MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) The SI base unit for length is the
A) foot. B) meter. C) inch. D) kilometer. E) millimeter.
Answer: B

2) The metric unit for volume is the
A) liter. B) meter. C) pint. D) centimeter. E) quart.
Answer: A

3) Which of the following is the basic unit of mass in the SI?
A) pound B) kilogram C) microgram D) gram E) milligram
Answer: B

4) Which of the following is a measurement of mass in the metric system?
A) milliliter B) centimeter C) Celsius D) meter E) kilogram
Answer: E

5) Which of the following is a measurement of temperature in the metric system?
A) degree Celsius
B) meter
C) lb
D) kilogram
E) degree Fahrenheit
Answer: A

6) A value of 25 °C is a measurement of
A) mass. B) density. C) volume. D) temperature. E) distance.
Answer: D

7) A value of 36 mL is a measure of
A) distance. B) temperature. C) density. D) volume. E) mass.
Answer: D

8) A value of 345 cm is a measure of
A) distance. B) temperature. C) volume. D) density. E) mass.
Answer: A

9) The amount of space occupied by a substance is its
A) density. B) mass. C) volume. D) weight. E) length.
Answer: C

10) The measurement of the gravitational pull on an object is its
A) weight. B) volume. C) mass. D) length. E) size.
Answer: A

11) Significant figures are important because they indicate
A) the exact numbers in a measurement.
B) the certain and estimated digits in a measurement.
C) the number of measurements.
D) the number of digits on a calculator.
E) the accuracy of the conversion factor.

Answer: B

12) Which of the following measurements has three significant figures?
A) 0.051 m B) 510 m C) 0.510 m D) 0.005 m E) 5100 m

Answer: C

13) Which of the following measured numbers contains the designated CORRECT number of significant figures?
A) 0.04300 5 significant figures
B) 0.00302 2 significant figures
C) 1.04 2 significant figures
D) 156 000 3 significant figures
E) 3.0650 4 significant figures

Answer: D

14) The number of significant figures in the measurement of 45.030 mm is
A) none. B) three. C) four. D) five. E) six.

Answer: D

15) How many significant figures are in the measured number 0.00208 m?
A) two B) five C) six D) three E) four

Answer: D

16) Which of the following measurements has the same number of significant figures as the measured number 0.02030?
A) 2.03×10^3 B) 4600 C) 0.0067 D) 510 E) 4.006

Answer: E

17) Which of the following examples illustrates a number that is correctly rounded to three significant figures?
A) 20.0332 grams to 20.0 grams
B) 4.05438 grams to 4.054 grams
C) 109,526 grams to 109 500 grams
D) 0.03954 grams to 0.040 grams
E) 103.692 grams to 103.7 grams

Answer: A

18) A calculator answer of 423.6059 must be rounded off to three significant figures. What answer is reported?
A) 424 B) 423.6 C) 423.7 D) 420 E) 423

Answer: A

19) Which of the answers for the following calculations contains the correct number of significant figures?

A) $2.543\ \text{m} \times \frac{39.4\ \text{in}}{1\ \text{m}} = 100.1942\ \text{in}$

B) $12.0\ \text{ft} \times \frac{12\ \text{in.}}{1\ \text{ft}} \times \frac{2.54\ \text{cm}}{1\ \text{in}} = 370\ \text{cm}$

C) $2\ \text{L} \times \frac{1.06\ \text{qt}}{1\ \text{L}} = 2.12\ \text{qt}$

D) $24.0\ \text{kg} \times \frac{1\ \text{lb}}{2.20\ \text{kg}} = 11\ \text{lb}$

E) $24.95\ \text{min} \times \frac{1\ \text{h}}{60\ \text{min}} = 0.4158\ \text{h}$

Answer: E

20) What is the correct answer for the calculation of a volume (in mL) with measured numbers $\frac{28.58}{16 \times 8.02}$?

A) 57 mL B) 0.223 mL C) 14 mL D) 0.22 mL E) 14.3 mL

Answer: D

21) A researcher added three samples of sodium chloride solution; the volumes were: 0.351 mL, 0.350 mL and 0.349 mL. The total volume should be reported as

A) 1.0500 mL. B) 1.1 mL. C) 1.050 mL. D) 1.05 mL. E) 1.0 mL.

Answer: C

22) When 2610 + 11.7 + 0.22 are added, which of the following expresses the answer to the correct number of decimal places?

A) 2621.92 B) 2620 C) 2600 D) 2621.9 E) 2621

Answer: B

23) What is the answer, with the correct number of decimal places, for this problem?

