#### **Chemistry 4th Edition Burdge Test Bank**

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## Chapter 02 **Atoms and the Periodic Table**

1. The scientist who determined the magnitude of the electric charge on the electron was

A. John Dalton.

**B.** Robert Millikan.

C. J. J. Thomson.

D. Henry Moseley.

E. J. Burdge.

Blooms: 1. Remember Difficulty: Easy Gradable: automatic Subtopic: Structure of the Atom Topic: Components of Matter

2. When J. J. Thomson discovered the electron, what physical property of the electron did he measure?

- A. its charge, e
- **B.** its charge-to-mass ratio, *e/m*
- C. its temperature, T
- D. its mass, m

E. its atomic number, Z

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Structure of the Atom Topic: Components of Matter

3. Which field of study made a big contribution toward understanding the composition of the atom?

- A. Electricity
- **B**. Radiation
- C. Solution chemistry
- D. Electrochemistry
- E. Quantum mechanics

Blooms: 2. Understand Difficulty: Medium Gradable: automatic Subtopic: Structure of the Atom Topic: Components of Matter

4. Which of the following is a type of radioactive radiation that has no charge and is unaffected by external electric or magnetic fields?

- A. α rays
- B.  $\beta$  rays
- <u>C</u>. γ rays
- D. \delta rays
- E. ε rays

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Structure of the Atom Topic: Components of Matter

5. Which of the following is a type of radioactive radiation that consists of positively charged particles and is deflected away from the positively charged plate?

- <u>**A**</u>.  $\alpha$  rays
- B.  $\beta$  rays
- C. y rays
- D.  $\delta$  rays
- E. ε rays

Blooms: 2. Understand Difficulty: Medium Gradable: automatic Subtopic: Structure of the Atom Topic: Components of Matter

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6. Which of the following is a type of radioactive radiation that consists of electrons and is deflected away from the negatively charged plate?

A. α rays <u>**B.**</u>β rays

 $\frac{D}{C}$ ,  $\gamma$  rays

D. \delta rays

E. ε rays

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Atomic Theories Subtopic: Structure of the Atom Topic: Components of Matter

7. Which of these scientists developed the nuclear model of the atom?

A. John Dalton

B. Robert Millikan

C. J. J. Thomson

- D. Henry Moseley
- E. Ernest Rutherford

Blooms: 1. Remember Difficulty: Easy Gradable: automatic Subtopic: Atomic Theories Subtopic: Structure of the Atom Topic: Components of Matter

8. Rutherford's experiment with alpha particle scattering by gold foil established that

<u>A</u>. protons are not evenly distributed throughout an atom.

B. electrons have a negative charge.

C. electrons have a positive charge.

- D. atoms are made of protons, neutrons, and electrons.
- E. protons are 1840 times heavier than electrons.

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Structure of the Atom Topic: Components of Matter

- 9. Who is credited with measuring the mass/charge ratio of the electron?
- A. Dalton
- B. Chadwick
- <u>C</u>. Thomson
- D. Millikan
- E. Rutherford

Blooms: 1. Remember Difficulty: Easy Gradable: automatic Subtopic: Structure of the Atom

10. Who is credited with first measuring the charge of the electron?

- A. Dalton
- B. Gay-Lussac
- C. Thomson
- **D.** Millikan
- E. Rutherford

Blooms: 1. Remember Difficulty: Easy Gradable: automatic Subtopic: Structure of the Atom Topic: Components of Matter 11. Millikan's oil-drop experiment

<u>A</u>. established the charge on an electron.

B. showed that all oil drops carried the same charge.

C. provided support for the nuclear model of the atom.

D. suggested that some oil drops carried fractional numbers of electrons.

E. suggested the presence of a neutral particle in the atom.

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Structure of the Atom Topic: Components of Matter

12. Who is credited with discovering the atomic nucleus?

A. Dalton

- B. Gay-Lussac
- C. Thomson
- D. Chadwick
- E. Rutherford

Blooms: 1. Remember Difficulty: Easy Gradable: automatic Subtopic: Atomic Theories Subtopic: Structure of the Atom Topic: Components of Matter

13. Which one of the following statements about atoms and subatomic particles is correct?

- A. Rutherford discovered the atomic nucleus by bombarding gold foil with electrons.
- B. The proton and the neutron have identical masses.

C. The neutron's mass is equal to that of a proton plus an electron.

**D**. A neutral atom contains equal numbers of protons and electrons.

E. An atomic nucleus contains equal numbers of protons and neutrons.

Blooms: 2. Understand Difficulty: Medium Gradable: automatic Subtopic: Atomic Theories Subtopic: Structure of the Atom Topic: Components of Matter

14. Who discovered the neutron, the subatomic particle having a neutral charge?

- A. Millikan
- B. Dalton
- C. Chadwick
- D. Rutherford
- E. Thomson

Blooms: 1. Remember Difficulty: Easy Gradable: automatic Subtopic: Atomic Theories Subtopic: Structure of the Atom Topic: Components of Matter

15. What is the term for the number of protons in the nucleus of each atom of an element? It also indicates the number of electrons in the atom.

- A. Isotope number
- B. Mass number
- C. Mass-to-charge ratio
- **D**. Atomic number
- E. Atomic mass units

Blooms: 1. Remember Difficulty: Easy Gradable: automatic Subtopic: Atomic Theories Subtopic: Structure of the Atom Topic: Components of Matter 16. What is the term for the total number of neutrons and protons in the nucleus of each atom of an element?

