***General Chemistry*, 10e Cdn (Petrucci)**
Chapter 2 Atoms and the Atomic Theory

1) Atoms retain their identity during a chemical reaction.
Answer: TRUE
Diff: 1 Type: TF
Reference: Section 2-1

2) All matter is composed of atoms.
Answer: TRUE
Diff: 1 Type: TF
Reference: Section 2-1

3) Atoms combine in small, whole-numbered ratios.
Answer: TRUE
Diff: 1 Type: TF
Reference: Section 2-1

4) All atoms of a given element are identical.
Answer: FALSE
Diff: 1 Type: TF
Reference: Section 2-1

5) Different ratios of atoms produce different compounds.
Answer: TRUE
Diff: 1 Type: TF
Reference: Section 2-1

6) J. J. Thomson suggested the "plum pudding" model of the atom.
Answer: TRUE
Diff: 2 Type: TF
Reference: Section 2-2

7) Robert Millikan determined the charge on an electron.
Answer: TRUE
Diff: 2 Type: TF
Reference: Section 2-2

8) The number of protons and neutrons in the nucleus of a given atom is called the atomic number.
Answer: FALSE
Diff: 1 Type: TF
Reference: Section 2-3

9) Isotopes have different atomic number (Z) but the same mass number (A).
Answer: FALSE
Diff: 2 Type: TF
Reference: Section 2-4

10) The vertical columns in the periodic table of the elements are called groups.
Answer: TRUE
Diff: 2 Type: TF
Reference: Section 2-6

11) A 25 g sample of sugar is found to contain 51.4% oxygen by mass. Another 250 g sample of the same sugar is also 51.4% oxygen by mass. This is consistent with the:
A) law of conservation of mass
B) law of constant composition
C) law of multiple proportions
D) first assumption of Dalton's atomic theory
E) second assumption of Dalton's theory
Answer: B
Diff: 1 Type: MC
Reference: Section 2-1

12) When a chemical reaction is carried out in a sealed container, the substances may change in color, temperature, or state, but no change in mass is detected. This is evidence of the:
A) law of conservation of mass
B) law of constant composition
C) law of definite proportions
D) existence of electrons
E) existence of protons
Answer: A
Diff: 1 Type: MC
Reference: Section 2-1

13) When decomposed chemically, 73.0 grams of a sample of HCl produce 71.0 g of Cl_2 and 2.0 g of H_2, while 34.0 g of a sample of H_2S produce 32.0 g of S and 2.0 g of H_2. This is an example of the Law:
A) of Conservation of Mass
B) of Multiple Proportions
C) of Definite Proportions
D) $E = mc^2$
E) of Simple Whole Numbers
Answer: A
Diff: 1 Type: MC
Reference: Section 2-1

14) Choose the INCORRECT statement from those given below.
A) Atoms retain their identity during a chemical reaction.
B) All matter is composed of atoms.
C) Atoms combine in small, whole-numbered ratios.
D) All atoms of a given element are identical.
E) Different ratios of atoms produce different compounds.
Answer: D
Diff: 1 Type: MC
Reference: Section 2-1

15) A 0.920-gram sample of magnesium is allowed to burn in 0.321 g of oxygen gas. The sole product is magnesium oxide. After the reaction, no oxygen remains and 0.809 g of magnesium oxide has been formed. What mass of magnesium is left unreacted?
A) 0.210 g
B) 0.432 g
C) 1.408 g
D) 0.111 g
E) 0.488 g
Answer: B
Diff: 2 Type: MC
Reference: Section 2-1

16) Dalton's atomic theory is based on several assumptions, which are listed below. Which of these assumptions is strictly correct?
I) All atoms of the same element are identical.
II) Atoms are indivisible and unchangeable.
III) Chemical changes are the result of the combination, separation, and rearrangement of atoms.
A) I, II, and III are correct.
B) I and III are correct.
C) II and III are correct.
D) I and II are correct.
E) III is correct.
Answer: E
Diff: 3 Type: MC
Reference: Section 2-1

17) Choose the INCORRECT statement.
A) The Law of Constant Composition is the Law of Definite Proportions.
B) Objects of like charge repel each other.
C) Electrons were once known as cathode rays.
D) Alpha particles are the same mass as a helium nucleus.
E) Gamma rays are the same as electrons.
Answer: E
Diff: 1 Type: MC
Reference: Section 2-2

