

## PERIODIC TABLE QUESTIONS

- \_\_\_ 1. The elements characterized as nonmetals are located in the periodic table at the (1) far left; (2) bottom; (3) center; (4) \*top right.
- \_\_\_ 2. An element that is a liquid at STP is in Group (1)IA; (2) IIA; (3) IB; (4) \*IIB.
- \_\_\_ 3. Elements that have properties of both metals and nonmetals are called (1)\* metalloids; (2) halogens; (3) alkali metals; (4) transition elements.
- \_\_\_ 4. Which of the following noble gases has the lowest normal boiling point? (1) \*Ne; (2) Ar; (3) Kr; (4) Xe.
- \_\_\_ 5. Which is the atomic number of an alkali metal? (1) 10; (2)\* 11; (3) 12; (4) 13.
- \_\_\_ 6. Which element is a halogen? (1) iron; (2) nitrogen; (3)\*iodine; (4) neon.
- \_\_\_ 7. Which element forms a colored ion in solution? (1) \*Ni; (2) Li; (3) K; (4) Mg.
- \_\_\_ 8. Given the same conditions, which of the following Group VIIA elements has the least tendency to gain electrons? (1) fluorine; (2)\* iodine; (3) bromine; (4) chlorine.
- \_\_\_ 9. The element in Period 3 with the most metallic character is (1) \*sodium; (2) aluminum; (3) silicon; (4) phosphorus.
- \_\_\_ 10. The alkaline earth element having the largest atomic radius is found in Period (1) 1; (2) 2; (3) 6; (4) 7.
- \_\_\_ 11. Which is the electron configuration of a transition element for the Bohr orbits K,L,M,N? (1) 2-2; (2) 2-8-2; (3) 2-8-8-2; (4) 2-8-9-2.
- \_\_\_ 12. Which of the following atoms will lose an electron most readily? (1) potassium; (2) calcium; (3) rubidium; (4) strontium.
- \_\_\_ 13. Which element in Group 16 (VIA) has the greatest tendency to gain electrons? (1) Te; (2) Se; (3) S; (4) O.
- \_\_\_ 14. Which element would most likely form a compound whose water solution is colored? (1) H; (2) P; (3) Mg; (4) Cu.
- \_\_\_ 15. Which element will form a +2 ion the easiest? (1) calcium; (2) oxygen; (3) sodium; (4) aluminum.
- \_\_\_ 16. Which element has the highest electron affinity? (1) lithium; (2) nitrogen; (3)

boron;

(4) /fluorine.

\_\_\_ 17. The elements known as the alkali metals are found in Group (1) /1 (IA); (2) 2 (IIA);

(3) 13 (IIIA); (4) 17 (VIIA).

\_\_\_ 18. Which of the Group VIIA elements listed below has the greatest nuclear charge? (1) F; (2) Cl; (3) Br; (4) /I.

\_\_\_ 19. The element in Period 3 that has the highest ionization energy is (1) /an inert gas; (2) a halogen; (3) an alkali metal; (4) an alkaline earth metal.

\_\_\_ 20. Which element in Period 3 has both metallic and nonmetallic properties? (1) Na; (2) Mg; (3) /Si; (4) Ar.

\_\_\_ 21. Which electron configuration represents an atom of an element having a completed

third principal energy level? (1) 2-8-2; (2) 2-8-6-2; (3) 2-8-10-2; (4) /2-8-8-2.

\_\_\_ 22. Given the general formula  $XCl_2$  Which element in Period 3 of the periodic table will

form a chloride having the above formula? (1) /Mg; (2) Na; (3) Ar; (4) Si.

\_\_\_ 23. Which element forms an ion larger than its atom? (1) Na; (2) Ne; (3) Ba; (4) /Br.

\_\_\_ 24. Which element is most likely to form a compound with xenon? (1) /fluorine; (2) sodium; (3) bromine; (4) calcium.

\_\_\_ 25. The elements in the present Periodic Table are arranged according to their (1) /atomic

numbers; (2) atomic masses; (3) mass numbers; (4) oxidation state.

\_\_\_ 26. Which ion would have the smallest radius? (1) / $Ba^{2+}$ ; (2)  $Ca^{2+}$ ; (3)  $Mg^{2+}$ ; (4)  $Sr^{2+}$ .

\_\_\_ 27. Elements in Period 3 are alike in that they all have the same number of (1) protons;

(2) neutrons; (3) electrons in the valence shell; (4) /occupied principal energy levels.

\_\_\_ 28. The majority of the elements in the Periodic Table are (1) /metals; (2) nonmetals; (3) metalloids; (4) noble gases.