A. Isotope number

**B.** Mass number

C. Mass-to-charge ratio

D. Atomic number

E. Atomic mass units

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Structure of the Atom Topic: Components of Matter

17. Bromine is the only nonmetal that is a liquid at room temperature. Consider the isotope bromine-81, <sup>81</sup><sub>35</sub>Br. Select the combination which lists the correct atomic number, number of neutrons, and mass number, respectively. <u>A</u>. 35, 46, 81

B. 35, 81, 46

C. 81, 46, 35

D. 46, 81, 35

E. 35, 81, 116

Blooms: 3. Apply Difficulty: Medium Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Subtopic: Elements and the Periodic Table Topic: Components of Matter

18. Atoms X, Y, Z, and R have the following nuclear compositions: 410 X 410 Y 412 X 412 R 186 X 183 Y 186 Z 185 R

Ι Π ш IV Which of the following are isotopes of the same element? A. I & II B. I & IV C. II & IV D. III & IV <u>E</u>. I & III

> Blooms: 5. Evaluate Difficulty: Medium Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Topic: Components of Matter

19. Which isotope is not possible?  $\begin{array}{c} 1 \\ 1 \\ A. 1 \\ B. 1 \\ B. 1 \\ C. 24 \\ Cr \\ 25 \\ Mn \\ B. 54 \\ Mn \\ B. 4 \\ Cr \\ 25 \\ Mn \\ Cr \\ 25 \\ Cr \\ 25$ 

Blooms: 5. Evaluate Difficulty: Hard Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Topic: Components of Matter

20. Atoms of the same element with different mass numbers are called

E.All of these isotopes are possible.

A. ions.B. neutrons.C. chemical groups.D. chemical families.<u>E.</u> isotopes.

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Subtopic: Structure of the Atom Topic: Components of Matter

21. How many neutrons are there in an atom of lead whose mass number is 208?
A. 82
B. 126
C. 208
D. 290
E. none of them

Blooms: 3. Apply Difficulty: Medium Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Subtopic: Structure of the Atom Topic: Components of Matter

22. An atom of the isotope sulfur-31 consists of how many protons, neutrons, and electrons? (p = proton, n = neutron, e = electron) A. 15 p, 16 n, 15 e **B.** 16 p, 15 n, 16 e C. 16 p, 31 n, 16 e D. 32 p, 31 n, 32 e E. 16 p, 16 n, 15 e

> Blooms: 3. Apply Difficulty: Medium Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Subtopic: Structure of the Atom Topic: Components of Matter

23. Give the number of protons (p), electrons (e), and neutrons (n) in one atom of chlorine- 37. A. 37 p, 37 e, 17 n B. 17 p, 17 e, 37 n <u>C</u>. 17 p, 17 e, 20 n

> Blooms: 3. Apply Difficulty: Medium Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Subtopic: Structure of the Atom Topic: Components of Matter

- 24. Two isotopes of an element differ only in their
- A. symbol.
- B. atomic number.

D. 37 p, 17 e, 20 n E. 17 p, 37 e, 17 n

- <u>C</u>. atomic mass.
- D. number of protons.
- E. number of electrons.

Blooms: 3. Apply Difficulty: Easy Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Subtopic: Structure of the Atom Topic: Components of Matter 25. The elements in a column of the periodic table are known as

A. metalloids.

B. a period.

C. noble gases.

**<u>D</u>.** a group.

E. nonmetals.

Blooms: 1. Remember Difficulty: Easy Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

26. Which of these materials are usually poor conductors of heat and electricity?

- A. Metals
- B. Metalloids

**<u>C</u>**. Nonmetals

- D. Alkaline earth metals
- E. Alkali metals

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Components of Matter

27. Which of these elements is most likely to be a good conductor of electricity?

- A. N
- B. S
- C. He
- D. Cl
- <u>E</u>. Fe

Blooms: 2. Understand Difficulty: Medium Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Components of Matter

- 28. Which of the following is a nonmetal? A. Lithium, Li, Z = 3**B.** Bromine, Br, Z = 35C. Mercury, Hg, Z = 80D. Bismuth, Bi, Z = 83
- E. Sodium, Na, Z = 11

Blooms: 3. Apply Difficulty: Easy Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

29. Which of the following is a metal? A. Nitrogen, N, Z = 7B. Phosphorus, P, Z = 15C. Arsenic, As, Z = 33D. Thallium, Tl, Z = 81E. Silicon, Si, Z = 14

> Blooms: 3. Apply Difficulty: Easy Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

30. Which of the following is a metalloid? A. Carbon, C, Z = 6B. Sulfur, S, Z = 16C. Germanium, Ge, Z = 32D. Iridium, Ir, Z = 77E. Bromine, Br, Z = 35

> Blooms: 3. Apply Difficulty: Medium Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

31. A row of the periodic table is called a(n)

A. group.

**<u>B</u>**. period.

 $\overline{C}$ . isotopic mixture.

D. family.

E. subshell.

Blooms: 1. Remember Difficulty: Easy Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

32. Silicon, which makes up about 25% of Earth's crust by mass, is used widely in the modern electronics industry. It has three naturally occurring isotopes, <sup>28</sup>Si, <sup>29</sup>Si, and <sup>30</sup>Si. Calculate the atomic mass of silicon.

Isotope	Isotopic Mass (amu)	Abudance %
<sup>28</sup> Si	27.976927	92.22
<sup>29</sup> Si	28.976495	4.69
<sup>30</sup> Si	29.973770	3.09
A. 29.2252 amu	1	
B. 28.9757 amu	l	
C. 28.7260 amu	l	

**D.** 28.0855 amu E. 27.9801 amu

> Blooms: 3. Apply Difficulty: Medium Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Subtopic: Elements and the Periodic Table Topic: Components of Matter

33. Lithium forms compounds which are used in dry cells, storage batteries, and in high-temperature lubricants. It has two naturally occurring isotopes,  ${}^{6}$ Li (isotopic mass = 6.015123 amu) and  ${}^{7}$ Li (isotopic mass = 7.016005 amu). Lithium has an atomic mass of 6.9412 amu. What is the percent abundance of lithium-6?

