Chapter 01 - Measurement

1. A pint of water (on Earth) is approximately

a. 1 pound.
b. 1 gram.
c. 1 kilogram.
d. 1 quart.

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

2. Historically, which measurement may have been defined as the distance from the royal nose to the thumb of the royal outstretched arm?

a. 1 foot
b. 1 yard
c. 1 meter
d. 1 kilometer

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

3. In a debate, is the statement "It's only a theory" a valid argument point against a theory (as in "The theory of evolution is wrong because it's only a theory")?

a. Yes, theories are weak.
b. No, theories are strong.
c. No, theories are weak.
d. Yes, theories are meaningless.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

4. Which of the following is *not* considered a major physical science:

a. Physics
b. Astronomy
c. Geology
d. Biology
e. Meteorology

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice

5. The word *science* comes from the Latin word meaning

a. "experiment."
b. "investigate."

c. "knowledge."
d. "debate."

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

6. The most information about our environment comes to us through the sense of
a. smell.
b. sight.
c. hearing.
d. touch.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

7. Our senses may obtain less-than-accurate information concerning our physical world because they
a. have limited sensitivity.
b. have a limited range.
c. are useless.
d. can be deceived.

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice

8. A quantitative observation that is the basis of scientific investigation is a(n)
a. experiment.
b. measurement.
c. explanation.
d. number.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

9. A scientific law describes
a. the scientific method.
b. a fundamental relationship of nature.
c. the behavior of nature.
d. an experiment.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

10. A very tentative explanation of observations of some regularity of nature is a(n)

a. scientific law.
b. theory.
c. experiment.
d. hypothesis.

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice

11. A successfully tested hypothesis may take on the status of a(n)

a. experimental result.
b. theory.
c. scientific law.
d. concept.
e. superior hypothesis.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

12. A standard unit

a. is the same in all systems of units.
b. may not be fixed in value.
c. is found only in the British system.
d. is used for taking accurate measurements.
e. is found only in the metric system.

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice

13. The standard unit of time is the

a. hour.
b. day.
c. second.
d. minute.

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

14. Which of the following is *not* a fundamental quantity?

a. Weight
b. Length
c. Time

d. Mass

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

15. Which fundamental quantity does the average person measure most often every day?

a. Mass
b. Length
c. Time
d. Electric charge

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

16. Which has a larger mass, a liter of water or a liter of mercury (a liquid metal)?

a. mercury
b. water
c. none of these

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

17. Which has a larger volume, a liter of water or a liter of mercury (a liquid metal)?

a. water
b. mercury
c. none of these

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

18. The mass of a cubic meter of water is

a. 1 metric ton.
b. 100 kg.
c. 100 L.
d. 1 lb.

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

19. Which statement is *incorrect*?

a. A kilogram has an equivalent weight greater than that of a pound.
b. A kilometer is longer than a mile.

c. A meter is longer than a yard.
d. A liter is larger than a quart.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

20. Which has more volume, a liter or a quart?
a. A liter
b. A quart
c. Both are the same
d. Neither describes volume

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

21. Which of the following is *not* a standard metric unit?
a. Kilogram
b. Meter
c. Second
d. Gram

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice

22. The standard unit of mass in the mks system is the
a. meter
b. kilogram
c. pound
d. second
e. gram

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

23. The standard unit of time in the mks system is the
a. meter
b. kilogram
c. second
d. minute
e. microsecond

ANSWER: c

POINTS: 1
QUESTION TYPE: Multiple Choice

24. The standard unit of distance in the mks system is the

a. centimeter
b. inch
c. kilometer
d. meter
e. second

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice

25. The standard unit of length, the meter, is now defined with reference to

a. a meridian on the Earth.
b. the French meter.
c. the speed of light.
d. a platinum-iridium bar.
e. a member of the royal family.

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

26. The standard unit of time, the second, is now defined with reference to

a. the Earth's revolution period.
b. the mean solar day.
c. the cesium-133 atom.
d. the Earth's rotation period.

