Chapter 2—The Chemical View of Matter

MULTIPLE CHOICE

1. Which of the following is not one of the common states of matter?
   a. solid
   b. plasma
   c. liquid
   d. gas

   ANS: B PTS: 1

2. A pure substance which can be decomposed into two or more pure substances is a(n)
   a. element
   b. mixture
   c. compound
   d. atom

   ANS: C PTS: 1

3. Which of the following is one of the classes of pure substances?
   a. compound
   b. homogeneous mixture
   c. solution
   d. heterogeneous mixture

   ANS: A PTS: 1

4. Which is not a mixture?
   a. pure water
   b. mayonnaise
   c. strawberry Kool-Aid drink
   d. rock

   ANS: A PTS: 1

5. Most samples of matter occur in nature as
   a. elements
   b. compounds
   c. homogeneous samples
   d. mixtures

   ANS: D PTS: 1

6. Separating a mixture of iron and sulfur can be done
   a. by filtration
   b. dissolving in water
   c. with a magnet
   d. by burning

   ANS: C PTS: 1

7. Which statement describes a physical property of oxygen?
   a. oxygen supports burning of gasoline

b. oxygen has a density of l. 4 g/mL
c. oxygen is required for human metabolism of food
d. oxygen combines with iron causing the formation of rust

ANS: B PTS: 1

8. Which is a chemical property?
a. boiling point
b. state
c. odor
d. flammability

ANS: D PTS: 1

9. A process is probably a chemical reaction if
a. it produces light
b. a solid appears when two solutions are mixed
c. bubbles start to form when two substances are mixed
d. all of these

ANS: D PTS: 1

10. Which of the following is not a chemical change?
a. burning charcoal
b. rusting iron
c. melting ice
d. baking bread

ANS: C PTS: 1

11. Which term describes energy?
a. motion
b. heat
c. light
d. all of these

ANS: D PTS: 1

12. Alfred Nobel _____?
a. discovered dynamite
b. proposed the metric system
c. developed the STM, scanning tunneling microscope
d. discovered kinetic energy

ANS: A PTS: 1

13. Which mixture is heterogeneous?
a. salt and water
b. water and oil
c. sweetened hot tea
d. Ivory soap bar

ANS: B PTS: 1

14. The element whose name is derived from the Latin *aurum*, meaning shining dawn
a. gold

b. aluminum
c. silver
d. chromium

ANS: A PTS: 1

15. The symbol for magnesium is
a. Ma
b. Mg
c. Mm
d. Mn

ANS: B PTS: 1

16. Which of the following elements is a metal?
a. Ca, calcium
b. Na, sodium
c. Hg, mercury
d. all of these

ANS: D PTS: 1

17. Sublimation is a characteristic physical property of
a. chlorine (Cl_2, liquid)
b. oxygen (O_2, gas)
c. bromine (Br_2, liquid)
d. iodine (I_2, solid)

ANS: D PTS: 1

18. What information is not provided by the formula, C_4H_{10}, for butane?
a. butane is an organic compound
b. the molecular formula
c. the relative number of atoms of each kind
d. the shape of the molecule

ANS: D PTS: 1

19. Which of the following sets, is a list of the symbols for an element and a compound (in that order)?
a. Mg, CO
b. CO, CO_2
c. CO, Co
d. H_2O_2, P

ANS: A PTS: 1

20. Which of the following sets, is a list of the symbols for:
lead, a compound of equal parts hydrogen and oxygen, and elemental oxygen?
a. PB, H_2O_2, O
b. Pb, HO, O
c. Pb, H_2O_2, O_2
d. PB, HO, O_2

ANS: C PTS: 1

21. In the balanced equation, $2\ Al + 6\ HCl \rightarrow 2\ AlCl_3 + 3\ H_2$, the sum of the coefficients of the reactants is

a. 5
b. 8
c. 13
d. none of these

ANS: B PTS: 1

22. The equation, $2\ C(s) + O_2(g) \rightarrow 2\ CO(g)$, tells us
a. the number of atoms of each kind in reactants and products is the same
b. carbon monoxide (CO) is a product
c. two atoms of carbon undergo reaction
d. all of these

ANS: D PTS: 1

23. How does the known number of nonmetals compare to that of metals?
a. there are fewer metals
b. there are an equal number of each
c. there are fewer nonmetals
d. unknown because not all metals and nonmetals have been discovered

