

Name _____

[/test-bank-general-organic-and-biological-chemistry-7e-stoker](#)

Class _____

Date _____

CHAPTER 2: MEASUREMENTS IN CHEMISTRY

1. The “mathematical meaning” associated with the metric system prefixes *centi*, *milli*, and *micro* is, respectively,

- a. 10^{-2} , 10^{-4} , and 10^{-6}
- b. 10^{-2} , 10^{-3} , and 10^{-6}
- c. 10^{-3} , 10^{-6} , and 10^{-9}
- d. 10^{-3} , 10^{-9} , and 10^{-12}

ANSWER:

b

2. In which of the following sequences are the metric system prefixes listed in order of *decreasing* size?

- a. kilo giga mega
- b. milli nano micro
- c. mega kilo micro
- d. pico kilo deci

ANSWER:

c

3. Which of the following is an incorrect pairing of terminology?

- a. kilogram - metric unit of mass
- b. milliliter - metric unit of volume
- c. meter - metric unit of length
- d. cubic centimeter - metric unit of length

ANSWER:

d

4. To what decimal position should a measurement be recorded if the smallest markings on the measurement scale are tenths of a centimeter?

- a. to the closest centimeter
- b. to the tenths of a centimeter
- c. to the hundredths of a centimeter
- d. to the thousandths of a centimeter

ANSWER:

c

5. In which one of the following measure numbers are *all* of the zeros significant?

- a. 0.0705
- b. 3,300,000
- c. 0.000440
- d. 3.945900

ANSWER:

d

6. In which of the following pairs of measured numbers does each member of the pair contain the same number of significant figures?

- a. 10.3 and 10.30
- b. 800.0 and 80
- c. 0.03330 and 0.0333
- d. 0.000096 and 960,000

ANSWER:

d

7. In which of the following cases is the given measurement correctly rounded to three significant figures?

- a. 479,000 becomes 479
- b. 0.02235 becomes 0.0223
- c. 37.98 becomes 38.0
- d. 49.400 becomes 49,400

ANSWER:

c

8. Which of the following would involve an *exact* number?

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- a. the length of a table
b. the mass of a bag of carrots
c. the number of inches in a yard
d. the surface area of a quilt

ANSWER:

c

9. The measurement 8310.90 expressed in scientific notation becomes

- a. 0.83109×10^3
b. 8.3109×10^2
c. 8.3109×10^4
d. 8.3109×10^3

ANSWER:

d

10. What is the uncertainty associated with the measurement of 6.02×10^4 ?

- a. 100
b. 10
c. 0.1
d. 0.01

ANSWER:

a

11. The calculator answer obtained from multiplying the measurements 64.49 and 6.57 is 423.70. Given the operational rules governing significant figures, this answer

- a. is correct as written
b. should be rounded to 423.7
c. should be rounded to 424
d. could be written as 423

ANSWER:

c

12. The correct answer obtained from adding the measurements 9.6, 4.79, and 5.352 contains

- a. two significant figures
b. three significant figures
c. four significant figures
d. five significant figures

ANSWER:

b

13. The correct answer obtained by dividing the measurement 8.63×10^{-3} by the measurement 2.876×10^{-9} is

- a. 0.30×10^{-6}
b. 3.00×10^{-6}
c. 3.00×10^{-7}
d. 3.00×10^{-5}

ANSWER:

b

14. According to dimensional analysis, which of the following is the correct setup for the problem "How many milligrams are there in 85 kilograms?"

- a. $85 \text{ kg} \times \left(\frac{1 \text{ g}}{10^3 \text{ kg}} \right) \times \left(\frac{1 \text{ mg}}{10^{-3} \text{ mg}} \right)$
b. $85 \text{ kg} \times \left(\frac{10^3 \text{ g}}{1 \text{ kg}} \right) \times \left(\frac{1 \text{ mg}}{10^{-3} \text{ mg}} \right)$
c. $85 \text{ kg} \times \left(\frac{10^3 \text{ mg}}{1 \text{ kg}} \right) \times \left(\frac{10^{-3} \text{ mg}}{1 \text{ mg}} \right)$
d. $85 \text{ kg} \times \left(\frac{1 \text{ g}}{10^3 \text{ kg}} \right) \times \left(\frac{10^{-3} \text{ kg}}{1 \text{ mg}} \right)$

ANSWER:

b

15. How many conversion factors can be derived from the equality 60 seconds = 1 minute?

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- a. two
- b. three
- c. four
- d. an unlimited number

ANSWER:

a

16. The density of an object is the ratio of its

- a. length to volume
- b. mass to height
- c. mass to volume
- d. length to mass

ANSWER:

c

17. If object A weighs 6.0 grams and has a volume of 3.0 mL and object B weighs 9.0 grams and has a volume of 2.25 mL

- a. B is less dense than A.
- b. A and B have equal densities.
- c. B is twice as dense as A.
- d. B is four times as dense as A.