18) Which of the following statements is FALSE?
A) Michael Faraday discovered cathode rays.
B) J .J. Thomson suggested the "plum pudding" model of the atom.
C) Robert Millikan determined the charge on an electron.
D) J. J. Thomson determined the charge-to-mass ratio for electrons.
E) Michael Faraday determined that cathode rays were the fundamental negatively charged particles and called them electrons.
Answer: E
Diff: 2 Type: MC
Reference: Section 2-2

19) Which of the following would be unaffected by an electric field?
A) alpha particles
B) beta particles
C) gamma rays
D) protons
E) electrons
Answer: C
Diff: 2 Type: MC
Reference: Section 2-2

20) Choose the correct statement.
A) Neutrons have no charge and no mass.
B) An electron has 1/1837 the mass of a proton.
C) The atomic number is the total number of protons and neutrons in the nucleus.
D) The charge of a proton is 1837 times the charge of an electron.
E) Electrons and protons have about the same mass.
Answer: B
Diff: 1 Type: MC
Reference: Section 2-3

21) Which of the following is a correct feature of the nuclear atom proposed by Rutherford?
A) All atoms of an element have the same mass.
B) The atom is mostly empty space.
C) The number of neutrons and electrons in the atom are equal.
D) The majority of alpha particles to strike the foil "bounced back."
E) It is like the "plum pudding" model.
Answer: B
Diff: 1 Type: MC
Reference: Section 2-3

22) Beta particles:
A) have a mass of 4 and a charge of +2
B) are like X-rays
C) are repelled by a positively charged plate
D) are electrons
E) have the same mass as a neutron
Answer: D
Diff: 1 Type: MC
Reference: Section 2-3

23) Ernest Rutherford is credited with:
I) the nuclear model of the atom
II) the identification of alpha and beta particles
III) the discovery of protons
IV) the prediction of a third, neutral, subatomic particle
A) I and II
B) I and III
C) I, II, III
D) II, III, IV
E) I, II, III, IV
Answer: E
Diff: 2 Type: MC
Reference: Section 2-3

24) Choose the INCORRECT statement.
A) Gamma rays are bent by magnetic fields as a ray of positive charges.
B) Protons and neutrons are found in the nucleus.
C) Protons and neutrons are close to the same mass.
D) The atomic number is the proton number.
E) The mass number is the number of protons plus neutrons.
Answer: A
Diff: 1 Type: MC
Reference: Section 2-4

25) What is the mass number of the most abundant form of oxygen atom?
A) 15.9994
B) 8
C) 16
D) 24
E) 32
Answer: C
Diff: 1 Type: MC
Reference: Section 2-4

26) Which of these atoms has the greatest number of neutrons in its nucleus?
A) $^{56}_{25}\text{Mn}$
B) $^{57}_{27}\text{Co}$
C) $^{55}_{27}\text{Fe}$
D) $^{56}_{28}\text{Ni}$
E) $^{28}_{14}\text{Si}$
Answer: A
Diff: 1 Type: MC
Reference: Section 2-4

27) Choose the information a mass spectrometer is unable to provide.
A) the relative abundance of two isotopes of potassium
B) the number of protons in potassium
C) the atomic mass of a single isotope of potassium
D) the mass of a proton
E) the number of stable isotopes of potassium
Answer: B
Diff: 1 Type: MC
Reference: Section 2-4

28) A species that differs in charge from another atom of the same element:
I) is called an isotope
II) has more or less neutrons
III) has lost or gained electrons
IV) is called an ion
V) has the same number of protons
A) I and II
B) I and III
C) II and IV
D) III and IV
E) III, IV, V
Answer: E
Diff: 3 Type: MC
Reference: Section 2-4

29) Which of the following statements is true concerning the masses of individual Cl atoms?
A) All atoms have a mass of 35.45 u.
B) Most of the atoms have a mass of 35.45 u.
C) Some of the atoms have a mass of 35.45 u.
D) None of the atoms have a mass of 35.45 u.
E) All atoms have a mass of 17 u.
Answer: D
Diff: 2 Type: MC
Reference: Section 2-5

30) A hypothetical element, E, has two stable isotopes:
E-46 = 46.046 u 64.08% E-51 = 50.826 u 35.92%
What is the average atom weight of the element?
A) 47.76 u
B) 48.44 u
C) 49.11 u
D) 48.50 u
E) 47.44 u
Answer: A
Diff: 1 Type: MC
Reference: Section 2-5

31) A hypothetical element, E, has two stable isotopes.

