General Chemistry Reactions First 1st edition Revell Test Bank

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Name:_____ Class:_____ Date:_____

Chapter 1 Matter and Measurement

1. Which of the following career fields are connected to chemistry?
   a. biology and medicine
   b. physics and engineering
   c. agriculture and food science
   d. environmental, earth, and space science
   e. all of the above

ANSWER: e

2. A scientific law describes an observation is widely considered true. What else is TRUE of a scientific law?
   a. It will tell us why the observation is true.
   b. It can be used to make predictions.
   c. It is a theory that has been proven true.
   d. All of the above are true.
   e. None of the above are true.

ANSWER: b

3. Which of the following is NOT true about a theory?
   a. A theory can be considered a way of thinking about a particular topic.
   b. A theory is an idea that is supported by experimental evidence.
   c. A theory is part of the scientific method.
   d. A theory can change based on new evidence.
   e. A theory is an idea that is completely unproven.

ANSWER: e

4. A hypothesis is
   a. a proven fact.
   b. an experimental procedure.
   c. a tentative explanation that has not been tested.
   d. an idea that has been tested and refined.
   e. a statement that describes observations that are true in widely varying circumstances.

ANSWER: c

5. According to the scientific method, what is the next step after developing a hypothesis?
   a. draw conclusions
   b. devise and conduct experiments
   c. develop a theory
   d. share results with other scientists
   e. develop another hypothesis

ANSWER: b

6. Which of the following is TRUE about the scientific method?

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a. First, observations are made, then new ideas are formulated, and it ends with testing.
b. The first step is to make conclusions.
c. It is a cyclic process.
d. The last step is to run experiments.
e. None of the above.

ANSWER: c

7. Chemistry is often called the central science. Why?

ANSWER: Chemistry is used in many other scientific fields such as biology, physics, agriculture, and engineering.

8. What is chemistry?

ANSWER: Chemistry is the study of what substances are made of and how they behave.

9. How do you interact with chemistry in your daily life?

ANSWER: Chemistry is everywhere. Everything you do is impacted by chemistry!

10. Briefly explain the scientific method.

ANSWER: The scientific method is a cyclic process of making observations, formulating new ideas, and then testing those ideas with experiments.

11. An element is defined as

a. a substance that is made of only one type of atom.
b. anything that has mass and takes up volume.
c. a substance that can be broken down into simpler substances.
d. a combination of two or more pure substances.
e. a substance composed of two or more types of atoms bound together in a fixed ratio.

ANSWER: a

12. A compound is a substance that

a. contains more than one type of atom present in fixed ratios.
b. contains only one type of atom.
c. contains more than one type of atom present in different ratios.
d. can contain one or many types of atoms.
e. must contain at least three different types of atoms.

ANSWER: a

13. Which of the following is an element?

a. water (H_2O)
b. oxygen (O_2)
c. sucrose ($C_{12}H_{22}O_{11}$)

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d. sodium chloride (NaCl)

e. carbon dioxide (CO_2)

ANSWER: b

14. Which of the following is a compound?
    a. copper (Cu)
    b. fluorine (F_2)
    c. neon (Ne)
    d. carbon (C)
    e. nitrogen monoxide (NO)

ANSWER: e

15. Which of the following is an example of a heterogeneous mixture?
    a. salt water
    b. sugar dissolved in coffee
    c. air
    d. salad
    e. ketchup

ANSWER: d

16. Which of the following characteristics best describes a liquid?
    a. Has a definite volume and a definite shape.
    b. Does not have a definite volume nor shape.
    c. Has a definite volume, but not a definite shape.
    d. The particles vibrate within their spaces in a framework.
    e. The particles move freely with very little interaction with each other.

ANSWER: c

17. What is the process of a liquid transitioning into a gas called?
    a. melting
    b. vaporization
    c. freezing
    d. sublimation
    e. condensation

ANSWER: b

18. Which of the following is an example of a homogenous mixture?
    a. a soda with ice
    b. oil and water
    c. chicken noodle soup

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d. saltwater
e. sand and rocks

ANSWER: d

19. Which of the following is an example of a chemical change?
a. You boil some water for pasta.
b. You pour the excess pasta water down the drain.
c. The steam from the water turns to liquid on your glasses.
d. You wipe the water from your glasses.
e. You digest your food.