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

27. The current definition of a kilogram is the mass of a platinum-iridium cylinder kept in

a. the United States.
b. France.
c. England.
d. Japan.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

28. In what year did the United States officially adopt the metric system?

a. 1893
b. 1995
c. 2011
d. 1776
e. none of these

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

29. The meter was defined originally as
a. one ten-millionth of the diameter of Earth.
b. one ten-millionth of the distance from the equator to the North Pole.
c. the wavelength of a line in the spectrum of krypton-86.
d. the length of a platinum-iridium bar.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

30. The meter is presently defined as
a. one ten-millionth of the diameter of Earth.
b. the wavelength of a line in the spectrum of krypton-86.
c. the length of a platinum-iridium bar.
d. the distance light travels in a vacuum in a very short time.

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice

31. The metric prefix that means one-hundredth (1/100) is
a. kilo-.
b. centi-.
c. mega-.
d. milli-.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

32. The metric prefix that means one-thousandth (1/1000) is
a. kilo-.
b. centi-.
c. milli-.
d. nano-.

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

33. The metric prefix that means one thousand (1000) is

a. kilo-.
b. centi-.
c. mega-.
d. milli-.

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

34. The metric prefix that means one million (1,000,000) is

a. centi-.
b. mega-.
c. milli-.
d. nano-.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

35. The metric prefix that means ten (10) is

a. deci
b. deka
c. milli
d. centi
e. kilo

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

36. The metric prefix that means one tenth (1/10) is

a. deka
b. deci
c. centi
d. milli
e. none of these

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

37. A cubic centimeter of pure water at maximum density has a mass of

a. 1 g.
b. 1 kg.
c. 1 cg.
d. 1 lb.
e. none of these

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

38. In the SI, m is the symbol for

a. mass.
b. meter.
c. mole.
d. metric.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

39. Which of the following is a unit of mass density?

a. kg/m^3
b. g/cm^2
c. lb/ft^3
d. lb/ft^2

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

40. One kilogram is the same as

a. 1000 g.
b. 1/1000 kg.
c. 10,000 g.
d. 0.001 g.

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

41. An object's weight would be different on Earth and on the Moon. Which of the following would also be different?

a. Mass density
b. Mass
c. Length

d. Volume
e. None of these

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice

42. An object transported from Earth's surface to the surface of the Moon has
a. the same mass, but different weight.
b. the same weight, but different mass.
c. the same mass and the same weight.
d. different mass and different weight.
e. none of these.

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

43. In buying a product, a shopper has a choice of the following amounts, all at the same price. Which is the best buy?
a. 432 cc
b. 1 pint
c. 1 half-liter
d. 450 mL

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

44. A hydrometer is used to measure
a. the time for an object to sink.
b. water (hydro).
c. the volume of a quantity of water.
d. liquid density.

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice

45. Which of the following is *not* a derived quantity?
a. Volume
b. Speed
c. Mass
d. Density

ANSWER: c
POINTS: 1

QUESTION TYPE: Multiple Choice

46. The International System of Units (SI) has _____ base units.

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

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

47. What is the mass of 25 cm^3 of pure water?

a. None of these
b. 25 kg
c. 25 g
d. 25 mL

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

48. A derived unit

a. involves only length.
b. is a combination of units.
c. applies only to density.
d. is not found in the metric system.

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

49. A metric ton (or tonne) is

a. the same as a British ton.
b. not defined.
c. a mass unit.
d. a weight unit.

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

50. Which of the following quantities expressed in derived units includes the unit of length?

a. Area
b. Volume
c. Speed

d. Density
e. All of these

ANSWER: e
POINTS: 1
QUESTION TYPE: Multiple Choice

51. Density describes
a. mass per unit volume.
b. length per unit time.
c. volume per liter.
d. weight per mass.

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

52. A relationship such as 1 in. = 2.54 cm is a(n)
a. equivalence statement.
b. base unit.
c. derived unit.
d. fundamental quantity.

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

53. A method of expressing the accuracy of measured quantities is
a. metric prefixes.
b. derived units.
c. significant figures.
d. conversion factors.