\_\_\_ 29. Given the general formula  $M_2O_3$  The elements which form oxides with this

formula

are in Group (1) 1 (IA); (2) 2 (IIA); (3) /13 (IIIA); (4) 14 (IVA).

\_\_\_ 30. Which element in Period 3 is the most active nonmetal? (1) sodium; (2) magnesium; (3) /chlorine; (4) argon.

\_\_\_ 31. What is the total number of electrons found in the valence shell of an alkaline earth element in the ground state? (1) 1; (2) /2; (3) 3; (4) 4.

\_\_\_ 32. The most active metals are in Group (1) /1 (IA); (2) 15 (VA); (3) 13 (IIIA); (4) 17 (VIIA).

\_\_\_ 33. Which is an example of a metalloid? (1) sodium; (2) strontium; (3) /silicon; (4) sulfur.

\_\_\_ 34. Which element exists as a diatomic molecule at STP? (1) /bromine; (2) argon; (3) sulfur; (4) rubidium.

\_\_\_ 35. The water solution of a compound is bright yellow. The compound could be (1)  $\text{KNO}_3$ ; (2) / $\text{K}_2\text{CrO}_4$ ; (3)  $\text{KOH}$ ; (4)  $\text{K}_3\text{PO}_4$ .

\_\_\_ 36. Which Period contains four elements which are gases at STP? (1) 1; (2) /2; (3) 3; (4) 4.

\_\_\_ 37. An atom in the ground state with eight valence electrons would most likely be classified as (1) an active metal; (2) an inactive metal; (3) /a noble gas; (4) a halogen

\_\_\_ 38. The atomic number of a metalloid in Period 4 is (1) 19; (2) 26; (3) /33; (4) 36.

\_\_\_ 39. Which electron configuration represents the atom in period 2 with the largest covalent radius? (1) / $1s^2 2s^1$ ; (2)  $1s^2 2s^2$ ; (3)  $1s^2 2s^2 2p^1$ ; (4)  $1s^2 2s^2 2p^2$ .

\_\_\_ 40. Which element is a liquid at STP? (1) K; (2) I; (3) Ag; (4) /Hg.

\_\_\_ 41. All elements whose atoms in the ground state have a total of 5 electrons in their outermost p sublevel are called (1) noble gases; (2) metalloids; (3) /halogens; (4) alkaline earth metals.

\_\_\_ 42. Which element will have the highest boiling point? (1) sodium; (2) potassium; (3) /silicon; (4) neon.

- \_\_\_ 43. Which solution contains colored ions? (1)  $\text{KCl(aq)}$ ; (2)  $\text{NiCl}_2\text{(aq)}$ ; (3)  $\text{HCl(aq)}$ ; (4)  $\text{LiCl(aq)}$ .
- \_\_\_ 44. An element that has an ionic radius larger than its atomic radius is (1) Al; (2) Cl; (3) Li; (4) Ni.
- \_\_\_ 45. Which element may be prepared only by the electrolysis of its fused compounds? (1)  $\text{F}_2$ ; (2)  $\text{I}_2$ ; (3)  $\text{Cl}_2$ ; (4)  $\text{Br}_2$ .
- \_\_\_ 46. Which of the following elements has the highest electronegativity? (1) phosphorous; (2) sulfur; (3) oxygen; (4) sodium.
- \_\_\_ 47. Which element has the highest ionization energy? (1) barium; (2) magnesium; (3) calcium; (4) strontium.
- \_\_\_ 48. Which element will have the most vigorous reaction with water? (1) sodium; (2) cesium; (3) magnesium; (4) barium.
- \_\_\_ 49. In which group do all the elements have the same number of electrons in the outermost principal energy level? (1) 6 (VIB); (2) 18 (VIII); (3) 18 (0); (4) 14 (IVA).
- \_\_\_ 50. Which is an alkaline earth metal? (1) Na; (2) Ca; (3) Ga; (4) Ta.
- \_\_\_ 51. As one proceeds from left to right across a given period on the Periodic Table the electronegativities of the elements generally (1) decrease; (2) increase; (3) remain the same.
- \_\_\_ 52. As one proceeds from fluorine to astatine in Group VIIA the electronegativity (1) decreases and the atomic radius increases; (2) decreases and the atomic radius decreases; (3) increases and the atomic radius decreases; (4) increases and the atomic radius increases.
- \_\_\_ 53. If X is the atomic number of an element in Group 12 (IIB), an element with the atomic number (X + 1) will be found in Group (1) 11 (IB); (2) 2 (IIA); (3) 13 (IIIA); (4) 3 (IIIB).
- \_\_\_ 54. Which element will react violently with water at room temperature? (1) aluminum; (2) potassium; (3) iodine; (4) zinc.
- \_\_\_ 55. Which group of elements exhibits all three phases of matter at room temperature?

