AT Chemistry Chapter 2 Problems

1. The radius of a Cl nucleus is 4.0 fm (femtometer), and the radius of a Cl atom is 100 pm (picometer). (1 fm = 1 X 10-15m; 1 pm = 1 X 10-12m).

a) How many times larger is the diameter of the Cl atom than the diameter of the Cl nucleus?

b) If you are standing in a 1 meter square block in room 388 (the chemistry room!) at Scarsdale High, and we make the analogy the 1 meter is the diameter of the nucleus, calculate the distance in meters, feet, and miles that would represent the distance to the end of the entire atom. Note: 1 m = 3.20 ft, 1 mile = 5280 ft.

c) How many times larger is the volume of the atom than the volume of the nucleus?

(The formula for the volume of a sphere is 4/3πr3).

d) Compare the density of the Cl atom to the density of the Cl nucleus for a Cl-37 isotope of Cl. Determine the densities in g/cm3. Note: the mass of 1 proton = 1.673 X 10-27 kg and the mass of 1 neutron = 1.675 X 10-27 kg.

After these calculations you should be saying “WOW! I never realized just how small the nucleus is compared to the atom and how much more dense the nucleus is compared to the atom.”

1. Identify the elements that correspond to the following atomic numbers. Label each as either a noble gas, a halogen, an alkali metal, an alkaline earth metal, a transition metal, a lanthanide metal, or an actinide metal.
2. 17
3. 4
4. 63
5. 72
6. 2
7. 92
8. 55
9. What is the isotopic notation for an ion with 63 protons, 60 electrons, and 88 neutrons?

What is the isotopic notation for an ion with 50 protons, 48 electrons, and 68 neutrons

1. Name the following compounds
2. NaBr
3. Rb2O
4. CaS
5. AlI3

Write formulas for the following compounds

1. Strontium fluoride
2. Aluminum selenide
3. Potassium nitride
4. Magnesium phosphide
5. Name the following compounds
6. Hg2O
7. FeBr3
8. CoS
9. TiCl4

Write formulas for the following compounds

1. Tin(II)nitride
2. Cobalt(III)iodide
3. Mercury(II)oxide
4. Chromium(VI)sulfide
5. Name each of the following compounds
6. CsF
7. Li3N
8. Ag2S
9. MnO2
10. TiO2
11. Sr3P2
12. Write formulas for each of the following compounds:
13. Zinc chloride
14. Tin(IV)fluoride
15. Calcium nitride
16. Aluminum sulfide
17. Mercury(I)selenide
18. Silver iodide
19. Name each of the following compounds:
20. BaSO3
21. NaNO2
22. KMnO4
23. K2Cr2O7
24. Write formulas for each of the following compounds:
25. Chromium(III)hydroxide
26. Magnesium cyanide
27. Lead(IV)carbonate
28. Ammonium acetate
29. Name each of the following compounds
30. NO2
31. ICl3
32. SO2
33. P2S5
34. Write the formula for each of the following compounds:
35. Diboron trioxide
36. Arsenic pentafluoride
37. Dinitrogen monoxide
38. Sulfur hexafluoride
39. Name each of the following compounds:
40. CuI
41. CuI2
42. CoI2
43. Na2CO3
44. NaHCO3
45. S4N4
46. SF4
47. NaOCl
48. BaCrO4
49. NH4NO3
50. Name each of the following compounds. Assume the acids are dissolved in water.
51. HC2H3O2
52. NH4NO2
53. Co2S3
54. ICl
55. Pb3(PO4)2
56. KClO3
57. H2SO4
58. Sr3N2
59. Al2(SO3)3
60. SnO2
61. Na2CrO4
62. HClO
63. Elements in the same family often form oxyanions of the same general formula. The anions are named in a similar fashion. What are the names of the oxyanions of selenium and tellurium?
64. SeO42-
65. SeO32-
66. TeO42-
67. TeO32-
68. Knowing the names of similar chlorine oxyanions a Knowing the names of similar chlorine oxyanionsa nd acids, deduce the names of the following:

IO- HIO

IO2- HIO2

IO3- HIO3

IO4- HIO4

1. nd acids, deduce the names of the following:

IO- HIO

IO2- HIO2

IO3- HIO3

IO4- HIO4

1. Write the formula for each of the following:
2. Sulfur difluoride
3. Sulfur hexafluoride
4. Sodium dihydrogen phosphate
5. Lithium nitride
6. Chromium(III)carbonate
7. Tin(II)fluoride
8. Ammonium acetate
9. Ammonium hydrogen sulfate
10. Cobalt(III)nitrate
11. Mercury(I)chloride
12. Potassium chlorate
13. Sodium hydride
14. Write the formula for each of the following:
15. Chromium(VI)oxide
16. Disulfur dichloride
17. Nickel(II)fluoride
18. Potassium hydrogen phosphate
19. Aluminum nitride
20. Ammonia
21. Manganese(IV)sulfide
22. Sodium dichromate
23. Ammonium sulfite
24. Carbon tetraiodide
25. Write formulas for each of the following compounds:
26. Sodium oxide
27. Sodium peroxide
28. Potassium cyanide
29. Copper(II)nitrate
30. Selenium tetrabromide
31. Iodous acid
32. Lead(IV)sulfide
33. Copper(I)chloride
34. Gallium arsenide
35. Cadmium selenide
36. Zinc sulfide
37. Nitrous acid
38. Diphosphorous pentoxide
39. Write the formula for each of the following compounds:
40. Ammonium hydrogen phosphate
41. Mercury(I)sulfide
42. Silicon dioxide
43. Sodium sulfite
44. Aluminum hydrogen sulfate
45. Nitrogen trichloride
46. Hydrobromic acid
47. Bromous acid
48. Perbromic acid
49. Potassium hydrogen sulfide
50. Calcium iodide
51. Cesium perchlorate
52. Name the following acids:
53. HNO3
54. HClO4
55. HC2H3O2
56. H2SO4
57. H3PO4
58. The formulas and common names for several substances are given below. Give the systematic names for these substances.
59. Sugar of lead Pb(C2H3O2)2
60. Blue vitriol CuSO4
61. Quicklime CaO
62. Epsom salts MgSO4
63. Milk of magnesia Mg(OH)2
64. Laughing gas N2O