**Honors Chemistry Bonus Quiz Answer Sheet**

Quarter 2, 2021

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period: \_\_\_\_\_\_\_\_\_\_

Please write the letter of the correct answer in each blank. Make sure to write legibly.

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**Honors Chemistry Bonus Quiz, Day 1**

**Quarter 2 – 2021-22**

1. How many electrons does oxygen-16 have?
2. 8
3. 16.999
4. 16
5. 24
6. How many neutrons are present in plutonium-245?
7. 94
8. 150
9. 151
10. 244
11. What is the atomic mass of the isotope of ruthenium with 58 neutrons?
12. 44 amu
13. 58 amu
14. 102 amu
15. 101.07 amu
16. What is an isotope?
17. It is one of the forms of an element, differing from the others by the number of neutrons.
18. It is one of the forms of an element, differing from the others by atomic mass.
19. It is one of the forms of an element, differing from the others by the number of protons.
20. More than one of the above is correct.
21. Why do elements form isotopes with different masses?
22. They have different numbers of neutrons.
23. Their nuclei aren’t stabilized by the electrons surrounding them.
24. They have different numbers of protons.
25. They have differently-shaped nuclei.
26. What is a line spectrum?
27. The spectrum of sunlight.
28. A spectrum that consists only of certain energies of light.
29. A pattern of light given off by a Bunsen burner.
30. A set of orbitals that are given off by an element.
31. What is an orbital?
32. It’s another word for an electron
33. It’s where the electrons exist in the plum pudding model of the atom.
34. It’s where neutrons can be found in the atom.
35. It’s where electrons can be found in the atom.
36. What do we mean when we say that an electron is in an “excited state”?
37. It is in a low energy orbital.
38. It is in a high energy orbital.
39. It is jumping between orbitals.
40. It is giving off light.
41. What is spectroscopy?
42. It’s a way of heating elements.
43. It’s how you can tell if an atom has electrons.
44. It’s a way of identifying an unknown element from its protons.
45. It’s a way of identifying an unknown element from the light it emits.
46. Which of the following is characteristic of the Bohr model of the atom?
47. Orbitals near the nucleus have lower energy than those farther away.
48. Electrons can be found in circular orbits around the nucleus.
49. The energies of electrons can be determined by only one variable, n.
50. All of the above.
51. Which of the following is characteristic of the quantum model of the atom?
52. Electrons are treated as waves.
53. Electrons can be found in circular orbits.
54. Orbitals can hold up to six electrons at a time.
55. None of the above is true of the quantum model of the atom.
56. Which of these is the electron configuration of platinum (Pt)?
57. 1s2 2s2 2p6 3s2 3p6 4s2 3d10 4p6 5s2 4d10 5p6 6s2 4f14 5d8
58. 1s2 2s2 2p6 3s2 3p6 4s2 4d10 4p6 5s2 5d10 5p6 6s2 6f14 6d8
59. 5s2 4d10 5p6 6s2 4f14 5d8
60. 1s2 2s2 2p6 3s2 3p6 4s2 3d10 4p6 5s2 4d10 5p6 6s2 5f14 5d8
61. What element is represented by the electron configuration 1s2 2s2 2p6 3s2 3p6 4s2 3d10 4p6 5s2 4d1?
62. Scandium (Sc)
63. Yttrium (Y)
64. Lanthanum (La)
65. This doesn’t represent any element because it is not a valid electron configuration.
66. What is an orbital filling diagram?
67. A diagram that shows how many orbitals an atom has.
68. A diagram that shows how many protons an atom has.
69. A diagram that shows how many neutrons an atom has.
70. A diagram that shows the locations of the electrons in an atom.
71. What is Hund’s rule?
72. No two electrons can exist in the same atom.
73. Electrons prefer to stay unpaired in orbitals when possible.
74. Electron configurations reflect a “building up” of terms.
75. No two electrons can have the same four quantum numbers.
76. Which of the following is the best definition of the “scientific method”?
77. It is a method that’s used when graphing scientific data.
78. It’s a systematic stepwise method for approaching scientific problems.
79. It’s a systematic method for determining the independent variable in an experiment.
80. It’s an approach to doing science that involves a “guess and check” way of solving problems.
81. What is a hypothesis?
82. It’s a statement in which a prediction is made about what will happen when the independent variable in an experiment is changed.
83. It’s a statement in which a prediction is made about what will happen when the dependent variable in an experiment is changed.
84. It’s a statement that explains the purpose of an experiment.
85. It’s a summary of the data collected in an experiment.
86. Which of the following pieces of lab equipment can be used to accurately measure the volume of a liquid?
87. Graduated cylinder
88. Beaker
89. Erlenmeyer flask
90. Balance
91. What piece of lab equipment should *always* be worn by students?
92. Beaker
93. Safety hat
94. Goggles
95. Rubber gloves
96. Which of the following is NOT an SI base unit?
97. Meter
98. Second
99. Yard
100. All of the above are SI base units.
101. What does the prefix “milli-“ mean?
102. One thousandth (0.001)
103. One millionth (0.000001)
104. One thousand (1,000)
105. One million (1,000,000)
106. If I have 8.7 kilograms, how many centigrams is this?
107. 87 cg
108. 870 cg
109. 87,000 cg
110. 870,000 cg
111. What is the density of a ball that has a volume of 95 mL and a mass of 34 grams?
112. 0.036 g/mL
113. 0.36 g/mL
114. 0.28 g/mL
115. 2.8 g/mL
116. Which of the following is a good definition for accuracy?
117. It’s a measure of how often a measurement can be repeated.
118. It’s a measure of how close a measurement is to the actual value of the thing being measured.
119. It’s a measure of the precision of the measurement that’s being taken.
120. It indicates how many significant figures should be used when recording a measurement.
121. Which of these numbers has three significant figures?
122. 0.01
123. 0.010
124. 0.0010
125. 0.00100
126. Why do we use significant figures in chemistry?
127. To indicate the accuracy of the measurement being taken.
128. To indicate the accuracy we hope to get in an experiment.
129. To indicate the precision of the measurement being taken.
130. None of these are a good explanation for why we use significant figures.
131. Which of the following is not a characteristic of a good graph?
132. The data are graphed using a best fit line.
133. The independent variable is shown on the x-axis.
134. The best fit line should never pass through the origin.
135. Both axes are labeled
136. Which of these is a homogeneous mixture?
137. My Uncle Merle
138. Kool Aid
139. Ice-cold, refreshing Faygo brand diet cola
140. A mixture of rocks and water.
141. Which of these results in a chemical change?
142. Putting a hot dog in a blender
143. Putting a hot dog in a refrigerator
144. Putting a hot dog in a blast furnace
145. Soaking a hot dog in salt water until it shrivels up.
146. Which of these is an extensive property of my nephew’s hamster?
147. It does not rust when put into salt water.
148. It has a mass of 205 grams.
149. It is flammable (though this is *not* something we know from experience!)
150. All of the above are extensive properties of the hamster.

