

End of Semester 1 Review

Name: _____

Date: _____

- In the modern Periodic Table, the elements are arranged in order of increasing
 - atomic number
 - mass number
 - oxidation number
 - valence number
- More than two-thirds of the elements are classified as
 - nonmetals
 - metals
 - metalloids
 - noble gases
- Which is the most active nonmetal in the Periodic Table of the Elements?
 - Na
 - F
 - I
 - Cl
- Which element in Period 2 has the greatest tendency to form a negative ion?
 - lithium
 - carbon
 - neon
 - fluorine
- Which element within any given period of the Periodic Table would always have the *lowest* first ionization energy?
 - an alkali metal
 - a halogen
 - an alkaline earth metal
 - a noble gas
- Element X is in Group 2 (IIA) and element Y is in Group 17 (VIIA). A compound formed between these two elements is most likely to have the formula
 - X_2Y
 - XY_2
 - X_2Y_7
 - X_7Y_2
- In the ground state, how many electrons are in the outermost *s* sublevel of each element in Group VIIA?
 - 5
 - 2
 - 7
 - 8

8. Beryllium is classified as
- A. an alkaline earth metal
 - B. an alkali metal
 - C. a transition metal
 - D. a noble gas
9. As the elements are considered from the top to the bottom of Group VA, which sequence in properties occurs?
- A. metal → metalloid → nonmetal
 - B. metal → nonmetal → metalloid
 - C. metalloid → metal → nonmetal
 - D. nonmetal → metalloid → metal
10. All the elements in Period 3 have the same number of
- A. occupied sublevels
 - B. principal energy levels
 - C. electrons
 - D. protons
11. All of the elements in Period 3 have a total of 2 electrons in the
- A. $2s$ sublevel
 - B. $3s$ sublevel
 - C. $2p$ sublevel
 - D. $3p$ sublevel
12. Which element would have properties characteristic of both a metal and a nonmetal?
- A. Ag
 - B. K
 - C. Si
 - D. Xe
13. The chemical properties of elements are periodic functions of their
- A. ionic charges
 - B. oxidation states
 - C. atomic numbers
 - D. mass numbers
14. Which characteristic describes most nonmetals in the solid phase?
- A. good conductors of electricity
 - B. good conductors of heat
 - C. malleable
 - D. brittle

15. Two basic properties of the gas phase are
- A. a definite shape and a definite volume
 - B. a definite shape but no definite volume
 - C. no definite shape but a definite volume
 - D. no definite shape and no definite volume
16. Which list of particles is in order of increasing mass?
- A. proton → electron → alpha particle
 - B. proton → alpha particle → electron
 - C. electron → proton → alpha particle
 - D. alpha particle → electron → proton
17. Which terms are used to identify pure substances?
- A. an element and a mixture
 - B. an element and a compound
 - C. a solution and a mixture
 - D. a solution and a compound
18. Which is the electron configuration of a neutral atom in the ground state with a total of six valence electrons?
- A. $1s^2 2s^2 2p^2$
 - B. $1s^2 2s^2 2p^4$
 - C. $1s^2 2s^2 2p^6$
 - D. $1s^2 2s^2 2p^6 3s^2 3p^6$
19. What is the total number of valence electrons in an atom with the electron configuration $1s^2 2s^2 2p^6 3s^2 3p^3$?
- A. 15
 - B. 2
 - C. 3
 - D. 5
20. The number of valence electrons in an atom with an electron configuration of $1s^2 2s^2 2p^6 3s^2 3p^4$ is
- A. 6
 - B. 2
 - C. 16
 - D. 4
21. What is the electron configuration for Be^{2+} ions?
- A. $1s^1$
 - B. $1s^2$
 - C. $1s^2 2s^1$
 - D. $1s^2 2s^2$

22. An atom has the electron configuration $1s^2 2s^2 2p^6 3s^2 3p^5$. The electron dot symbol for this element is

- A. X: B. $\overset{\cdot}{X}$: C. $\cdot\overset{\cdot}{X}$: D. $:\overset{\cdot\cdot}{X}$:

23. Which is the electron dot symbol for a chlorine atom in the ground state?

- A. $:\overset{\cdot\cdot}{Cl}$: B. Cl: C. $:\overset{\cdot\cdot}{Cl}$: D. $\cdot\overset{\cdot}{Cl}$:

24. The correct electron dot formula for hydrogen chloride is

- A. H:Cl B. $:\overset{\cdot\cdot}{H}:Cl$
 C. $H:\overset{\cdot\cdot}{Cl}$: D. $:\overset{\cdot\cdot}{H}:\overset{\cdot\cdot}{Cl}$:

25. Which electron-dot formula represents a substance that contains a nonpolar covalent bond?

- A. $[Na]^+ [:\overset{\cdot\cdot}{Cl}:\overset{\cdot\cdot}{Cl}:]^-$
 B. $\overset{\cdot\cdot}{x}Cl:\overset{\cdot\cdot}{x}Cl:\overset{\cdot\cdot}{\cdot}$
 C. $H:\overset{\cdot\cdot}{x}Cl:\overset{\cdot\cdot}{x}$
 D. $\overset{\cdot\cdot}{\cdot}O:\overset{\cdot\cdot}{x}H$
 H

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

- A. $Mg:\overset{\cdot\cdot}{F}:$ B. $Mg^+[:\overset{\cdot\cdot}{F}:]^-$
 C. $[:\overset{\cdot\cdot}{F}:]^- Mg^{2+}[:\overset{\cdot\cdot}{F}:]^-$ D. $:\overset{\cdot\cdot}{F}:\overset{\cdot\cdot}{Mg}:\overset{\cdot\cdot}{F}:$

27. Which electron dot symbol could represent a metalloid?

- A. X· B. X: C. $:\overset{\cdot\cdot}{X}$: D. $\cdot\overset{\cdot}{X}$ ·

28. Which represents the electron configuration of an atom of an alkaline earth metal?
- A. $[\text{Ar}]4s^1$ B. $[\text{Ar}]4s^2$
C. $[\text{Ar}]3d^{10}4s^1$ D. $[\text{Ar}]3d^{10}4s^2$
29. An atom that has an electron configuration of $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^2$ is classified as
- A. an alkali metal
B. an alkaline earth metal
C. a transition element
D. a noble gas element
30. Which ion has the electron configuration of a noble gas?
- A. Cu^{2+} B. Fe^{2+} C. Ca^{2+} D. Hg^{2+}
31. Which pair of elements form an ionic bond with each other?
- A. KCl B. ICl C. PCl D. HCl
32. Which compound contains ionic bonds?
- A. NaBr(s) B. HBr(g)
C. $\text{C}_6\text{H}_{12}\text{O}_6(\text{s})$ D. $\text{CO}_2(\text{g})$
33. A characteristic of ionic solids is that they
- A. have high melting points
B. have low boiling points
C. conduct electricity
D. are noncrystalline
34. 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
35. Which compound has the *least* ionic character?
- A. KCl B. CaCl_2 C. AlCl_3 D. CCl_4

36. When ionic bonds are formed, metallic atoms tend to
- A. lose electrons and become negative ions
 - B. lose electrons and become positive ions
 - C. gain electrons and become negative ions
 - D. gain electrons and become positive ions
37. When a metal atom combines with a nonmetal atom, the nonmetal atom will
- A. lose electrons and decrease in size
 - B. lose electrons and increase in size
 - C. gain electrons and decrease in size
 - D. gain electrons and increase in size
38. Which kind of bond is formed when two atoms share electrons to form a molecule?
- A. ionic
 - B. metallic
 - C. electrovalent
 - D. covalent
39. Which of the following elements is most likely to form a compound with radon?
- A. iodine
 - B. fluorine
 - C. sodium
 - D. calcium
40. Which molecule contains a nonpolar covalent bond?
- A. HCl
 - B. F₂
 - C. CO₂
 - D. NH₃
41. Which type of bond is predominant in a water molecule?
- A. coordinate covalent
 - B. polar covalent
 - C. ionic
 - D. metallic
42. Which element is composed of atoms that can form more than one covalent bond with each other?
- A. hydrogen
 - B. helium
 - C. carbon
 - D. calcium

43. The four single bonds of a carbon atom are directed in space toward the corners of a

- A. regular tetrahedron B. regular octahedron
C. square plane D. trigonal bipyramid