E-38 = 38.012 u 75.68%

E-46 = 45.981 u 24.32%

The element's atomic mass would be closest to which of the elements?

A) K

B) Ar

C) Ca

D) Sc

E) Cl

Answer: B

Diff: 2 Type: MC

Reference: Section 2-5

32) The atomic weight of chlorine is very close to 35.5. This means that:

A) chlorine occurs with a variable number of protons

B) a variable number of electrons gives the fractional weight

C) on the average, an atom of chlorine weighs almost 3 times as much as carbon

D) the actual weight of a chlorine atom is not known very precisely

E) chlorine atoms contain half of a proton

Answer: C

Diff: 2 Type: MC

Reference: Section 2-5

33) An element has 5 stable isotopes. The mass and percentage of each are:

69.9243	20.52%
71.9217	27.43%
72.9234	7.76%
73.9219	36.54%
75.9214	7.76%

The element is which of the following?

A) As

B) Se

C) Ge

D) Ga

E) Zn

Answer: C

Diff: 3 Type: MC

Reference: Section 2-5

34) An element has 5 stable isotopes. The mass and percentage of each are:

89.9043	51.46%
90.9053	11.23%
91.9046	17.11%
93.9061	17.40%
95.9082	2.80%

The element is which of the following?
A) Nb
B) Y
C) Sr
D) Zr
E) Rb
Answer: D
Diff: 3 Type: MC
Reference: Section 2-5

35) Which statement below is true?
A) Metals gain electrons to have a positive charge.
B) Metals gain electrons to have a negative charge.
C) Metals lose electrons to have a positive charge.
D) Nonmetals lose electrons.
E) Transition metals can gain 2 or more electrons to become metal ions.
Answer: C
Diff: 1 Type: MC
Reference: Section 2-6

36) Groups, or families, on the periodic table are:
A) vertical columns of elements with similar properties
B) horizontal rows of elements with increasing atomic numbers
C) named for the first elements in the series; such as "actinides"
D) extremely reactive with each other
E) elements that all occur naturally in the same state
Answer: A
Diff: 1 Type: MC
Reference: Section 2-6

37) Which of the following is a metalloid?
A) mercury
B) selenium
C) bismuth
D) radium
E) calcium
Answer: B
Diff: 2 Type: MC
Reference: Section 2-6

38) What is the mass in grams of 1 atom of sulfur (atomic mass = 32.066)?
A) 1.661×10^{-24} g
B) 1.931×10^{-25} g
C) 5.325×10^{-23} g
D) 5.179×10^{-26} g
E) 5.989×10^{-23} g
Answer: C
Diff: 2 Type: MC
Reference: Section 2-7

39) 31.0 grams of the element phosphorus contain:
A) 6.02×10^{23} P_4 molecules
B) $31.0 \times (6.02 \times 10^{23})$ P atoms
C) 6.02×10^{23} P atoms
D) 31.0 P atoms
E) 31.0 moles of P
Answer: C
Diff: 1 Type: MC
Reference: Section 2-8

40) How many arsenic atoms are in 5.21 g of arsenic?
A) 0.0695 atoms
B) 9.51×10^{22} atoms
C) 3.14×10^{24} atoms
D) 2.10×10^{22} atoms
E) 4.19×10^{22} atoms
Answer: E
Diff: 1 Type: MC
Reference: Section 2-8

41) A cubic centimeter of lead weighs 11.35 g. How many atoms are in the block?
A) 6.8×10^{24} atoms
B) 2.4×10^{23} atoms
C) 3.3×10^{22} atoms
D) 5.3×10^{22} atoms
E) 1.1×10^{25} atoms
Answer: C
Diff: 1 Type: MC
Reference: Section 2-8

42) How many moles are represented by 2.5×10^{15} Na atoms?
A) 3.8×10^{-10} mol
B) 1.8×10^{-10} mol
C) 1.5×10^{39} mol
D) 4.2×10^{-9} mol
E) 1.1×10^{14} mol
Answer: D
Diff: 1 Type: MC
Reference: Section 2-8