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

54. When multiplying and/or dividing quantities, you should report
a. the result rounded to the same number of digits as there are in the quantity with the greatest number of significant figures.
b. all the digits that show on your calculator.
c. only whole numbers.
d. the result rounded to the same number of digits as there are in the quantity with the least number of significant figures.

ANSWER: d
POINTS: 1

QUESTION TYPE: Multiple Choice

55. Rounding the number 200.601 to three significant figures

a. gives 199.
b. gives 200.
c. gives 200.601
d. gives 201.
e. cannot be done.

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice

56. Expressed in standard powers-of-10 notation and rounded to four significant figures, the number 0.00023648 is

a. 2.364×10^{3}.
b. 2.365×10^{4}.
c. 2.365×10^{-4}.
d. 236.4×10^{-6}.

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

57. One microgram (μg) contains how many grams?

a. 10^{-3}
b. 10^{-6}
c. 10^{-9}
d. 10^{3}

ANSWER: b
POINTS: 1
QUESTION TYPE: Multiple Choice

58. One megawatt contains how many watts?

a. 10^{3}
b. 10^{-6}
c. 10^{6}
d. 10^{-3}

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

59. The speed of light in a vacuum is 300,000,000 m/s. Represented in powers-of-10 notation, this is

a. 30×10^{8}m/s.

b. 3×10^7 m/s.
c. 30×10^6 m/s.
d. 3×10^8 m/s.

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice

60. A measurement of 0.00254 g is the same as
a. 0.254 mg.
b. 25.4 mg.
c. 254 mg.
d. 2.54 mg.
e. none of these.

ANSWER: d
POINTS: 1
QUESTION TYPE: Multiple Choice

61. For the multiplication of 4.769 m times 7.20 m, the result should be reported with how many significant figures?
a. Two
b. One
c. Three
d. Four
e. Seven

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

62. For the multiplication of 7.443 m times 8.5 m, the result should be reported with how many significant figures?
a. Two
b. One
c. Three
d. Four
e. Seven

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

63. For the multiplication of 4.4 m times 1.5 m, the result should be reported with how many significant figures?
a. Two

b. One
c. Three
d. Four
e. Seven

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

64. For the multiplication of 4.212 m divided by 7.60 m, the result should be reported with how many significant figures?

a. Two
b. One
c. Three
d. Four
e. Seven

ANSWER: c
POINTS: 1
QUESTION TYPE: Multiple Choice

65. For the multiplication of 2.817 m divided by 6.3 m, the result should be reported with how many significant figures?

a. Two
b. One
c. Three
d. Four
e. Seven

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

66. For the multiplication of 6.3 m divided by 2.8 m, the result should be reported with how many significant figures?

a. Two
b. One
c. Three
d. Four
e. Seven

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

67. When the measured quantity 45.67 kg is divided by the measured quantity 3.42 L, the answer should have

how many significant figures?

a. Three
b. One
c. Four
d. Two

ANSWER: a
POINTS: 1
QUESTION TYPE: Multiple Choice

68. The natural sciences are divided into _____ sciences and biological sciences.
ANSWER: physical
POINTS: 1
QUESTION TYPE: Subjective Short Answer

69. The natural sciences are divided into physical sciences and _____ sciences.
ANSWER: biological
POINTS: 1
QUESTION TYPE: Objective Short Answer

70. A scientific law is a concise statement that describes a(n) _____ of nature.
ANSWER: relationship (or regularity)
POINTS: 1
QUESTION TYPE: Objective Short Answer

71. The scientific method holds that no theory is valid unless its predictions are in accord with _____.
ANSWER: experiment
POINTS: 1
QUESTION TYPE: Objective Short Answer

72. A hypothesis is a very tentative explanation of some _____ of nature.
ANSWER: regularity (or relationship)
POINTS: 1
QUESTION TYPE: Objective Short Answer

73. A(n) _____ is a tested explanation of a broad segment of basic natural phenomena.
ANSWER: theory
POINTS: 1
QUESTION TYPE: Objective Short Answer

