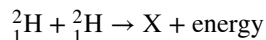


1st Semester Final Exam

Name: _____

Date: _____

1. Given the fusion reaction:



Which particle is represented by X?

- A. ${}^1_1\text{H}$ B. ${}^3_1\text{H}$ C. ${}^3_2\text{He}$ D. ${}^4_2\text{He}$

2. As an Na atom forms an Na^{2+} ion, the number of protons in its nucleus

- A. decreases B. increases
C. remains the same

3. The total number of pairs of shared electrons in a nitrogen molecule is

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

4. Compared to the atoms of nonmetals in Period 3, the atoms of metals in Period 3 have

- A. fewer valence electrons B. more valence electrons
C. fewer electron shells D. more electron shells

5. What is the net charge of an ion that consists of 10 electrons, 11 protons, and 12 neutrons?

- A. 1^+ B. 2^+ C. 1^- D. 2^-

6. The formula N_2O_4 is an example of

- A. an empirical formula B. a structural formula
C. an ionic formula D. a molecular formula

7. What is the chemical formula for sodium sulfate?

- A. Na_2SO_3 B. Na_2SO_4 C. NaSO_3 D. NaSO_4

8. Isotopes of the same element must have the same

- A. atomic number B. mass number
C. number of nucleons D. number of neutrons

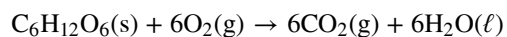
9. The nucleus of an atom of $^{127}_{53}\text{I}$ contains

- A. 53 neutrons and 127 protons
- B. 53 protons and 127 neutrons
- C. 53 protons and 74 neutrons
- D. 53 protons and 74 electrons

10. Atoms of ^{16}O , ^{17}O , and ^{18}O have the same number of

- A. neutrons, but a different number of protons
- B. protons, but a different number of neutrons
- C. protons, but a different number of electrons
- D. electrons, but a different number of protons

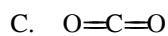
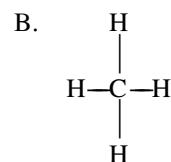
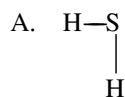
11. Given the reaction:



How many moles of $\text{C}_6\text{H}_{12}\text{O}_6(\text{s})$ are needed to produce 24 moles of carbon dioxide?

- A. 1.0 mole
- B. 12 moles
- C. 24 moles
- D. 4.0 moles

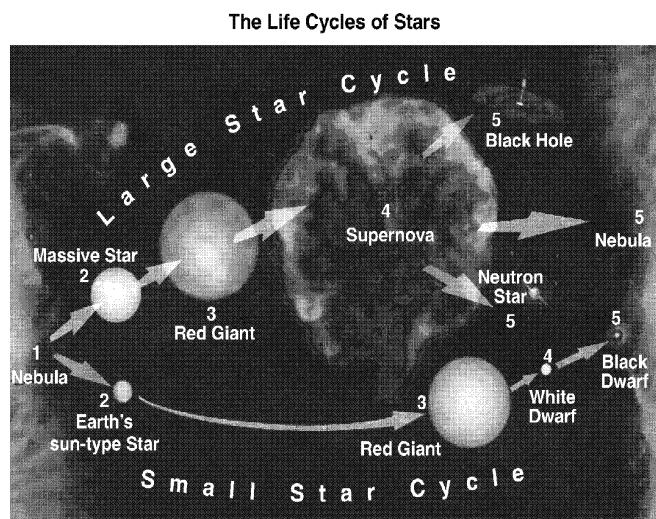
12. Which molecule is a dipole?



13. When an excited electron in an atom moves to the ground state, the electron

- A. absorbs energy as it moves to a higher energy state
- B. absorbs energy as it moves to a lower energy state
- C. emits energy as it moves to a higher energy state
- D. emits energy as it moves to a lower energy state

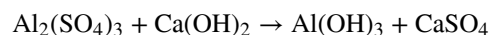
14. Base your answer(s) to the following question(s) on the diagram below, which shows two possible sequences in the life cycle of stars, beginning with their formation from nebular gas clouds in space.



According to the diagram, the life-cycle path followed by a star is determined by the star's initial

- A. mass and size
 B. temperature and origin
 C. luminosity and color
 D. luminosity and structure
15. According to the diagram, a star like Earth's Sun will eventually
- A. explode in a supernova
 B. become a black hole
 C. change into a white dwarf
 D. become a neutron star

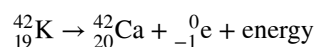
16. Given the unbalanced equation:



What is the coefficient in front of the CaSO_4 when the equation is completely balanced with the smallest whole-number coefficients?

- A. 1 B. 2 C. 3 D. 4
17. Salt water is classified as a
- A. compound because the proportion of its atoms is fixed
 B. compound because the proportion of its atoms can vary
 C. mixture because the proportion of its components is fixed
 D. mixture because the proportion of its components can vary

18. Given the nuclear equation:



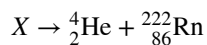
This equation is an example of

- A. alpha decay B. beta decay
 C. fission D. fusion

19. Which element is classified as a metalloid?

- A. tellurium B. zinc
C. lithium D. barium

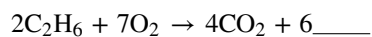
20. Given the equation:



The nucleus represented by X is

- A. ${}^{218}_{84}\text{Po}$ B. ${}^{218}_{84}\text{Po}$ C. ${}^{218}_{84}\text{Ra}$ D. ${}^{226}_{88}\text{Ra}$

21. Given the incomplete equation for the combustion of ethane:



What is the formula of the missing product?