43) The natural abundance of calcium in the earth's crust is 3.4% by mass. How many calcium atoms are present in a 1.50 g sample of the earth's crust?
A) 6.6×10^{23} atoms
B) 3.1×10^{22} atoms
C) 7.7×10^{20} atoms
D) 7.7×10^{22} atoms
E) 5.1×10^{20} atoms
Answer: C
Diff: 2 Type: MC
Reference: Section 2-8

44) 57.7 g Ni contains how many atoms?
A) 6.13×10^{23} atoms
B) 3.47×10^{23} atoms
C) 5.92×10^{23} atoms
D) 1.24×10^{24} atoms
E) 0.983 atoms
Answer: C
Diff: 2 Type: MC
Reference: Section 2-8

45) How many atoms of silicon are contained in 8.50×10^{-5} grams?
A) 1.44×10^{23} atoms
B) 1.82×10^{18} atoms
C) 5.02×10^{30} atoms
D) 5.02×10^{18} atoms
E) 1.82×10^{20} atoms
Answer: B
Diff: 2 Type: MC
Reference: Section 2-8

46) If the density of lead is 11.34 g/cm^3, how many atoms are in a piece of lead that is 2.00 cm wide, 1.00 m long, and 2.00 mm thick?
A) 1.32×10^{24} atoms
B) 1.16×10^{23} atoms
C) 1.32×10^{23} atoms
D) 1.16×10^{22} atoms
E) 6.60×10^{23} atoms
Answer: A
Diff: 3 Type: MC
Reference: Section 2-8

47) How many atoms of rubidium-85 are in 87.2 g of rubidium? Rubidium-85 is 72.2 % abundant.
A) 5.16×10^{46} atoms
B) 4.44×10^{23} atoms
C) 8.51×10^{23} atoms
D) 6.14×10^{22} atoms
E) 1.02×10^{24} atoms
Answer: B
Diff: 3 Type: MC
Reference: Section 2-8

48) How many atoms of hydrogen are present in 1.5 lb of hydrogen peroxide, which is 5.93% hydrogen? (1 lb = 454 grams)
A) 2.4×10^{25} atoms
B) 1.21×10^{25} atoms
C) 1.2×10^{25} atoms
D) 2.41×10^{25} atoms
E) 1.2×10^{20} atoms
Answer: A
Diff: 3 Type: MC
Reference: Section 2-8

49) How many atoms of sulfur are in 280 g of a 50% by mass H_2SO_4 solution?
A) 8.6×10^{25} atoms
B) 8.6×10^{23} atoms
C) 8.0×10^{25} atoms
D) 8.0×10^{23} atoms
E) 2.8×10^{29} atoms
Answer: B
Diff: 3 Type: MC
Reference: Section 2-8

50) How many Cu atoms are present in a 75.0 cm length of 20-gauge copper wire? A 20-gauge wire has a diameter of 0.03196 in. Copper's density is 8.92 g/cm^3.
A) 1.31×10^{21}
B) 3.28×10^{22}
C) 8.08×10^{21}
D) 1.04×10^{22}
E) 2.08×10^{22}
Answer: B
Diff: 3 Type: MC
Reference: Section 2-8

51) How many atoms of lead are required to cover a 33.0 cm by 45.0 cm area with a sheet of lead that is 0.140 mm thick? The density of lead is 11.35 g/cm^3.
A) 6.86×10^{23}
B) 2.29×10^{26}
C) 2.29×10^{25}
D) 6.86×10^{22}
E) 1.42×10^{26}
Answer: A
Diff: 3 Type: MC
Reference: Section 2-8

52) A 3.214 g sample of magnesium reacts with 8.416 g of bromine. The only product is magnesium bromide. If 1.934 g of magnesium is left unreacted, how much magnesium bromide is formed?
A) 1.280 g
B) 5.202 g
C) 9.696 g
D) 7.136 g
E) 3.268 g
Answer: C
Diff: 2 Type: BI
Reference: Section 2-1