A. 92.53% B. 86.65% C. 49.47%

**<u>D</u>.** 7.47% E. 6.015%

> Blooms: 3. Apply Difficulty: Hard Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Subtopic: Elements and the Periodic Table Topic: Components of Matter

34. In the periodic table, atoms are arranged in order of

A. increasing atomic mass.

**<u>B</u>**. increasing atomic number.

C. physical properties.

D. periodicity.

E. chemical reactivities.

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Subtopic: Elements and the Periodic Table Topic: Components of Matter

35. The elements in Group 7A are known by what name?

- A. Transition metals
- **<u>B</u>**. Halogens
- $\overline{C}$ . Alkali metals
- D. Alkaline earth metals
- E. Noble gases

Blooms: 1. Remember Difficulty: Easy Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

36. The elements in Group 2A are known by what name?

- A. Transition metals
- B. Halogens
- C. Alkali metals
- **D**. Alkaline earth metals
- E. Noble gases

Blooms: 1. Remember Difficulty: Medium Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

37. The alkali metal elements are found in \_\_\_\_\_ of the periodic table.

- <u>A</u>. Group 1A
- B. Group 2A
- C. Group 3A
- D. Period 7
- E. Period 1

Blooms: 1. Remember Difficulty: Medium Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

38. What terms defines a mass which is exactly equal to 1/12 the mass of one carbon-12 atom?

- A. Isotope number
- B. Mass number
- C. Mass-to-charge ratio
- D. Atomic number
- E. Atomic mass unit

Blooms: 1. Remember Difficulty: Easy Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Topic: Components of Matter 39. Which of these elements is chemically similar to magnesium?

- A. Sulfur
- B. Calcium
- C. Iron
- D. Nickel
- E. Potassium

Blooms: 5. Evaluate Difficulty: Medium Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Components of Matter

- 40. Which of these elements is chemically similar to oxygen?
- A. Sulfur
- B. Calcium
- C. Iron
- D. Nickel
- E. Potassium

Blooms: 5. Evaluate Difficulty: Medium Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Components of Matter

- 41. Which of these elements is chemically similar to potassium?
- A. calcium
- B. arsenic
- C. phosphorus
- D. cerium
- E. cesium

Blooms: 5. Evaluate Difficulty: Medium Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Components of Matter

42. What element is represented by X in the atomic symbol notation  $\frac{195}{78} \times ?$ 

- A. Iridium
- **B.** Platinum
- C. Palladium
- D. Selenium
- E. Magnesium

Blooms: 4. Analyze Difficulty: Medium Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Subtopic: Elements and the Periodic Table Topic: Components of Matter

43. Determine the number of electrons and identify the correct symbol for an atom with 17 protons and 18 neutrons.

<u>A.</u> 17 electrons, 17 B. 18 electrons, 18 C. 17 electrons, 18 D. 17 electrons, 17 D. 17 electrons, 35 E. 18 electrons, 36 Ar

> Blooms: 4. Analyze Difficulty: Easy Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Subtopic: Structure of the Atom Topic: Components of Matter

44. Determine the number of protons, electrons, and neutrons for the isotope gold-118. The symbol for gold is Au.

A. 118 protons, 118 electrons, 79 neutrons

B. 79 protons, 79 electrons, 118 neutrons

<u>C</u>. 79 protons, 79 electrons, 39 neutrons

D. 118 protons, 118 electrons, 39 neutrons

E. 79 protons, 39 electrons, 118 neutrons

Blooms: 4. Analyze Difficulty: Medium Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Subtopic: Structure of the Atom Topic: Components of Matter

45. Determine the number of protons and identify the correct symbol for an atom with 20 neutrons and 20 electrons.

45. Determine the number  $A_{20}$  Ca A. 20 protons,  $20_{20}$  Ca **B.** 20 protons,  $20_{20}$  Ca C. 20 protons,  $40_{20}$  Ca C. 20 protons,  $20_{20}$  Ca D. 40 protons,  $20_{20}$  Ca E. 40 protons,  $40_{20}$  Ca

Blooms: 4. Analyze Difficulty: Easy Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Subtopic: Structure of the Atom Topic: Components of Matter

46. Which of these compounds is most likely to be ionic?

<u>A</u>. KF

 $\overline{B}$ . CCl<sub>4</sub>

 $C. CS_2$  $D. CO_2$ 

E. ICl

Blooms: 4. Analyze Difficulty: Easy Gradable: automatic Subtopic: Bond Polarity Subtopic: Electronegativity Subtopic: Ionic Bonding and Lattice Energy Topic: Chemical Bonding

47. Which of these compounds is most likely to be ionic? A. GaAs **B**. SrBr<sub>2</sub>

 $\overline{C}$ . NO<sub>2</sub>

D. CBr<sub>4</sub>

E. H<sub>2</sub>O

Blooms: 4. Analyze Difficulty: Easy Gradable: automatic Subtopic: Bond Polarity Subtopic: Electronegativity Subtopic: Ionic Bonding and Lattice Energy Topic: Chemical Bonding

48. Which of these compounds is most likely to be ionic? A.  $NCl_3$ 

 $\underline{\mathbf{B}}$ . BaCl<sub>2</sub> C. CO

D. SO<sub>2</sub>

E. SF<sub>4</sub>

Blooms: 4. Analyze Difficulty: Easy Gradable: automatic Subtopic: Bond Polarity Subtopic: Electronegativity Subtopic: Ionic Bonding and Lattice Energy Topic: Chemical Bonding

