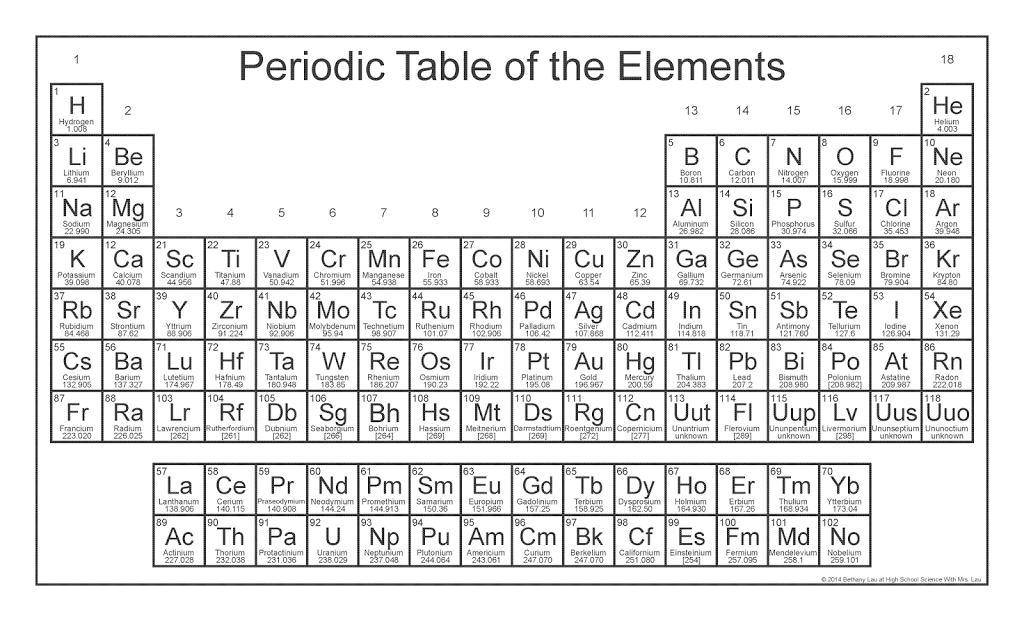
**General Chemistry Midterm: 2023-24**

Hi! This is your general chemistry midterm. I hope you like taking it as much as I enjoyed writing it.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_
11. \_\_\_\_\_
12. \_\_\_\_\_
13. \_\_\_\_\_
14. \_\_\_\_\_
15. \_\_\_\_\_
16. \_\_\_\_\_
17. \_\_\_\_\_
18. \_\_\_\_\_
19. \_\_\_\_\_
20. \_\_\_\_\_
21. \_\_\_\_\_
22. \_\_\_\_\_
23. \_\_\_\_\_
24. \_\_\_\_\_
25. \_\_\_\_\_
26. \_\_\_\_\_
27. \_\_\_\_\_
28. \_\_\_\_\_
29. \_\_\_\_\_
30. \_\_\_\_\_
31. \_\_\_\_\_
32. \_\_\_\_\_
33. \_\_\_\_\_
34. \_\_\_\_\_
35. \_\_\_\_\_
36. \_\_\_\_\_
37. \_\_\_\_\_
38. \_\_\_\_\_
39. \_\_\_\_\_
40. \_\_\_\_\_
41. \_\_\_\_\_
42. \_\_\_\_\_
43. \_\_\_\_\_
44. \_\_\_\_\_
45. \_\_\_\_\_
46. \_\_\_\_\_
47. \_\_\_\_\_
48. \_\_\_\_\_
49. \_\_\_\_\_
50. \_\_\_\_\_
51. \_\_\_\_\_
52. \_\_\_\_\_



**Common polyatomic ions:**

ammonium – NH4+1

acetate – C2H3O2-1

bicarbonate – HCO3-1

carbonate – CO3-2

cyanide – CN-1

hydroxide – OH-1

nitrate – NO3-1

nitrite - NO2-1

sulfate – SO4-2

­sulfite – SO3-2

permanganate – MnO4-1

phosphate – PO4-3

1. Which piece of equipment is best suited for measuring the volume of a liquid?

a) Burette

b) Erlenmeyer flask

c) Test tube

d) Graduated cylinder

1. What is the first step in the scientific method?
   1. Conducting experiments
   2. Formulating a hypothesis
   3. Making observations
   4. Analyzing data
2. Which scientist proposed the plum pudding model of the atom?