$4.392\ \text{g} + 102.40\ \text{g} + 2.51\ \text{g} =$

A) 109.3 g B) 110 g C) 109 g D) 109.302 g E) 109.30 g

Answer: E

24) The correct answer for the addition of 7.5 g + 2.26 g + 1.311 g + 2 g is

A) 10 g. B) 13 g. C) 13.1 g. D) 13.0 g. E) 13.071 g.

Answer: B

25) What is the correct answer for the calculation $\frac{36 \times 0.12345}{6.77}$?

A) 1.52 B) 0.66 C) 0.65645 D) 1.5 E) 0.656

Answer: B

26) 5.21 cm is the same distance as

A) 5.21 mm. B) 52.1 dm. C) 5210 m. D) 0.0521 m. E) 0.00521 km.

Answer: D

27) Which of the following measurements are NOT equivalent?
A) 183 L = 0.183 kL
B) 84 cm = 8.4 mm
C) 24 dL = 2.4 L
D) 25 mg = 0.025 g
E) 150. ms = 0.150 s

Answer: B

28) In which of the following is the metric unit paired with its correct abbreviation?
A) kilogram / cg
B) centimeter / km
C) milliliter / mL
D) microgram / mg
E) gram / gm

Answer: C

29) Which of the following is the largest unit?
A) kilometer B) decimeter C) meter D) millimeter E) micrometer

Answer: A

30) What is the relationship between grams and micrograms?
A) 1 g = 1000 µg
B) 1 g = 0.001 µg
C) 1 g = 100 µg
D) 1 g = 0.000 001 µg
E) 1 g = 1 000 000 µg

Answer: E

31) Which of the following is the smallest unit?
A) milligram B) gram C) kilogram D) decigram E) microgram

Answer: E

32) The cubic centimeter (cm^3 or cc) has the same volume as a
A) cubic decimeter.
B) cubic liter.
C) cubic inch.
D) milliliter.
E) centimeter.

Answer: D

33) 9.31 g is the same mass as
A) 931 kg. B) 931 µg. C) 0.0931 dg. D) 9310 mg. E) 93.1 cg.

Answer: D

34) In which of the following is the metric unit paired with its correct abbreviation?
A) microgram / Mg
B) centimeter / cmm
C) milliliter / mcL
D) kilogram / Kg
E) microgram / mcg

Answer: E

35) What is the conversion factor for the relationship between millimeters and centimeters?
A) 10 mm/1 cm
B) 1 cm/1 mm
C) 10 cm/1 mm
D) 1 mm/1 cm
E) 100 mm/1 cm

Answer: A

36) A conversion factor set up correctly to convert 15 inches to centimeters is
A) 1 inch/2.54 cm.
B) 100 cm/1 m.
C) 1 cm/10 mm.
D) 10 cm/1 inch.
E) 2.54 cm/1 inch.

Answer: E

37) Which of the following conversion factors is a measured number?
A) 12 in/ft
B) 16 oz/lb
C) 10 cm/dm
D) 25 miles/gallon
E) 12 eggs/dozen

Answer: D

38) Parts per million (ppm) is the same as:
A) milligrams per kilogram
B) grams per kilogram
C) parts per hundred
D) kilograms per milligram
E) micrograms per kilogram

Answer: A

39) According to the United States Food and Drug Administration, the recommended daily requirement of protein is 44 g. This is _____ oz of protein.
A) 1.6 B) 1248.5 C) 150 000 D) 320 000 E) 0.0605

Answer: A

40) Which of the following setups would convert centimeters to feet?

A) $\text{cm} \times \frac{1\text{ in.}}{2.54\text{ cm}} \times \frac{1\text{ ft}}{12\text{ in.}}$

B) $\text{cm} \times \frac{2.54\text{ in.}}{1\text{ cm}} \times \frac{1\text{ ft}}{12\text{ in.}}$

C) $\text{cm} \times \frac{2.54\text{ cm}}{1\text{ in.}} \times \frac{1\text{ ft}}{12\text{ in.}}$

D) $\text{cm} \times \frac{2.54\text{ cm}}{1\text{ in.}} \times \frac{12\text{ in.}}{1\text{ ft}}$

E) $\text{cm} \times \frac{1\text{ in.}}{2.54\text{ cm}} \times \frac{12\text{ in.}}{1\text{ ft}}$

Answer: A

41) The EPA limit for lead in the soil of play areas is 400 ppm. This is the same as

A) 400 µg lead in each kilogram of soil.
B) 400 mg lead in each kilogram of soil.
C) 400 mg lead in each gram of soil.
D) 400 µg lead in each milligram of soil.
E) 400 g lead in each kilogram of soil.