49. Which of these pairs of elements would be most likely to form an ionic compound?

- A. Cl and I
- B. Al and K <u>C</u>. Cl and Mg
- D. C and S
- E. Al and Mg

Blooms: 4. Analyze Difficulty: Easy Gradable: automatic Subtopic: Bond Polarity Subtopic: Cherconegativity Subtopic: Ionic Bonding and Lattice Energy Topic: Chemical Bonding

50. Which of the following contains ionic bonding?
A. CO
B. SrF<sub>2</sub>
C. Al
D. OCl<sub>2</sub>
E. HCl

Blooms: 4. Analyze Difficulty: Easy Gradable: automatic Subtopic: Bond Polarity Subtopic: Chertonegativity Subtopic: Ionic Bonding and Lattice Energy Topic: Chemical Bonding

51. Which of the following is an ionic compound? A.  $H_2S$ B.  $NH_3$ C.  $I_2$ **D.** KI

 $\overline{E}$ .  $CCl_4$ 

Blooms: 4. Analyze Difficulty: Easy Gradable: automatic Subtopic: Bond Polarity Subtopic: Electronegativity Subtopic: Ionic Bonding and Lattice Energy Topic: Chemical Bonding

52. An anion is defined as

- <u>A</u>. a charged atom or group of atoms with a net negative charge.
- B. a stable atom.
- C. a group of stable atoms.
- D. an atom or group of atoms with a net positive charge.
- E. neutral.

Blooms: 1. Remember Difficulty: Easy Gradable: automatic Subtopic: Electron Configurations of Cations and Anions Subtopic: Molecules and Ions Topic: Components of Matter Topic: Electron Configuration

2-11 Copyright © 2016 McGraw-Hill Education. All rights reserved. No reproduction or distribution without the prior written consent of McGraw-Hill Education. 53. Which one of these species is an ion?

 $\underline{\mathbf{A}} \cdot \mathbf{B}^{3+}$ 

B. NaCl

C. He

D. <sup>14</sup>C

E. None of these species is an ion.

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Electron Configurations of Cations and Anions Subtopic: Molecules and Ions Topic: Electron Configuration

54. Which of these pairs of elements would be most likely to form an ionic compound?

- A. P and Br
- B. Cu and K
- C. C and O
- **D**. O and Zn
- E. Al and Rb

Blooms: 4. Analyze Difficulty: Easy Gradable: automatic Subtopic: Bond Polarity Subtopic: Electronegativity Subtopic: Ionic Bonding and Lattice Energy Topic: Chemical Bonding

55. Which pair of elements would be most likely to form an ionic compound?

- A. P and Br
- B. Zn and K
- C. F and Al
- D. C and S
- E. Al and Rb

Blooms: 4. Analyze Difficulty: Easy Gradable: automatic Subtopic: Bond Polarity Subtopic: Electronegativity Subtopic: Ionic Bonding and Lattice Energy Topic: Chemical Bonding

56. What is the formula for the ionic compound formed by calcium ions and nitrate ions? A.  $Ca_3N_2$ **B.**  $Ca(NO_3)_2$ C.  $Ca_2NO_3$ D.  $Ca_2NO_2$ E.  $CaNO_3$ 

> Blooms: 4. Analyze Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Molecules and Ions Topic: Components of Matter

57. What is the formula for the ionic compound formed by calcium and selenium?

- A. CaSe
- $\overline{B}$ . Ca<sub>2</sub>Se
- C. CaSe<sub>2</sub>
- D. Ca<sub>3</sub>Se
- E. CaSe<sub>3</sub>

Blooms: 4. Analyze Difficulty: Easy Gradable: automatic Subtopic: Chemical Formulas Subtopic: Molecules and Ions Topic: Components of Matter 58. Which is the correct formula for copper(II) phosphate?
A. Cu<sub>2</sub>PO<sub>4</sub>
B. Cu<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>
C. Cu<sub>2</sub>PO<sub>3</sub>
D. Cu(PO<sub>4</sub>)<sub>2</sub>
E. Cu(PO<sub>3</sub>)<sub>2</sub>

Blooms: 4. Analyze Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Molecules and Ions Topic: Components of Matter

59. The chemical name for  $CIO_3^-$  is "chlorate ion". What is the common name for  $HCIO_3$ ?

- A. hydrochloric acid
- B. chloroform
- C. hydrogen trioxychloride
- D. chlorous acid
- E. chloric acid

Blooms: 3. Apply Difficulty: Medium Gradable: automatic Subtopic: Acid-Base Definitions Subtopic: Chemical Formulas Subtopic: Nomenclature Subtopic: Nomenclature Topic: Acids and Bases Topic: Components of Matter

60. The formula for magnesium sulfate is A. MnS. B. MgS.

C. MnSO<sub>3</sub>.

- D. MgSO<sub>4</sub>.
- E. MnSO<sub>4</sub>.

Blooms: 4. Analyze Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Ionic Bonding and Lattice Energy Subtopic: Molecules and Ions Subtopic: Nomenclature Topic: Chemical Bonding Topic: Components of Matter

61. The formula for sodium sulfide isA. NaS.B. K<sub>2</sub>S.C. NaS<sub>2</sub>.

- $\underline{\mathbf{D}}$ . Na<sub>2</sub> $\mathbf{\tilde{S}}$ .
- E. SeS.

