# *Chemistry 8th edition Silberberg Test Bank*

SKU: 9781259741098-TEST-BANK

# Chapter 2 Test Bank
# The Components of Matter

1. Kaolinite, a clay mineral with the formula $Al_4Si_4O_{10}(OH)_8$, is used as a filler in slick-paper for magazines and as a raw material for ceramics. Analysis shows that 14.35 g of kaolinite contains 8.009 g of oxygen. Calculate the mass percent of oxygen in kaolinite.
A. 1.792 mass %
B. 24.80 mass %
C. 30.81 mass %
D. 34.12 mass %
**E.** 55.81 mass %

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Atomic Theories*
*Topic: Components of Matter*

2. Compound 1 has a composition of 46.7 mass % of element A and 53.3 mass % of element B. A and B also form a second binary compound (compound 2). If the compositions of the two compounds are consistent with the law of multiple proportions, which of the following compositions could be that of compound 2?
A. 23.4 mass % A 76.6 mass % B
**B.** 30.4 mass % A 69.6 mass % B
C. 33.3 mass % A 66.7 mass % B
D. 53.3 mass % A 46.7 mass % B
E. 73.3 mass % A 26.7 mass % B

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Atomic Theories*
*Topic: Components of Matter*

3. What are the approximate carbon:hydrogen mass ratios in methane ($CH_4$) and ethyne ($C_2H_2$)?
A. 1:4 and 1:1
B. 3:2 and 6:1
**C.** 3:1 and 12:1
D. 3:2 and 12:1
E. 3:1 and 6:1

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Atomic Theories*
*Topic: Components of Matter*

4. J. J. Thomson studied cathode ray particles (electrons) and was able to measure the mass/charge ratio. His results showed that
A. the mass/charge ratio varied with as the cathode material was changed.
B. the charge was always a whole-number multiple of some minimum charge.
**C.** matter included particles much smaller than the atom.
D. atoms contained dense areas of positive charge.
E. atoms are largely empty space.

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Structure of the Atom*
*Topic: Components of Matter*

5. Who is credited with measuring the mass/charge ratio of the electron?
A. Dalton
B. Gay-Lussac
**C.** Thomson
D. Millikan
E. Rutherford

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*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Structure of the Atom*
*Topic: Components of Matter*

6. Who is credited with first measuring the charge of the electron?
A. Dalton
B. Gay-Lussac
C. Thomson
**D.** Millikan
E. Rutherford

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Structure of the Atom*
*Topic: Components of Matter*

7. Millikan's oil-drop experiment
**A.** 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.

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*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Structure of the Atom*
*Topic: Components of Matter*

8. In a Millikan oil-drop experiment, the charges on several different oil drops were as follows: –5.92; –4.44; –2.96; –8.88. The units are arbitrary. What is the likely value of the electronic charge in these arbitrary units?
A. –1.11
**B.** –1.48
C. –2.22
D. –2.96
E. –5.55

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Structure of the Atom*
*Topic: Components of Matter*

9. Who is credited with discovering the atomic nucleus?
A. Dalton
B. Gay-Lussac
C. Thomson
D. Millikan
**E.** Rutherford

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Structure of the Atom*
*Topic: Components of Matter*

10. Rutherford bombarded gold foil with alpha (α) particles and found that a small percentage of the particles were deflected. Which of the following was *not* accounted for by the model he proposed for the structure of atoms?
A. the small size of the nucleus
B. the charge on the nucleus
**C.** the total mass of the atom
D. the existence of protons
E. the presence of electrons outside the nucleus

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*Bloom's: 1. Remember*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Structure of the Atom*


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*Topic: Components of Matter*

11. 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.

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Structure of the Atom*
*Topic: Components of Matter*

12. The chemical symbol for potassium is
A. P.
B. Po.
C. Pt.
D. Pm.
**E.** K.

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes*
*Topic: Components of Matter*

13. Which of the following symbols does not represent an element?
A. $O_2$
B. Co
**C.** HF
D. Cs
E. Xe

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes*
*Topic: Components of Matter*

14. When an atom is represented by the symbol $^{A}_{Z}X$, the value of *A* is the
A. number of neutrons in the atom.
B. number of protons in the atom.
C. atomic mass of the element.
D. total number of electrons and neutrons in the atom.
**E.** total number of protons and neutrons in the atom.