**Honors Chemistry Bonus Quiz, Day 2**

Quarter 2, 2021-22

1. When I heated a solid material, it turned into a liquid. This indicates a \_\_\_\_\_\_\_\_\_ change took place.
2. Intrinsic
3. Extrinsic
4. Chemical
5. Physical
6. Which of these real world examples is an example of the law of conservation of mass:
7. When 5.0 grams of compound A are combined with 10.0 grams of compound B, 15.0 grams of compound C are made.
8. The weight of a pizza is not equal to the masses of the ingredients that went into making it.
9. When a helium balloon that’s attached to a balance is popped, the balance records a higher mass than before.
10. All of these processes must, in some way, follow the law of conservation of mass because ALL processes follow the law of conservation of mass, even if we can’t always figure out how.
11. John Dalton had an atomic theory with five major points. Which of these is not a characteristic of his model of the atom?
12. Atoms are spherical
13. Atoms obey the law of conservation of energy
14. Atoms are indestructible
15. Atoms are very small
16. Which of these is not true of the plum pudding model of the atom?
17. The positive charge in the atom has negatively-charged electrons embedded in it.
18. Electrons can be easily pulled from the atom, while the positively-charged portion of the atoms cannot.
19. There is a positively-charged nucleus in the middle of the atom.
20. Electrons have negative charge, as shown by Thomson’s cathode ray experiment.
21. Which of these phenomena convinced Rutherford that the positive charge in an atom is concentrated in the nucleus?
22. His cathode ray experiment showed that anode rays move toward the negative pole of a magnet.
23. His gold foil experiment showed that the positively-charged radioactive particles he fired at a target were deflected by positively-charged nuclei.
24. All of the positively-charged particles he shot at his gold foil target went right through the foil without being deflected at all.
25. When positively-charged particles were fired at a gold foil target, a beam of electrons was formed.
26. Which of the following is true of the halogens?
27. They are relatively unreactive.
28. They tend to form ions with a +1 charge.
29. They are diatomic.
30. They are metals.
31. What family of the periodic table contains elements that would be best suited to use as fuel in nuclear power plants?
32. Lanthanides
33. Actinides
34. Transition metals
35. Main block elements
36. Which of the following best describes electronegativity?
37. It indicates how much energy is required to remove an electron from an atom.
38. It is a measurement of how much atoms expand when an electron is added to them.
39. It is a measurement of how much atoms tend to pull electrons away from other atoms they have bonded to.
40. It is a way of measuring the positive charge in the nucleus of an atom
41. Which of the following elements has the highest atomic radius out of all these choices?
42. Helium
43. Iodine
44. Lithium
45. Rubidium
46. Which of the following elements has the smallest ionization energy?
47. Fluorine
48. Lithium
49. Cesium
50. Iodine
51. Which of the following elements has six valence electrons?
52. Carbon
53. Oxygen
54. Gallium
55. Bromine
56. Which of the following may be true of an electron in an f-orbital?
57. ml is 3
58. l is 3
59. ms is +1/2
60. More than one of the above
61. Another term for d-block elements is:
62. Lanthanides
63. Actinides
64. Transition metals
65. All of these are technically correct
66. If a neutral atom gains an electron, which of the following is formed?
67. Proton
68. Electron
69. Cation
70. Anion
71. Why do metals and nonmetals generally react with one another to form ionic compounds?
72. Metals have low electronegativity and nonmetals have higher electronegativity, so it’s easy for metals to transfer electrons to nonmetals to form an anion and cation.