Blooms: 4. Analyze Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Ionic Bonding and Lattice Energy Subtopic: Molecules and Ions Subtopic: Nomenclature Topic: Chemical Bonding Topic: Components of Matter 62. The chemical formula for iron(II) nitrate isA. Fe<sub>2</sub>(NO<sub>3</sub>)<sub>3</sub>.B. Ir(NO<sub>2</sub>)<sub>2</sub>.

C.  $Fe_2N_3$ .

 $\underline{\mathbf{D}}$ . Fe(NO<sub>3</sub>)<sub>2</sub>.

E.  $Fe(NO_2)_2$ .

Blooms: 4. Analyze Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Ionic Bonding and Lattice Energy Subtopic: Molecules and Ions Subtopic: Nomenclature Topic: Chemical Bonding Topic: Components of Matter

63. Which one of the following formulas of ionic compounds is the least likely to be correct?

- A. NH<sub>4</sub>Cl
- B. Ba(OH)<sub>2</sub>
- C. Na<sub>2</sub>SO<sub>4</sub>
- $\underline{\mathbf{D}}$ . Ca<sub>2</sub>NO<sub>3</sub>
- $\overline{E}$ . Cu(CN)<sub>2</sub>

Blooms: 4. Analyze Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Ionic Bonding and Lattice Energy Subtopic: Molecules and Ions Topic: Chemical Bonding Topic: Components of Matter

64. What is the formula for lead(II) oxide?

- A. PbO
- B. PbO<sub>2</sub>

C. Pb<sub>2</sub>O

- D. PbO<sub>4</sub>
- E. Pb<sub>2</sub>O<sub>3</sub>

Blooms: 4. Analyze Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Ionic Bonding and Lattice Energy Subtopic: Molecules and Ions Topic: Chemical Bonding Topic: Components of Matter

65. Potassium permanganate is a strong oxidizer that reacts explosively with easily oxidized materials. What is its formula?

- A. KMnO<sub>3</sub>
- **<u>B</u>**.  $KMnO_4$
- $\overline{C}$ . K<sub>2</sub>MnO<sub>4</sub>
- D. K(MnO<sub>4</sub>)<sub>2</sub>
- E. K<sub>2</sub>Mn<sub>2</sub>O<sub>7</sub>

Blooms: 4. Analyze Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Ionic Bonding and Lattice Energy Subtopic: Molecules and Ions Topic: Chemical Bonding Topic: Components of Matter 66. Ferric oxide is used as a pigment in metal polishing. Which of the following is its formula?

A. FeO

B. Fe<sub>2</sub>O C. FeO<sub>3</sub>

- D.  $Fe_2O_5$
- $\underline{\mathbf{E}}$ . Fe<sub>2</sub>O<sub>3</sub>
- $\underline{\mathbf{D}}_{1} = \mathbf{C}_{2} \mathbf{C}_{3}$

Blooms: 4. Analyze Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Ionic Bonding and Lattice Energy Subtopic: Molecules and Ions Topic: Chemical Bonding Topic: Components of Matter

- 67. What is the name of  $Mn(CO_3)_2$ ?
- A. manganese carbide
- B. magnesium(IV) carbonate
- C. manganese(II) carbonate
- D. magnesium(II) carbonate
- $\underline{\mathbf{E}}$ . manganese(IV) carbonate

Blooms: 4. Analyze Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Ionic Bonding and Lattice Energy Subtopic: Molecules and Ions Topic: Chemical Bonding Topic: Components of Matter

- 68. What is the name of  $Ba(NO_2)_2 \cdot 3H_2O$ ?
- A. barium nitrite
- B. trihydrobarium(II) nitrite
- <u>C</u>. barium nitrite trihydrate
- D. barium(II) nitrite trihydrate
- E. barium nitrate trihydrate

Blooms: 4. Analyze Difficulty: Hard Gradable: automatic Subtopic: Chemical Formulas Subtopic: Ionic Bonding and Lattice Energy Subtopic: Molecules and Ions Topic: Chemical Bonding Topic: Components of Matter

69. What is the formula of hydrobromic acid? A. H<sub>2</sub>OBr B. HBrO<sub>3</sub> C. HBrO **D.** HBr E. HBr·2H<sub>2</sub>O

> Blooms: 3. Apply Difficulty: Hard Gradable: automatic Subtopic: Acid-Base Definitions Subtopic: Chemical Formulas Subtopic: Nomenclature Topic: Acids and Bases Topic: Components of Matter

70. What is the formula of iodous acid? A. HI B. HIO<sub>3</sub> C. HIO D. HIO<sub>4</sub> <u>**E**</u>.  $HIO_2$ 

> Blooms: 3. Apply Difficulty: Hard Gradable: automatic Subtopic: Acid-Base Definitions Subtopic: Chemical Formulas Subtopic: Nomenclature Topic: Acids and Bases Topic: Components of Matter

71. Iron(III) chloride hexahydrate is used as a coagulant for sewage and industrial wastes. What is its formula? A. Fe(Cl·6H<sub>2</sub>O)<sub>3</sub>

- B. Fe<sub>3</sub>Cl·6H<sub>2</sub>O
- C. FeCl<sub>3</sub>(H<sub>2</sub>O)<sub>6</sub>
- D. Fe<sub>3</sub>Cl(H<sub>2</sub>O)<sub>6</sub>
- <u>**E**</u>. FeCl<sub>3</sub> $\cdot$ 6H<sub>2</sub>O

Blooms: 3. Apply Difficulty: Hard Gradable: automatic Subtopic: Chemical Formulas Subtopic: Ionic Bonding and Lattice Energy Subtopic: Nomenclature Topic: Chemical Bonding Topic: Components of Matter