Answer: B

42) How many pounds are in 3.5 kg?

A) 7.7 lb B) 1.6 lb C) 1.59 lb D) 7.70 lb E) 0.629 lb

Answer: A

43) How many centimeters are there in 57.0 in.?

A) 22 cm B) 140 cm C) 0.0445 cm D) 145 cm E) 22.4 cm

Answer: D

44) How many kilograms are in 30.4 lb?

A) 14 kg B) 66.88 kg C) 13.8 kg D) 66.9 kg E) 67 kg

Answer: C

45) How many liters of soft drink are there in 5.25 qt?

A) 5.0 L B) 4950 L C) 5.57 L D) 4.95 L E) 55.7 L

Answer: D

46) What is 6.5 m converted to inches?

A) 260 in B) 1700 in C) 1651 in D) 255.9 in E) 39 in

Answer: A

47) 1.00 pint of milk has a volume of how many milliliters? (2 pints = 1 quart)

A) 472 mL B) 106 mL C) 1000 mL D) 1890 mL E) 530. mL

Answer: A

48) What is the volume of a cube that measures 4.00 cm on each side?

A) 64.0 mL B) 0.640 L C) 64.0 L D) 64.00 mL E) 16.0 mL

Answer: A

49) Grapes are $1.49 per pound. What is the cost of 1.20 kg of grapes?
A) $0.81 B) $0.56 C) $3.94 D) $1.79 E) $2.73

Answer: C

50) A driver is traveling at 60 km/h. Is the driver speeding if the speed limit is 45 mph?
A) Yes B) No

Answer: B

51) How many kilograms are in 30.4 lb?
A) 14 kg B) 67 kg C) 66.88 kg D) 66.9 kg E) 13.8 kg

Answer: E

52) A dose of aspirin of 5.0 mg per kilogram of body weight has been prescribed to reduce the fever of an infant weighing 8.5 pounds. The number of milligrams of aspirin that should be administered is
A) 53 mg. B) 5.0 mg. C) 19 mg. D) 0.59 mg. E) 1.6 mg.

Answer: C

53) A doctor's order is 0.125 g of ampicillin. The liquid suspension on hand contains 250 mg/5.0 mL. How many milliliters of the suspension are required?
A) 3.0 mL B) 0.0063 mL C) 2.5 mL D) 0.0025 mL E) 6.3 mL

Answer: C

54) A nugget of gold with a mass of 521 g is added to 50.0 mL of water. The water level rises to a volume of 77.0 mL. What is the density of the gold?
A) 10.4 g/mL B) 19.3 g/mL C) 6.77 g/mL D) 1.00 g/mL E) 0.0518 g/mL

Answer: B

55) Which one of the following substances will float in gasoline, which has a density of 0.66 g/mL?
A) table salt (density = 2.16 g/mL)
B) sugar (density = 1.59 g/mL)
C) balsa wood (density = 0.16 g/mL)
D) mercury (density = 13.6 g/mL)
E) aluminum (density = 2.70 g/mL)

Answer: C

56) What is the mass of 2.00 L of an intravenous glucose solution with a density of 1.15 g/mL?
A) 0.015 kg B) 2.30 kg C) 0.58 kg D) 1.15 kg E) 0.023 kg

Answer: B

57) Mercury has a specific gravity of 13.6. How many milliliters of mercury have a mass of 0.35 kg?
A) 0.026 mL B) 25.7 mL C) 0.0257 mL D) 26 mL E) 4760 mL

Answer: D

58) What is the density of a substance with a mass of 45.00 g and a volume of 26.4 mL?
A) 0.587 g/mL B) 1.70 g/mL C) 45.0 g/mL D) 1.7 g/mL E) 0.59 g/mL

Answer: B

59) A liquid has a volume of 34.6 mL and a mass of 46.0 g. What is the density of the liquid?
A) 1.33 g/mL B) 0.752 g/mL C) 0.663 g/mL D) 1.00 g/mL E) 1330 g/mL

Answer: A

60) What is the mass of 53 mL of ethanol, which has a density of 0.79 g/mL?
A) 67.1 g B) 42 g C) 67 g D) 41.9 g E) 53 g
Answer: B

61) The density of a solution is 0.847 g/mL. Its specific gravity is
A) 1.2. B) 11.8. C) 1.18. D) 0.118. E) 0.847.
Answer: E

62) The specific gravity of a solution is 1.18. Its density is
A) 0.118 g/mL. B) 11.8 g/mL. C) 0.847 g/mL. D) 1.2 g/mL. E) 1.18 g/mL.
Answer: E