ANSWER:

c

18. What is the mass, in grams, of 30.7 mL of a liquid if its density is 0.81 g/mL?

- a. 3.8
- b. 25
- c. 4
- d. 249

ANSWER:

b

19. Which of the following comparisons of the size of a degree on the major temperature scales is *correct*?

- a. A Kelvin degree is larger than a Celsius degree.
- b. A Fahrenheit degree and a Celsius degree are equal in size.
- c. A Fahrenheit degree is larger than a Kelvin degree.
- d. A Celsius degree and a Kelvin degree are equal in size.

ANSWER:

d

20. If the temperature of an object is 435°C, what is the temperature on a Kelvin scale?

- a. 162 K
- b. 608 K
- c. 672 K
- d. 708 K

ANSWER:

d

21. In which of the following pairings of metric system prefix and power of ten is the pairing *incorrect*?

- a. kilo- and 10^{-3}
- b. micro- and 10^{-6}
- c. deci- and 10^1
- d. more than one correct response
- e. no correct response

ANSWER:

d

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22. In which of the following pairs of units is the first listed unit 1000 times *larger* than the second?

- a. milligram and nanogram
- b. liter and centiliter
- c. kilometer and megameter
- d. more than one correct response
- e. no correct response

ANSWER:

e

23. In which of the following sequences of measured numbers do all members of the sequence contain three significant figures?

- a. 3.03 and 3.30 and 0.033
- b. 78,000 and 0.00780 and 780
- c. 30.0 and 0.300 and 30,100
- d. more than one correct response
- e. no correct response

ANSWER:

c

24. Which of the following digits in the measurement 654,300 seconds is an estimated digit?

- a. the last digit
- b. the next to last zero
- c. the three
- d. more than one correct response
- e. no correct response

ANSWER:

c

25. Which of the following statements concerning the measured number 0.3030 is correct?

- a. Only one of the zeros in the number is significant.
- b. Rounded off to two significant figures the number becomes 0.30.
- c. Expressed in scientific notation the number becomes 3.03×10^{-2} .
- d. More than one correct response.
- e. No correct response.

ANSWER:

b

26. Which of the following mathematical expressions is correctly evaluated?

- a. $\frac{10^3}{10^{-4}} = 10^7$
- b. $10^3 \times 10^4 = 10^{12}$
- c. $\frac{10^3}{10^4} = 10^{-7}$

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- d. more than one correct response
- e. no correct response

ANSWER:

a

27. Which of the following measured numbers contains three significant figures and has a magnitude of less than one?

- a. 3.30×10^5
- b. 3.00×10^{-3}
- c. 3.20×10^{-4}
- d. more than one correct response
- e. no correct response

ANSWER:

d

28. When expressed in scientific notation, the measured numbers 3200 and 3200.0 become, respectively,

- a. 3.2×10^3 and 3.200×10^3
- b. 3.2×10^3 and 3.2000×10^3
- c. 3.200×10^3 and 3.2000×10^3
- d. more than one correct response
- e. no correct response

ANSWER:

b

29. Which of the following measured numbers has an uncertainty of 0.01 associated with it?

- a. 32.930
- b. 3.02×10^6
- c. 3.0×10^{-1}
- d. more than one correct response
- e. no correct response

ANSWER:

c

30. Which of the following statements concerning conversion factors is incorrect?

- a. English-to-English conversion factors come from defined relationships
- b. Metric-to-metric conversions come from measured relationships
- c. English-to-English conversion factors always contain exact numbers
- d. more than one correct response
- e. no correct response

ANSWER:

c

31. Which of the following conversion factors would limit a calculation to two significant figures?

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- a. $\frac{453.6 \text{ g}}{1 \text{ lb}}$
- b. $\frac{1 \text{ in.}}{2.54 \text{ cm}}$
- c. $\frac{24 \text{ hr}}{1 \text{ day}}$
- d. more than one correct response
- e. no correct response

ANSWER:

e

32. Density can be used as a conversion factor to convert from

- a. mass to volume
- b. volume to mass
- c. metric unit mass to English unit mass
- d. more than one correct response
- e. no correct response

ANSWER:

d

33. The density of table sugar is 1.59 g/mL. It is true that

- a. 2.00 g of table sugar occupies a volume of 1.17 mL.
- b. 3.00 g of table sugar occupies a volume of 1.97 mL.
- c. 5.00 g of table sugar occupies a volume of 3.14 mL.
- d. More than one correct response
- e. No correct response

ANSWER:

c

34. Which of the following statements concerning the three major temperature scales is *correct*?

- a. Kelvin temperatures are always positive.
- b. The equation for converting from Celsius to Kelvin involves the number 273.
- c. The freezing point of water has a lower numerical value on the Kelvin scale than on the Fahrenheit scale.
- d. More than one correct response.
- e. No correct response.