*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes*
*Topic: Components of Matter*

15. An isotope of which of the following elements is chosen as a standard in measuring atomic mass?
**A.** carbon
B. oxygen
C. hydrogen
D. neon
E. helium

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

16. One amu is defined as
A. the mass of a proton.
**B.** 1/12 the mass of an atom of $^{12}C$.


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C. the mass of an atom of $^{1}H$.

D. 1/20 the mass of an atom of $^{20}Ne$.

E. 1/16 the mass of an atom of $^{16}O$.

*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

17. Bromine is the only nonmetal that is a liquid at room temperature. Consider the isotope bromine-81, $^{81}_{35}Br$. Select the combination which lists the correct atomic number, neutron number, and mass number, respectively.
**A.** 35, 46, 81
B. 35, 81, 46
C. 81, 46, 35
D. 46, 81, 35
E. 35, 81, 116

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes*
*Topic: Components of Matter*

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

Which two are isotopes?
A. X & Y
B. X & R
C. Y & R
D. Z & R
**E.** X & Z

*Bloom's: 2. Understand*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes*
*Topic: Components of Matter*

19. Lithium forms compounds which are used in dry cells and storage batteries and in high-temperature lubricants. It has two naturally occurring isotopes, $^{6}Li$ (isotopic mass = 6.015121 amu) and $^{7}Li$ (isotopic mass = 7.016003 amu). Lithium has an atomic mass of 6.9409 amu. What is the percent abundance of lithium-6?
A. 92.50%
B. 86.66%
C. 46.16%
**D.** 7.503%
E. 6.080%

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Hard*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

20. 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, $^{28}Si$, $^{29}Si$, and $^{30}Si$. Calculate the atomic mass of silicon.

| Isotope | Isotopic Mass (amu) | Abundance % |
|---|---|---|
| $^{28}Si$ | 27.976927 | 92.23 |
| $^{29}Si$ | 28.976495 | 4.67 |
| $^{30}Si$ | 29.973770 | 3.10 |

A. 29.2252 amu
B. 28.9757 amu
C. 28.7260 amu
**D.** 28.0855 amu
E. 27.9801 amu


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*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

21. Bromine has two naturally-occurring isotopes. $^{79}$Br has a mass of 78.9 amu and accounts for 50.3% of bromine atoms. If the atomic mass of bromine is 79.9 amu, what is the mass of an atom of the second bromine isotope?
A. 77.9 amu
B. 80.0 amu
C. 80.1 amu
**D.** 80.9 amu
E. 88.9 amu

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

22. In the modern periodic table, the order in which the elements are placed is based on
A. atomic mass.
B. mass number.
**C.** atomic number.
D. atomic size.
E. chemical reactivity.

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

23. Which of the following elements are the least reactive?
A. alkali metals
**B.** noble gases
C. halogens
D. alkaline earth metals
E. metalloids

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

24. Which of the following is a nonmetal?
A. lithium, Li, $Z = 3$
**B.** bromine, Br, $Z = 35$
C. mercury, Hg, $Z = 80$
D. bismuth, Bi, $Z = 83$
E. sodium, Na, $Z = 11$

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

25. Which of the following is a metal?
A. nitrogen, N, $Z = 7$
B. phosphorus, P, $Z = 15$
C. arsenic, $Z = 33$
**D.** thallium, Tl, $Z = 81$
E. silicon, Si, $Z = 14$

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*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*


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*Topic: Components of Matter*

26. Which of the following is a metalloid?
A. carbon, C, $Z = 6$
B. sulfur, S, $Z = 16$
**C.** germanium, Ge, $Z = 32$
D. iridium, $Z = 77$
E. bromine, Br, $Z = 35$

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

27. Which one of the following groups does not contain any metals?
**A.** C, S, As, H
B. Cu, P, Se, Kr
C. N, Ne, Nd, Np
D. Xe, Hg, Ge, O
E. Cl, Al, Si, Ar

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

28. A column of the periodic table is called a
**A.** group.
B. period.
C. isotopic mixture.
D. pillar.
E. shell.

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

29. A row of the periodic table is called a
A. group.
**B.** period.
C. isotopic mixture.
D. family.
E. subshell.

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

30. What is the chemical symbol for the group 6A (16) element that lies in period 4?
A. Cr
B. Hf
C. W
D. Ti
**E.** Se

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

31. Which of the following compounds is ionic?
A. $PF_3$
B. $CS_2$


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C. HCl
D. $SO_2$
**E.** $MgCl_2$