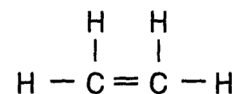
44. In a nonpolar covalent bond, electrons are

- A. located in a mobile "sea" shared by many ions
B. transferred from one atom to another
C. shared equally by two atoms
D. shared unequally by two atoms

45. Which type of bond is formed between the two chlorine atoms in a chlorine molecule?

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

46. Given the compound:



The symbol = represents

- A. one pair of shared electrons
B. two pairs of shared electrons
C. a single covalent bond
D. a coordinate covalent bond

47. What is the maximum number of covalent bonds that a carbon atom can form?

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

48. Which pair of atoms is held together by a covalent bond?

- A. HCl B. LiCl C. NaCl D. KCl

49. Which molecule contains a triple covalent bond?

- A. H₂ B. N₂ C. O₂ D. Cl₂

50. Metallic bonding occurs between atoms of

- A. fluorine
- B. neon
- C. sulfur
- D. copper

51. Mobile electrons are a distinguishing characteristic of

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

52. When combining with nonmetallic atoms, metallic atoms generally will

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

53. Most metals have the properties of

- A. brittleness and high ionization energy
- B. brittleness and low ionization energy
- C. ductility and high ionization energy
- D. ductility and low ionization energy

54. Which type of bond is found between atoms of solid cobalt?

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

55. Which is the predominate type of attraction between molecules of HF in the liquid state?

- A. hydrogen bonding
- B. electrocovalent bonding
- C. ionic bonding
- D. covalent bonding

56. Which atom has the *least* attraction for the electrons in a bond between that atom and an atom of hydrogen?

- A. carbon
- B. nitrogen
- C. oxygen
- D. fluorine

57. Oxygen, nitrogen, and fluorine bond with hydrogen to form molecules. These molecules are attracted to each other by

- A. ionic bonds
- B. hydrogen bonds
- C. electrovalent bonds
- D. coordinate covalent bonds

58. The unusually high boiling point of water is due to the

- A. network bonds between the molecules
- B. hydrogen bonds between the molecules
- C. linear structure of the molecules
- D. nonpolar character of the molecules

59. The P–Cl bond in a molecule of PCl_3 is

- A. nonpolar covalent
- B. polar covalent
- C. coordinate covalent
- D. electrocovalent

60. Which molecule is a dipole?

- A. He
- B. H_2
- C. NH_3
- D. CH_4

61. Which electron dot formula represents a nonpolar molecule?

- A. $\begin{array}{c} \text{H} \\ \vdots \\ \text{H} : \text{C} : \ddot{\text{Cl}} : \\ \vdots \\ \text{H} \end{array}$
- B. $\begin{array}{c} \text{H} \\ \vdots \\ \text{H} : \text{N} : \\ \vdots \\ \text{H} \end{array}$
- C. $\begin{array}{c} \text{H} \\ \vdots \\ \text{H} : \text{C} : \text{H} \\ \vdots \\ \text{H} \end{array}$
- D. $\begin{array}{c} \text{H} : \text{O} : \\ \vdots \\ \text{H} \end{array}$

62. The bond between hydrogen and oxygen in a water molecule is classified as

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

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

- A. NaBr—nonpolar covalent
- B. HCl—nonpolar covalent
- C. NH₃—polar covalent
- D. Br₂—polar covalent

64. Which statement explains why a molecule of CH₄ is nonpolar?

- A. The bonds between the atoms in a CH₄ molecule are polar.
- B. The bonds between the atoms in a CH₄ molecule are ionic.
- C. The geometric shape of a CH₄ molecule distributes the charges symmetrically.
- D. The geometric shape of a CH₄ molecule distributes the charges asymmetrically.

65. Which formula represents a molecule with the most polar bond?

- A. CO B. NO C. HI D. HCl

66. Why is NH₃ classified as a polar molecule?

- A. NH₃ is a gas at STP.
- B. N—H bonds are nonpolar.
- C. Nitrogen and hydrogen are both nonmetals.
- D. NH₃ molecules have asymmetrical charge distribution.