ANSWER:

d

35. In which of the following pairs of temperature readings are the two members of the pair equivalent to each other?

- a. 32°F and 273 K
- b. 0°C and 373 K
- c. 0°C and 40°F

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- d. more than one correct response
- e. no correct response

ANSWER:

a

36. Statements:

- (1) The meaning of a metric system prefix is independent of the base unit it modifies.
- (2) "Trailing zeros" at the end of a measured number are never significant.
- (3) The answer to the problem $10^5/10^{-3}$ is 10^2 .

- a. All three statements are true.
- b. Two of the three statements are true.
- c. Only one of the statements is true.
- d. None of the statements are true.

ANSWER:

c

37. Statements:

- (1) In outer space, an astronaut may be weightless but never massless.
- (2) The metric system prefixes *milli* and *micro* differ in mathematical meaning by a factor of 1000.
- (3) The addition of 273 to a Fahrenheit temperature reading will convert it to a Kelvin temperature reading.

- a. All three statements are true.
- b. Two of the three statements are true.
- c. Only one of the statements is true.
- d. None of the statements are true.

ANSWER:

b

38. Statements:

- (1) The measured number 2.410×10^{-3} contains three significant figures.
- (2) The specific heat of water is higher than that of most other substances.
- (3) The equation $1 \text{ kg} = 10^6 \text{ mg}$ is a correct mathematical statement.

- a. All three statements are true.
- b. Two of the three statements are true.
- c. Only one of the statements is true.
- d. None of the statements are true.

ANSWER:

b

39. Statements:

- (1) The answer to the addition problem $3.21 + 32 + 3.22$ should have an uncertainty of hundredths.
- (2) The measurement 653,899, when rounded to five significant figures, becomes 65,390.
- (3) The higher the specific heat of a substance, the more its temperature will change when it absorbs a given amount of heat.

- a. All three statements are true.
- b. Two of the three statements are true.

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- c. Only one of the statements is true.
- d. None of the statements are true.

ANSWER:

d

40. Statements:

- (1) The conversion factor 10^3 m/l km contains an unlimited number of significant figures.
 - (2) Density may be used as a conversion factor to convert from mass to volume.
 - (3) The equation $2.33 \text{ lb} = 625 \text{ g}$ is a correct mathematical statement.
- a. All three statements are true.
 - b. Two of the three statements are true.
 - c. Only one of the statements is true.
 - d. None of the statements are true.

ANSWER:

b

41. Statements:

- (1) A deciliter is equal to 100 milliliters.
 - (2) The Kelvin temperature scale is closely related mathematically to the Celsius temperature scale.
 - (3) Measurements cannot be exact because two estimated digits are always recorded as part of any measurement.
- a. All three statements are true.
 - b. Two of the three statements are true.
 - c. Only one of the statements is true.
 - d. None of the statements are true.

ANSWER:

b

42. Statements:

- (1) The answer to the calculation $12.00 \times (6.00 \times 10^{23})$ should contain three significant figures.
 - (2) A meter is slightly larger than a yard, and a liter is slightly larger than a quart.
 - (3) The numbers 3.30×10^{-1} and 3.30×10^1 both have a magnitude of less than one.
- a. All three statements are true.
 - b. Two of the three statements are true.
 - c. Only one of the statements is true.
 - d. None of the statements are true.

ANSWER:

b

43. Statements:

- (1) The size of the degree is the same on the Fahrenheit and Celsius temperature scales.
 - (2) The measurement 62,300 has an uncertainty of ± 100 .
 - (3) The answer to the calculation $8.45 + 10.40$ should contain four significant figures.
- a. All three statements are true.
 - b. Two of the three statements are true.

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- c. Only one of the statements is true.
- d. None of the statements are true.

ANSWER:

b

44. Statements:

- (1) The measured numbers 244,000 and 0.000244 contain the same number of significant figures.
- (2) One cubic centimeter is equal to ten milliliters.
- (3) The conversion factor 1 in/2.54 cm, when used as written, would decrease unit size.
 - a. All three statements are true.
 - b. Two of the three statements are true.
 - c. Only one of the statements is true.
 - d. None of the statements are true.

ANSWER:

c