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*Bloom's: 2. Understand*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Molecules and Ions*
*Topic: Components of Matter*

32. After an atom has lost an electron it becomes a/an _____ and has a _____ charge.
A. anion, positive
B. isotope, negative
C. anion, negative
**D.** cation, positive
E. nucleus, positive

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Molecules and Ions*
*Topic: Components of Matter*

33. Which of the following ions occurs commonly?
A. $N^{3+}$
B. $S^{6+}$
**C.** $O^{2-}$
D. $Ca^{+}$
E. $Cl^{+}$

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Molecules and Ions*
*Topic: Components of Matter*

34. Which of the following ions occurs commonly?
A. $P^{3+}$
B. $Br^{7+}$
C. $O^{6+}$
**D.** $Ca^{2+}$
E. $K^{-}$

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Molecules and Ions*
*Topic: Components of Matter*

35. Which of the following compounds is covalent?
A. $CaCl_2$
B. MgO
C. $Al_2O_3$
D. $Cs_2S$
**E.** $PCl_3$

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Molecules and Ions*
*Topic: Components of Matter*

36. Select the incorrect statement about elements and compounds.
A. All ionic compounds are neutral.
B. Some elements exist as molecules.
C. The bonding in compounds may be covalent or ionic.
**D.** The molecular formula of a compound provides more information than the structural formula.
E. Among the elements, there are more metals than nonmetals.

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*Bloom's: 1. Remember*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Molecules and Ions*
*Topic: Components of Matter*

37. Which, if any, of the following elements do not occur in the major classes of organic compounds?
A. H
B. C
C. N
D. O
**E.** All of these choices are correct.

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Molecules and Ions*
*Topic: Components of Matter*

38. Which of the following is the empirical formula for hexane, $C_6H_{14}$?
A. $C_{12}H_{28}$
B. $C_6H_{14}$
**C.** $C_3H_7$
D. $CH_{2.3}$
E. $C_{0.43}H$

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Chemical Formulas*
*Topic: Components of Matter*

39. Sodium oxide combines violently with water. Which of the following gives the formula and the bonding for sodium oxide?
A. NaO, ionic compound
B. NaO, covalent compound
**C.** $Na_2O$, ionic compound
D. $Na_2O$, covalent compound
E. $Na_2O_2$, ionic compound

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Chemical Formulas*
*Topic: Components of Matter*

40. Barium fluoride is used in embalming and in glass manufacturing. Which of the following gives the formula and bonding for barium fluoride?
**A.** $BaF_2$, ionic compound
B. $BaF_2$, covalent compound
C. BaF, ionic compound
D. BaF, covalent compound
E. $Ba_2F$, ionic compound

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Chemical Formulas*
*Topic: Components of Matter*

41. The colorless substance, $MgF_2$, is used in the ceramics and glass industry. What is its name?
A. magnesium difluoride
**B.** magnesium fluoride
C. magnesium(II) fluoride
D. monomagnesium difluoride
E. None of these choices are correct

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*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*


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*Topic: Components of Matter*

42. The compound, BaO, absorbs water and carbon dioxide readily and is used to dry gases and organic solvents. What is its name?
**A.** barium oxide
B. barium(II) oxide
C. barium monoxide
D. baric oxide
E. barium peroxide

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

43. What is the name of $Na_2O$?
A. disodium monoxide
B. sodium monoxide
C. sodium dioxide
D. sodium(I) oxide
**E.** sodium oxide

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

44. The substance, CaSe, is used in materials which are electron emitters. What is its name?
A. calcium monoselenide
B. calcium(II) selenide
**C.** calcium selenide
D. calcium(I) selenide
E. calcium(II) selenium

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

45. The substance, $CoCl_2$, is useful as a humidity indicator because it changes from pale blue to pink as it gains water from moist air. What is its name?
A. cobalt dichloride
**B.** cobalt(II) chloride
C. cobalt chloride
D. cobaltic chloride
E. copper(II) chloride

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

46. In the ionic compound with the general formula $M_2X_3$, the likely charge on X is
A. +1.
B. +3.
C. –1.
**D.** –2.
E. –3.