- A. CH_3OH B. HCOOH
C. H_2O D. H_2O_2

22. What is the mass number of an atom which contains 21 electrons, 21 protons, and 24 neutrons?

- A. 21 B. 42 C. 45 D. 66

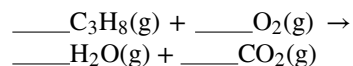
23. Beryllium is classified as

- A. an alkaline earth metal B. an alkali metal
C. a transition metal D. a noble gas

24. Which is a unique characteristic of the bonding between metal atoms?

- A. Atoms require additional electrons to reach a stable octet.
B. Atoms must give away electrons to reach a stable octet.
C. Atoms share valence electrons only with neighboring atoms to reach a stable octet.
D. Delocalized electrons move among many atoms creating a sea of electrons.

25. Given the unbalanced equation:



When the equation is completely balanced using smallest whole numbers, the coefficient of O_2 is

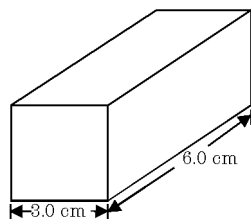
- A. 5 B. 2 C. 3 D. 10

26. The stability of an isotope is based on its

- A. number of neutrons, only
- B. number of protons, only
- C. ratio of neutrons to protons
- D. ratio of electrons to protons

27. The solid block shown here has a mass of 146 grams. What is the block's density?

- A. 0.37 g/cm^3
- B. 2.7 g/cm^3
- C. 8.1 g/cm^3
- D. 54 g/cm^3



28. What is the total number of valence electrons in an atom of phosphorus in the ground state?

- A. 5
- B. 2
- C. 3
- D. 7

29. Which molecule contains a triple covalent bond between its atoms?

- A. N_2
- B. O_2
- C. F_2
- D. H_2

30. Atoms of metallic elements tend to

- A. gain electrons and form negative ions
- B. gain electrons and form positive ions
- C. lose electrons and form negative ions
- D. lose electrons and form positive ions

31. The correct formula for sodium oxide is

- A. SO_2
- B. S_2O
- C. NaO_2
- D. Na_2O

32. Which electron dot diagram represents H_2 ?

- A. $\text{H} \cdot \text{H}$
- B. $\text{H} : \text{H}$
- C. $:\ddot{\text{H}} \cdot \ddot{\text{H}}:$
- D. $:\ddot{\text{H}} : \ddot{\text{H}}:$

33. Which of the Group 15 (VA) elements can lose an electron most readily?

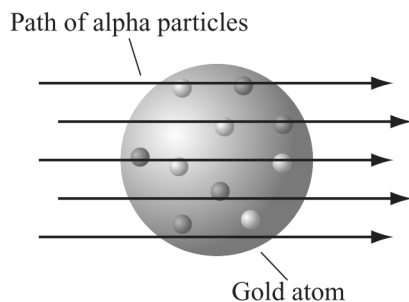
- A. N
- B. P
- C. Sb
- D. Bi

34. The mass number of an atom is always equal to the total number of its
- A. electrons, only B. protons, only
C. electrons plus protons D. protons plus neutrons
35. An atom of an element contains 20 protons, 20 neutrons, and 20 electrons. This element is
- A. an alkali metal B. an alkaline earth metal
C. a halogen D. a noble gas
36. The total number of sodium atoms in 46.0 grams of sodium is
- A. 3.01×10^{23} B. 6.02×10^{23}
C. 12.0×10^{23} D. 24.0×10^{23}
37. What information is necessary to determine the atomic mass of the element chlorine?
- A. the atomic mass of each artificially produced isotope of chlorine, only
B. the relative abundance of each naturally occurring isotope of chlorine, only
C. the atomic mass and the relative abundance of each naturally occurring isotope of chlorine
D. the atomic mass and the relative abundance of each naturally occurring and artificially produced isotope of chlorine
38. Which period contains three elements that commonly exist as diatomic molecules?
- A. Period 1 B. Period 2
C. Period 3 D. Period 4
39. Many stars in the universe, including the sun, maintain fusion reactions in their cores. Such stars are known as main sequence stars.
- What is the primary fuel of main sequence stars?
- A. Uranium B. Hydrogen
C. Oxygen D. Carbon

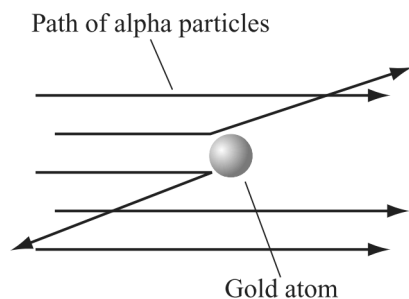
40. What is the total number of electrons in an atom of $^{19}_9\text{F}$?
- A. 9 B. 10 C. 19 D. 28
41. What is the correct formula of potassium hydride?
- A. KH B. KH₂ C. KOH D. K(OH)₂
42. A property of most nonmetals in the solid state is that they are
- A. brittle
B. malleable
C. good conductors of electricity
D. good conductors of heat
43. Which atom has the largest atomic radius?
- A. potassium B. rubidium
C. francium D. cesium
44. As part of the modern theory of the origins of the elements, it is hypothesized that before the formation of the stars, most of the matter in the universe consisted of what atoms?
- A. hydrogen and helium B. nitrogen and carbon
C. silicon and lithium D. uranium and radium
45. Which of the following elements has the highest electrical conductivity?
- A. gold B. iodine C. sulfur D. silicon
46. Which is the formula for magnesium sulfide?
- A. MgS B. MgSO₃ C. MnS D. MnSO₃
47. Cosmic background radiation provides direct evidence for the origin of
- A. the universe
B. our solar system
C. Earth's ozone layer
D. Earth's earliest atmosphere