53) What mass of magnesium is necessary to make 10.5 g of magnesium bromide if 1.04 g of magnesium makes 7.88 g of magnesium bromide?
A) 1.39 g
B) 79.9 g
C) 1.58 g
D) 3.66 g
E) 7.89 g
Answer: A
Diff: 2 Type: BI
Reference: Section 2-1

54) A sample of pure carbon weighing 1.48 g was burned in an excess of air. The mass of carbon dioxide, the sole product, was 5.42 g. In a second experiment, 11.62 g of carbon dioxide was obtained. What mass of carbon was burned in the second experiment?
A) 42.6 g
B) 3.17 g
C) 3.54 g
D) 0.866 g
E) 11.6 g
Answer: B
Diff: 2 Type: BI
Reference: Section 2-1

55) A 1.4 g sample of calcium is reacted with 3.2 g of oxygen. The only product after the reaction is 1.96 g of CaO. How many grams of oxygen remains unreacted?
A) 0.56 g
B) 0.224 g
C) 2.64 g
D) 0.264 g
E) 0.203 g
Answer: C
Diff: 2 Type: BI
Reference: Section 2-1

56) A certain mass of nickel reacts with sulphur to produce 2.83 g of NiS. The same mass of nickel reacts completely with 0.5 g of oxygen to produce 2.33 g of NiO. How many grams of sulfur reacted in the first reaction?
A) 0.5 g
B) 1 g
C) 1.5 g
D) 10^{-1} g
E) 1.25 g
Answer: B
Diff: 2 Type: BI
Reference: Section 2-1

57) Write the symbol for the radioactive isotope phosphorus-32.
A) $^{32}_{15}\mathrm{P}$
B) $^{15}_{32}\mathrm{Ge}$
C) $^{15}_{15}\mathrm{P}$
D) $^{17}_{15}\mathrm{P}$
E) $^{32}_{32}\mathrm{Ge}$
Answer: A
Diff: 1 Type: BI
Reference: Section 2-4

58) The total number of neutrons in an $^{192}Ir^{2+}$ cation is _____.
A) 115
B) 77
C) 192
D) 75
E) 269
Answer: A
Diff: 1 Type: BI
Reference: Section 2-4

59) With mass spectral data the ratio of the mass of $^{14}N/^{12}C$ was found to be 1.167. What is the mass of the ^{14}N atom?
A) 14.017 u
B) 10.292 u
C) 14.004 u
D) 17.000 u
E) 14.007 u
Answer: C
Diff: 1 Type: BI
Reference: Section 2-4

60) Which is the proper chemical symbol for tungsten?
A) Te
B) Ti
C) Tm
D) W
E) Tc
Answer: D
Diff: 1 Type: BI
Reference: Section 2-4

61) The total numbers of neutrons, protons, and electrons in $^{31}P^{3-}$ are:
A) 15 neutrons, 31 protons, 15 electrons
B) 16 neutrons, 15 protons, 18 electrons
C) 31 neutrons, 15 protons, 18 electrons
D) 15 neutrons, 16 protons, 12 electrons
E) 16 neutrons, 16 protons, 18 electrons
Answer: B
Diff: 1 Type: BI
Reference: Section 2-4

62) The total numbers of neutrons, protons, and electrons in $^{35}Cl^-$ are _____.
A) 17 neutrons, 35 protons, 36 electrons
B) 35 neutrons, 17 protons, 18 electrons
C) 18 neutrons, 17 protons, 16 electrons
D) 18 neutrons, 17 protons, 18 electrons
E) 17 neutrons, 17 protons, 17 electrons
Answer: D
Diff: 1 Type: BI
Reference: Section 2-4

63) The total numbers of neutrons, protons, and electrons in $^{138}Ba^{2+}$ are _____.
A) 138 neutrons, 56 protons, 54 electrons
B) 82 neutrons, 56 protons, 54 electrons
C) 56 neutrons, 82 protons, 80 electrons
D) 82 neutrons, 56 protons, 58 electrons
E) 82 neutrons, 82 protons, 82 electrons
Answer: B
Diff: 1 Type: BI
Reference: Section 2-4

64) A cation has 13 neutrons and 10 electrons. If it has a charge of +1, what is its correct symbol?
A) $^{13}_{11}Na^+$
B) $^{24}_{11}Na^+$
C) $^{26}_{13}Al^+$
D) $^{23}_{10}Ne^+$
E) $^{13}_{10}Na^+$
Answer: B
Diff: 1 Type: BI
Reference: Section 2-4