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Chemical Formulas*
*Topic: Components of Matter*

47. Which one of the following combinations of names and formulas of ions is incorrect?


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**A.** $O_2^-$ oxide
B. $Al^{3+}$ aluminum
C. $NO_3^-$ nitrate
D. $PO_4^{3-}$ phosphate
E. $CrO_4^{2-}$ chromate

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Molecules and Ions*
*Topic: Components of Matter*

48. Which one of the following is a polyatomic cation?
A. nitrate
B. chromate
C. permanganate
**D.** hydronium
E. potassium

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Molecules and Ions*
*Topic: Components of Matter*

49. Which one of the following combinations of names and formulas of ions is incorrect?
A. $O^{2-}$ oxide
B. $Cd^{2+}$ cadmium
C. $ClO_3^-$ chlorate
D. $HCO_3^-$ hydrogen carbonate
**E.** $NO_2^-$ nitrate

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Molecules and Ions*
*Topic: Components of Matter*

50. Which one of the following combinations of names and formulas of ions is incorrect?
A. $Ba^{2+}$ barium
**B.** $S^{2-}$ sulfate
C. $CN^-$ cyanide
D. $ClO_4^-$ perchlorate
E. $HCO_3^-$ bicarbonate

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Molecules and Ions*
*Topic: Components of Matter*

51. Which one of the following combinations of names and formulas of ions is incorrect?
A. $NH_4^+$ ammonium
B. $S^{2-}$ sulfide
C. $CN^-$ cyanide
D. $S_2O_3^{2-}$ thiosulfate
**E.** $ClO_3^-$ perchlorate

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Molecules and Ions*
*Topic: Components of Matter*

52. A red glaze on porcelain can be produced by using $MnSO_4$. What is its name?
A. manganese disulfate
**B.** manganese(II) sulfate
C. manganese(IV) sulfate
D. manganese sulfate
E. manganese(I) sulfate


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*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

53. The compound, $(NH_4)_2S$, can be used in analysis for trace amounts of metals present in a sample. What is its name?
**A.** ammonium sulfide
B. diammonium sulfide
C. ammonium sulfite
D. ammonia(I) sulfite
E. ammonium(I) sulfide

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

54. The substance, $KClO_3$, is a strong oxidizer used in explosives, fireworks, and matches. What is its name?
A. potassium chlorite
B. potassium chloride
C. potassium(I) chlorite
D. potassium(I) chlorate
**E.** potassium chlorate

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

55. The compound, $NaH_2PO_4$, is present in many baking powders. What is its name?
A. sodium biphosphate
B. sodium hydrogen phosphate
**C.** sodium dihydrogen phosphate
D. sodium hydrophosphate
E. sodium dihydride phosphate

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

56. Zinc acetate is used in preserving wood and in manufacturing glazes for porcelain. What is its formula?
A. $ZnAc_2$
B. $ZnCH_3COO$
**C.** $Zn(CH_3COO)_2$
D. $Zn_2CH_3COO$
E. $ZnCH_3COCH_3$

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

57. Silver chloride is used in photographic emulsions. What is its formula?
A. $Ag_2Cl_3$
B. $Ag_2Cl$
C. $AgCl_3$
D. $AgCl_2$
**E.** AgCl

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*


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*Topic: Components of Matter*

58. Barium sulfate is used in manufacturing photographic paper. What is its formula?
**A.** $BaSO_4$
B. $Ba(SO_4)_2$
C. $Ba_2SO_4$
D. $Ba_2(SO_4)_3$
E. $BaSO_3$

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

59. Sodium peroxide is an oxidizer used to bleach animal and vegetable fibers. What is its formula?
A. NaO
B. $NaO_2$
**C.** $Na_2O_2$
D. $Na_2O$
E. $NaH_2O_2$

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

60. What is the formula for magnesium sulfide?
**A.** MgS
B. $MgS_2$
C. $Mg_2S$
D. $Mg_2S_3$
E. $MgSO_4$

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

61. Ferric oxide is used as a pigment in metal polishing. Which of the following is its formula?
A. FeO
B. $Fe_2O$
C. $FeO_3$
D. $Fe_2O_5$
**E.** $Fe_2O_3$

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

62. What is the formula for lead (II) oxide?
**A.** PbO
B. $PbO_2$
C. $Pb_2O$
D. $PbO_4$
E. $Pb_2O_3$

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

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


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A. $KMnO_3$
**B.** $KMnO_4$
C. $K_2MnO_4$
D. $K(MnO_4)_2$
E. $K_2Mn_2O_7$

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

64. Calcium hydroxide is used in mortar, plaster, and cement. What is its formula?
A. CaOH
B. $CaOH_2$
C. $Ca_2OH$
**D.** $Ca(OH)_2$
E. $CaHO_2$