(1) 2 (IIA); (2) 14 (IVA); (3) 15 (VA); (4) /17 (VIIA).

\_\_\_ 56. Which element had its last electron go in an inner energy level? (1) potassium; (2) /scandium; (3) calcium; (4) bromine.

\_\_\_ 57. Which element in Group IIA is the best reducing agent? (1) Mg; (2) Sr; (3) Ca; (4) /Ba.

\_\_\_ 58. The element whose properties are most similar to those of tellurium is (1) Be; (2) S;

(3) O; (4) /Po.

\_\_\_ 59. Which period in the Periodic Table contains the most metals? (1) /6; (2) 2; (3) 3; (4) 4.

\_\_\_ 60. Which element will never have a positive oxidation number? (1) /fluorine; (2) oxygen;

(3) sodium; (4) iodine.

\_\_\_ 61. An atom of fluorine is smaller than an atom of oxygen. One possible explanation is

that, compared with oxygen, fluorine has (1) a smaller oxidation number; (2) a smaller atomic number; (3) /a greater nuclear charge; (4) more unpaired electrons.

\_\_\_ 62. In Period 3, as the atomic numbers increase, the pattern according to which the properties of the elements change is (1) /metal = metalloid = nonmetal = noble gas; (2) metal = nonmetal = noble gas = metalloid; (3) nonmetal = metalloid = metal = noble gas; (4) nonmetal = metal = noble gas = metalloid.

\_\_\_ 63. All of the elements in Period 3 have a total of 2 electrons in the (1) /2s sublevel; (2) 3s sublevel; (3) 2p sublevel; (4) 3p sublevel.

\_\_\_ 64. If X represents an element of Group IA the formula of its oxide would be (1) /XO; (2) X<sub>2</sub>O; (3) XO<sub>2</sub>; (4) X<sub>2</sub>O<sub>3</sub>.

\_\_\_ 65. At STP, which element is a solid? (1) hydrogen; (2) /carbon; (3) nitrogen; (4) argon.

\_\_\_ 66. Which element exists as monatomic molecules at STP? (1) hydrogen; (2) nitrogen;

(3) /argon; (4) chlorine.

\_\_\_ 67. Which element in Period 2 is the most active metal? (1) neon; (2) beryllium;

(3) /fluorine; (4) lithium.

\_\_\_ 68. Beryllium is classified as (1) /an alkaline earth metal; (2) an alkali metal; (3) a transition element; (4) a noble gas.

\_\_\_ 69. As the elements in group 1 (IA) are considered in order of increasing atomic number the atomic radius of each successive element increases. This is primarily due to an

increase in the number of (1) neutrons in the nucleus; (2) /electrons in the outermost shell; (3) unpaired electrons; (4) principal energy levels.

\_\_\_ 70. Ozone is an allotropic form of the element (1) /oxygen; (2) phosphorus; (3) sulfur; (4) carbon.

\_\_\_ 71. Given the general formula  $MCl_2$  Which group will form chlorides with the above formula? (1) 1 (IA); (2)/ 2 (IIA); (3) 17 (VIIA); (4) 18 (O).

\_\_\_ 72. What is the total number of electrons found in the valence shell of a halogen in the ground state? (1)/ 1; (2) 2; (3) 7; (4) 8.

\_\_\_ 73. Which of the following elements is most likely to form a compound with radon? (1) iodine; (2) /fluorine; (3) sodium; (4) calcium.

\_\_\_ 74. Which element has atoms with only one completely filled principal energy level? (1) /N; (2) P; (3) As; (4) Sb.

\_\_\_ 75. The oxide of metal X has the formula  $XO$ . Which group in the Periodic Table contains metal X? (1) /1 (IA); (2) 2 (IIA); (3) 13 (IIIA); (4) 15 (VA).

\_\_\_ 76. When a fluorine atom becomes an ion, it will (1) gain an electron and decrease in size; (2) gain an electron and increase in size; (3) lose an electron and decrease in size; (4) /lose an electron and increase in size.

\_\_\_ 77. Which element in Period 3 of the Periodic Table is the strongest re- ducing agent? (1) S; (2) Na; (3) /Cl; (4) Al.

\_\_\_ 78. Which element can form more than one binary compound with chlorine? (1) K; (2) Ca; (3) /Fe; (4) Zn.

