**Topics in Chemistry Practice Midterm Questions**

1. How many electrons does aluminum have?
2. 13
3. 26.982
4. 27
5. None of these
6. How many neutrons are present in plutonium-243?
7. 94
8. 149
9. 243
10. 244
11. What is the atomic mass of the isotope of ruthenium with 56 neutrons?
12. 44
13. 100
14. 101
15. 112
16. Which of these best explains why elements have different isotopes?
17. Different numbers of neutrons can stabilize the positive charges in the nucleus
18. Different numbers of protons can stabilize the positive charges in the nucleus
19. Different numbers of protons can stabilize the negative charges in the nucleus
20. Different numbers of electrons can stabilize the negative charges in the nucleus
21. The atomic mass of an element is equal to which of these?
22. The number of protons in the atom
23. The number of neutrons in the atom
24. The number of protons + the number of neutrons in the atom
25. The number of protons + the number of electrons in the atom
26. The average atomic mass of an element is equal to which of these?
27. The number of protons in an atom.
28. The average of the atomic masses of all the isotopes
29. The average of the number of neutrons of all the isotopes
30. A weighted average of the atomic masses of all the isotopes
31. What is a continuous spectrum?
32. It’s a pattern of lines given off when an element is heated
33. It’s a pattern of lines given off when electrons fall from an excited state back down to the ground state.
34. It’s a series of colors given off by atoms when they gain energy
35. It’s a rainbow of colors given off when substances are heated.
36. What is an orbital?
37. It’s where electrons live
38. It’s where protons and neutrons live
39. It’s when atoms lose electrons due to the addition of energy
40. More than one of the above is correct.
41. What do we mean when we say that an electron is in a “ground state”?
42. It is in a low energy orbital
43. It is in a medium energy orbital
44. It is in a high energy orbital
45. It has jumped off of the atom to another atom.
46. Which of the following would NOT take place during the flame test?
47. The generation of a line spectrum
48. An excited state orbital is forced to hold three electrons.
49. The colors of light given off correspond to the energy difference between the ground state and excited state.
50. Electrons will fall from excited states back down to their ground states.
51. Which of the following is not characteristic of the Bohr model of the atom?
52. Electrons can be found in orbitals around the nucleus.
53. A maximum of two electrons can be found in an orbital.
54. Orbitals increase in energy as their distance increases from the nucleus.
55. All of the above are characteristic of the Bohr model of the atom.
56. Which of the following is not characteristic of the quantum model of the atom?
57. Electrons can be found in orbitals around the nucleus
58. A maximum of two electrons can be found in an orbital.
59. Orbitals increase in energy as their distance increases from the nucleus.
60. All of the above are characteristic of the Bohr model of the atom.
61. Which of the following is the best definition of “quantitative data”?
62. Data that involves numerical data.
63. Data that involves any observational data.
64. Data that doesn’t involve numerical data.
65. Data that doesn’t use numbers.
66. Which of these is an example of a good hypothesis?
67. If I eat a sandwich, then I have probably been sitting in the sun.
68. If I eat a sandwich, then I will no longer be hungry.
69. If I eat a sandwich containing old mayonnaise, then I will become sick.
70. More than one of the above is an example of a good hypothesis.
71. Which of the following pieces of lab equipment can be used to accurately measure the mass of a liquid?
72. Beaker
73. Graduated cylinder
74. Balance
75. Volumetric flask
76. What piece of lab equipment should always be worn by students?
77. Gloves
78. Apron
79. Dosimeter
80. Goggles
81. Which of the following is NOT an SI base unit?
82. Degree Fahrenheit
83. Kelvin
84. Meter
85. Gram
86. What does the prefix “centi-“ mean?
87. One-millionth
88. One-hundredth
89. One hundred
90. One million
91. If I have 8.7 centigrams, how many kilograms is this?
92. 87 kg
93. 0.87 kg
94. 0.087 kg
95. 0.0087 kg
96. Which of the following is a good definition for precision?
97. How close a measured value is to the actual value of the thing it’s measuring
98. How often a measurement is taken during an experiment.
99. How accurate the significant figures of an experiment are.
100. How often a measured value can be reproduced.
101. How many significant figures does the number 0.040 have?
102. 1
103. 2
104. 3
105. 4
106. Why do chemists use significant figures in their work?
107. To let others know the precision with which the data were collected.
108. To let others know how accurate their data are.
109. To let others know how many digits there are in measured data.
110. To demonstrate a clear knowledge of the experimental procedure.
111. Which of these is an example of the law of conservation of mass:
112. When I hit my son with a water balloon, the weight of my wet son was the same as the weight of my dry son plus the weight of the water in the balloon.
113. When I rear ended somebody else’s car with mine, the original weight of my car was equal to the weight of my crashed car and the bumper that fell from it.