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

65. What is the formula for lithium nitrite?
**A.** $LiNO_2$
B. $Li_2NO_2$
C. $LiNO_3$
D. $Li_2NO_3$
E. $LiNO_4$

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

66. Iron (III) chloride hexahydrate is used as a coagulant for sewage and industrial wastes. What is its formula?
A. $Fe(Cl\cdot 6H_2O)_3$
B. $Fe_3Cl\cdot 6H_2O$
C. $FeCl_3(H_2O)_6$
D. $Fe_3Cl(H_2O)_6$
**E.** $FeCl_3\cdot 6H_2O$

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

67. Which one of the following formulas of ionic compounds is the least likely to be correct?
A. $NH_4Cl$
B. $Ba(OH)_2$
C. $Na_2SO_4$
**D.** $Ca_2NO_3$
E. $Cu(CN)_2$

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Chemical Formulas*
*Topic: Components of Matter*

68. Which one of the following formulas of ionic compounds is the least likely to be correct?
A. $CaCl_2$
**B.** $NaSO_4$
C. $MgCO_3$
D. KF
E. $Cu(NO_3)_2$


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*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Chemical Formulas*
*Topic: Components of Matter*

69. What is the name of the acid formed when $H_2S$ gas is dissolved in water?
A. sulfuric acid
B. sulfurous acid
**C.** hydrosulfuric acid
D. hydrosulfurous acid
E. sulfidic acid

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

70. What is the name of the acid formed when HBr gas is dissolved in water?
A. bromic acid
B. bromous acid
**C.** hydrobromic acid
D. hydrobromous acid
E. hydrobromidic acid

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

71. What is the name of the acid formed when $HClO_4$ liquid is dissolved in water?
A. hydrochloric acid
**B.** perchloric acid
C. chloric acid
D. chlorous acid
E. hydrochlorate acid

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

72. What is the name of the acid formed when HCN gas is dissolved in water?
A. cyanic acid
**B.** hydrocyanic acid
C. cyanous acid
D. hydrocyanous acid
E. hydrogen cyanide

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

73. The name for HF(*g*) is
A. hydrofluoric acid.
B. hydrogen(I) fluoride.
**C.** hydrogen fluoride.
D. hydrogen fluorine.
E. fluoric acid.

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*


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*Topic: Components of Matter*

74. Which one of the following combinations of names and formulas is incorrect?
A. $H_3PO_4$ phosphoric acid
B. $HNO_3$ nitric acid
**C.** $NaHCO_3$ sodium carbonate
D. $H_2CO_3$ carbonic acid
E. KOH potassium hydroxide

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

75. What is the name of $PCl_3$?
A. phosphorus chloride
B. phosphoric chloride
C. phosphorus trichlorate
D. trichlorophosphide
**E.** phosphorus trichloride

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

76. 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 pentasulfide

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

77. What is the name of $BBr_3$?
A. boron bromide
B. boric bromide
**C.** boron tribromide
D. tribromoboride
E. bromine triboride

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

78. What is the name of $IF_7$?
A. iodine fluoride
B. iodic fluoride
**C.** iodine heptafluoride
D. heptafluoroiodide
E. heptafluorine iodide

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

79. What is the name of $P_4Se_3$?
A. phosphorus selenide
B. phosphorus triselenide


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C. tetraphosphorus selenide
D. phosphoric selenide
**E.** tetraphosphorus triselenide

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

80. Diiodine pentaoxide is used as an oxidizing agent that converts carbon monoxide to carbon dioxide. What is its chemical formula?
**A.** $I_2O_5$
B. $IO_5$
C. $2IO_5$
D. $I_5O_2$
E. $(IO_5)_2$

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

81. Tetrasulfur dinitride decomposes explosively when heated. What is its formula?
A. $S_2N_4$
**B.** $S_4N_2$
C. $4SN_2$
D. $S_4N$
E. $S_2N$

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

82. Chlorine dioxide is a strong oxidizer that is used for bleaching flour and textiles and for purification of water. What is its formula?
A. $(ClO)_2$
B. $Cl_2O$
C. $Cl_2O_2$
D. $Cl_2O_4$
**E.** $ClO_2$

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

83. The formula of heptane is
A. $C_6H_{12}$.
B. $C_6H_{14}$.
C. $C_7H_{14}$.
**D.** $C_7H_{16}$.
E. $C_8H_{16}$.

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Nomenclature*
*Topic: Components of Matter*