48. When the electrons of an excited atom return to a lower energy state, the energy emitted can result in the production of
- A. alpha particles B. isotopes
C. protons D. spectra
49. Which reaction illustrates fusion?
- A. ${}^2_1\text{H} + {}^2_1\text{H} \rightarrow {}^4_2\text{He}$
B. ${}^1_0\text{n} + {}^{27}_{13}\text{Al} \rightarrow {}^{24}_{11}\text{Na} + {}^4_2\text{He}$
C. ${}^{27}_{13}\text{Al} + {}^4_2\text{He} \rightarrow {}^{30}_{15}\text{P} + {}^1_0\text{n}$
D. ${}^{14}_7\text{N} + {}^4_2\text{He} \rightarrow {}^1_1\text{H} + {}^{17}_8\text{O}$
50. Compared to a sodium atom in the ground state, a sodium atom in the excited state must have
- A. a greater number of electrons
B. a smaller number of electrons
C. an electron with greater energy
D. an electron with less energy
51. The explosion associated with the Big Bang theory and the formation of the universe is inferred to have occurred how many billion years ago?
- A. less than 1 B. 2.5
C. 4.6 D. over 10
52. The atomic number of an atom is always equal to the total number of
- A. neutrons in the nucleus
B. protons in the nucleus
C. neutrons plus protons in the atom
D. protons plus electrons in the atom
53. What is the total mass in grams of 0.75 mole of SO_2 ?
- A. 16 g B. 24 g C. 32 g D. 48 g

54. Ernest Rutherford performed an experiment in which he shot alpha particles through a thin layer of gold foil. He predicted that the alpha particles would travel straight through the gold atoms, as shown below.



However, Rutherford observed that although most of the alpha particles passed straight through the foil, a few alpha particles were deflected, as shown below.



Which of the following statements about the atom did Rutherford's experiment support?

- A. An atom contains protons, neutrons, and electrons.
 B. An atom's nucleus is small and has a positive charge.
 C. Electrons follow a predictable path around the nucleus.
 D. Different isotopes of an element have different masses.
55. What is the chemical formula for zinc carbonate?
- A. ZnCO_3 B. $\text{Zn}(\text{CO}_3)_2$
 C. Zn_2CO_3 D. Zn_3CO_2

56. In the reaction ${}^{238}_{92}\text{U} + {}^1_0\text{n} \rightarrow {}^{239}_{93}\text{Np} + X$, the species represented by X is

- A. ${}^1_1\text{H}$ B. ${}^1_0\text{n}$ C. ${}^4_2\text{He}$ D. ${}^0_{-1}\text{e}$

57. The percent by mass of oxygen in CO is approximately

- A. 73% B. 57% C. 43% D. 17%

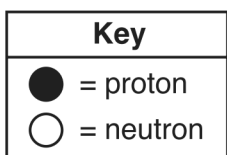
58. Which term identifies a type of nuclear reaction?

- A. fermentation B. deposition
 C. reduction D. fission

59. Which formulas represent one ionic compound and one molecular compound?

- A. N_2 and SO_2 B. Cl_2 and H_2S
 C. BaCl_2 and N_2O_4 D. NaOH and BaSO_4

60. The diagram below represents the nucleus of an atom.



What are the atomic number and mass number of this atom?

- A. The atomic number is 9 and the mass number is 19.
B. The atomic number is 9 and the mass number is 20.
C. The atomic number is 11 and the mass number is 19.
D. The atomic number is 11 and the mass number is 20.
61. Which atom has a nucleus that contains 13 protons and 14 neutrons?
A. Mg B. Be C. Al D. N
62. In the equation ${}_{90}^{228}\text{Th} \rightarrow {}_{88}^{224}\text{Ra} + X$, which particle is represented by the letter X?
A. an alpha particle B. a beta particle
C. a positron D. a deuteron
63. An atom in the ground state has seven valence electrons. This atom could be an atom of which element?
A. calcium B. fluorine C. oxygen D. sodium

64. Which star color indicates the hottest star surface temperature?

- A. blue B. white C. yellow D. red

65. Monica made a snack for her friends by putting pretzels, peanuts, and raisins together in a bowl.

Which statement describes Monica's snack?

- A. It is a new element because a chemical change took place.
B. It is a solution because the ingredients cannot be separated.
C. It is a new compound because a physical change took place.
D. It is a mixture because each ingredient kept its original properties.

66. Mobile electrons are a distinguishing characteristic of

- A. an ionic bond B. an electrovalent bond
C. a metallic bond D. a covalent bond

67. Which type of bond is predominant in a water molecule?

- A. coordinate covalent B. polar covalent
C. ionic D. metallic

68. With respect to one another, galaxies have been found to be
- moving closer together
 - moving farther apart
 - moving in random directions
 - stationary

69. Compared to Earth's solar system, the universe is inferred to be
- younger and larger
 - younger and smaller
 - older and larger
 - older and smaller

70. Which is the correct formula for dinitrogen pentoxide?
- N_4O
 - NO_2
 - N_2O_5
 - NO_4

71. The data table below represents the properties determined by the analysis of substances A, B, C, and D.

Substance	Melting Point (°C)	Boiling Point (°C)	Conductivity
A	-80	-20	none
B	20	190	none
C	320	770	as solid
D	800	1250	in solution

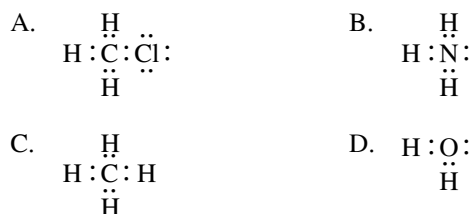
Which substance is an ionic compound?