72. Which of the following is the oxoanion of bromine called the bromate ion?

- $\underline{\mathbf{A}}$ . BrO<sub>3</sub><sup>-</sup>
- $\overline{B}$ . BrO<sub>3</sub>
- C.  $BrO_4^{2-}$
- D. BrO<sub>2</sub>
- E. BrO

Blooms: 3. Apply Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Ionic Bonding and Lattice Energy Subtopic: Nomenclature Topic: Chemical Bonding Topic: Components of Matter

73. What types of elements undergo ionic bonding?

- A. two metals
- **B**. a nonmetal and a metal C. two nonmetals
- D. two Group 1A elements
- E. two noble gases

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Ionic Bonding and Lattice Energy Subtopic: Periodic Classification of the Elements Topic: Chemical Bonding Topic: Chemical Periodicity

74. What is the name of  $PCl_3$ ?

A. phosphorus chloride

B. phosphoric chloride

C. phosphorus trichlorate

- D. trichlorophosphide
- $\underline{\mathbf{E}}$ . phosphorus trichloride

Blooms: 3. Apply Difficulty: Easy Gradable: automatic Subtopic: Chemical Formulas Subtopic: Covalent Bonding Subtopic: Nomenclature Topic: Chemical Bonding Topic: Components of Matter

75. The compound,  $P_4S_{10}$ , is used in the manufacture of safety matches. What is its name?

A. phosphorus sulfide

- B. phosphoric sulfide
- C. phosphorus decasulfide
- **D**. tetraphosphorus decasulfide
- E. phosphorus sulfite

Blooms: 3. Apply Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Covalent Bonding Subtopic: Nomenclature Topic: Chemical Bonding Topic: Components of Matter

76. Diiodine pentaoxide is used as an oxidizing agent that converts carbon monoxide to carbon dioxide. What is its chemical formula?

<u>A</u>. I<sub>2</sub>O<sub>5</sub> B. IO<sub>5</sub>

D. 105 C. 2IO5

D. I<sub>5</sub>O<sub>2</sub>

E. (IO<sub>5</sub>)<sub>2</sub>

Blooms: 3. Apply Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Covalent Bonding Subtopic: Nomenclature Topic: Chemical Bonding Topic: Components of Matter

77. What is the name of  $P_4Se_3$ ?

- A. phosphorus selenide
- B. phosphorus triselenide
- C. tetraphosphorus selenide
- D. phosphoric selenide
- $\underline{\mathbf{E}}$ . tetraphosphorus triselenide

Blooms: 3. Apply Difficulty: Easy Gradable: automatic Subtopic: Chemical Formulas Subtopic: Covalent Bonding Subtopic: Molecules and Ions Subtopic: Nomenclature Topic: Chemical Bonding Topic: Components of Matter 78. What is the name of ClO<sup>-</sup> ion?

A. hypochlorite

B. chlorate

C. chlorite

- D. perchlorate
- E. perchlorite

Blooms: 3. Apply Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Molecules and Ions Subtopic: Nomenclature Topic: Components of Matter

79. What is the formula for the permanganate ion? A. MnO<sub>2</sub>

 $\frac{\mathbf{B}}{\mathbf{C}} \cdot \mathbf{MnO_4^-}$ 

- D.  $Mn_2O_7^-$ E.  $MgO_2^{2-}$

Blooms: 3. Apply Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Molecules and Ions Subtopic: Nomenclature Topic: Components of Matter

80. Tetrasulfur dinitride decomposes explosively when heated. What is its formula? A.  $S_2N_4$  $\underline{\mathbf{B}}$ .  $\mathbf{S}_4 \mathbf{N}_2$ 

- $\overline{C}$ .  $4SN_2$ D.  $S_4N$
- E.  $S_2N$

Blooms: 3. Apply Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Molecules and Ions Subtopic: Nomenclature Topic: Components of Matter

81. Which of the following is the empirical formula for hexane,  $C_6H_{14}$ ? A. C<sub>12</sub>H<sub>28</sub> B. C<sub>6</sub>H<sub>14</sub> <u>C</u>. C<sub>3</sub>H<sub>7</sub> D. CH<sub>2.3</sub> E. C<sub>0.43</sub>H

> Blooms: 4. Analyze Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Formula Determination of Unknown Compounds (Empirical and Molecular Formulas) Subtopic: Molecules and Ions Subtopic: Nomenclature Topic: Components of Matter Topic: Stoichiometry and Chemical Reactions

82. Which of the following is a molecular formula for a compound with an empirical formula of CH?

A.  $C_2H_6$ 

B. C<sub>3</sub>H<sub>9</sub>

C. C<sub>4</sub>H<sub>10</sub>

 $\underline{\mathbf{D}}$ . C<sub>6</sub>H<sub>6</sub>

E. None of the answers is correct.

Blooms: 4. Analyze Difficulty: Easy Gradable: automatic Subtopic: Formula Determination of Unknown Compounds (Empirical and Molecular Formulas) Subtopic: Molecules and Ions Subtopic: Nomenclature Topic: Components of Matter Topic: Stoichiometry and Chemical Reactions

83. Which of the following substances is a molecule, but not a compound?

A. SO<sub>2</sub> <u>B</u>. O<sub>2</sub>

 $\underline{\mathbf{D}}$ .  $\mathbf{O}_2$ C.  $\mathbf{CS}_2$ 

D. Ar

E.  $CO_3^{2-}$ 

Blooms: 5. Evaluate Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Molecules and Ions Topic: Components of Matter

84. What is the chemical name of FeSO<sub>3</sub>?

<u>A</u>. Iron(II) sulfite

B. Iron(III) sulfate

C. Iron sulfate

- D. Iron sulfur trioxide
- E. None of the names is correct.

