

## Chapter Test A

### Chapter: Measurements and Calculations

In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

- \_\_\_\_\_ 1. In an experiment, onion plants of different ages were exposed to various amounts of caffeine to determine the effect of caffeine on cell growth. Temperature, amount of water, and light were kept constant. Which of these statements about the experiment is definitely true?
- The results may not be valid because there were two variables.
  - The amount of caffeine used was a control.
  - Temperature, water, and light were the only variables.
  - Onion plants can be used to model the effects of caffeine on living things.
- \_\_\_\_\_ 2. Which of these is the variable in an experiment designed to determine whether steel rusts more quickly near a lake or in a desert in one year?
- amount of rust
  - time of exposure
  - amount of water in the air
  - mass of the steel
- \_\_\_\_\_ 3. Which of these recorded observations is qualitative, rather than quantitative?
- A chemical reaction is complete in 2.3 s.
  - The solid has a mass of 23.4 g.
  - The compound melts at 87.5°C.
  - Iron is denser than aluminum.
- \_\_\_\_\_ 4. Which of these terms best describes the following statement?  
“A solution of the unknown compound turned litmus paper blue.”
- hypothesis
  - model
  - quantitative observation
  - qualitative observation
- \_\_\_\_\_ 5. Which of these statements is true of the scientific method?
- The steps may vary somewhat to suit the experiment.
  - Working scientists rarely use it.
  - Scientists must follow its steps exactly.
  - Scientists rarely publish results of experiments.

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- \_\_\_\_\_ 6. Theories are considered successful only if they
- can be used to make accurate predictions.
  - can be stated in simple terms.
  - can be written in the form of an equation.
  - have been accepted by all scientists.
- \_\_\_\_\_ 7. An experiment is designed to measure the effect of global temperature increase on ocean levels. In this experiment, if the ocean level is compared to the average ocean level over the last 100 years, then the average ocean level over the last 100 years would be considered
- a model.
  - a variable.
  - the hypothesis.
  - the control.
- \_\_\_\_\_ 8. The unit  $\text{cm}^3$  is used to express
- length.
  - mass.
  - volume.
  - time.
- \_\_\_\_\_ 9. The SI base units for time and temperature are
- hour and degree Celsius.
  - second and degree Celsius.
  - hour and kelvin.
  - second and kelvin.
- \_\_\_\_\_ 10. Which of these shows SI unit prefixes arranged in order from smallest to largest?
- centi, milli, kilo
  - milli, centi, kilo
  - kilo, milli, centi
  - kilo, centi, milli
- \_\_\_\_\_ 11. The conversion factor  $\frac{1 \text{ L}}{10^3 \text{ mL}}$  would be used to change
- milliliters to liters.
  - liters to milliliters.
  - units of volume to units of length.
  - units of length to units of volume.
- \_\_\_\_\_ 12. A sample of bismuth has a mass of 343 g and a volume of  $35.0 \text{ cm}^3$ . What is the density of bismuth?
- $0.102 \text{ g/cm}^3$
  - $9.80 \text{ g/cm}^3$
  - $378 \text{ g/cm}^3$
  - $1.20 \times 10^4 \text{ g/cm}^3$

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- \_\_\_\_\_ 13. Which of these statements about density is true?
- a. Density is proportional to the amount of a substance.
  - b. Density is expressed in units of mL/cm<sup>3</sup>.
  - c. Density does not change with temperature.
  - d. Density may be used to help identify a material.
- \_\_\_\_\_ 14. An object's weight is a measure of
- a. the force with which it is attracted by gravity.
  - b. the pressure exerted on a scale.
  - c. the amount of material per unit volume.
  - d. the force causing the object to move.
- \_\_\_\_\_ 15. The SI base unit for mass is the
- a. gram.
  - b. cubic centimeter.
  - c. meter.
  - d. kilogram.
- \_\_\_\_\_ 16. Which of these is *not* an SI base unit?
- a. meter
  - b. pound
  - c. kelvin
  - d. ampere
- \_\_\_\_\_ 17. Precision is related to all of these *except*
- a. reproducibility of measurements.
  - b. range of measurement values.
  - c. number of significant figures.
  - d. closeness of a measurement to the accepted value.
- \_\_\_\_\_ 18. A student determined the density of aluminum by averaging the results of three density calculations. Each value was different, but the average was equal to the accepted value for aluminum's density. The results of this investigation are best described as
- a. accurate, but not precise.
  - b. precise, but not accurate.
  - c. both precise and accurate.
  - d. neither precise nor accurate.
- \_\_\_\_\_ 19. The measurement 0.0265 g, rounded off to two significant figures, would be
- a. 0.026 g.
  - b. 0.027 g.
  - c. 0.03 g.
  - d. 0.030 g.

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- \_\_\_\_\_ **20.** In division and multiplication, the answer should have the same number of significant figures as the
- number in the calculation with the fewest significant figures.
  - number in the calculation with the most significant figures.
  - average number of significant figures in the calculation.
  - total number of significant figures in the calculation.
- \_\_\_\_\_ **21.** The number of significant figures in the measurement 170.040 km is
- three.
  - four.
  - five.
  - six.
- \_\_\_\_\_ **22.** The dimensions of rectangular solid are measured to be 1.27 cm, 1.3 cm, and 2.5 cm. The volume should be recorded as
- $4.128 \text{ cm}^3$ .
  - $4.12 \text{ cm}^3$ .
  - $4.13 \text{ cm}^3$ .
  - $4.1 \text{ cm}^3$ .
- \_\_\_\_\_ **23.** Samples with masses of 0.12 g, 1.8 g, and 0.562 g are mixed together. The combined mass of the three samples, expressed to the correct number of significant figures, should be recorded as
- 2.4 g.
  - 2.48 g.
  - 2.482 g.
  - 2.5 g.
- \_\_\_\_\_ **24.** Expressed in scientific notation, 0.0930 m is
- $93 \times 10^{-3} \text{ m}$ .
  - $9.3 \times 10^{-3} \text{ m}$ .
  - $9.30 \times 10^{-2} \text{ m}$ .
  - $9.30 \times 10^{-4} \text{ m}$ .
- \_\_\_\_\_ **25.** When  $6.02 \times 10^{23}$  is multiplied by  $9.1 \times 10^{-31}$ , the product is
- $5.5 \times 10^{-8}$ .
  - $5.5 \times 10^{55}$ .
  - $5.5 \times 10^{-7}$ .
  - $5.5 \times 10^{-53}$ .