- A
- B
- C
- D

72. What is the correct Lewis electron-dot structure for the compound magnesium fluoride?



73. Which electron dot formula represents a nonpolar molecule?



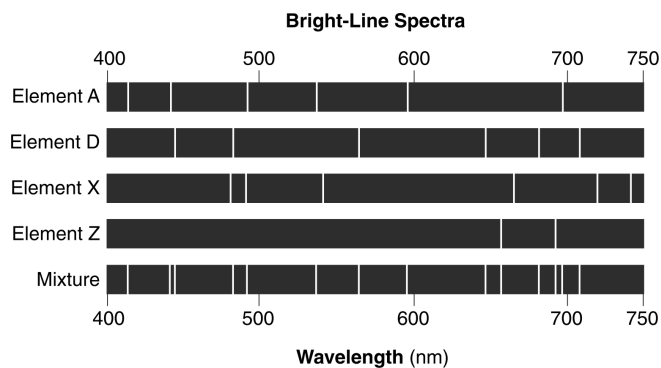
74. A leaf gently floats on a pond. Which of the following statements *best* explains why the leaf stays on top of the water?

- The leaf has nonpolar covalent bonds between its atoms.
- The density of the leaf is greater than the density of the water.
- The water molecules are held tightly together by hydrogen bonding.
- The hydrogen and oxygen atoms in the water are chemically bonded.

75. Which substance represents a compound?
- A. C(s) B. Co(s) C. CO(g) D. O₂(g)

76. Which type of electromagnetic radiation has the longest wavelength?
- A. ultraviolet B. gamma rays
C. visible light D. radio waves

77. The diagram below represents the bright-line spectra of four elements and a bright-line spectrum produced by a mixture of three of these elements.



Which element is *not* present in the mixture?

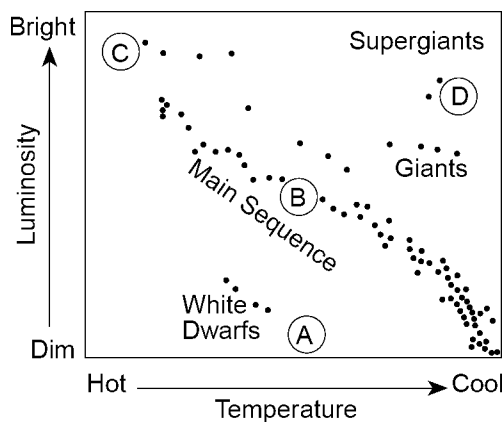
- A. A B. D C. X D. Z

78. As the mass number of the isotopes of hydrogen increases, the number of protons
- A. decreases B. increases
C. remains the same

79. Bromine has chemical properties most similar to
- A. fluorine B. potassium
C. krypton D. mercury

80. The percent by mass of oxygen in H₂C₂O₄ is equal to
- A. $\frac{90}{64} \times 100$ B. $\frac{64}{90} \times 100$
C. $\frac{8}{4} \times 100$ D. $\frac{4}{8} \times 100$

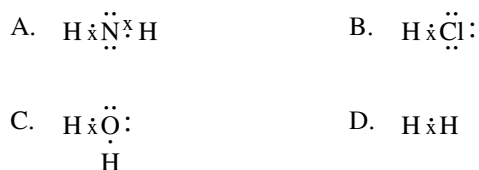
81. The accompanying graph represents the brightness and temperature of stars visible from Earth.



Which location on the graph best represents a star with average brightness and temperature?

- A. A B. B C. C D. D
82. The atomic mass of an element is the weighted average of the masses of
- A. its two most abundant isotopes
 - B. its two least abundant isotopes
 - C. all of its naturally occurring isotopes
 - D. all of its radioactive isotopes
83. During all chemical reactions, mass, energy, and charge are
- A. absorbed
 - B. conserved
 - C. formed
 - D. released

84. Which molecule contains a nonpolar covalent bond?



85. Metallic bonding occurs between atoms of



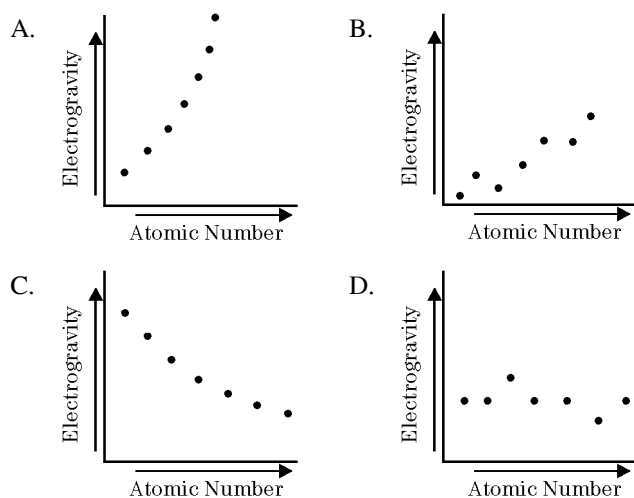
86. Which of the following statements explains why the bond in hydrogen chloride (HCl) is polar covalent?

- A. The atomic mass of chlorine is greater than that of hydrogen.
- B. The electronegativity of chlorine is greater than that of hydrogen.
- C. The diameter of a chlorine atom is greater than that of a hydrogen atom.
- D. The number of valence electrons in a chlorine atom is greater than that in a hydrogen atom.

87. Which of the following pieces of evidence *best* supports Bohr's idea that electrons occupy specific energy levels within an atom?

- A. Sodium atoms become positive ions when they lose electrons.
- B. Each element emits a unique bright-line spectrum when it falls from an excited state to a ground state.
- C. Beryllium atoms bombarded with alpha particles produce beams that are not influenced by magnetic fields.
- D. Each element has physical and chemical properties that are unique to that element and different from those of other elements.