ANS: C PTS: 1

24. What prefix is the largest?
a. mega
b. centi
c. micro
d. kilo

ANS: A PTS: 1

25. A person weighs 165 lbs. What is the weight in kilograms if 2.2 lbs = 1 kg?
a. 165×2.2
b. $165 \div 2.2$
c. $2.2 \div 165$
d. $165 + 2.2$

ANS: B PTS: 1

26. Which prefix has the meaning 10^{-3}?
a. mega
b. nano
c. centi
d. milli

ANS: D PTS: 1

27. How many milligrams are there in 10 grams?
a. 10^3
b. 10^{-6}
c. 10^{-3}
d. 10^4

ANS: D PTS: 1

28. The quantity 10^{-9} (one billionth) is designated by the prefix

a. pico
b. nano
c. centi
d. mega

ANS: B PTS: 1

29. Convert 15 L of gasoline to gallons. 1.06 qt = 1 L ; 4 qts = 1 gal
a. (15) (1.06/1) (1/4)
b. (15) (1/1.06) (4/1)
c. (15) (1.06/1) (4/1)
d. (15) (1/1.06) (1/4)

ANS: A PTS: 1

30. An example of a homogeneous mixture is
a. oil in water
b. a salt water solution
c. a suspension
d. a pure substance

ANS: B PTS: 1

31. Which of the following is not a pure substance?
a. pure gold
b. clean air
c. refined sugar
d. distilled water

ANS: B PTS: 1

32. Which state of matter is composed of charged particles which are dramatically affected by electric and magnetic fields?
a. solids
b. liquids
c. gases
d. plasmas

ANS: D PTS: 1

33. How many categories of pure substances exist?
a. 2
b. 3
c. thousands
d. about 100

ANS: A PTS: 1

34. A pure substance which can be decomposed into two or more pure substances is a(n)
a. element
b. compound
c. mixture
d. colloid

ANS: B PTS: 1

35. For which of the following is it necessary that there be a definite composition which cannot vary?
    a. mixture
    b. solution
    c. compound
    d. colloid

    ANS: C PTS: 1

36. How many phosphorus atoms are in the formula H_3PO_4?
    a. 4
    b. 3
    c. 7
    d. 1

    ANS: D PTS: 1

37. How many chemical formulas are in this chemical equation?

    $P_4(s) + 6\ F_2(g) \rightarrow 4\ PF_3(g)$
    a. 2
    b. 3
    c. 4
    d. 11

    ANS: B PTS: 1

38. Which of the following is an SI unit?
    a. pound
    b. kilogram
    c. millimeter
    d. calorie

    ANS: B PTS: 1

39. Potential energy is defined as
    a. heat energy
    b. energy associated with motion
    c. stored energy
    d. the ability to do work

    ANS: C PTS: 1

40. Which of the following is a physical change?
    a. souring of milk
    b. ripening of fruit
    c. frying an egg
    d. melting

    ANS: D PTS: 1

41. The simplest form of matter is a(n)
    a. element
    b. mixture
    c. compound
    d. solution

ANS: A PTS: 1

42. Which is a compound?
    a. mercury
    b. blood
    c. sugar
    d. air

    ANS: C PTS: 1

43. How would you separate a mixture of salt, sand, and water?
    a. by filtration, followed by evaporation
    b. freezing, followed by melting
    c. separating with tweezers, followed by evaporation
    d. by filtration, followed by burning

    ANS: A PTS: 1

44. Which is a physical property?
    a. freezing point
    b. color
    c. odor
    d. all of the above

    ANS: D PTS: 1

45. Which of the following is an example of a chemical change?
    a. boiling water
    b. iodine sublimating
    c. barbecuing a steak
    d. breaking a piece of glass

    ANS: C PTS: 1

46. What element has the symbol Cu?
    a. cobalt
    b. carbon
    c. copper
    d. chromium

    ANS: C PTS: 1

47. Identify the nonmetal?
    a. Fe
    b. Na
    c. S
    d. Ag

    ANS: C PTS: 1

48. What is the coefficient in front of iron when the following equation is balanced?
    $Fe + O_2 \rightarrow Fe_2O_3$
    a. 1
    b. 2
    c. 4
    d. 6

ANS: C PTS: 1

49. How many millimeters are in 100 cm?
    a. 10
    b. 1000
    c. 100
    d. 1

    ANS: B PTS: 1

50. Which of the following has the highest kinetic energy?
    a. boulder on the top of hill
    b. water behind a dam
    c. a ball falling from a 3 story building
    d. a piece of wood

    ANS: C PTS: 1