73. Metals have high electronegativity and nonmetals have lower electronegativity, so it’s easy for nonmetals to transfer electrons to metals to form a cation and anion.
74. Metals are noble gases, as are nonmetals.
75. The periodic trend for electronegativity down a group is decreasing electronegativity.
76. Which of the following is a general property of ionic compounds?
77. They conduct electricity as solids.
78. They conduct electricity when melted.
79. They have low melting and boiling points.
80. They are softer than the elements that make them up.
81. Why do ionic compounds generally have high melting and boiling points?
82. Cations are very hard
83. Anions are very hard
84. The attraction between anions and cations is strong
85. There is a lot of energy in the space around cation-cation interactions.
86. Generally speaking, why doesn’t carbon form ionic compounds?
87. Its low electronegativity means that it doesn’t tend to form ions.
88. Its high electronegativity means that it doesn’t tend to form ions.
89. It is a metalloid and metalloids generally don’t form ionic compounds with metals or nonmetals.
90. It is only moderately electronegative, making it difficult for it to either gain or lose electrons.
91. Which of these is a good definition of a “period” in the periodic table?
92. A collection of elements with similar properties.
93. A collection of elements with similar electron configurations.
94. It is another word for “group”.
95. A collection of elements in a row of the periodic table.
96. Which of the following is a good definition of the octet rule?
97. Lithium gaining an electron to form a +1 ion.
98. Lithium gaining an electron to form a -1 ion.
99. Helium losing an electron to form a +1 ion.
100. Chlorine gaining an electron to form a -1 ion.
101. 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?
102. Inner electrons are bigger than the outer electrons, making it harder to remove an electron from an atom.
103. Outer electrons are bigger than inner electrons, making it harder to remove an electron from an atom.
104. Inner electrons have a higher charge than outer electrons, making it easier for an atom to lose electrons.
105. The combined charge of the inner electrons push outer electrons away, making it easier to pull them away from the atom.
106. Which of the following is a reasonable explanation for why oxygen is less reactive than fluorine?
107. It has to lose two electrons to get the same number of valence electrons as neon.
108. It has to gain two electrons to get the same number of valence electrons as neon.
109. It has to lose six electrons to get the same number of valence electrons as helium.
110. It has to gain six electrons to get the same number of valence electrons as helium.
111. Which of the following is most likely not an ionic compound?
112. beryllium acetate
113. copper(I) hydroxide
114. carbon
115. potassium bromide
116. Why do salts conduct electricity when melted or dissolved in water?
117. Electricity is formed when water is melted.
118. Electricity can be caused by the movement of ions.
119. Stationary ions have electronegativity deficits.
120. The ions attach to water molecules and form ionic liquids.
121. Why are ionic compounds hard?
122. Metals are hard, so metal ions are also hard.
123. Ionic crystals are extremely stable and the ions are locked in place.
124. Covalent bonding causes the ions to repel outside forces.
125. Metallic bonding causes the ions to have a strong attraction toward each other.
126. What is the charge of an iron(II) ion?
127. -2
128. +2
129. +3
130. It varies on what compound it’s in.
131. What is the formula of the sulfide ion?
132. S
133. SO2
134. SO3
135. None of these
136. What is the name of Sr3N2?
137. strontium nitride
138. strontium (II) nitride
139. strontium nitrate
140. strontium (II) nitrate
141. What is the name of Mn2O7?
142. manganese oxide
143. magnesium oxide
144. manganese (II) oxide
145. manganese (VII) oxide
146. Who’s your favorite teacher?
147. Mr. Guch, because he’s perfect in every way.