67. What is the correct name of the compound with the formula NH₄NO₂?

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

68. The correct formula for sodium oxide is

- A. SO₂ B. S₂O C. NaO₂ D. Na₂O

69. Which formula represents tetrahedral molecule?

- A. CH₄ B. CaCl₂ C. HBr D. Br₂

70. What is the correct formula of potassium hydride?

- A. KH B. KH₂
C. KOH D. K(OH)₂

71. Which formula correctly represents iron (III) oxide?

- A. Fe₂O₃ B. Fe₃O₂ C. FeO₃ D. Fe₃O

72. Which is the correct formula for iron (III) sulfate?

- A. Fe₃SO₄ B. Fe₂SO₄
C. Fe(SO₄)₃ D. Fe₂(SO₄)₃

73. 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

74. All of the atoms of argon have the same

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

75. 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

76. Which atom has a nucleus that contains 13 protons and 14 neutrons?

- A. Mg B. Be C. Al D. N

77. A particle of matter contains 6 protons, 7 neutrons, and 6 electrons. This particle must be a
- A. neutral carbon atom
 - B. neutral nitrogen atom
 - C. positively charged carbon ion
 - D. positively charged nitrogen ion
78. The mass number of an atom is equal to the number of
- A. neutrons, only
 - B. protons, only
 - C. neutrons plus protons
 - D. electrons plus protons
79. An atom of ${}^{226}_{88}\text{Rn}$ contains
- A. 88 protons and 138 neutrons
 - B. 88 protons and 138 electrons
 - C. 88 electrons and 226 neutrons
 - D. 88 electrons and 226 protons
80. The nucleus is the part of the atom that
- A. consist mostly of empty space
 - B. has a negative charge
 - C. occupies most of the atom's total volume
 - D. contains most of the atom's total mass
81. An atom that contains 8 protons, 8 electrons, and 9 neutrons has
- A. an atomic number of 9
 - B. an atomic number of 16
 - C. a mass number of 17
 - D. a mass number of 25
82. The atomic mass of an element is defined as the weighted average mass of that element's
- A. most abundant isotope
 - B. least abundant isotope
 - C. naturally occurring isotopes
 - D. radioactive isotopes

83. Which symbol represents a proton?
- A. ${}^1_1\text{H}$ B. ${}^0_1\text{H}$ C. ${}^1_0\text{H}$ D. ${}^0_0\text{H}$
84. How many protons are present in an atom of ${}^{31}_{15}\text{P}$?
- A. 15 B. 16 C. 31 D. 46
85. An experiment using alpha particles to bombard a thin sheet of gold foil indicated that most of the volume of the atoms in the foil is taken up by
- A. electrons B. protons
C. neutrons D. empty space
86. In an experiment, alpha particles were used to bombard gold foil. As a result of this experiment, the conclusion was made that the nucleus of an atom is
- A. smaller than the atom and positively charged
B. smaller than the atom and negatively charged
C. larger than the atom and positively charged
D. larger than the atom and negatively charged
87. Which atom contains exactly 15 protons?
- A. phosphorus-32 B. sulfur-32
C. oxygen-15 D. nitrogen-15
88. Which statement is true about a proton and an electron?
- A. They have the same masses and the same charges.
B. They have the same masses and different charges.
C. They have different masses and the same charges.
D. They have different masses and different charges.
89. What is the total number of orbitals in a p sublevel?
- A. 1 B. 2 C. 3 D. 4
90. The maximum number of electrons that can occupy a principal energy level (n) of an atom is equal to
- A. n^2 B. $2n^2$ C. $n + 2$ D. $n^2 + 2$

91. Which principal energy level can hold a maximum of 18 electrons?

- A. 5 B. 2 C. 3 D. 4

92. The total number of *d* orbitals in the third principal energy level is

- A. 1 B. 5 C. 3 D. 7





93. What is the total number of sublevels in the second principal energy level?

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


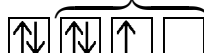
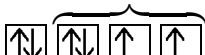
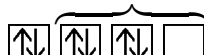
94. What is the maximum number of electrons that can occupy an orbital?

- A. 1 B. 2 C. 3 D. 6

95. Which orbital notation represents an atom of beryllium in the ground state?

- A. $1s \ 2s \ 2p$

- B. $1s \ 2s \ 2p$

- C. $1s \ 2s \ 2p$

- D. $1s \ 2s \ 2p$


96. Which orbital notation correctly represents the outermost principal energy level of a nitrogen atom in the ground state?