74. A proposed concept or model of nature is tested using the _____.
ANSWER: scientific method
POINTS: 1

QUESTION TYPE: Objective Short Answer

75. The three fundamental quantities studied in Chapter 1 are length, mass, and _____.
ANSWER: time
POINTS: 1
QUESTION TYPE: Objective Short Answer

76. The measurement of space in any direction is called _____.
ANSWER: length
POINTS: 1
QUESTION TYPE: Objective Short Answer

77. _____ is the continuous forward flow of events.
ANSWER: Time
POINTS: 1
QUESTION TYPE: Objective Short Answer

78. _____ is a measurement of the quantity of matter.
ANSWER: Mass
POINTS: 1
QUESTION TYPE: Objective Short Answer

79. An object's _____would be the same on Earth and on the Moon, but its weight would be different.
ANSWER: mass
POINTS: 1
QUESTION TYPE: Objective Short Answer

80. An object's mass would be the same on Earth and on the Moon, but its _____ would be different.
ANSWER: weight
POINTS: 1
QUESTION TYPE: Objective Short Answer

81. In the metric mks system of units, the letter k stands for _____.
ANSWER: kilogram
POINTS: 1
QUESTION TYPE: Objective Short Answer

82. In the metric mks system of units, the letter m stands for _____.
ANSWER: meter
POINTS: 1
QUESTION TYPE: Objective Short Answer

83. In the metric mks system of units, the letter s stands for _____.

ANSWER: second
POINTS: 1
QUESTION TYPE: Objective Short Answer

84. Time is sometimes thought of as a fourth dimension of _____.
ANSWER: space
POINTS: 1
QUESTION TYPE: Objective Short Answer

85. SI stands for the _____ of units.
ANSWER: International System
POINTS: 1
QUESTION TYPE: Objective Short Answer

86. On a computer, a megabyte of memory is _____ bytes.
ANSWER: one million (10^6)
POINTS: 1
QUESTION TYPE: Subjective Short Answer

87. The meter is defined in terms of the speed of _____.
ANSWER: light
POINTS: 1
QUESTION TYPE: Objective Short Answer

88. A metric ton is _____ kg.
ANSWER: 1000
POINTS: 1
QUESTION TYPE: Objective Short Answer

89. There are 10 mm in a(n) _____.
ANSWER: centimeter
POINTS: 1
QUESTION TYPE: Objective Short Answer

90. In the metric system, a penny might be called a(n) _____ dollar.
ANSWER: centi-
POINTS: 1
QUESTION TYPE: Objective Short Answer

91. The metric system is a(n)_____ system.
ANSWER: decimal, or base-10
POINTS: 1
QUESTION TYPE: Objective Short Answer

92. The British system is a(n) _____ , or base-12 system.
ANSWER: duodecimal
POINTS: 1
QUESTION TYPE: Objective Short Answer

93. Given that 1 L = 0.266 gal, the conversion factor for converting gallons to liters would be _____.
ANSWER: 0.266 gal/L
POINTS: 1
QUESTION TYPE: Objective Short Answer

94. The ratio of mass to volume is known as _____.
ANSWER: density
POINTS: 1
QUESTION TYPE: Objective Short Answer

95. Liquid density may be measured with a(n) _____.
ANSWER: hydrometer
POINTS: 1
QUESTION TYPE: Objective Short Answer

96. The standard unit of mass in the SI is the _____.
ANSWER: kilogram
POINTS: 1
QUESTION TYPE: Objective Short Answer

97. One liter of pure water at its maximum density has a mass of 1 _____.
ANSWER: kg
POINTS: 1
QUESTION TYPE: Objective Short Answer

98. The unit of density in the mks system is _____.
ANSWER: kg/m^3
POINTS: 1
QUESTION TYPE: Subjective Short Answer

99. A set value for a fundamental quantity is called a(n) _____ unit.
ANSWER: standard
POINTS: 1
QUESTION TYPE: Objective Short Answer