Blooms: 3. Apply Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Subtopic: Molecules and Ions Topic: Components of Matter

85. Polyatomic molecules contain

A. two different types of atoms.

B. two of the same types of atoms.

C. only two atoms of the same or different type.

 $\underline{\mathbf{D}}$ . more than two atoms of the same or different type.

Gradable: automatic Subtopic: Chemical Formulas Topic: Components of Matter

Blooms: 2. Understand Difficulty: Easy

86. Common examples of diatomic molecules from Group 7A elements include

A. fluorine, hydrogen, and nitrogen.

B. nitrogen, chlorine, and bromine.

C. chlorine, bromine, and iodine.

D. iodine, lead, and oxygen.

Blooms: 1. Remember Difficulty: Easy Gradable: automatic Subtopic: Elements and the Periodic Table Topic: Components of Matter 87. The fact that when 48.6 g of magnesium completely reacts with 32.0 g of oxygen, exactly 80.6 g of magnesium oxide is formed illustrates

A. the law of definite proportions.

**<u>B</u>**. the law of conservation of mass.

 $\overline{\mathbf{C}}$ . the law of multiple proportions.

D. Dalton's description of the atom.

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Atomic Theories Topic: Components of Matter

88. Why was it more difficult to design an experiment that would prove the existence of neutrons than it was to design an experiment that would prove the existence of either protons or electrons?

A. Neutrons are smaller than either protons or electrons, so their presence is much more difficult to detect.

B. Because neutrons are 1840 times heavier than protons, they are difficult to separate, and therefore, to count.

<u>C</u>. Neutrons do not deflect charged particles.

D. The similarity of the magnetic and electrical properties of protons and neutrons made them experimentally indistinguishable.

Blooms: 4. Analyze Difficulty: Medium Gradable: automatic Subtopic: Structure of the Atom Topic: Components of Matter

89. The  ${}^{80}\text{Br}^-$  ion has

A. 45 protons, 35 neutrons, 45 electrons.

B. 35 protons, 45 neutrons, 34 electrons.

 $\underline{\mathbf{C}}$ . 35 protons, 45 neutrons, 36 electrons.

D. 45 protons, 35 neutrons, 46 electrons.E. 35 protons, 45 neutrons, 46 electrons.

Blooms: 3. Apply Difficulty: Easy Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Topic: Components of Matter

90. C(graphite) and C(diamond) are examples of

A. isotopes of carbon.

**<u>B</u>**. allotropes of carbon.

 $\overline{\mathbf{C}}$ . the law of definite proportions.

D. different carbon ions.

Blooms: 3. Apply Difficulty: Easy Gradable: automatic Subtopic: Molecules and Ions Topic: Components of Matter

91. What binary compound would be formed from barium ions and fluoride ions?

- A.  $Ba_2F_3$
- B. BaF<sub>3</sub>

C. BaF

D. Ba<sub>2</sub>F

 $\underline{\mathbf{E}}$ . Ba $\overline{\mathbf{F}}_2$ 

Blooms: 3. Apply Difficulty: Medium Gradable: automatic Subtopic: Chemical Formulas Topic: Components of Matter 92. The chemical name for  $SO_3^{2-}$  (aq) is sulfite ion. Therefore, the chemical name of  $H_2SO_3$  (aq) is

A. dihydrosulfuric acid.

**<u>B</u>.** sulfurous acid.

C. dihydrogen sulfite.

D. hyposulfurous acid.

E. sulfuric acid.

Blooms: 1. Remember Difficulty: Medium Gradable: automatic Subtopic: Nomenclature Topic: Components of Matter

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Structure of the Atom Topic: Components of Matter

93. The mass of a neutron is equal to the mass of a proton plus the mass of an electron. **FALSE** 

94. All neutral atoms of tin have 50 protons and 50 electrons. **TRUE** 

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Structure of the Atom Topic: Components of Matter

95. Copper (Cu) is a transition metal. **TRUE** 

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

96. Lead (Pb) is a main group element. **TRUE** 

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

97. Almost all the mass of an atom is concentrated in the nucleus. **TRUE** 

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Atomic Theories Subtopic: Structure of the Atom Topic: Components of Matter

98. Ionic compounds may carry a net positive or net negative charge. **FALSE** 

Blooms: 2. Understand Difficulty: Medium Gradable: automatic Subtopic: Ionic Bonding and Lattice Energy Topic: Chemical Bonding 99. The empirical formula of  $C_6H_6$  is CH. **TRUE** 

Blooms: 4. Analyze Difficulty: Easy Gradable: automatic Subtopic: Formula Determination of Unknown Compounds (Empirical and Molecular Formulas) Topic: Stoichiometry and Chemical Reactions

100. The empirical formula is the simplest whole number ratio of atoms representing a chemical formula of a molecule. **TRUE** 

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Formula Determination of Unknown Compounds (Empirical and Molecular Formulas) Topic: Stoichiometry and Chemical Reactions

101. Many compounds can be represented with the same empirical formula. **TRUE** 

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Formula Determination of Unknown Compounds (Empirical and Molecular Formulas) Topic: Stoichiometry and Chemical Reactions

102. There is only one distinct empirical formula for each compound that exists. **TRUE** 

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Formula Determination of Unknown Compounds (Empirical and Molecular Formulas) Topic: Stoichiometry and Chemical Reactions

103. The molecular formula is a whole number multiple of the empirical formula. **FALSE** 

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Formula Determination of Unknown Compounds (Empirical and Molecular Formulas) Topic: Stoichiometry and Chemical Reactions