ANSWER: e

20. If liquid water is frozen into solid ice, what is happening on a molecular level?
a. The molecules get closer together and have less energy.
b. The molecules get further apart and have less energy.
c. The molecules get closer together and have more energy.
d. The molecules get further apart and have more energy.
e. No change in distance or energy occurs.

ANSWER: b

21. What happens to the starting substances as they are converted into products in an endothermic reaction?
a. The energy of the substances does not change.
b. The energy of the substances decreases.
c. The energy of the substances increases.
d. The substances become less reactive.
e. The substances become more stable.

ANSWER: c

22. What type of mixture has a composition that is the same throughout?

ANSWER: Homogenous mixture

23. What is the difference between the composition and structure of a material?

ANSWER: The composition of a material is the components that make up the material. The structure of a material is how those components are arranged.

24. What are the differences between atoms, elements, and compounds?

ANSWER: Atoms are the fundamental unit of matter. All matter is made up of atoms. An element is the simplest form of matter. Every element is made up of one type of atom. Compounds are composed of more than one type of atom, bound together in fixed ratios.

25. If a chemical change has occurred, what must be true?

ANSWER: If a chemical change has occurred, a chemical reaction has occurred, and we have made a new,

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chemically distinct substance.

26. Water is pumped to the top of a water tower to increase the municipal water pressure. Does the water at the top of the tower have more or less potential energy than the water at the base of the tower?
ANSWER: The water at the top has more potential energy than the water at the base due to its position.

27. Which of the following is NOT an SI base unit?
a. meters
b. seconds
c. amperes
d. grams
e. candela
ANSWER: d

28. What is the SI unit of temperature?
a. degree Celsius
b. degree Fahrenheit
c. Kelvin
d. ampere
e. joule
ANSWER: c

29. What is the prefix for $\frac{1}{1000}$ in the SI system?
a. centi-
b. kilo-
c. micro-
d. milli-
e. mega-
ANSWER: d

30. The typical human body temperature is 98.6 °F. What is this temperature in Kelvin?
a. 310.2 K
b. 37.0 K
c. 371.8 K
d. 209.5 K
e. 482.6 K
ANSWER: a

31. Which of the following is the SI unit for length?
a. centimeter

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b. foot
c. meter
d. kilometer
e. mile

ANSWER: c

32. Convert 315.15 K to degrees Celsius.
a. 588.30 °C
b. 107.6 °C
c. 42.00 °C
d. 5.556 °C
e. 315.15 °C

ANSWER: c

33. How many megagrams are in 1 gram?
a. 1×10^{3} Mg
b. 1×10^{-3} Mg
c. 1×10^{-6} Mg
d. 1×10^{-9} Mg
e. 1×10^{6} Mg

ANSWER: c

34. What is the volume of a sphere with a radius of 3.2 cm? The volume of a sphere is given by $V = \frac{4}{3}\pi r^3$.
a. 44 cm^3
b. 140 cm^3
c. 43 cm^3
d. 1.0×10^{2} cm^3
e. 78 cm^3

ANSWER: b

35. How many milligrams are equal to 1 gram?
a. 0.001 mg
b. 0.01 mg
c. 100 mg
d. 1000 mg

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e. 1,000,000 mg

ANSWER: d

36. Which of the following substances will sink in water (d = 1.0 g/mL)?

a. acetone (d = 0.78 g/mL)

b. vegetable oil (d = 0.92 g/mL)

c. honey (d = 1.42 g/mL)

d. All of the above will sink in water.

e. None of the above will sink in water.

ANSWER: c

37. How many micrometers are in 1 meter?

ANSWER: There are 1,000,000 micrometers in 1 meter.

38. Why is it important to use correct units consistently?

ANSWER: Measurements don't have any meaning without a unit attached. Units of measurement are quantities with accepted values that can be used to communicate between people. Additionally, units can help you check whether you've done a calculation correctly.