63) Diamond has a density of 3.52 g/mL. What is the volume in cubic centimeters of a diamond with a mass of 15.1 g?
A) 0.233 cm^3 B) 4.3 cm^3 C) 53 cm^3 D) 53.2 cm^3 E) 4.29 cm^3
Answer: E

64) The ratio of the mass of a substance to its volume is its
A) density.
B) specific gravity.
C) conversion factor.
D) weight.
E) buoyancy.
Answer: A

65) Which of the following is often used to determine an individual's percentage of body fat?
A) weight loss B) temperature C) density D) weight gain E) height
Answer: C

66) A 50.0 mL urine sample has a mass of 50.7 g. The specific gravity of the urine is
A) 50.7. B) 1.014 g/mL. C) 0.986. D) 1.01. E) 0.986 g/L.
Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Round off each of the following to three significant figures.

67) 504.85
Answer: 505

68) 8.3158
Answer: 8.32

69) 25 225
Answer: 25 200

70) 58.5422
Answer: 58.5

71) 6.3477×10^4

Answer: 6.35×10^4

72) 399870

Answer: 4.00×10^5

73) 0.003 408 8

Answer: 0.003 41

State the number of significant figures in each of the following measurements.

74) 0.008 090 cm

Answer: 4

75) 680 000 km

Answer: 2

76) 28.050 km

Answer: 5

77) 0.0005 L

Answer: 1

78) 75.00 m

Answer: 4

79) 2.043×10^4 mm

Answer: 4

80) 6.1×10^{-5} mL

Answer: 2

81) 9.00×10^6 g

Answer: 3

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

82) The basic unit of mass in the metric system is the pound.

Answer: True False

83) The liter is a unit of volume in the metric system.

Answer: True False

84) The kelvin is a unit of length in the metric system.

Answer: True False

85) The number 0.0500 has four significant figures.

Answer: True False

86) The number 650 000 has two significant figures.
Answer: True False

87) The number 3.10×10^3 has two significant figures.
Answer: True False

88) When the measured number 0.0090 is multiplied by the measured number 87.10, the answer has two significant figures.
Answer: True False

89) When the measured number 675 is added to the measured number 87.10, the answer should be rounded to the ones place.
Answer: True False

90) A µg is larger than a mg.
Answer: True False

91) There are 1000 µg in a mg.
Answer: True False

92) A cubic centimeter is a unit of length.
Answer: True False

93) 1 kilogram is the same as 1000 mg.
Answer: True False

94) 1 milliliter is the same as 1000 L.
Answer: True False

95) There are 1000 cm in one meter.
Answer: True False

96) A conversion factor between mL and L is 1000 L/1 mL.
Answer: True False

97) A distance of 6.3 inches is the same as 16 cm.
Answer: True False

98) A stone that weighs 3.6 lbs has a mass of 7.9 kg.
Answer: True False

99) The density of water is 1 kg/mL.
Answer: True False

100) Specific gravity has no units.
Answer: True False

MATCHING. Choose the item in column 2 that best matches each item in column 1.

Match the type of measurement to the unit given below.

101) milliliter
Answer: A

102) mm
Answer: D

103) gram
Answer: E

104) K
Answer: B

105) kilometer
Answer: D

106) milligram
Answer: E

A) volume

B) temperature

C) density

D) distance

E) mass

Are the numbers in each of the following statements measured or exact?

107) In the U.S. system there are 5280 feet in one mile.
Answer: A

108) The patient's blood sugar level is 350 mg/dL.
Answer: B

109) There are 452 pages in a book.
Answer: A

110) The rabbit weighs 2.5 pounds.
Answer: B

111) There are 100 capsules in the bottle.
Answer: A

112) I lost 14 pounds on my diet last month.
Answer: B

113) 1 liter is equal to 1.06 quarts.
Answer: B

114) The patient's temperature is 100.1 °F.
Answer: B

A) exact

B) measured

Select the correct prefix to complete the equality.

115) 1 g = _____ kg
Answer: I

116) 1 m = _____ mm
Answer: C

117) 1 cm = _____ mm
Answer: H

118) 1 dL = _____ mL
Answer: E

119) 1 kg = _____ g
Answer: C

120) 1 pg = _____ g
Answer: F

121) 1 g = _____ pg
Answer: A

122) 1 mL = _____ cc
Answer: B

A) 1×10^{12}

B) 1

C) 1000

D) 0.1

E) 100

F) 1×10^{-12}

G) 0.01

H) 10

I) 0.001