104. The elements in Group 8A are called the \_\_\_\_\_\_ noble gases

Blooms: 1. Remember Difficulty: Medium Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

105. The elements in Group 2A are called the \_\_\_\_\_. alkaline earth metals

Blooms: 1. Remember Difficulty: Medium Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

106. The elements in Group 7A are called the \_\_\_\_\_\_. halogens

Blooms: 1. Remember Difficulty: Medium Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter 107. The elements in Group 1A are called the \_\_\_\_\_\_ alkali metals

Blooms: 1. Remember Difficulty: Medium Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

108. \_\_\_\_\_ are electrons that are deflected away from negatively charged plates. β particles

Blooms: 3. Apply Difficulty: Medium Gradable: automatic Subtopic: Radioactivity and Nuclear Stability Topic: Nuclear Chemistry

109. \_\_\_\_\_\_ are atoms that have the same atomic number (*Z*) but different mass numbers (*A*). Isotopes

Blooms: 3. Apply Difficulty: Easy Gradable: automatic Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Subtopic: Structure of the Atom Topic: Components of Matter

110. \_\_\_\_\_ have properties that are intermediate between those of metals and nonmetals. Metalloids

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

111. The elements in Group 8A are called the \_\_\_\_\_\_ noble gases

Blooms: 1. Remember Difficulty: Easy Gradable: automatic Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

112. \_\_\_\_\_\_ is defined as a mass exactly equal to one-twelfth the mass of one carbon-12 atom. One atomic mass unit

Blooms: 2. Understand Difficulty: Easy Gradable: automatic Subtopic: Structure of the Atom Topic: Components of Matter

113. What is the name given for the elements in Group 1A in the periodic table? Alkali metals

Blooms: 1. Remember Difficulty: Easy Gradable: manual Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter 114. What is the name given for the elements in Group 7A in the periodic table? Halogens

Blooms: 1. Remember Difficulty: Easy Gradable: manual Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

115. Which group is given the name chalcogens? Group 6A

Blooms: 1. Remember Difficulty: Easy Gradable: manual Subtopic: Elements and the Periodic Table Subtopic: Periodic Classification of the Elements Topic: Chemical Periodicity Topic: Components of Matter

116. The table bel	ow describe	describes four atoms.			
	Atom A	Atom B	Atom C	Atom D	

Number of protons	79	80	80	79
Number of neutrons	118	120	118	120
Number of electrons	79	80	80	79

Which atoms represent the same element?

Atoms A and D represent the same element, and Atoms B and C represent the same element.

Blooms: 4. Analyze Difficulty: Medium Gradable: manual Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Subtopic: Structure of the Atom Topic: Components of Matter

117. In the early 1900s, Ernest Rutherford performed an experiment with thin foils of gold and alpha particles to probe the structure of the atoms. He observed that most of these alpha particles penetrated the foil and were not deflected. Realizing that atoms are electrically neutral (that is, they have equal numbers of protons and electrons) and that the mass of a proton is significantly greater than the mass of an electron, use Rutherford's data to propose a structural model of an atom. (Answers will vary.) Atoms are mostly empty space. The mass is concentrated mostly at the center of the atom.

Blooms: 4. Analyze Difficulty: Easy Gradable: manual Subtopic: Structure of the Atom Topic: Components of Matter

118. State the two important experimental results (and the names of the responsible scientists) which enabled the mass of the electron to be determined.

Thomson measured m/e, the mass-to-charge ratio. Millikan measured e, the charge. Thus, the mass m could be calculated.

Blooms: 2. Understand Difficulty: Medium Gradable: manual Subtopic: Structure of the Atom Topic: Components of Matter

119. Determine the average atomic mass of boron. The natural abundance of  ${}^{10}$ B (weighing 10.0129 amu) is 19.9% and the natural abundance of  ${}^{11}$ B (weighing 11.0093 amu) is 80.1%. Show all your work.

(10.0129 amu)(0.199) + (11.0093 amu)(0.801) = 10.81 amu

Blooms: 3. Apply Difficulty: Medium Gradable: manual Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes Topic: Components of Matter 120. What is the electrostatic attraction called that holds oppositely charged ions together in a compound? ionic bond

Blooms: 2. Understand Difficulty: Easy Gradable: manual Subtopic: Ionic Bonding and Lattice Energy Topic: Chemical Bonding

121. What is the law that describes different samples of a given compound that always contain the same elements in the same mass ratio? law of definite proportions

Blooms: 2. Understand Difficulty: Easy Gradable: manual Subtopic: Chemical Formulas Subtopic: Mass Percent Composition Topic: Components of Matter Topic: Stoichiometry and Chemical Reactions

122. What name is given to the simplest organic compounds which only contain carbons and hydrogens? hydrocarbons

Blooms: 1. Remember Difficulty: Easy Gradable: manual Subtopic: Classes of Organic Molecules (Functional Groups) Topic: Organic Molecules

123. What is the name of Cu<sub>2</sub>O? Copper(I) oxide

Blooms: 4. Analyze Difficulty: Medium Gradable: manual Subtopic: Chemical Formulas Subtopic: Nomenclature Topic: Components of Matter

124. Describe the difference between an empirical formula and a molecular formula. An empirical formula is the simplest chemical formula that has the smallest possible whole number ratio of atoms in the formula. A molecular formula is the true formula of a molecule which is a whole number multiple of its empirical formula.

> Blooms: 2. Understand Difficulty: Easy Gradable: manual Subtopic: Formula Determination of Unknown Compounds (Empirical and Molecular Formulas) Topic: Stoichiometry and Chemical Reactions

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