39. The temperature of a typical refrigerator is about 4 °C. What is this temperature in degrees Fahrenheit?

ANSWER: $°\text{F} = \frac{9}{5}°\text{C} + 32 = \frac{9}{5}(4\ °\text{C}) + 32 = 39\ °\text{F}$

40. A cube has a side length of 5.3 cm and a mass of 125.8 g. Will this cube float in water? The density of water is 1.0 g/cm^3.

ANSWER: d = 0.84 g/cm^3, so the cube will float in water

41. A cube with a side length of 5.00 cm has a mass of 131 g. Calculate the volume (in cm^3) and density (in g/cm^3) of the cube.

ANSWER: $V = l^3 = (5.00\ \text{cm})^3 = 125\ \text{cm}^3$

$$d = \frac{m}{V} = \frac{131\ \text{g}}{125\ \text{cm}^3} = 1.05\ \text{g/cm}^3$$

42. A student measures 210.50 mL of water for an experiment in her chemistry lab. How many significant digits does 210.50 have?

a. 1

b. 2

c. 3

d. 4

e. 5

ANSWER: e

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43. Which of the following measurements has the highest precision?
    a. 15.0 cm
    b. 15.000 cm
    c. 15 cm
    d. 15.00 cm
    e. 1.5 cm

ANSWER: b

44. If a set of measurements are all very close to each other, but are far away from the true value, they are
    a. accurate and precise.
    b. accurate but not precise.
    c. precise but not accurate.
    d. neither accurate nor precise.
    e. none of the above.

ANSWER: c

45. Which of the following numbers has three significant digits?
    a. 0.12
    b. 3.850
    c. 305
    d. 432.0
    e. 0.001

ANSWER: c

46. When multiplying 3.45 by 2.9, how many significant digits should the result have?
    a. 1
    b. 2
    c. 3
    d. 4
    e. 5

ANSWER: b

47. The height of a book is measured as 8.0230 cm. How many significant digits are in this measurement?
    a. 1
    b. 2
    c. 3
    d. 4
    e. 5

ANSWER: e

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48. How many significant digits are in the measurement 0.0930?
    a. 1
    b. 2
    c. 3
    d. 4
    e. 5

ANSWER: c

49. The mass of molten aluminum that is needed to make a specific car part is 275 g. Which of the following measurements is the most accurate?
    a. 280 g
    b. 278.714 g
    c. 288.32 g
    d. 300 g
    e. 276.4 g

ANSWER: e

50. A pallet of lumber has 256 boards on it. If the mass of the boards on the pallet weighs 928.96 kg, how much does each board weigh using an appropriate number of significant digits?
    a. 3.6288 kg
    b. 3.629 kg
    c. 3.63 kg
    d. 3.6 kg
    e. 4 kg

ANSWER: a

51. What kind of numbers are exempt from significant digits?
    a. measured numbers
    b. decimal numbers
    c. exact numbers
    d. large numbers
    e. numbers in scientific notation

ANSWER: c

52. Kris walks 1.32 km from his home to the hardware store, 1.1 km from the hardware store to the grocery store, and 1.435 km from the grocery store back to home. What is the total distance he traveled on this trip using appropriate significant digits?
    a. 3.86 km
    b. 3.9 km
    c. 4 km
    d. 4.0 km

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e. 3.855 km

ANSWER: b

53. Accuracy and precision are terms that scientists use to describe the qualities of a data set. What does the accuracy of a data set indicate?

ANSWER: The accuracy of a data set indicates how well the data reflects the true value.

54. Calculate the area of a rectangle with side lengths of 3.042 cm and 2.1 cm. Report your answer with appropriate units and significant digits.

ANSWER: $A = l \times w = 3.042 \text{ cm} \times 2.1 \text{ cm} = 6.4 \text{ cm}^2$

55. A student adds 5.0 mL of water to a graduated cylinder. They then add an insoluble solid to the graduated cylinder and record the volume of the water and solid as 9.15 mL. What is the volume of the solid reported using appropriate significant figures?

ANSWER: $9.15 \text{ mL} - 5.0 \text{ mL} = 4.2 \text{ mL}$

56. If a set of measurements reflects the true value of a measurement well, but the individual measurements are scattered away from the true value, what can be said about the accuracy and precision of these measurements?

ANSWER: The set of measurements is accurate (reflects the true value), but the measurements are not precise (they are far away from each other).

