Test Study Materials

There is more here than would be on the test, but this is a good example of the types of questions you will encounter.

Chapter 1

38. Define matter.
    Explain what is meant by mass and volume.
    Is everything in nature matter? If not, what else exists?

39. Define solid, liquid, and gas.
    Explain the differences in the three phases of matter on both the macroscopic and molecular levels.

40. Explain what chemistry is.

41. Explain how the study of chemistry can be helpful to you in your everyday life.

42. Matter is classified into substances and mixtures.
    Explain how these are different.
    Substances are either elements or compounds. Describe what these are and give examples of each.
    Mixtures can be either heterogeneous or homogeneous. Explain how these are different and give examples of each.
    What is a solution? Give examples of solutions.

43. Suppose someone brought you an unidentified material. List five questions a chemist might ask in an attempt to identify the material.

44. Name four different ways in which you could classify or organize twenty different types of fasteners such as nails or screws.

45. State the four steps of the scientific method.

46. Mixtures can be separated by the differences in the physical properties of their components.

What physical properties could be used to separate the components of the following mixtures?

A. Sand and salt
B. Salt and water
C. Iron filings and sulfur
D. Fine sand and coarse gravel

Chapter 2

40. What number is indicated by the SI prefix milli?
    A. 1/100
    B. 1/1000
    C. 100
    D. 1000

41. Convert 4.30 feet into centimeters.
    A. 10.9cm
    B. 30.5cm
    C. 131cm
    D. 151cm

42. Convert 10.00 grams into decigrams.
    A. 1.000dg
    B. 10.00dg
    C. 100.0dg
    D. 1000.dg

43. The density of copper is 8.96g/mL. The mass of 7.00mL of copper is
    A. 62.7g
    B. 1.28g
    C. 0.781g
    D. 1.96g

44. The density of copper is 8.96g/mL. The volume of 12.0g of copper is
    A. 0.747g
    B. 1.34g
    C. 3.04g
    D. 108g

45. The mass of a substance is 17.46g and its volume is 3.42mL. What is the density of the substance rounded to the correct number of significant figures?

A. 0.1959g/mL
B. 0.196g/mL
C. 5.105g/mL
D. 5.11g/mL

46. Convert 30.0 milliliters to Liters.

A. 0.0300L
B. 0.00300L
C. 300.L
D. 30000L

47. The space occupied by a sample is its

A. Mass
B. Volume
C. Length
D. Temperature

48. The Celsius temperature of a sample changes twenty degrees, how many degrees does its Kelvin temperature change?

A. 20
B. 257
C. 273
D. 293

49. A rectangular piece of metal measures 8.0cm by 1.20m by 15.0mm. What is its volume rounded to the correct number of significant figures?

A. $14cm^3$
B. $144cm^3$
C. $1400cm^3$
D. $1440cm^3$

50. A cube measures 13.00cm on edge. What is its volume?

A. $13.00cm^3$
B. $169.0cm^3$
C. $2197cm^3$
D. $28600cm^3$

51. A metal cube measures 8.60cm on edge and has a density of $11.4g/cm^3$. What is its mass?

A. 98.0g
B. 843g
C. 7250g
D. 62400g

52. A 48.0g piece of metal is dropped into 50.0mL of water in a graduated cylinder. The water level rises to 62.4mL. What is the density of the metal?

A. 12.4mL
B. 0.258mL/g
C. 3.87g/mL
D. 595gmL

53. One centimeter is equal to

A. 2.54 inches
B. 0.394 inches
C. 12.0 inches
D. 0.100 inches

54. An empty graduated cylinder has a mass of 68.00g. 50.0mL of water is added to the cylinder and its mass increases to 109.5g. What is the density of the liquid?

