CHAPTER 2

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

   ANS: b

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

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

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

   ANS: a

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

   ANS: d
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

7. Which statement describes a physical property of oxygen?
   a. oxygen supports burning of gasoline
   b. oxygen has a density of 1.4 g/mL
   c. oxygen is required for human metabolism of food
   d. oxygen combines with iron causing the formation of rust

   ANS: b

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

   ANS: d

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

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

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

   ANS: d

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

   ANS: a

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

   ANS: b

14. The element whose name is derived from the Latin aurum, meaning shining dawn
   a. gold
   b. aluminum
   c. silver
   d. chromium

   ANS: a

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

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

   ANS: d

17. Sublimation is a characteristic physical property of
   a. chlorine (Cl₂, liquid)
   b. oxygen (O₂, gas)
   c. bromine (Br₂, liquid)
   d. iodine (I₂, solid)

   ANS: d

18. What information is not provided by the formula, C₄H₁₀, 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

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, CO₂
   c. CO, Co
   d. H₂O₂, P

   ANS: a

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, H₂O₂, O
   b. Pb, HO, O
   c. Pb, H₂O₂, O₂
   d. Pb, HO, O₂

   ANS: c
21. In the balanced equation, $2 \text{Al} + 6 \text{HCl} \rightarrow 2 \text{AlCl}_3 + 3 \text{H}_2$, the sum of the coefficients of the reactants is
   a. 5
   b. 8
   c. 13
   d. none of these

   ANS: b

22. The equation, $2 \text{C(s)} + \text{O}_2(g) \rightarrow 2 \text{CO(g)}$, 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

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

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

   ANS: a

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

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

   ANS: d

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

   ANS: d

28. The quantity $10^{-9}$ (one billionth) is designated by the prefix
   a. pico
   b. nano
   c. centi
   d. mega

   ANS: b

29. Convert 15 L of gasoline to gallons. 1.06 qt = 1 L; 4 qts = 1 gal
   a. $(15) \left( \frac{1.06}{1} \right) \left( \frac{1}{4} \right)$
   b. $(15) \left( \frac{1}{1.06} \right) \left( \frac{4}{1} \right)$
   c. $(15) \left( \frac{1.06}{1} \right) \left( \frac{4}{1} \right)$
   d. $(15) \left( \frac{1}{1.06} \right) \left( \frac{1}{4} \right)$

   ANS: a

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

   ANS: b

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

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

   ANS: a

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

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
36. How many phosphorus atoms are in the formula H₃PO₄?
   a. 4
   b. 3
   c. 7
   d. 1

   ANS: d

37. How many chemical formulas are in this chemical equation?
   \[ \text{P}_4(s) + 6 \text{F}_2(g) \rightarrow 4 \text{PF}_3(g) \]
   a. 2
   b. 3
   c. 4
   d. 11

   ANS: b

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

   ANS: b

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

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

   ANS: a

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

   ANS: c

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

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

   ANS: d

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

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

   ANS: c

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

   ANS: c

48. What is the coefficient in front of iron when the following equation is balanced?
   \[ \text{Fe} + \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3 \]
   a. 1
   b. 2
   c. 4
   d. 6

   ANS: c

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

   ANS: b

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