- A. $S \ P$

- B. $S \ P$

- C. $S \ P$

- D. $S \ P$


97. Which atom has the strongest attraction for electrons?

- A. Cl B. F C. Br D. I

98. Hydrogen bonds are most likely to form between molecules in which hydrogen is covalently bonded to an element of

- A. small atomic radius and low electronegativity
- B. small atomic radius and high electronegativity
- C. large atomic radius and low electronegativity
- D. large atomic radius and high electronegativity

99. Which of the following atoms has the *least* tendency to lose electrons?

- A. Cs B. Na C. Ba D. Mg

100. The formula H_2 represents one

- A. gram B. liter
C. atom D. molecule

101. Which element is a noble gas?

- A. W B. Ar C. N D. Er

102. Which element exists as diatomic molecules at STP?

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

103. What is the total number of electrons in a Mg^{2+} ion?

- A. 10 B. 2 C. 12 D. 24

104. 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

105. A sodium atom and a sodium ion must have the same number of

- A. neutrons
B. protons
C. occupied principal energy levels
D. outermost electrons

106. An isotope of which element has an atomic number of 6 and a mass number of 14?

- A. carbon
- B. magnesium
- C. nitrogen
- D. silicon

107. If X is the symbol of an element, which pair correctly represents isotopes of X?

- A. ${}^{158}_{64}\text{X}$ and ${}^{158}_{64}\text{X}$
- B. ${}^{64}_{158}\text{X}$ and ${}^{158}_{64}\text{X}$
- C. ${}^{158}_{64}\text{X}$ and ${}^{159}_{64}\text{X}$
- D. ${}^{158}_{64}\text{X}$ and ${}^{158}_{65}\text{X}$

108. Different isotopes of the same element must have a different

- A. mass number
- B. atomic number
- C. number of protons
- D. number of electrons

109. Atoms of every isotope of calcium have the same

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

110. Element X has two isotopes. If 72.0% of the element has an isotopic mass of 84.9 atomic mass units, and 28.0% of the element has an isotopic mass of 87.0 atomic mass units, the average atomic mass of element X is numerically equal to

- A. $(72.0 + 84.9) \times (28.0 + 87.0)$
- B. $(72.0 - 84.9) \times (28.0 + 87.0)$
- C. $\frac{(72.0 \times 84.9)}{100} + \frac{(28.0 \times 87.0)}{100}$
- D. $(72.0 \times 84.9) + (28.0 \times 87.0)$

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

- A. 50% ${}^{12}\text{C}$ and 50% ${}^{13}\text{C}$
- B. 50% ${}^{35}\text{Cl}$ and 50% ${}^{37}\text{Cl}$
- C. 75% ${}^{35}\text{Cl}$ and 25% ${}^{37}\text{Cl}$
- D. 75% ${}^{12}\text{C}$ and 25% ${}^{13}\text{C}$

112. Which statement best explains why most atomic masses on the Periodic Table are decimal numbers?

- A. Atomic masses are determined relative to an H-1 standard.
- B. Atomic masses are determined relative to an O-16 standard.
- C. Atomic masses are a weighted average of the naturally occurring isotopes.
- D. Atomic masses are an estimated average of the artificially produced isotopes.

113. Base your answer(s) to the following question(s) on the data table below, which shows three isotopes of neon.

Isotope	Atomic Mass (atomic mass units)	Percent Natural Abundance
^{20}Ne	19.99	90.9%
^{21}Ne	20.99	0.3%
^{22}Ne	21.99	8.8%

Based on natural abundances, the average atomic mass of neon is closest to which whole number?

114. An 80 milligram sample of a radioactive isotope decays to 5 milligrams in 32 days. What is the half-life of this element?