A. 41.5g
B. 1.20mL/g
C. 0.830g/mL
D. 1.36g/mL

55. A car gets 25.6 miles per gallon of gasoline. A full tank of gasoline contains 56.8 liters. How many miles can this car travel on a full tank of gasoline? (1.000L = 1.057qt)

A. 1454 miles
B. 96.9 miles
C. 1.71 miles
D. 384 miles

56. Convert 4.34 yards to centimeters.

A. 4.34cm
B. 132cm
C. 264cm
D. 397cm

57. The number of centimeters in one inch is

A. 0.109
B. 0.328
C. 0.394
D. 2.54

58. Add: 3.604m + 104.29m + 3.1m + 17.41m. The sum expressed in the correct number of significant figures is

A. 13m
B. 128m
C. 130m
D. 128.4m

59. Subtract: 14.278m from 106.31m. The difference expressed in the correct number of significant figures is

A. 92.032m
B. 92.03m
C. 92.0m
D. 92m

60. Multiply: (3.687) (14.1) (36.22). The product expressed in the correct number of significant figures is

A. 1882.9583
B. 188
C. 1883.0
D. 1880

61. Divide: 34.72 by 4.7. The quotient expressed to the correct number of significant figures is

A. 0.14
B. 0.1
C. 7.39
D. 7.4

62. Divide: 32.14 by 0.204. The quotient expressed to the correct number of significant figures is

A. 157.55
B. 158
C. 6347
D. 6350

63. When expressed in proper scientific notation the number 4289 is

A. 4.289×10^{-4}
B. 4.289×10^{-3}
C. 4.289×10^{3}
D. 4.289×10^{4}

64. When expressed in proper scientific notation the number 286 is

A. 2.86×10^{1}
B. 2.86×10^{2}
C. 2.86×10^{-2}
D. 28.6×10^{1}

65. When expressed in proper scientific notation the number 0.00364 is

A. 3.64×10^{3}
B. 3.64×10^{2}
C. 3.64×10^{-2}
D. 3.64×10^{-3}

66. When expressed in proper scientific notation the number 0.000034 is

A. 3.4×10^{4}
B. 3.4×10^{-4}
C. 3.4×10^{3}
D. 3.4×10^{-5}

67. Express the number 2.64×10^4 in normal notation
    A. 0.000264
    B. 0.0000264
    C. 26400
    D. 2640

68. Express the number 3.00×10^2 in normal notation
    A. 3.00
    B. 30.0
    C. 300.
    D. 3000.

69. Express the number 4.317×10^{-4} in normal notation
    A. 0.04317
    B. 0.004317
    C. 0.0004317
    D. 43170

70. Express the number 5.0×10^{-2} in normal notation
    A. 500
    B. 50
    C. 0.050
    D. 0.0050

71. Multiply: $(4.36 \times 10^{-2}) (3.17 \times 10^4)$. When expressed properly the product is
    A. 1.38×10^3
    B. 1.38×10^2
    C. 1.38×10^{-2}
    D. 1.38×10^5

72. Multiply: $(5.24 \times 10^4) (2.36 \times 10^{-5})$. When expressed properly the product is
    A. 1.24×10^{-1}
    B. 1.24×10^0
    C. 1.24×10^1
    D. 1.24×10^9

73. Divide: 3.724×10^{-3} by 2.46×10^4. When expressed properly the quotient is
    A. 1.51×10^1
    B. 1.51×10^{-7}
    C. 6.61×10^1
    D. 6.61×10^2

Chapter 3

8. The majority of the elements are
    A. Metals

B. Gases
C. Nonmetals
D. Metalloids

9. At room temperature the majority of metals exist as
A. Vapors
B. Solids
C. Gases
D. Liquids

10. Which type of element has the following general properties: solid at room temperature, high luster, good conductor of heat and electricity, malleable, and ductile?
A. Metalloid
B. Noble Gas
C. Nonmetal
D. Metal

11. Which type of element has the following general properties: low melting point and density, lacks luster, poor conductor of heat and electricity, and brittle?
A. Metal
B. Nonmetal
C. Metalloid
D. Transition element

12. On the periodic table vertical columns contain elements with similar properties. These vertical columns are called:
A. Periods
B. Rows
C. Groups
D. Series

13. The elements on the periodic table are placed in order of increasing
A. Density
B. Atomic number
C. Boiling point
D. Atomic mass