a) Ernest Rutherford

b) J.J. Thomson

c) Niels Bohr

d) John Dalton

1. According to Rutherford's nuclear model of the atom, most of the atom's mass and positive charge is concentrated in the:

a) Protons

b) Neutrons

c) Nucleus

d) Electrons

1. An atom with 11 electrons and 11 protons is an atom of:

a) Sodium

b) Oxygen

c) Hydrogen

d) Carbon

1. Which group of the periodic table contains elements known as halogens?

a) Group 1

b) Group 17

c) Group 14

d) Group 2

1. What is the name of the compound Fe2O3?

a) Iron oxide

b) Iron(II) oxide

c) Iron(III) oxide

d) Ferrous oxide

1. According to the Bohr model, in which orbit does an electron have higher energy?

a) Innermost orbit

b) Second orbit

c) Third orbit

d) Outermost orbit

1. What is the trend in electronegativity as you move from left to right across the periodic table?

a) Increases

b) Decreases

c) Remains constant

d) Fluctuates randomly

1. Which element is a noble gas?

a) Oxygen (O)

b) Helium (He)

c) Sodium (Na)

d) Chlorine (Cl)

1. The formula for copper(II) sulfate is:

a) CuSO4

b) Cu2SO3

c) Cu2SO4

d) Cu(SO4)2

1. What is the name of the compound with the formula NH3?

a) Nitrogen trihydride

b) Ammonium

c) Ammonia

d) Nitrous oxide

1. What is the electrical conductivity of covalent compounds in general?

a) Good conductors of electricity

b) Poor conductors of electricity

c) Partial conductors of electricity

d) No effect on electrical conductivity

1. The bonding in an ionic compound results from:

a) Sharing of electrons

b) Unequal sharing of electrons

c) Transfer of electrons

d) No sharing of electrons

1. Which of the following statements is true for ionic compounds?

a) They often have a low solubility in water.

b) They consist of discrete molecules.

c) They have a network-like structure.

d) They have low melting points.

1. What kind of ions are involved in the formation of ionic compounds?

a) Charged protons

b) Charged neutrons

c) Cations and anions

d) Isotopes

17) How many electrons does oxygen-16 have?