- A. 8 days B. 2 days
C. 16 days D. 4 days

115. What is the number of hours required for potassium-42 to undergo 3 half-life periods?

- A. 6.2 hours B. 12.4 hours
C. 24.8 hours D. 37.2 hours

116. In the reaction $X + {}^1_1\text{H} \rightarrow {}^6_3\text{Li} + {}^4_2\text{He}$, the nucleus represented by X is

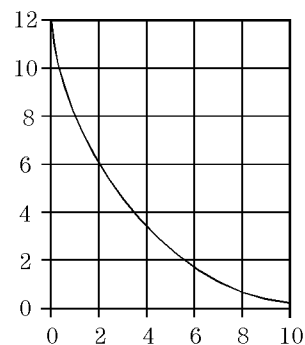
- A. ${}^9_3\text{Li}$ B. ${}^{10}_5\text{B}$ C. ${}^9_4\text{Be}$ D. ${}^{10}_6\text{C}$

117. 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. ${}^0_{-1}\text{e}$

118. The graph shown represents the decay of a radioactive isotope. What is the half-life of this isotope?

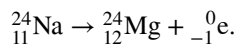
- A. 1 hour
B. 2 hours
C. 3 hours
D. 6 hours



119. What is the mass of ${}^{42}\text{K}$ remaining in a 16-gram sample of ${}^{42}\text{K}$ after 37.2 hours?

- A. 1.0 g B. 2.0 g C. 8.0 g D. 4.0 g

120. Given the reaction:



This reaction is best described as

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

121. Which nuclear reaction is classified as alpha decay?

- A. ${}_{6}^{14}\text{C} \rightarrow {}_{7}^{14}\text{N} + {}_{-1}^0\text{e}$
- B. ${}_{19}^{42}\text{K} \rightarrow {}_{20}^{42}\text{Ca} + {}_{-1}^0\text{e}$
- C. ${}_{88}^{226}\text{Ra} \rightarrow {}_{86}^{222}\text{Rn} + {}_{2}^4\text{He}$
- D. ${}_{1}^3\text{H} \rightarrow {}_{-1}^0\text{e} + {}_{2}^3\text{He}$

122. The structure of an alpha particle is the same as a

- A. lithium atom
- B. neon atom
- C. hydrogen nucleus
- D. helium nucleus

123. Gamma rays are most similar to

- A. positively charged hydrogen nuclei
- B. positively charged helium nuclei
- C. high-energy X-rays
- D. high-speed electrons

124. Which two characteristics do radioisotopes have that are useful in medical diagnosis?

- A. long half-lives and slow elimination from the body
- B. short half-lives and slow elimination from the body
- C. long half-lives and quick elimination from the body
- D. short half-lives and quick elimination from the body

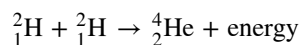
125. Gamma rays are emanations that have

- A. mass but no charge
- B. charge but no mass
- C. neither mass nor charge
- D. both mass and charge

126. Which product of nuclear decay has mass but no charge?

- A. alpha particles B. neutrons
C. gamma rays D. beta positrons

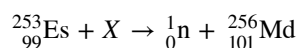
127. Given the reaction:



The process represented by the reaction is called

- A. fission
B. fusion
C. artificial transmutation
D. alpha decay

128. Given the nuclear equation:



Which particle is represented by X?

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

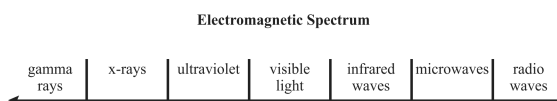
129. A nuclear fission reaction and a nuclear fusion reaction are similar because both reactions

- A. form heavy nuclides from light nuclides
B. form light nuclides from heavy nuclides
C. release a large amount of energy
D. absorb a large amount of energy

130. When a uranium nucleus breaks up into fragments, which type of nuclear reaction occurs?

- A. fusion B. fission
C. replacement D. redox

131. A diagram of the electromagnetic spectrum is shown below.



Sunscreen is a lotion used to protect skin from exposure to the Sun. This sunscreen protects a person's skin from wavelengths that are

- A. longer than radio waves but shorter than x-rays.
B. longer than x-rays but shorter than infrared waves.
C. longer than microwaves but shorter than infrared waves.
D. longer than visible light waves but shorter than radio waves.

138. Some of the molecules found in the human body are $\text{NH}_2\text{CH}_2\text{COOH}$ (glycine), $\text{C}_6\text{H}_{12}\text{O}_6$ (glucose), and $\text{CH}_3(\text{CH}_2)_{16}\text{COOH}$ (stearic acid). The bonds they form are

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

139. Water is a polar solvent, while hexane is a nonpolar solvent.

Solute	Water	Hexane
NH_4Cl , ammonium chloride	Soluble	Insoluble
C_{10}H_8 , naphthalene	Insoluble	Soluble
$\text{C}_2\text{H}_5\text{OH}$, ethanol	Soluble	Soluble
$\text{CO}(\text{NH}_2)_2$, urea	Soluble	Insoluble

Which of the examples above illustrates a nonpolar solute in a polar solvent?