88. Which diagram correctly shows the relationship between electronegativity and atomic number for the elements of Period 3?



89. Which compound contains ionic bonds?

- A. NaBr(s)
- B. HBr(g)
- C. C₆H₁₂O₆(s)
- D. CO₂(g)

90. The average isotopic mass of chlorine is 35.5. Which mixture of isotopes (shown as percents) produces this average mass?

- A. 50% ¹²C and 50% ¹³C
- B. 50% ³⁵Cl and 50% ³⁷Cl
- C. 75% ³⁵Cl and 25% ³⁷Cl
- D. 75% ¹²C and 25% ¹³C

91. The coefficients in a balanced chemical equation represent

- A. the mass ratios of the substances in the reaction
- B. the mole ratios of the substances in the reaction
- C. the total number of electrons in the reaction
- D. the total number of elements in the reaction

92. A sample of H₂(g) at STP contains 9.03×10^{23} molecules. The volume of the sample is

- A. 11.2 l
- B. 22.4 l
- C. 33.6 l
- D. 44.8 l

93. What is the source of energy for the Sun?

- A. hydrogen fusion
- B. internal combustion
- C. nuclear fission of metals
- D. burning of solar gases

94. When the equation $\text{H}_2\text{S} + \text{O}_2 \rightarrow \text{H}_2\text{O} + \text{SO}_2$ is completely balanced using smallest whole numbers, the sum of all the coefficients is

- A. 5 B. 7 C. 9 D. 11

95. Which color of the visible spectrum has the *shortest* wavelength?

- A. violet B. blue C. yellow D. red

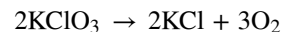
96. In which type of reaction do two or more substances combine to produce a single substance?

- A. synthesis B. decomposition
- C. single replacement D. double replacement

97. The correct formula for calcium phosphate is

- A. CaPO_4 B. $\text{Ca}_2(\text{PO}_4)_3$
- C. Ca_3P_2 D. $\text{Ca}_3(\text{PO}_4)_2$

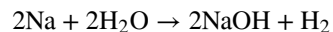
98. Given the balanced equation:



Which type of reaction is represented by this equation?

- A. synthesis B. decomposition
- C. single replacement D. double replacement

99. Given the reaction:



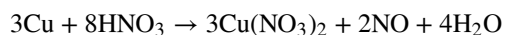
What is the total number of moles of hydrogen produced when 4 moles of sodium react completely?

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

100. Which type of bond is contained in a water molecule?

- A. nonpolar covalent B. polar covalent
- C. ionic D. electrovalent

101. Given the reaction:



The total number of grams of Cu needed to produce 1.0 mole of $\text{Cu}(\text{NO}_3)_2$ is

- A. 32 B. 64 C. 128 D. 192

102. More than two-thirds of the elements are classified as

- A. nonmetals B. metals
C. metalloids D. noble gases

103. What causes the emission of radiant energy that produces characteristic spectral lines?

- A. neutron absorption by the nucleus
B. gamma ray emission from the nucleus
C. movement of electrons to higher energy levels
D. return of electrons to lower energy levels

104. In the modern Periodic Table, the elements are arranged in order of increasing

- A. atomic number B. mass number
C. oxidation number D. valence number

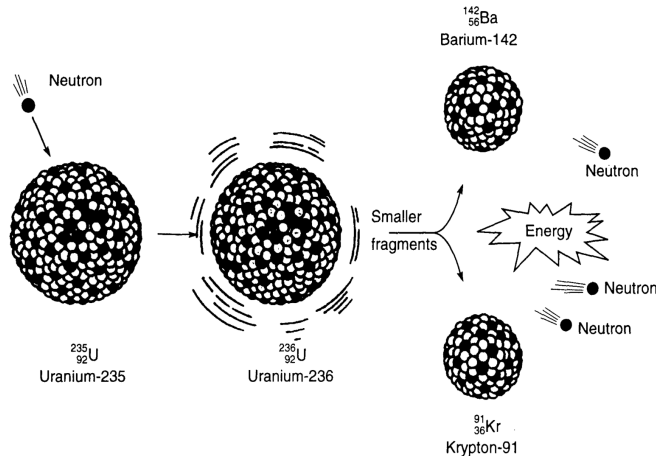
105. What is the gram-molecular mass of the compound with the formula CH_3COOH ?

- A. 22.4 g B. 44.0 g C. 48.0 g D. 60.0 g

106. Which substance contains a polar covalent bond?

- A. Na_3N B. Mg_3N_2 C. NH_3 D. N_2

107. The accompanying diagram represents a nuclear reaction in which a neutron bombards a heavy nucleus.

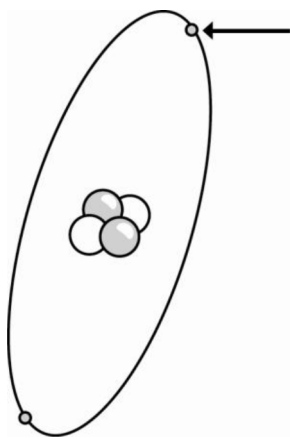


Which type of reaction does the diagram illustrate?