1. 8
2. 16.999
3. 16
4. 24
5. How many neutrons are present in plutonium-245?
6. 94
7. 150
8. 151
9. 244
10. What is an isotope?
11. It is one of the forms of an element, differing from the others by the number of neutrons.
12. It is one of the forms of an element, differing from the others by atomic mass.
13. It is one of the forms of an element, differing from the others by the number of protons.
14. More than one of the above is correct.
15. What is a line spectrum?
16. The spectrum of sunlight.
17. A spectrum that consists only of certain energies of light.
18. A pattern of light given off by a Bunsen burner.
19. A set of orbitals that are given off by an element.
20. What is an orbital?
21. It’s another word for an electron
22. It’s where the electrons exist in the plum pudding model of the atom.
23. It’s where neutrons can be found in the atom.
24. It’s where electrons can be found in the atom.
25. What do we mean when we say that an electron is in an “excited state”?
26. It is in a low energy orbital.
27. It is in a high energy orbital.
28. It is jumping between orbitals.
29. It is giving off light.
30. What is spectroscopy?
31. It’s a way of heating elements.
32. It’s how you can tell if an atom has electrons.
33. It’s a way of identifying an unknown element from its protons.
34. It’s a way of identifying an unknown element from the light it emits.
35. Which of the following is characteristic of the Bohr model of the atom?
36. Orbitals near the nucleus have lower energy than those farther away.
37. Electrons can be found in circular orbits around the nucleus.
38. The energies of electrons can be determined by the variable n.
39. All of the above.
40. Which of the following is characteristic of the quantum model of the atom?
41. Electrons are treated as waves.
42. Electrons can be found in circular orbits.
43. Orbitals can hold up to six electrons at a time.
44. None of the above is true of the quantum model of the atom.
45. Which of the following is a good definition for accuracy?
46. It’s a measure of how often a measurement can be repeated.
47. It’s a measure of how close a measurement is to the actual value of the thing being measured.
48. It’s a measure of the precision of the measurement that’s being taken.
49. It indicates how many significant figures should be used when recording a measurement.
50. Which of these numbers has three significant figures?
51. 0.01
52. 0.010
53. 0.0010
54. 0.00100
55. Which of the following is true about covalent compounds?
56. The atoms are bonded together in molecules.
57. The atoms are bonded together to form crystals.
58. The atoms form ions that are attracted to each other.
59. They have unusually high melting and boiling points.
60. Why are covalent compounds generally formed when two nonmetals bond with one another?
61. Nonmetals have similar electronegativities, so neither can steal electrons from the other.
62. Nonmetals have very different electronegativities, so neither can steal electrons from the other.
63. Nonmetals do not follow the octet rule.
64. Nonmetals do not bond with metals.
65. Provide the formula for nitric acid
66. HNO2
67. H3N
68. HNO3
69. HNO
70. Which of these phenomena convinced Rutherford that the positive charge in an atom is concentrated in the nucleus?
71. His cathode ray experiment showed that anode rays move toward the negative pole of a magnet.
72. His gold foil experiment showed that the positively-charged radioactive particles he fired at a target were deflected by positively-charged nuclei.
73. All of the positively-charged particles he shot at his gold foil target went right through the foil without being deflected at all.
74. When positively-charged particles were fired at a gold foil target, a beam of electrons was formed.
75. Which of the following is true of the halogens?
76. They are relatively unreactive.
77. They tend to form ions with a +1 charge.
78. They are diatomic.
79. They are metals.
80. What family of the periodic table contains elements that would be best suited to use as fuel in nuclear power plants?
81. Lanthanides
82. Actinides
83. Transition metals
84. Main block elements
85. Which of the following best describes electronegativity?
86. It is a measurement of the size of the atoms of an element.
87. It is a measurement of how much atoms expand when an electron is added to them.
88. It is a measurement of how much atoms tend to pull electrons away from other atoms they have bonded to.
89. It is a way of measuring the positive charge in the nucleus of an atom
90. Which of the following elements has the highest atomic radius out of all these choices?
91. Helium
92. Iodine
93. Lithium
94. Rubidium
95. Which of the following elements has the smallest ionization energy?
96. Fluorine
97. Lithium
98. Cesium
99. Iodine
100. Which of the following elements has six valence electrons?
101. Carbon
102. Oxygen
103. Gallium
104. Bromine
105. If a neutral atom gains an electron, which of the following is formed?
106. Proton
107. Electron
108. Cation
109. Anion
110. Why do ionic compounds generally have high melting and boiling points?
111. Cations are very hard
112. Anions are very hard
113. The attraction between anions and cations is strong
114. There is a lot of energy in the space around cation-cation interactions.
115. Which of these is a good definition of a “period” in the periodic table?
116. A collection of elements with similar properties.
117. A collection of elements with similar electron configurations.
118. It is another word for “group”.
119. A collection of elements in a row of the periodic table.
120. Which of the following is a demonstration of the octet rule?
121. Lithium gaining an electron to form a +1 ion.
122. Lithium gaining an electron to form a -1 ion.
123. Helium losing an electron to form a +1
124. Chlorine gaining an electron to form a -1 ion.
125. How does the shielding effect cause the ionization energy of elements to decrease as you move from top to bottom down a group in the periodic table?
126. Inner electrons are bigger than the outer electrons, making it harder to remove an electron from an atom.
127. Outer electrons are bigger than inner electrons, making it harder to remove an electron from an atom.
128. Inner electrons have a higher charge than outer electrons, making it easier for an atom to lose electrons.
129. The combined charge of the inner electrons push outer electrons away, making it easier to pull them away from the atom.
130. Which of the following is a reasonable explanation for why oxygen is less reactive than fluorine?
131. It has to lose two electrons to get the same number of valence electrons as neon.
132. It has to gain two electrons to get the same number of valence electrons as neon.
133. It has to lose six electrons to get the same number of valence electrons as helium.
134. It has to gain six electrons to get the same number of valence electrons as helium.
135. Which of the following is most likely not an ionic compound?
136. Beryllium acetate
137. CuOH
138. Carbon dioxide
139. KBr
140. What is the charge of an iron(II) ion?
141. -2
142. +2
143. +3
144. It varies on what compound it’s in.
145. What is the name of Sr3N2?
146. strontium nitride
147. strontium (II) nitride
148. strontium nitrate
149. strontium (II) nitrate
150. What is spectroscopy?
151. It’s a method for identifying ionic compounds using their mass.
152. It’s a method for identifying elements using their line spectra.
153. It’s a method for identifying elements using their continuous spectra.
154. It’s a method for determining whether something is a metal, nonmetal, or metalloid.
155. Which of these elements is most electronegative?
156. He
157. H
158. F
159. Fr
160. Which of the following can easily conduct electricity?
161. Metals
162. Iron
163. Metalloids, but only if they’re heated or subjected to high voltage.
164. All of the above.
165. How are ionic compounds formed?
166. Electronegative elements give electrons to elements that are less electronegative.
167. Electronegative elements receive electrons from elements that are less electronegative.
168. Two cations stick together to form a compound.
169. Two anions stick together to form a compound.
170. Which of these is **not** a property of the alkali metals?
171. They are reactive
172. They want to lose electrons to be like the nearest noble gas.
173. They have the smallest atomic radii of the elements in their periods.
174. They have low melting and boiling points.
175. Why are covalent compounds sometimes flammable?
176. They can contain carbon and nitrogen
177. They can contain hydrogen and nitrogen
178. They can contain carbon and hydrogen
179. They can contain nitrogen and boron

**The end. You’re done with the test! Hooray!**