- A. NH_4Cl in water
B. C_{10}H_8 in water
C. $\text{C}_2\text{H}_5\text{OH}$ in hexane
D. $\text{CO}(\text{NH}_2)_2$ in hexane

- | | | | |
|---------|---|---------|---|
| 1. | | 21. | |
| Answer: | A | Answer: | B |
| 2. | | 22. | |
| Answer: | B | Answer: | D |
| 3. | | 23. | |
| Answer: | B | Answer: | C |
| 4. | | 24. | |
| Answer: | D | Answer: | C |
| 5. | | 25. | |
| Answer: | A | Answer: | B |
| 6. | | 26. | |
| Answer: | B | Answer: | C |
| 7. | | 27. | |
| Answer: | B | Answer: | D |
| 8. | | 28. | |
| Answer: | A | Answer: | B |
| 9. | | 29. | |
| Answer: | D | Answer: | C |
| 10. | | 30. | |
| Answer: | B | Answer: | C |
| 11. | | 31. | |
| Answer: | A | Answer: | A |
| 12. | | 32. | |
| Answer: | C | Answer: | A |
| 13. | | 33. | |
| Answer: | C | Answer: | A |
| 14. | | 34. | |
| Answer: | D | Answer: | D |
| 15. | | 35. | |
| Answer: | D | Answer: | D |
| 16. | | 36. | |
| Answer: | C | Answer: | B |
| 17. | | 37. | |
| Answer: | B | Answer: | D |
| 18. | | 38. | |
| Answer: | B | Answer: | D |
| 19. | | 39. | |
| Answer: | D | Answer: | B |
| 20. | | 40. | |
| Answer: | A | Answer: | B |

41.
Answer: B

42.
Answer: C

43.
Answer: A

44.
Answer: C

45.
Answer: B

46.
Answer: B

47.
Answer: D

48.
Answer: A

49.
Answer: B

50.
Answer: D

51.
Answer: C

52.
Answer: B

53.
Answer: D

54.
Answer: C

55.
Answer: A

56.
Answer: A

57.
Answer: B

58.
Answer: B

59.
Answer: B

60.
Answer: C

61.
Answer: C

62.
Answer: D

63.
Answer: C

64.
Answer: C

65.
Answer: D

66.
Answer: D

67.
Answer: B

68.
Answer: D

69.
Answer: A

70.
Answer: A

71.
Answer: A

72.
Answer: D

73.
Answer: B

74.
Answer: B

75.
Answer: B

76.
Answer: C

77.
Answer: A

78.
Answer: C

79.
Answer: A

80.
Answer: D

81.
Answer: C

82.
Answer: C

83.
Answer: A

84.
Answer: A

85.
Answer: D

86.
Answer: A

87.
Answer: A

88.
Answer: D

89.
Answer: C

90.
Answer: B

91.
Answer: C

92.
Answer: B

93.
Answer: B

94.
Answer: B

95.
Answer: C

96.
Answer: A

97.
Answer: B

98.
Answer: B

99.
Answer: D

100.
Answer: D

101.
Answer: B

102.
Answer: C

103.
Answer: A

104.
Answer: A

105.
Answer: B

106.
Answer: A

107.
Answer: C

108.
Answer: A

109.
Answer: B

110.
Answer: C

111.
Answer: C

112.
Answer: C

113.
Answer: 20

114.
Answer: A

115.
Answer: D

116.
Answer: C

117.
Answer: D

118.
Answer: B

119.
Answer: B

120.
Answer: B

121.
Answer: C

122.
Answer: D

123.
Answer: C

124.
Answer: D

125.
Answer: C

126.
Answer: B

127.
Answer: B

128.
Answer: A

129.
Answer: C

130.
Answer: B

131.
Answer: B

132.
Answer:

133.
Answer: B

134.
Answer: D

135.
Answer: C

136.
Answer: D

137.
Answer: A

138.
Answer: D

139.
Answer: B