100. A combination of one or more fundamental units is called a(n) _____ unit.
ANSWER: derived

POINTS: 1
QUESTION TYPE: Objective Short Answer

101. A(n) _____ is a comparison of an unknown physical quantity with the standard unit.
ANSWER: measurement
POINTS: 1
QUESTION TYPE: Objective Short Answer

102. A liter has a volume of _____ cubic centimeters.
ANSWER: 1000
POINTS: 1
QUESTION TYPE: Objective Short Answer

103. Which is longer, a meter or a yard?

ANSWER: A meter
POINTS: 1
QUESTION TYPE: Objective Short Answer

104. Which is larger, a liter or a quart?

ANSWER: A liter
POINTS: 1
QUESTION TYPE: Objective Short Answer

105. In ratio form, the equivalence statement 1 mi = 1.61 km would be expressed as _____.
ANSWER: 1.61 km/mi (or 1 mi/1.61 km)
POINTS: 1
QUESTION TYPE: Objective Short Answer

106. For the multiplication of 8.704 m × 3.14 m, the result should be reported with _____ significant figures.
ANSWER: three
POINTS: 1
QUESTION TYPE: Objective Short Answer

107. If the decimal point is shifted to the left in a number expressed in powers-of-10 notation, the exponent, or power of 10, is _____.
ANSWER: increased
POINTS: 1
QUESTION TYPE: Objective Short Answer

108. If the decimal point is shifted to the right in a number expressed in powers-of-10 notation, the exponent, or power of 10, is _____.

ANSWER: decreased
POINTS: 1
QUESTION TYPE: Objective Short Answer

109. A student's height is 170 cm. Determine that student's height in inches.

ANSWER: 66.9 in.
POINTS: 1
QUESTION TYPE: Objective Short Answer

110. A friend from Europe asks what the length of a 100-yd football field would be in meters. After doing the conversion, what would you tell her?

ANSWER: 91.4 m
POINTS: 1
QUESTION TYPE: Objective Short Answer

111. How long is a 10.0-ft pole in meters?

ANSWER: 3.05 m
POINTS: 1
QUESTION TYPE: Objective Short Answer

112. A cubic container 20 cm on a side is filled with water. What is the mass of the water?

ANSWER: 8 kg
POINTS: 1
QUESTION TYPE: Objective Short Answer

113. Dry air has a density of 1.29 kg/m^3. What would be the volume of a metric ton of air?
ANSWER: 775 m^3
POINTS: 1
QUESTION TYPE: Subjective Short Answer

114. Perform the operation of 147.02/0.338, and report the result with the proper number of significant figures in standard powers-of-10 notation.
ANSWER: 4.35×10^2
POINTS: 1
QUESTION TYPE: Subjective Short Answer

115. Express 100 megadollars in standard powers-of-10 notation.
ANSWER: 1.0×10^8 dollars
POINTS: 1
QUESTION TYPE: Subjective Short Answer

116. Calculate the product of 2.1×10^2 and 1.9×10^7. Express the answer in standard powers-of-10 notation.

ANSWER: 3.99×10^9
POINTS: 1
QUESTION TYPE: Subjective Short Answer

117. Calculate the approximate number of seconds that a(n) 30-year-old student has lived.

ANSWER: 9.5×10^8 s
POINTS: 1
QUESTION TYPE: Subjective Short Answer

118. If there are 2.54 cm/in., how many inches are there per centimeter?

ANSWER: 1/2.54 = 0.394
POINTS: 1
QUESTION TYPE: Objective Short Answer

119. Write 0.000852 in standard powers-of-10 notation.

ANSWER: 8.52×10^{-4}
POINTS: 1
QUESTION TYPE: Subjective Short Answer

120. What does 4×10^{-12} times 3×10^{-8} divided by 2×10^{24} equal?

ANSWER: 6×10^{-44}
POINTS: 1
QUESTION TYPE: Subjective Short Answer

121. What does 6×10^{12} times 3×10^{-9} divided by 2×10^{-17} equal?

ANSWER: 9×10^{20}
POINTS: 1
QUESTION TYPE: Subjective Short Answer