d. 0.004104

ANSWER: b

34. Do the following calculation. How many significant figures are justified for the answer?
_____ = $6.02 + 5.119 + 0.04218$

a. three
b. four
c. five
d. seven

ANSWER: b

35. A furnace delivers 8.0×10^4 BTU per hour. How many kilocalories per hour is this? (hint: $1 \text{ cal} = 0.00397 \text{ BTU}$)

a. 3.2×10^{-5} kcal
b. 3.2×10^{2} kcal
c. 2.0×10^{4} kcal

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d. 2.5×10^2 kcal

ANSWER: c

36. Which of the following set-ups will allow you to calculate the cost of fruit in dollars per gram, if the price is given as 0.79 dollars per pound?

a. $\frac{0.79 \text{ dollars}}{\text{lb}} \times \frac{2.20 \text{ lb}}{1000 \text{ g}}$

b. $\frac{0.79 \text{ dollars}}{\text{lb}} \times \frac{457 \text{ lb}}{1 \text{ dollar}}$

c. $\frac{\text{lb}}{0.79 \text{ dollar}} \times \frac{1 \text{ lb}}{457 \text{ g}}$

d. $\frac{\text{lb}}{0.79 \text{ dollar}} \times \frac{1 \text{ kg}}{2.20 \text{ lb}}$

ANSWER: a

37. A mass 0.0040 kg is equal to ___ cg.

a. 4.0×10^{-8}

b. 400

c. 0.40

d. 40

ANSWER: b

38. Suppose the speedometer in your car reads 55.0 mph. What is your speed in km/hr? (1 km = 0.621 mi.)

a. 34.1

b. 0.029

c. 88.6

d. 0.011

ANSWER: c

39. Knowing that 1 g = 0.035 oz and 16 ounces = 1 lb, calculate the number of grams in 10 pounds.

a. 35

b. 0.56

c. 1.8

d. 4.6×10^3

ANSWER: d

40. If a student completes 5 problems out of a total of 8 on a pop quiz, what percentage of the quiz was completed?

a. 0.625

b. 6.25

c. 16.0

d. 62.5

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ANSWER: d

41. If 13% of a class cheats on an exam and there are 93 students in the class, how many students should you recommend be expelled (to the nearest whole student)?
    a. 9
    b. 10
    c. 12
    d. 15

ANSWER: c

42. A hiker began a hike with a pint canteen full of water. One pint equals 16 fluid ounces. At the end of the hike, 7.0 fluid ounces of water remained. What percent of the water was *used* during the hike?
    a. 78
    b. 44
    c. 56
    d. 13

ANSWER: c

43. Eighteen students in a class will get this question correct. If that represents 45% of the class, how large is the class?
    a. 20
    b. 40
    c. 60
    d. 100

ANSWER: b

44. If urine has a density of 1.08 g/mL, what would be the mass of a 125 mL urine sample?
    a. 135 g
    b. 0.00864 g
    c. 116 g
    d. 125 g

ANSWER: a

45. You are able to carry a maximum of 20 kg. What is the maximum volume of gold that you can carry? (Au has a density of 19.6 g/cm^3)
    a. 392 cm^3
    b. 1.0×10^3 cm^3
    c. 0.98 cm^3
    d. none of these

ANSWER: b

46. The fact that iron (Fe) corrodes when exposed to water and air is a
    a. physical property
    b. metal property

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c. chemical property
d. real property

ANSWER: c

47. Convert 30.0°C to Fahrenheit.
a. 112
b. 86.0
c. 48.7
d. 34.4

ANSWER: b

48. How can the volume of an irregular unknown object be measured?
a. using a ruler to measure length, width, and depth
b. measuring the volume of water displaced by the object
c. obtaining the mass of the object
d. measure the radius and use $V=\pi r^2$

ANSWER: b

49. Do the following calculation and express the answer using the correct number of significant figures.
_____ $= (1.21 \times 10^{-3} + 1.3 \times 10^{-3}) \times 6.453 \times 10^{2}$

a. 1.619
b. 2
c. 1.6
d. 1.62

ANSWER: c

50. If a sample of blood was found to have a density of 1.05 g/mL, what would be the mass of 1.000 liters of this material? Express your answer with the proper number of significant figures.
a. 1.05×10^{-3} g
b. 1.05×10^{3} g
c. 1050 g
d. 1.050 kg

ANSWER: b

51. On a cold winter day the weather report gives the temperature as -5.0° F. What would this temperature be if reported on the Kevin scale?
a. 252 K
b. 258 K
c. 268 K
d. -20.6 K

ANSWER: a

52. Express the following "generic" number in standard notation. X.XX × 10^4

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a. 0.000XXX
b. XX,X00
c. X,XX0
d. 0.00XXX

ANSWER: b

53. Express the following "generic number" in scientific notation. 0.0000XXX
a. $XXX \times 10^{-7}$
b. $X.XX \times 10^{5}$
c. $X.XX \times 10^{-5}$
d. $X.XX \times 10^{-4}$

ANSWER: c

54. The density of zinc is 7.13 g/cm^3. What is the mass in kilograms of a 125 cm^3 cylinder of zinc?
a. 891 kg
b. 17.5 kg
c. 0.0175 kg
d. 0.891 kg

ANSWER: d

55. Ethanol (ethyl alcohol) has a density of 0.789 g/mL at 25°C. If 75.5 g of ethanol is needed for a reaction, what volume in mL should be added to the reaction container?
a. 95.7 mL
b. 59.6 mL
c. 0.0105 mL
d. 78.9 mL

ANSWER: a

56. Based on data obtained in an experiment, to determine the density of a metal, the following calculation is carried out. Express the answer to the correct number of significant figures.