- A. fission B. fusion
C. alpha decay D. beta decay

108. Which element is a noble gas?
- A. W B. Ar C. N D. Er
109. A gamma ray is best described as having
- A. no electric charge and no mass
B. a negative charge and no mass
C. a positive charge and a mass number of 2
D. a positive charge and a mass number of 4
110. A substance that is composed only of atoms having the same atomic number is classified as
- A. a compound
B. an element
C. a homogeneous mixture
D. a heterogeneous mixture
111. Given the balanced equation representing a reaction:
- $$\text{Al}_2(\text{SO}_4)_3 + 6\text{NaOH} \rightarrow 2\text{Al}(\text{OH})_3 + 3\text{Na}_2\text{SO}_4$$
- The mole ratio of NaOH to Al(OH)₃ is
- A. 1:1 B. 1:3 C. 3:1 D. 3:7
112. What is the total mass of 3.01×10^{23} atoms of helium gas?
- A. 8.00 g B. 2.00 g C. 3.50 g D. 4.00 g
113. As the elements in Group 2 (IIA) of the Periodic Table are considered in order from top to bottom, the number of electrons in the valence shell
- A. decreases B. increases
C. remains the same
114. Which of the following are most directly involved in chemical bonding?
- A. protons B. neutrons
C. alpha particles D. valence electrons

115. Use the picture of an atom below to answer the question.



Which statement *best* describes the part of the atom that is shown by the arrow?

- A. It is an electron, and it has a negative charge.
- B. It is an electron, and it has a positive charge.
- C. It is a proton, and it has a negative charge.
- D. It is a proton, and it has a positive charge.

116. A sample of element X contains 90 percent ^{35}X atoms, 8.0 percent ^{37}X atoms, and 2.0 percent ^{38}X atoms. The average isotopic mass is closest to

- A. 32
- B. 35
- C. 37
- D. 38

117. Covalent bonds are formed when electrons are

- A. transferred from one atom to another
- B. captured by the nucleus
- C. mobile within a metal
- D. shared between two atoms

118. If an equation is balanced properly, both sides of the equation must have the same number of

- A. atoms
- B. coefficients
- C. molecules
- D. moles of molecules

119. Which element in Period 2 has the greatest tendency to form a negative ion?

- A. lithium
- B. carbon
- C. neon
- D. fluorine

120. Which element exists as diatomic molecules at STP?

- A. argon
- B. sulfur
- C. nitrogen
- D. helium

121. Which element forms an ionic bond with fluorine?
- A. fluorine B. carbon
C. potassium D. oxygen
122. Given the reaction: $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{g})$. How many liters of $\text{H}_2(\text{g})$ are required to produce a total of 10 liters of $\text{H}_2\text{O}(\text{g})$?
- A. 1.0 B. 2.0 C. 10 D. 20
123. What is represented by the dots in a Lewis electron-dot diagram of an atom of an element in Period 2 of the Periodic Table?
- A. the number of neutrons in the atom
B. the number of protons in the atom
C. the number of valence electrons in the atom
D. the total number of electrons in the atom
124. Which element in Period 3 has the greatest tendency to gain electrons?
- A. Na B. Si C. Cl D. Ar
125. Atoms of nonmetals generally react with atoms of metals by
- A. gaining electrons to form ionic compounds
B. gaining electrons to form covalent compounds
C. sharing electrons to form ionic compounds
D. sharing electrons to form covalent compounds
126. The final stage of a star's existence is determined by its mass. The most massive stars will end their lives as
- A. supergiant stars. B. neutron stars.
C. white dwarf stars. D. black holes.
127. A K atom *differs* from a K^+ ion in that the K atom has one
- A. more electron B. less electron
C. more proton D. less proton
128. Based on the red-shift data on galaxies, most astronomers infer that the universe is currently
- A. expanding B. contracting
C. moving randomly D. fixed and stationary

129. As atoms of elements in Group 16 are considered in order from top to bottom, the electronegativity of each successive element

- A. decreases
- B. increases
- C. remains the same

130. Which Lewis electron-dot diagram is correct for a S^{2-} ion?

- A. $\left[\begin{array}{c} \cdot \\ \cdot \\ \text{S} \\ \cdot \\ \cdot \end{array} \right]^{2-}$
- B. $\left[\begin{array}{c} \cdot \\ \cdot \\ \text{S} \\ \cdot \\ \cdot \end{array} \right]^{2-}$
- C. $\left[\begin{array}{c} \cdot \\ \cdot \\ \text{S} \\ \cdot \\ \cdot \end{array} \right]^{2-}$
- D. $\left[\begin{array}{c} \cdot \\ \cdot \\ \text{S} \\ \cdot \\ \cdot \end{array} \right]^{2-}$

131. A compound whose empirical formula is NO_2 could have a molecular mass of

- A. 23
- B. 39
- C. 92
- D. 120

132. The elements in Group 2 are classified as

- A. metals
- B. metalloids
- C. nonmetals
- D. noble gases

133. What is the correct name of the compound with the formula NH_4NO_2 ?

- A. ammonia nitrite
- B. ammonium nitrite
- C. ammonia nitrate
- D. ammonium nitrate

134. When the equation $\text{C}_2\text{H}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$ is balanced using smallest whole numbers, what is the coefficient of the O_2 ?