65) A cation has 28 neutrons and 21 electrons. If it has a +3 charge, what is its correct symbol?
A) $^{24}_{28}Ni^{3+}$
B) $^{28}_{21}Sc^{3+}$
C) $^{28}_{24}Cr^{3+}$
D) $^{52}_{24}Cr^{3+}$
E) $^{49}_{21}Sc^{3+}$
Answer: D
Diff: 1 Type: BI
Reference: Section 2-4

66) An anion has 45 neutrons and 36 electrons. If it has a -1 charge, what is its correct symbol?

A) $^{45}_{32}Br^{-}$

B) $^{80}_{35}Br^{-}$

C) $^{90}_{45}Rh^{-}$

D) $^{81}_{36}Kr^{-}$

E) $^{80}_{45}Br^{-}$

Answer: B
Diff: 1 Type: BI
Reference: Section 2-4

67) How many protons, neutrons, and electrons are in $^{24}_{12}Mg^{2+}$?

A) 12 protons, 10 electrons, 12 neutrons
B) 12 protons, 12 electrons, 12 neutrons
C) 12 protons, 12 electrons, 24 neutrons
D) 24 protons, 10 electrons, 12 neutrons
E) 10 protons, 12 electrons, 24 neutrons

Answer: A
Diff: 1 Type: BI
Reference: Section 2-4

68) Write the appropriate symbol for the species containing 18 neutrons, 17 protons, and 16 electrons.

A) $^{18}_{35}Cl^{+}$

B) $^{35}_{18}Ar^{+}$

C) $^{18}_{17}Ar^{+}$

D) $^{34}_{35}Br^{+}$

E) $^{35}_{17}Cl^{+}$

Answer: E
Diff: 1 Type: BI
Reference: Section 2-4

69) What is the proper ${}^{A}_{Z}\mathrm{E}$ notation for an ion having 35 protons, 36 electrons and 45 neutrons?

A) ${}^{45}_{35}\mathrm{Br}^{+}$

B) ${}^{80}_{35}\mathrm{Br}^{-}$

C) ${}^{80}_{45}\mathrm{Br}^{+}$

D) ${}^{45}_{35}\mathrm{Br}^{-}$

Answer: B
Diff: 2 Type: BI
Reference: Section 2-4

70) Write the symbol for the most common ion formed by sulfur.

A) S^{-1}

B) S^{-2}

C) S^{+1}

D) S^{+2}

E) requires experimental data

Answer: B
Diff: 2 Type: BI
Reference: Section 2-4

71) An isotope with mass number 81 has eleven more neutrons than protons. This is an isotope of what element?

A) Tl

B) Yb

C) Zr

D) Br

E) Nb

Answer: D
Diff: 2 Type: BI
Reference: Section 2-4

72) The following ratios of masses were obtained with a mass spectrometer:

$${}^{35}_{17}\mathrm{Cl} / {}^{19}_{9}\mathrm{F} = 1.8406, \quad {}^{19}_{9}\mathrm{F} / {}^{12}_{6}\mathrm{C} = 1.5832$$

What is the mass of a ${}^{35}_{17}\mathrm{Cl}$ atom in atomic mass units?

A) 35.45 u

B) 36.36 u

C) 13.95 u

D) 35.00 u

E) 34.97 u

Answer: E
Diff: 2 Type: BI
Reference: Section 2-4

73) Copper occurs in an isotopic mixture of 69.09% ^{63}Cu (mass = 62.93 u per atom) and 30.91% ^{65}Cu (mass = 64.93 u per atom). What is the average atomic mass of copper?
A) 64.00 u
B) 63.55 u
C) 63.45 u
D) 64.31 u
E) 29.00 u
Answer: B
Diff: 2 Type: BI
Reference: Section 2-5

74) There are two stable isotopes of supposium (Su).
Su-191 = 190.9609 u (27.30%) Su-194 = 193.9633 u (72.70%)
Compute the atomic mass of supposium.
A) 190.9 u
B) 194.0 u
C) 191.8 u
D) 192.5 u
E) 193.1 u
Answer: E
Diff: 1 Type: BI
Reference: Section 2-5