84. Ammonium sulfate, $(NH_4)_2SO_4$, is a fertilizer widely used as a source of nitrogen. Calculate its molecular mass.
A. 63.07 amu
B. 114.10 amu
C. 118.13 amu
D. 128.11 amu
**E.** 132.13 amu


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*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Chemical Formulas*
*Topic: Components of Matter*

85. Sodium chromate is used to protect iron from corrosion and rusting. Determine its molecular mass.
A. 261.97 amu
B. 238.98 amu
**C.** 161.97 amu
D. 138.98 amu
E. 74.99 amu

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Chemical Formulas*
*Topic: Components of Matter*

86. Iodine pentafluoride reacts slowly with glass and violently with water. Determine its molecular mass.
A. 653.52 amu
B. 259.89 amu
**C.** 221.90 amu
D. 202.90 amu
E. 145.90 amu

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Chemical Formulas*
*Topic: Components of Matter*

87. Determine the molecular mass of iron (III) bromide hexahydrate, a substance used as a catalyst in organic reactions.
**A.** 403.65 amu
B. 355.54 amu
C. 317.61 amu
D. 313.57 amu
E. 295.56 amu

*Accessibility: Keyboard Navigation*
*Bloom's: 3. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Chemical Formulas*
*Topic: Components of Matter*

88. For each of the following elements, indicate whether it is a metal, a nonmetal, or a metalloid:
a. S
- **nonmetal**
- metalloid
- metal

b. Ge
- nonmetal
- **metalloid**
- metal

c. Hg
- nonmetal
- metalloid
- **metal**

d. H
- **nonmetal**
- metalloid
- metal

e. I


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- **nonmetal**
- metalloid
- metal

f. Si

- nonmetal
- **metalloid**
- metal

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

89. In nature, some elements exist as molecules, while others do not.
**TRUE**

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

90. Modern studies have shown that the Law of Multiple Proportions is not valid.
**FALSE**

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Atomic Theories*
*Topic: Components of Matter*

91. Atoms of one element cannot be converted to another element by any known method.
**FALSE**

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Atomic Theories*
*Topic: Components of Matter*

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

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Structure of the Atom*
*Topic: Components of Matter*

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

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Structure of the Atom*
*Topic: Components of Matter*

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

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

95. Lead (Pb) is a main-group element.


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**TRUE**

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

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

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Molecules and Ions*
*Topic: Components of Matter*

97. When an alkali metal combines with a non-metal, a covalent bond is normally formed.
**FALSE**

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Molecules and Ions*
*Topic: Components of Matter*

98. The molecular formula of a compound provides more information than its structural formula.
**FALSE**

*Accessibility: Keyboard Navigation*
*Bloom's: 1. Remember*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Chemical Formulas*
*Topic: Components of Matter*

99. The formula $C_9H_{20}$ is an empirical formula.
**TRUE**

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Chemical Formulas*
*Topic: Components of Matter*

100. Which of the following sets are isoelectronic (i.e., have the same number of electrons)?
i. $Br^-$, Kr, $Sr^{2+}$
ii. C, $N^-$, $O^{2-}$
iii. $Mg^{2+}$, $Ca^{2+}$, $Sr^{2+}$
iv. $O^{2-}$, O, $O^{2+}$
v. $Ag^+$, $Cd^{2+}$, Pd

A. i and ii
**B.** i and v
C. i, iii and iv
D. ii, iii and v
E. i, iii iv and v

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Apply*
*Difficulty: Medium*
*Gradable: automatic*
*Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes*
*Topic: Components of Matter*

101. For the element bromine, the symbol, group number, group name and physical state are, respectively
A. Bo, 17, noble gas, gas.
B. B, 13, semimetal, solid.
**C.** Br, 17, halogen, liquid.
D. Br, 17, halogen, gas.
E. Br, 15, chalcogenide, gas.


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*Accessibility: Keyboard Navigation*
*Bloom's: 2. Apply*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Atomic Number, Mass Number, Atomic Symbol, and Isotopes*
*Topic: Components of Matter*

102. Which of the following has the most metallic character?
A. Ge
**B.** In
C. O
D. P
E. Sb

*Accessibility: Keyboard Navigation*
*Bloom's: 2. Understand*
*Difficulty: Easy*
*Gradable: automatic*
*Subtopic: Elements and the Periodic Table*
*Topic: Components of Matter*

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