\_\_\_ 79. Which represents the electron configuration of a metalloid in the ground state? (1) /2-3; (2) 2-5; (3) 2-8-5; (4) 2-8-6.

- \_\_\_ 80. In a given period of the Periodic Table the element with the lowest first ionization energy is always (1) /an alkaline earth metal; (2) an alkali metal; (3) a halogen; (4) an inert gas.
- \_\_\_ 81. What is the total number of elements in Period 2 that are gases at room temperature and standard pressure? (1) 1; (2) 2; (3) 3; (4)/ 4.
- \_\_\_ 82. The atoms of the most active nonmetals have (1) /small atomic radii and high ionization energies; (2) small atomic radii and low ionization energies; (3) large atomic radii and low ionization energies; (4) large atomic radii and high ionization energies.
- \_\_\_ 83. Which element has the largest ionic radii? (1) sodium; (2) /fluorine; (3) potassium; (4) chlorine.
- \_\_\_ 84. An element in which electrons from more than one energy level may be involved in bond formation is (1) /potassium; (2) calcium; (3) copper; (4) zinc.
- \_\_\_ 85. Which of the following periods contains the greatest number of metals? (1) 1; (2) 2; (3) 3; (4) /4.
- \_\_\_ 86. An element that has a high ionization energy and tends to be chemically inactive would most likely be (1) an alkali metal; (2) a transition element; (3) /a noble gas; (4) a halogen.
- \_\_\_ 87. At STP which of the following elements has the most metallic character? (1) C; (2) Si; (3) Ge; (4)/ Sn.
- \_\_\_ 88. An atom of the element in Period 2 Group 14 (IVA) is in the ground state. What total number of valence electrons does the atom have? (1) 1; (2)/ 2; (3) 3; (4) 4.
- \_\_\_ 89. Proceeding from left to right in Period 2 of the Periodic Table the covalent radius of the elements generally (1) decreases; (2) /increases; (3) remains the same.
- \_\_\_ 90. Which element in Period 3 has the highest first ionization energy? (1) Na; (2) /Ar;

(3) Cl; (4) Mg.

\_\_\_ 91. When oxygen combines with any alkali metal, M, the formula of the compound produced usually is (1)  $M_2O_3$ ; (2)  $MO_2$ ; (3)  $M_2O$ ; (4)  $M_3O_2$ .

\_\_\_ 92. Which group contains elements in the solid, liquid, and gas phases at 25 °C and 1 atmosphere? (1) 16 (VIA); (2) 2 (IIA); (3) 17 (VIIA); (4) 18 (O).

\_\_\_ 93. A characteristic of the halogens is that they have relatively (1) low ionization energies; (2) low reduction potentials; (3) high oxidation potentials; (4) high electronegativities.

\_\_\_ 94. An element whose atoms have the electron configuration 2-8-8-1 is (1) a transition element; (2) an alkali metal; (3) an alkali metal; (4) an alkaline earth.

\_\_\_ 95. The elements of Period 2 have the same (1) atomic mass; (2) atomic number; (3) number of occupied principal energy levels; (4) number of occupied sublevels.

\_\_\_ 96. On the Periodic Table of the Elements all the elements within Group VIA have the same number of (1) valence electrons; (2) energy levels; (3) protons; (4) neutrons.

\_\_\_ 97. Which element in Period 3 has the least tendency to lose an electron? (1) argon; (2) sodium; (3) phosphorus; (4) aluminum.

\_\_\_ 98. Which compound contains an alkali metal and a halogen? (1)  $CaCl_2$ ; (2)  $CaS$ ; (3)  $RbCl$ ; (4)  $Rb_2S$ .

\_\_\_ 99. All atoms of Group IIA (2) elements in the ground state have the same number of electrons in which principal energy level? (1) 1; (2) 2; (3) 3; (4) 4.

\_\_\_ 100. Which represents the correct electron configuration of the outermost principal energy level of a Group 0 element in the ground state? (1)  $s^2p^2$ ; (2)  $s^2p^4$ ; (3)  $s^2p^6$ ; (4)  $s^2p^8$ .

\_\_\_ 101. At STP which of the following substances is the best conductor of electricity? (1) hydrogen; (2) mercury; (3) oxygen; (4) helium.

\_\_\_ 102. An element with two valence electrons is (1) an alkali metal; (2) an alkaline earth metal; (3) a halogen; (4) a transition element.



\_\_\_ 103. Based on the Periodic Table of the Elements which Group 2 (IIA) element is most

active? (1) Sr; (2) Mg; (3) Ca; (4) Ba.