75) Which is the more abundant isotope, Cl-35 or Cl-37?
A) The two isotopes are equal in abundance.
B) Cl-37
C) Cl-35
D) A third unstable isotope is more abundant.
E) Cl-17
Answer: C
Diff: 1 Type: BI
Reference: Section 2-5

76) A new element is discovered. It has two isotopes. The relative abundance of the isotopes and their masses are 18% isotope 1, mass 350.0 u and 82% isotope 2, mass 352.0 u. What is the atomic mass of the element?
A) 351.6
B) 351.0
C) 350.4
D) 352.0
E) 350.0
Answer: A
Diff: 2 Type: BI
Reference: Section 2-5

77) Rubidium possesses two stable forms and has an average mass of 85.5.
^{85}Rb has a mass of 84.9 and a percent abundance of 72.2%. What is the mass of the other form of Rb?
A) 86.1 u
B) 85.7 u
C) 88.3 u
D) 87.1 u
E) 89.4 u
Answer: D
Diff: 2 Type: BI
Reference: Section 2-5

78) The three naturally occurring isotopes of magnesium are ^{24}Mg (23.985042 u, 78.99%), ^{25}Mg (24.985837, 10.00%), and ^{26}Mg. What is the atomic mass of ^{26}Mg?
A) 25.98 u
B) 48.67 u
C) 23.94 u
D) 26.43 u
E) 24.31 u
Answer: A
Diff: 2 Type: BI
Reference: Section 2-5

79) The average atomic mass of B is 10.80 u. Boron has only two stable forms $^{10}_{5}$B (10.00 u) and $^{11}_{5}$B (11.00 u). What is the natural percent abundance of $^{11}_{5}$B ?
A) 80%
B) 20%
C) 1.0%
D) 3.8%
E) 75%
Answer: A
Diff: 2 Type: BI
Reference: Section 2-5

80) Silver possesses two stable isotopes: ^{107}Ag (106.90 u) and ^{109}Ag (108.90 u). If the average atomic mass of Ag is 107.87 u, what is the percent abundance of ^{107}Ag?
A) 48.5%
B) 50.0%
C) 51.5%
D) 46.3%
E) 53.8%
Answer: C
Diff: 2 Type: BI
Reference: Section 2-5

81) A certain element contains eleven atoms of mass 95.952 u for every four atoms of mass 98.949 u. Compute the average atomic weight of this element.
A) 97.451 u
B) 96.754 u
C) 98.150 u
D) 105.16 u
E) 96.952 u
Answer: B
Diff: 3 Type: BI
Reference: Section 2-5

82) Calculate the percent abundance of the two isotopes of a fictional element, georgium, if it has an average atomic mass of 291.23 u.

Go-290	289.86 u
Go-292	292.07 u

A) Go-290, 38% and Go-292, 62%
B) Go-290, 62% and Go-292, 38%
C) Go-290, 42% and Go-292, 58%
D) Go-290, 58% and Go-292, 42%
E) cannot be determined
Answer: A
Diff: 3 Type: BI
Reference: Section 2-5

83) Magnesium has 3 stable isotopes with masses of 23.98504, 24.98584, and 25.98259 respectively. Mg-25 is 10.13%. What are the percentages of the other two isotopes?
A) 78.9% and 10.9%
B) 50% and 50%
C) 44.9% and 44.9%
D) 83.6% and 16.4%
E) 78.9% and 21.1%
Answer: A
Diff: 3 Type: BI
Reference: Section 2-5

84) Lead has 4 stable isotopes with masses of 203.973 (1.48%), 205.9745 (23.6%), 206.9759, and 207.9766 respectively. What are the percentages of the last two isotopes?
A) 77% and 23%
B) 50% and 50%
C) 37% and 38%
D) 64% and 11%
E) 24% and 50%
Answer: E
Diff: 3 Type: BI
Reference: Section 2-5

85) Iodine is a member of the family called _____.
A) metals
B) metalloids
C) noble gasses
D) halogens
E) actinides
Answer: D
Diff: 1 Type: BI
Reference: Section 2-6

86) Sodium is a member of the family called _____.
A) alkali metals
B) earth alkali metals
C) metalloids
D) actinide metals
E) transition metals
Answer: A
Diff: 2 Type: BI
Reference: Section 2-6