14. The halogens are in group
A. 1A
B. 2A
C. 3A
D. 7A

15. The alkaline earth metals are in group
A. 1A
B. 2A

C. 5A
D. 7A

16. The alkali metals are in group
A. 1A
B. 3A
C. 5A
D. 7A

17. Which symbol represents a metallic element?
A. P
B. Ti
C. Si
D. I

18. Which is a nonmetal?
A. S
B. Pb
C. Sb
D. Na

19. Which is a metalloid?
A. Li
B. Be
C. B
D. C

21. Which element forms diatomic molecules?
A. Sulfur
B. Neon
C. Calcium
D. Chlorine

22. Which element forms diatomic molecules?
A. Nitrogen
B. Nickel
C. Boron
D. Iron

23. A distinct substance composed of two or more elements combined chemically in a definite proportion by mass is a
A. Homogeneous mixture
B. Heterogeneous mixture
C. Solution
D. Compound

24. The charge of a cation is

A. Positive
B. Negative
C. Neutral

25. The charge of an anion is
A. Positive
B. Negative
C. Neutral

26. How many different elements are present in the compound $CoCl_2$?
A. 1
B. 2
C. 3
D. 4

27. How many different elements are present in the compound $FeSO_4$?

A. 1
B. 2
C. 3
D. 4

Chapter 4

13. 400.0g of a metal absorbs 10000. J of heat energy and its temperature rises from 20.0° C to 103.0° C. What is the specific heat of the metal?

A. 0.301 J/g° C
B. 0.255 J/g° C
C. 3.32 J/g° C
D. 0.243 J/g°C

14. 250.0g of a metal releases 5000. J of energy and its temperature drops from 90.0°C to 15.7°C. What is the specific heat of the metal?

A. 3.72 J/g°C
B. 0.269 J/g°C
C. 0.222 J/g°C
D. 1.27 J/g°C

15. 300.0g of water is at 12.0°C. The water absorbs 4016 J of heat energy. What is the new temperature of the water?

A. 3.2°C
B. 15.2°C
C. 8.8°C
D. 13.1°C

16. 45.0g of water is at 20.0°C. The water releases 2000. J of heat energy. What is the new temperature of the water?

A. 19.9°C
B. 30.6°C
C. -168°C
D. 9.4°C

17. A sample of water absorbs 3000 J of heat energy and its temperature rises from 20.0°C to 31.2°C. What is the mass of the water?

A. 3.21g
B. 64.0g
C. 3.58g
D. 1120g

18. A sample of water releases 4500 J of heat energy and its temperature drops from 80.0°C to 68.0°C. What is the mass of the water?
   A. 89.6g
   B. 13.4g
   C. 15.8g
   D. 1570g

19. Hydrogen combines with oxygen to form water. If 1.67g of hydrogen combines with 13.33g of oxygen what mass of water will be produced?
   A. 1.67g
   B. 11.66g
   C. 13.33g
   D. 15.00g

20. Carbon, when burned completely, forms carbon dioxide. If 11.7g of carbon combines with 31.3g of oxygen, what mass of carbon dioxide will be produced?
   A. 11.7g
   B. 19.6g
   C. 31.3g
   D. 43.0g

21. 3.17g of sodium combines with chlorine to form 8.00g of sodium chloride. What is the mass of chlorine in this sample of sodium chloride?
   A. 3.17g
   B. 4.83g
   C. 8.00g
   D. 11.17g

22. A sample of carbon monoxide has a mass of 4.00g. What is the mass of oxygen in this compound if the mass of carbon is 1.71g?
   A. 1.71g
   B. 2.29g
   C. 0.59g
   D. 5.71g

23. Which is not a physical property?
   A. Boiling point
   B. Physical state
   C. Color
   D. Bleaching action

24. Which is a physical change?
   A. A piece of wood is burned
   B. A nail rusts
   C. A rubber band is stretched
   D. A firecracker explodes