\_\_\_ 104. Compared to the covalent atomic radius of a sodium atom, the covalent atomic radius of a magnesium atom is smaller. The smaller radius is primarily a result of the magnesium atom having (1) a larger nuclear charge; (2) a smaller nuclear charge; (3) more principal energy levels; (4) fewer principal energy levels.

\_\_\_ 105. The pair of elements with the most similar chemical properties are (1) Mg and S;

(2) Ca and Br; (3) Mg and Ca; (4) S and Ar.

\_\_\_ 106. More than two-thirds of the elements of the Periodic Table are (1) metalloids; (2) metals; (3) nonmetals; (4) noble gases.

\_\_\_ 107. Which element is a member of the halogen family? (1) K; (2) B; (3) I; (4) S.

\_\_\_ 108. Which of the following elements has the lowest electronegativity? (1) carbon; (2) fluorine; (3) nitrogen; (4) oxygen.

\_\_\_ 109. Which are the two properties of most nonmetals? (1) low ionization energy and good electrical conductivity; (2) high ionization energy and poor electrical conductivity; (3) low ionization energy and poor electrical conductivity; (4) high ionization energy and good electrical conductivity.

\_\_\_ 110. Which group contains elements with a total of four electrons in the outermost principal energy level? (1) 1 (IA); (2) 18 (O); (3) 16 (VIA); (4) 14 (IVA).

\_\_\_ 111. Which element exhibits a crystalline structure at STP? (1) fluorine; (2) chlorine; (3) bromine; (4) iodine.

\_\_\_ 112. Which period contains three elements that commonly exist as diatomic molecules?

(1) Period 1; (2) Period 2; (3) Period 3; (4) Period 4.

\_\_\_ 113. Which is an alkaline earth metal? (1) Mg; (2) Zn; (3) Li; (4) Pb.

\_\_\_ 114. The S<sup>2-</sup> ion differs from the S atom in that the S<sup>2-</sup> ion has a (1) smaller radius and

fewer electrons; (2) smaller radius and more electrons; (3) larger radius and fewer electrons; (4) larger radius and more electrons.

\_\_\_ 115. An aqueous solution of  $XCl$  contains colored ions. Element X is most likely (1) an

alkaline earth; (2) a halogen; (3) /a transition metal; (4) an alkali metal.

\_\_\_ 116. A reason why fluorine has a higher ionization energy than oxygen is that fluorine

has a (1) /smaller nuclear charge; (2) larger nuclear charge; (3) smaller number of neutrons; (4) larger number of neutrons.

\_\_\_ 117. As the elements are considered from the top to the bottom of Group VA which sequence in properties occurs? (1) metal→metalloid→nonmetal; (2) metal→nonmetal→metalloid; (3) metalloid→metal→nonmetal; (4) /nonmetal→metalloid→metal.

\_\_\_ 118. The element found in Group 13 (IIIA) and in Period 2 is (1) Be; (2) Mg; (3) B; (4) /Al.

\_\_\_ 119. Which element is considered malleable? (1) /gold; (2) hydrogen; (3) sulfur; (4) radon.

\_\_\_ 120. Which is the most active nonmetal in the Periodic Table of the Elements? (1) Na; (2) / F; (3) I; (4) Cl.

\_\_\_ 121. A chloride dissolves in water to form a colored solution. The chloride could be (1) HCl; (2) KCl; (3)  $CaCl_2$ ; (4)  $CuCl_2$ .

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\_\_\_ 122. Which of the following particles has the smallest radius? (1) Na; (2) K; (3) / $Na^{1+}$ ;

(4)  $K^{1+}$ .

\_\_\_ 123. In Period 2, as the elements are considered from left to right, there is a decrease in

(1) ionization energy; (2) atomic mass; (3) /metallic character; (4) nonmetallic character.

\_\_\_ 124. Which molecule is relatively inactive and contains a triple bond? (1) /  $N_2$ ; (2)  $O_2$ ; (3)  $Cl_2$ ; (4)  $H_2$ .

\_\_\_ 125. Atoms of metallic elements tend to (1) gain electrons and form negative ions; (2) /gain electrons and form positive ions; (3) lose electrons and form negative ions;

(4) lose electrons and form positive ions.

\_\_\_ 126. Alkali metals, alkaline earth metals, and halogens are elements found respectively

in Groups (1) IA, IIA, and O; (2) IIA, IIIA, and VIIA; (3) IA, IIA, and IVA; (4) IA, IIA, and VIIA.

\_\_\_ 127. The reactivity of metals in groups 1 (IA) and 2 (IIA) generally increases with (1) increased ionization energy; (2) increased atomic radius; (3) decreased nuclear charge; (4) decreased mass.