**Atomic Structure questions**

Name and date submitted (3 pts):

Instructions: Using the template below, write or type your answers. KEEP THE SAME NUMBERING SYSTEM or I will deduct points! Upload to Canvas by the due date.

(35 questions, 70 points total, average of 2 points each)

Atomic structure

1. What does the word ‘atomos’ mean?
2. What is an atom?
3. What is the difference between an atom and a molecule?
4. Describe the composition of the nucleus of the atom (what subatomic particles are in the nucleus?)
5. What is the meaning of “atomic number”?
6. What is the meaning of “atomic mass”?
7. Compare/contrast the three types of subatomic particles in terms of

location in the atom relative mass relative charge

Protons

Neutrons

Electrons

1. How many protons are in the nuclei of the following elements?
   1. Sulfur
   2. Hydrogen
   3. Phosphorus
   4. Chlorine
   5. Calcium
2. What is the atomic mass of
   1. Oxygen
   2. Aluminum
   3. Copper
   4. Gold

Isotopes

1. What is meant by “isotope”?
2. Determine the number of protons, neutrons, and electrons in each of the three isotopes of hydrogen

protons neutrons electrons

* 1. H-1
  2. H-2
  3. H-3

1. Determine the number of protons, neutrons, and electrons in carbon-14 (C-14)
   1. Protons
   2. Neutrons
   3. Electrons
2. Two isotopes of oxygen are oxygen-16 and oxygen-18. Determine the number of protons, neutrons, and electrons in each

protons neutrons electrons

* 1. O-16
  2. O-18

1. What is the basic atomic difference between isotopes of the same element?
2. If your chemistry grade is broken down so that 50% of it is based on tests, 25% on lab reports, 15% quizzes, and 10% homework, what is your weighted average score if your individual breakdown is as follows? tests=83, labs=94, quizzes=96, homework=95
3. Bromine-79 comprises 50.54% of naturally occurring bromine, and Bromine-81 comprises the other 49.46%. The mass of Br-79 is 78.9183 amu. The mass of Br-81 is 80.9163 amu. What is the atomic mass of naturally occurring bromine?
4. Element X has two naturally occurring isotopes. One isotope has a mass of 35.0 amu and comprises 75.4% by mass of the element. The other isotope has a mass of 37.0 amu.
   1. What is the atomic mass of element X?
   2. What is the name of element X?
5. Write isotopic notation for the atoms or ions that have these compositions
   1. 8 protons, 8 neutrons, 8 electrons [Example: 816O]
   2. 14 protons, 14 neutrons
   3. 1 proton, 1 neutron
   4. 80 protons, 120 neutrons
   5. 26 protons, 30 neutrons, 23 electrons (be careful)

Atomic theory

1. State the law of conservation of mass
2. Compound Z is made by chemically combining elements X and Y. If only 4 grams of element Y were used to make 12 grams of compound Z, how many grams of element X were required?
3. According to the law of conservation of mass, if element A has a mass of 2 mass units, and element B has a mass of 3 mass units, what mass would be expected for compound AB2?
4. State the law of definite proportions
5. A yellow material was decomposed and found to contain 22.0 g of sodium and 26.9 g of sulfur. Another yellow material was decomposed and found to contain 11.4 g of sodium and 26.5 g of sulfur. Using the law of definite proportions, determine if these two compounds are the same substance.

SAT Test Questions

1. Answer questions ‘a-c’ with the correct answer from the answer bank. Type out the whole answer or you won’t get credit.
   1. Provides that all matter may be considered as a wave \_\_\_\_\_\_
   2. Views electrons in true orbits around the nucleus \_\_\_\_\_\_\_
   3. Considers that one cannot know the position and velocity of an electron at the same moment \_\_\_\_\_\_

Answer bank:

Bohr model

De Broglie’s hypothesis

Heisenberg principle

Quantum theory

Atomic theory

1. The electron configuration 1s2 2s2 2p6 3s2 3p6 4s2 3d7 represents an atom of the element
   1. Br
   2. Co
   3. Cd
   4. Ga
   5. Mg

Famous Chemistry Scientists

Research the scientists listed below using your book and the Internet. Provide the information requested. Do not say, “I couldn’t find any information on him”; there are literally thousands of web pages on each of these. If you give lazy answers, you won’t get credit.

1. Democritus
2. Dates when he lived
3. Where he was from
4. His ideas/theory
5. Alchemists
6. Define alchemy and alchemists
7. What important contributions did they make to chemistry
8. Lavoisier
9. Dates when he lived
10. Where from
11. Laws – define/explain
12. How was he important to chemistry
13. John Dalton
14. Dates when he lived
15. Where from
16. List all 4 or 5 parts of his atomic theory. I don’t care if you think it’s 4 or 5; I just want you to list them all.
17. J.J. Thomson
18. Dates when he lived
19. Where from
20. Explain his cathode ray tube experiment
21. What did he discover
22. Explain his Plum Pudding Model
23. Millikan
24. Dates when he lived
25. Where from
26. What did he discover
27. Describe his Oil Drop Experiment
28. Rutherford
29. Dates when he lived
30. Where from
31. What did he discover
32. Explain his Gold Foil experiment
33. Niels Bohr
34. Dates when he lived
35. Where from
36. Explain his Quantized or “Planetary” Model of the atom
37. James Chadwick
38. Dates when he lived
39. Where from
40. Explain how he discovered the Neutron in 1932
41. De Broglie
42. Dates when he lived
43. Where from
44. Explain his contribution as best you can