57. If you have a pencil that weighs 4.632 g, a pen that weighs 7.15 g, and a stylus that weighs 20.7 g, what is the total mass of these three objects? Report the answer using correct significant digits.

ANSWER: $4.632 \text{ g} + 7.15 \text{ g} + 20.7 \text{ g} = 32.5 \text{ g}$

58. Ibuprofen is a commonly used over-the-counter medication used to treat body aches and pains. A common dose of ibuprofen is 400 mg. What is the mass of this dose of ibuprofen in grams?

a. 40 g
b. 4 g
c. 0.4 g
d. 0.04 g
e. 0.004 g

ANSWER: c

59. Convert 100 m to kilometers (km).

a. 0.001 km
b. 0.1 km
c. 1 km
d. 10,000 km
e. 100,000 km

ANSWER: b

60. How many centimeters are in 3.4 m?

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a. 0.0034 cm
b. 0.034 cm
c. 340 cm
d. 3400 cm
e. 34000 cm

ANSWER: c

61. Convert 4.7 L to milliliters.
a. 0.0047 mL
b. 0.047 mL
c. 4700 mL
d. 47000 mL
e. 470000 mL

ANSWER: c

62. The speed of light in a vacuum is 2.99×10^8 m/s. What is this value in miles per hour?

a. 1.86×10^5 miles per hour
b. 51.6 miles per hour
c. 1.34×10^8 miles per hour
d. 6.69×10^8 miles per hour
e. 1.73×10^{15} miles per hour

ANSWER: d

63. An Olympic-size swimming pool is 50. m × 25 m. What is the surface area of the pool in square feet?
a. 4100 ft^2
b. 1300 ft^2
c. 120 ft^2
d. 13,000 ft^2
e. 380 ft^2

ANSWER: d

64. Which of the following is the conversion of 100 mL to cm^3?
a. 1 cm^3
b. 10 cm^3
c. 100 cm^3
d. 1000 cm^3

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e. 10000 cm^3

ANSWER: c

65. How many liters are in 1 gallon of lemonade? 1 L = 0.264 gal

a. 0.264 L
b. 1.26 L
c. 2.32 L
d. 3.79 L
e. 7.58 L

ANSWER: d

66. Water is one of the few substances whose solid phase is less dense than its liquid phase. The density of liquid water is about 1.00 g/mL, whereas the density of ice is about 0.920 g/mL. Approximately how much does a 100.00 mL sample of ice weigh?

a. 100. g
b. 92.0 g
c. 109 g
d. 100.92 g
e. 99.08 g

ANSWER: b

67. How many square meters, m^2, are in 150 ft^2?

a. 46 m^2
b. 14 m^2
c. 490 m^2
d. 1600 m^2
e. 0.30 m^2

ANSWER: b

68. A water tank has a volume of 5 m^3. What is this volume in liters?

a. 0.005 L
b. 0.05 L
c. 50 L
d. 500 L
e. 5000 L

ANSWER: e

69. A bag of pretzels has 110 kilocalories per serving. How many kilojoules are in one serving? 4.184 kJ = 1 kcal

a. 460 kJ

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b. 26 kJ
c. 156 kJ
d. 440 kJ
e. 4.2 kJ

ANSWER: a

70. What is the mass of an iron block that has a volume of 24 cm^3? The density of iron is 7.87 g/cm^3.
ANSWER: 190 g

71. Convert 142 mg to kilograms (kg).
ANSWER: 1.42×10^{-4} kg

72. A student is trying to convert a measurement in millimeters to meters, but after performing the calculation, gets units of mm^2/m. What mistake was made? How would the student correct this?
ANSWER: The reciprocal of the conversion factor was used. The conversion factor should be flipped.

73. The flow of coolant through a pipe is 4.50 mL/s. What would the flow rate be in liters per hour?
ANSWER: 16.2 L/h

74. A cylindrical gasoline storage tank has a radius of 1.5 m, and a height of 3.0 m. What is the volume of this tank in liters? The volume of a cylinder is given by $V = \pi r^2 h$.

ANSWER: 21,000 L

75. The density of a certain motor oil is 0.860 g/cm^3. How much would 175 L of this oil weigh (in kg)?
ANSWER: 151 kg

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