25. Which is a chemical change?
    A. Water evaporates
    B. A penny tarnishes
    C. Ice melts
    D. Rock is ground into sand
26. Combining hydrogen and oxygen to form water is a
    A. Chemical change
    B. Physical change
    C. Conservation reaction
    D. None of these

27. Barium iodide contains 35.1% barium by mass. What mass of iodine is contained in 8.50g of barium iodide?
    A. 2.98g
    B. 5.52g
    C. 8.00g
    D. 2.54g

Chapter 5

1. Which is not part of Dalton's atomic model?
    A. Elements are composed of minute, indivisible particles called atoms.
    B. Atoms of the same element are alike in mass.
    C. Atoms of the same element can be different in size.
    D. Chemical compounds are composed of two or more atoms of different elements.

2. Neutral atoms of a specific element may have different
    A. Atomic numbers
    B. Number of protons
    C. Number of electrons
    D. Mass numbers

3. The Law of Definite Composition states
    A. A compound always contains one element physically combined in variable proportions by mass.
    B. A compound always contains one element chemically combined in a definite proportion by mass.
    C. A compound always contains two or more elements physically combined in variable proportions by mass.
    D. A compound always contains two or more elements chemically combined in a definite proportion by mass.

4. The Law of Multiple Proportions states

A. Atoms of one element may combine in different ratios to form more than one compound.
B. Atoms of one element may combine in different ratios to form the same compound.
C. Atoms of two or more elements may combine in different ratios to form more than one compound.
D. Atoms of two or more elements may combine in different ratios to produce the same compound.

5. Which pair of formulas illustrates the Law of Multiple Proportions?
A. CH_3Cl and CH_3OH
B. H_2O and HOH
C. $CuCl_2$ and CuBr
D. H_2O and H_2O_2

6. How many types of electrical charge exist?
A. 1
B. 2
C. 3
D. 4

7. Particles with which electric charges will attract one another?
A. Positive and positive
B. Positive and negative
C. Negative and negative
D. Both, choices A and B

8. Particles with which electrical charges will repel one another?
A. Positive and positive
B. Positive and negative
C. Negative and negative
D. Both choices A and C

9. As the distance between two particles with charges that attract one another increases, the force of attraction will
A. Increase
B. Decrease
C. Remain the same

10. As the distance between two particles with charges that repel each other increases, the force of attraction will
A. Increase
B. Decrease
C. Remain the same

11. What charge does a cation possess?
A. Positive

B. Negative
C. Neutral

12. What charge does an anion possess?
    A. Positive
    B. Negative
    C. Neutral

13. What is the relative electrical charge of an electron?
    A. -1
    B. +1
    C. -2
    D. 0
14. What is the relative electrical charge of a proton?
    A. -1
    B. +1
    C. -2
    D. 0

15. Which subatomic particle(s) was not part of the Thomson model of the atom?
    A. Proton
    B. Neutron
    C. Electron
    D. Both, choices A and B

16. What is the relative electrical charge of a neutron?
    A. -1
    B. +1
    C. +2
    D. 0

17. What is the relative mass of an electron?
    A. 1/1837 amu
    B. ½ amu
    C. 1 amu
    D. 2 amu

18. What is the relative mass of a proton?
    A. 1/1837 amu
    B. ½ amu
    C. 1 amu
    D. 2 amu

19. What is the relative mass of a neutron?
    A. 1/1837 amu

B. ½ amu
C. 1 amu
D. 2 amu

29. How many atoms of sodium are indicated in the formula Na_2SO_4?
    A. 1
    B. 2
    C. 3
    D. 4

30. What is the total number of atoms present in the compound CH_3COOH?
    A. 1
    B. 2
    C. 3
    D. 4

31. What is the total number of atoms present in one molecule of CH_3COOH?
    A. 3
    B. 5
    C. 8
    D. 10

32. How many atoms of hydrogen are present in one molecule of $Al(H_2PO_4)_3$?
    A. 2
    B. 3
    C. 5
    D. 6

33. Which is a compound?
    A. Air
    B. Lead
    C. Water
    D. Iron