$$\frac{57.675\ \text{g} - 3.047\ \text{g}}{25.65\ \text{mL} - 0.15\ \text{mL}} = 2.1422745098\ \text{g/mL}$$

a. 2.1 g/mL
b. 2.14 g/ml
c. 2.142 g/mL
d. 2.1423 g/mL

ANSWER: c

57. You are saving for a new $1226 (including taxes) laptop computer using earnings from your part-time job. At that job, you work 20 hours/week, earning $10.25/hour take home pay. If you can save 25% of all of your income, how many weeks will it take for you to save enough money?
a. 48 weeks
b. 24 weeks

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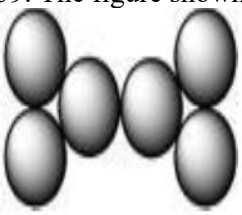
c. 12 weeks
d. 6 weeks

ANSWER: b

58. It turns out that the dark side of the moon has as a mean temperature of -280^{o}F. What would that the temperature be on the Kelvin scale?
a. -553 K
b. -7 K
c. 100 K
d. 173 K

ANSWER: c

59. The figure shown below is an example of what type of molecule?



a. homoatomic, triatomic
b. heteroatomic, polyatomic
c. homoatomic, polyatomic
d. heteroatomic, triatomic

ANSWER: c

60. Which of the following properties is characteristic of a mixture?
a. constant composition
b. variation of physical properties
c. fixed melting point.
d. cannot be physically separated into simpler materials

ANSWER: b

61. The average gestation period (length of a pregnancy) for humans is 40 weeks. If a child if born after just 36 weeks, what was the percentage of this gestation period compared to the normal length?
a. 4.0%
b. 10 %
c. 28%
d. 90 %

ANSWER: d

62. One system of rating food is to determine its energy density in kcal/g. If your 200 g snack contains 100 g fat (900 cal/g) and a total of 100 g of protein and carbohydrates (400 cal/gram). What is its energy density?
a. 1.3 kcal/g
b. 6.5 kcal/g
c. 9.0 kcal/g

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d. 13 kcal/g

ANSWER: b

63. The number twelve, representing a dozen, has two significant figures.
a. True
b. False

ANSWER: True

64. The number 6730.0 contains five significant figures.
a. True
b. False

ANSWER: True

65. If 3333 is divided by 5.0, the answer should have two significant figures.
a. True
b. False

ANSWER: True

66. If 6526 is added to 15.0, the answer should have two significant figures.
a. True
b. False

ANSWER: False

67. To convert feet to inches, you should multiply by the factor 12 in./ft.
a. True
b. False

ANSWER: True

68. To convert micrograms to grams, you should multiply by 1,000,000 g/microgram.
a. True
b. False

ANSWER: False

69. To convert microliters to liters, you should multiply by 1 liter/1,000,000 microliters.
a. True
b. False

ANSWER: True

70. If a 50 gram sample of iron alloy contains 40 grams if iron, it contains 80% iron by weight.
a. True
b. False

ANSWER: True

71. If 100 people in a town of 5,000 people own a certain color car, this represents 0.1% of the population.
a. True

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b. False

ANSWER: False

72. If a 200 gram sample of water is partially frozen forming 40 g of ice, than 80% of the original sample is still a liquid.
a. True
b. False

ANSWER: True

73. A patient weights 220 lbs. A medication for this patient is supposed to be taken 3 mg per kg per day. The correct dose for this patient is 3000 mg per day.
a. True
b. False

ANSWER: False

74. A particular medication is a heterogeneous mixture. Since heterogeneous mixtures are consistent throughout, this medication does not need to be shaken.
a. True
b. False

ANSWER: False

75. A Celsius degree is the same size as a Kelvin degree.
a. True
b. False

ANSWER: True

76. One advantage of the Kelvin system is that it is impossible to have temperatures below zero.
a. True
b. False

ANSWER: True

77. A monoatomic molecule cannot be reduced to a simpler chemical.
a. True
b. False

ANSWER: True

78. The yard is considered a derived SI unit.
a. True
b. False

ANSWER: False

79. A patient with a body temperature of 300 K would be considered as suffering from hypothermia.
a. True
b. False

ANSWER: True

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Chapter 01 - Matter, Measurements, and Calculations

80. Identify a true statement of matter.
    a. Matter is a measurement of gravitational force acting on an object.
    b. Matter is anything that has mass and occupies space.
    c. The amount of matter in an object varies in different locations.
    d. Matter is a measurement of mass in an object.

ANSWER: b

81. Which of the following units of measure is a derived unit of measurement?
    a. Length
    b. Area
    c. Mass
    d. Time

ANSWER: b

82. Molecules that contain two or more kinds of atoms are __.
    a. Diatomic molecules
    b. Homoatomic molecules
    c. Heteroatomic molecule
    d. Triatomic molecules
    e. Polyatomic molecules

ANSWER: c

83. Molecules that contain more than three atoms are __.
    a. Diatomic molecules
    b. Homoatomic molecules
    c. Heteroatomic molecule
    d. Triatomic molecules
    e. Polyatomic molecules

ANSWER: e

84. Molecules that contain two atoms are __.
    a. Diatomic molecules
    b. Homoatomic molecules
    c. Heteroatomic molecule
    d. Triatomic molecules
    e. Polyatomic molecules

ANSWER: a

85. Molecules that contain three atoms are ___.
    a. Diatomic molecules
    b. Homoatomic molecules
    c. Heteroatomic molecule
    d. Triatomic molecules
    e. Polyatomic molecules

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ANSWER: d

86. Molecules that contain only one kind of atom are ___.
    a. Diatomic molecules
    b. Homoatomic molecules
    c. Heteroatomic molecule
    d. Triatomic molecules
    e. Polyatomic molecules

ANSWER: b

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