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

135. Which substance is correctly paired with its type of bonding?

- A. NaBr —nonpolar covalent
- B. HCl —nonpolar covalent
- C. NH_3 —polar covalent
- D. Br_2 —polar covalent

136. In the ground state, all atoms of Group 13 (IIIA) of the Periodic Table have the same number of

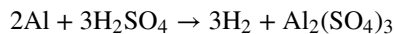
- A. nuclear particles
- B. occupied principal energy levels
- C. electrons
- D. valence electrons

137. Boron and arsenic are similar in that they both
- A. have the same ionization energy
 - B. have the same covalent radius
 - C. are in the same family of elements
 - D. are metalloids (semimetals)
138. What is the name for the sodium salt for the acid HClO_2 ?
- A. sodium chlorite
 - B. sodium chloride
 - C. sodium chlorate
 - D. sodium perchlorate
139. The color of a star provides a measure of its
- A. size
 - B. mass
 - C. composition
 - D. surface temperature
140. Which elements have the most similar chemical properties?
- A. K and Na
 - B. K and Cl
 - C. K and Ca
 - D. K and S
141. The radiant energy that comes to Earth from the Sun is
- A. only one wavelength that we see as yellow.
 - B. a narrow band of wavelengths that is entirely visible light.
 - C. mostly long wavelengths that become heat energy.
 - D. a range of many wavelengths from long to very short.
142. Which element attains the structure of a noble gas when it becomes a $1+$ ion?
- A. K
 - B. Ca
 - C. F
 - D. Ne
143. Which molecule contains a nonpolar covalent bond?
- A. HCl
 - B. F_2
 - C. CO_2
 - D. NH_3
144. What is at the center of our solar system?
- A. a medium planet with an atmosphere
 - B. a star composed of carbon and nitrogen
 - C. a black hole that was once a star
 - D. a star composed of hydrogen and helium

145. What is the gram-formula mass of $\text{Fe}(\text{NO}_3)_3$?

- A. 146 g/mol B. 194 g/mol
C. 214 g/mol D. 242 g/mol

146. Given the reaction:



The total number of moles of H_2SO_4 needed to react completely with 5.0 moles of Al is

- A. 2.5 moles B. 5.0 moles
C. 7.5 moles D. 9.0 moles

147. A characteristic of ionic solids is that they

- A. have high melting points
B. have low boiling points
C. conduct electricity
D. are noncrystalline

148. All of the atoms of argon have the same

- A. mass number B. atomic number
C. number of neutrons D. number of nucleons

149. What is the gram formula mass of $\text{Ca}_3(\text{PO}_4)_2$?

- A. 135 g/mol B. 215 g/mol
C. 278 g/mol D. 310 g/mol

150. What is the gram formula mass of $\text{Ca}(\text{OH})_2$?

- A. 29 g B. 34 g C. 57 g D. 74 g

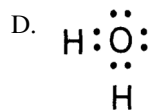
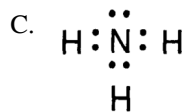
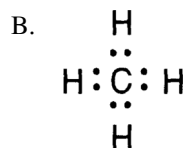
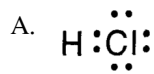
151. Which substance is classified as a salt?

- A. $\text{Ca}(\text{OH})_2$ B. $\text{C}_2\text{H}_4(\text{OH})_2$
C. CCl_4 D. CaCl_2

152. The shape and bonding in a diatomic bromine molecule are best described as

- A. symmetrical and polar
B. symmetrical and nonpolar
C. asymmetrical and polar
D. asymmetrical and nonpolar

153. Which electron-dot structure represents a nonpolar molecule?



154. How many electrons are contained in an Au^{3+} ion?

- A. 76 B. 79 C. 82 D. 197

155. Which atoms represent different isotopes of the same element?

- A. ${}^{39}_{18}\text{Ar}$ and ${}^{39}_{19}\text{K}$ B. ${}^{58}_{27}\text{Co}$ and ${}^{59}_{28}\text{Ni}$
C. ${}^{12}_6\text{C}$ and ${}^{13}_6\text{C}$ D. ${}^{35}_{17}\text{Cl}$ and ${}^{35}_{17}\text{Cl}$

156. Which kind of bond is formed when two atoms share electrons to form a molecule?

- A. ionic B. metallic
C. electrovalent D. covalent

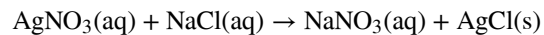
157. Which is the electron dot symbol of an atom of boron in the ground state?

- A. $\cdot\ddot{\text{B}}:$ B. $\text{B}\cdot$ C. $\cdot\ddot{\text{B}}:$ D. $\ddot{\text{B}}:$

158. A fusion reaction differs from a fission reaction in that the fusion reaction requires

- A. extremely low temperatures
B. extremely high temperatures
C. heavy atomic nuclei as fuels
D. neutrons with low kinetic energy

159. Given the balanced equation:



This reaction is classified as

- A. synthesis B. decomposition
C. single replacement D. double replacement

160. Matter that is composed of two or more different elements chemically combined in a fixed proportion is classified as

- A. a compound B. an isotope
C. a mixture D. a solution

161. Which element is considered malleable?

- A. gold
- B. hydrogen
- C. sulfur
- D. radon

162. Which element is a noble gas?

- A. krypton
- B. chlorine
- C. antimony
- D. manganese

163. Which type of bond is formed by the transfer of electrons from one atom to another?

- A. a covalent bond
- B. a coordinate covalent bond
- C. a hydrogen bond
- D. an ionic bond

1st Semester Final Exam 1/21/2020

1.		15.	
Answer:	D	Answer:	C
Points:	1	Points:	1
2.		16.	
Answer:	C	Answer:	C
Points:	1	Points:	1
3.		17.	
Answer:	C	Answer:	D
Points:	1	Points:	1
4.		18.	
Answer:	A	Answer:	B
Points:	1	Points:	1
5.		19.	
Answer:	A	Answer:	A
Points:	1	Points:	1
6.		20.	
Answer:	D	Answer:	D
Points:	1	Points:	1
7.		21.	
Answer:	B	Answer:	C
Points:	1	Points:	1
8.		22.	
Answer:	A	Answer:	C
Points:	1	Points:	1
9.		23.	
Answer:	C	Answer:	A
Points:	1	Points:	1
10.		24.	
Answer:	B	Answer:	D
Points:	1	Objective:	2.06
11.		Points:	1
Answer:	D	25.	
Points:	1	Answer:	A
12.		Points:	1
Answer:	A	26.	
Points:	1	Answer:	C
13.		Points:	1
Answer:	D	27.	
Points:	1	Answer:	B
14.		Points:	1
Answer:	A	28.	
Points:	1	Answer:	A
		Points:	1