87) Main group elements are those in groups _____.
A) 1 and 2
B) 1, 2, and 13 to 18
C) 13 to 18
D) 1 and 18
E) 3 to 12
Answer: B
Diff: 2 Type: BI
Reference: Section 2-6

88) What is the average mass in kilograms of one atom of arsenic?
A) 74.922 kg
B) 0.074922 kg
C) 5.48×10^{-23} kg
D) 1.24×10^{-25} kg
E) 1.24×10^{-22} kg
Answer: D
Diff: 2 Type: BI
Reference: Section 2-7

89) What is the mass of a sample containing 1.2 moles of Ni?
A) 49 g
B) 59 g
C) 34 g
D) 61 g
E) 70 g
Answer: E
Diff: 1 Type: BI
Reference: Section 2-8

90) How many moles of Fe is present in 1.2 grams of Fe?
A) 2.15×10^{-2} mol
B) 0.215 mol
C) 4.30×10^{-2} mol
D) 2.15×10^{-1} mol
E) 0.430 mol
Answer: A
Diff: 2 Type: BI
Reference: Section 2-8

91) 24.9 g of Mn is equivalent to how many moles of Mn?
A) 2.21 moles
B) 0.453 moles
C) 0.461 moles
D) 0.996 moles
E) 1.00 mole
Answer: B
Diff: 1 Type: BI
Reference: Section 2-8

92) How many moles of lead are present in a piece of lead with a volume of 0.600 cm^3? The density of Pb is 11.34 g/cm^3.
A) 6.80
B) 0.0328
C) 11.0
D) 0.547
E) 0.0912
Answer: B
Diff: 2 Type: BI
Reference: Section 2-8

93) What is the density (g/cm^3) of tin if 4.56×10^{20} atoms make a cube 2.31 mm on each side?
A) 0.00729
B) 169
C) 3.28
D) 0.0142
E) 7.29
Answer: E
Diff: 3 Type: BI
Reference: Section 2-8

94) What is the isotopic atomic mass of an isotope if 9.7023×10^{22} atoms weighs 4.0256 g?
A) 0.64858
B) 24.305
C) 24.986
D) 13.728
E) 4.0256
Answer: C
Diff: 3 Type: BI
Reference: Section 2-8

95) What is the atomic weight of an element if 4.00 grams of it contain 2.98×10^{22} atoms?
A) 20.2 u
B) 80.8 u
C) 19.7 u
D) 8.08 u
E) 2.02 u
Answer: B
Diff: 3 Type: BI
Reference: Section 2-8

96) A solution contains 12.5% NaCl by mass. What mass of solution is required to obtain 1.0×10^{23} Na atoms?
A) 0.013 g
B) 30 g
C) 1.2 g
D) 95 g
E) 78 g
Answer: E
Diff: 3 Type: BI
Reference: Section 2-8

97) A lead cube that is 3.00 cm on each side contains 8.91×10^{23} atoms. What is the density of this cube in g/cm^3?
A) 34.1
B) 11.4
C) 0.0550
D) 0.990
E) 26.7
Answer: B
Diff: 3 Type: BI
Reference: Section 2-8

98) Lead-204 has a relative abundance of 1.48%. What size block of lead (in cubic centimeters) will contain 8.34×10^{21} atoms of lead-204? The density of lead is 11.35 g/cm^3.
A) 3.75×10^{-3}
B) 0.253
C) 194
D) 17.1
E) 16.8
Answer: D
Diff: 3 Type: BI
Reference: Section 2-8

99) Lead-206 has a relative abundance of 23.6%. What size block of lead (in cubic centimeters) will contain 8.34×10^{21} atoms of lead-206? The density of lead is 11.35 g/cm^3.
A) 0.0107
B) 0.253
C) 1.07
D) 0.330
E) 12.1
Answer: C
Diff: 3 Type: BI
Reference: Section 2-8

100) What is the thickness in mm of the sheet 75.0 cm × 35.0 cm formed by 7.88×10^{23} atoms of lead? The density of lead is 11.35 g/cm^3.
A) 9.10
B) 0.0910
C) 1.88×10^4
D) 0.273
E) 2.73
Answer: B
Diff: 3 Type: BI
Reference: Section 2-8