114. When I washed my cat, the weight of the water that was originally in the tub was equal to the weight of the final weight of the water in the tub plus the weight of the water that my cat had splashed around.
115. All of these are examples of the law of conservation of mass.
116. John Dalton had an atomic theory with five major points. Which of these is not a characteristic of his model of the atom?
117. Atoms are small
118. Atoms contain electrons
119. Atoms obey the law of conservation of mass
120. Atoms cannot be destroyed
121. Which of these is not true of the plum pudding model of the atom?
122. Atoms contain electrons
123. Atoms contain orbitals
124. Electrons are embedded in a ball of positive charge.
125. More than one of the above is not true of the plum pudding model of the atom.
126. Which of the following is true of the alkaline earth metals?
127. They have high melting and boiling points
128. They are hard and brittle
129. They are extremely reactive
130. They form ions with a +1 charge
131. What family of the periodic table contains elements that would be best suited to kill bacteria at a water treatment plant?
132. Halogens
133. Alkali metals
134. Alkaline earth metals
135. Noble gases
136. Which of the following elements has four valence electrons?
137. Copper
138. Silicon
139. Gallium
140. Sulfur
141. Why doesn’t hydrogen have similar properties to the other elements in group 1?
142. It is a nonmetal
143. It is a metal
144. It is extremely electronegative
145. It is smaller than the other elements in group 1
146. If a neutral atom loses an electron, which of the following is formed?
147. Cation
148. Anion
149. Polyatomic ion
150. Neutral atom
151. Which of the following is not a general property of ionic compounds?
152. They have high melting and boiling points
153. They are hard and brittle
154. They form crystals
155. They are flammable.
156. Why are ionic compounds hard?
157. Ionic compounds form crystals where the ions are held tightly to one another.
158. Ionic compounds don’t form crystals, so their amorphous structure makes them inflexible.
159. Ionic compounds have high melting points.
160. Ionic compounds have low boiling points.
161. Generally speaking, why does fluorine form so many ionic compounds?
162. It is a nonmetal
163. It has lots of valence electrons
164. It is extremely electronegative so it’s good at pulling electrons off other atoms.
165. It wants to be like a noble gas, causing it to readily lose electrons.
166. Which of the following is a good definition of a family in the periodic table?
167. It is a column in the periodic table
168. It is a row in the periodic table
169. It contains nonmetals and metalloids
170. It contains only metals.
171. Which of the following is a poor definition of the octet rule?
172. Elements want to gain or lose electrons to get the same electron configurations the nearest noble gas.
173. Elements will become cations if they need to gain electrons to be like the nearest noble gas, and become anions if they need to lose electrons to be like the nearest noble gas.
174. All elements want to be like the nearest noble gas.
175. Because noble gas electron configurations are extremely stable, all elements want to get similar electron configurations to them.
176. Which of the following is most likely an ionic compound?
177. Sodium acetate
178. Nitrogen
179. Copper (II) sulfate
180. More than one of these is an ionic compound.
181. Why don’t salts conduct electricity unless they are melted or dissolved in water?
182. Moving ions result in electrical conductivity.
183. Moving ions cause conductivity to increasingly insulate going across a period.
184. Moving ions cause new crystal lattices to form when compounds are melted or dissolved in water.
185. Ions remain stationary, causing charged ions to conduct electricity.
186. Why do ionic compounds have high melting and boiling points?
187. Ionic compounds contain metals, which have high melting and boiling points.
188. Ionic compounds are brittle, causing them to shatter when heated.
189. Ionic compounds conduct electricity, causing the ions to stick together in higher temperatures.
190. The interaction between cations and anions is very strong, requiring a great deal of energy to break.
191. What is the charge of a phosphide ion?
192. +3
193. -3
194. +1
195. -1
196. What is the difference between a copper(I) and copper(II) ion?
197. Compounds containing copper(I) are green and compounds containing copper(II) are blue.
198. Copper(I) has a higher ionization energy
199. Copper(II) can be used to form ionic compounds and copper(I) cannot.
200. Copper(II) has a higher positive charge than copper(I)
201. Why do metals usually form cations in ionic compounds?
202. Metals have low electronegativities
203. Metals lose electrons when placed into contact with electronegative elements.
204. Nonmetals have much higher electronegativities than metals.
205. All of the above.
206. Why do covalent compounds have a much lower melting point than ionic compounds?
     1. Covalent compounds form crystals with strong bonds
     2. Covalent compounds exist as molecules that don’t interact much with each other
     3. Covalent bonds need to be broken in order for covalent compounds to melt.
     4. Covalent compounds have weak charges that don’t interact much.

Name these:

43. CuSO4

44. H2S

45. C60

46. N2S4

47. ammonia

Write the formulas of these:

48. nitrogen trifluoride

49. cobalt (III) oxide

50. sulfur

51. methane

52. magnesium bicarbonate