29.
Answer: A
Points: 1

30.
Answer: D
Points: 1

31.
Answer: D
Points: 1

32.
Answer: B
Points: 1

33.
Answer: D
Points: 1

34.
Answer: D
Points: 1

35.
Answer: B
Points: 1

36.
Answer: C
Points: 1

37.
Answer: C
Points: 1

38.
Answer: B
Points: 1

39.
Answer: B
Points: 1

40.
Answer: A
Points: 1

41.
Answer: A
Points: 1

42.
Answer: A
Points: 1

43.
Answer: C
Points: 1

44.
Answer: A
Points: 1

45.
Answer: A
Points: 1

46.
Answer: A
Points: 1

47.
Answer: A
Points: 1

48.
Answer: D
Points: 1

49.
Answer: A
Points: 1

50.
Answer: C
Points: 1

51.
Answer: D
Points: 1

52.
Answer: B
Points: 1

53.
Answer: D
Points: 1

54.
Answer: B
Objective: MA 2.2
Points: 1

55.
Answer: A
Points: 1

56.
Answer: D
Points: 1

57.
Answer: B
Points: 1

58.
Answer: D
Points: 1

59.
Answer: C
Points: 1

60.
Answer: B
Objective: I.06B
Points: 1

61.
Answer: C
Points: 1

62.
Answer: A
Points: 1

63.
Answer: B
Points: 1

64.
Answer: A
Points: 1

65.
Answer: D
Objective: MS 2b2
Points: 1

66.
Answer: C
Points: 1

67.
Answer: B
Points: 1

68.
Answer: B
Points: 1

69.
Answer: C
Points: 1

70.
Answer: C
Objective: 2.03
Points: 1

71.
Answer: D
Points: 1

72.
Answer: C
Points: 1

73.
Answer: C
Points: 1

74.
Answer: C
Objective: MA 4.5
Points: 1

75.
Answer: C
Points: 1

76.
Answer: D
Points: 1

77.
Answer: C
Points: 1

78.
Answer: C
Points: 1

79.
Answer: A
Points: 1

80.
Answer: B
Points: 1

81.
Answer: B
Points: 1

82.
Answer: C
Points: 1

83.
Answer: B
Points: 1

84.
Answer: D
Points: 1

85.
Answer: D
Points: 1

86.
Answer: B
Objective: MA 4.3
Points: 1

87.
Answer: B
Objective: MA 2.1
Points: 1

88.
Answer: A
Points: 1

89.
Answer: A
Points: 1

90.
Answer: C
Points: 1

91.
Answer: B
Points: 1

92.
Answer: C
Points: 1

93.
Answer: A
Points: 1

94.
Answer: C
Points: 1

95.
Answer: A
Points: 1

96.
Answer: A
Points: 1

97.
Answer: D
Points: 1

98.
Answer: B
Points: 1

99.
Answer: B
Points: 1

100.
Answer: B
Points: 1

101.
Answer: B
Points: 1

102.
Answer: B
Points: 1

103.
Answer: D
Points: 1

104.
Answer: A
Points: 1

105.
Answer: D
Points: 1

106.
Answer: C
Points: 1

107.
Answer: A
Points: 1

108.
Answer: B
Points: 1

109.
Answer: A
Points: 1

110.
Answer: B
Points: 1

111.
Answer: C
Points: 1

112.
Answer: B
Points: 1

113.
Answer: C
Points: 1

114.
Answer: D
Objective: MA 4.1
Points: 1

115.
Answer: A
Objective: LA PS-M-A2
Points: 1

116.
Answer: B
Points: 1

117.
Answer: D
Points: 1

118.
Answer: A
Points: 1

119.
Answer: D
Points: 1

120.
Answer: C
Points: 1

121.
Answer: C
Points: 1

122.
Answer: C
Points: 1

123.
Answer: C
Points: 1

124.
Answer: C
Points: 1

125.
Answer: A
Points: 1

126.
Answer: D
Points: 1

127.
Answer: A
Points: 1

128.
Answer: A
Points: 1

129.
Answer: A
Points: 1

130.
Answer: D
Points: 1

131.
Answer: C
Points: 1

132.
Answer: A
Points: 1

133.
Answer: B
Points: 1

134.
Answer: C
Points: 1

135.
Answer: C
Points: 1

136.
Answer: D
Points: 1

137.
Answer: D
Points: 1

138.
Answer: A
Points: 1

139.
Answer: D
Points: 1

140.
Answer: A
Points: 1

141.
Answer: D
Objective: LA PS-M-C3
Points: 1

142.
Answer: A
Points: 1

143.
Answer: B
Points: 1

144.
Answer: D
Points: 1

145.
Answer: D
Points: 1

146.
Answer: C
Points: 1

147.
Answer: A
Points: 1

148.
Answer: B
Points: 1

149.
Answer: D
Points: 1

150.
Answer: D
Points: 1

151.
Answer: D
Points: 1

152.
Answer: B
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153.
Answer: B
Points: 1

154.
Answer: A
Points: 1

155.
Answer: C
Points: 1

156.
Answer: D
Points: 1

157.
Answer: D
Points: 1

158.
Answer: B
Points: 1

159.
Answer: D
Points: 1

160.
Answer: A
Points: 1

161.
Answer: A
Points: 1

162.
Answer: A
Points: 1

163.
Answer: D
Objective: I.07B
Points: 1