1st Semester Review 2008-2009

Find the molar mass for each of the following

1. $FeCrO_4$
2. $BaCl_2$
3. $NaC_2H_3O_2$
4. ammonium sulfide
5. dinitrogen monoxide
6. How many protons does the isotope I-129 have?
7. How many neutrons does the isotope 129 I have?
8. How many electrons does a Ba^{+2} ion have?
9. What is the mass of a diamond that has a volume of 1.7 ml and a density of 1.06 g/cm^3?

WRITE THE FOLLOWING IN NORMAL NUMBER NOTATION

10) 2.3×10^3 11) 4.7×10^{-7} 12) 5.3×10^{-4}

WRITE THE FOLLOWING IN STANDARD SCIENTIFIC NOTATON

13) 0.016 30 14) 2 020 500 15) 0.002020

SOLVE THE FOLLOWING SHOWING ALL WORK, INCLUDE UNITS (Remember sig figs)

16) 6.7 m → cm

17) 17.7 g → mg

8) 8 MOLES OF → g of O (16 g of O =1 mole of O)

REMEMBER SIG FIGS

9) 4.1 +6.29 20) 0.1 x 7.01 21) 7.6 x 2.94 22) 7.8×10^4 1.9×10^2

23) 42.640 24) 0.000 120 25) 4920

Convert these temperatures

26. 234 ^oC to _____ K
27. 654K to _____ ^oC
28. 25 ^oC to _____ K

Name these compounds

29. SODIUM BROMIDE
30. IRON (III) CHLORIDE
31. CARBON MONOXIDE
32. CALCIUM SULFIDE
33. CARBON TETRAHYDRIDE
34. AMMONIUM SULFITE
35. MAGNESIUM BICARBONATE
36. COPPER (III) OXIDE
37. SULFER TRIOXIDE
38. SODIUM CHROMATE

NAME THE FOLLOWING COMPOUNDS AND MOLECULES

39. MgS
40. FeS
41. Al_2O_3
42. $(NH_4)_3PO_4$
43. N_2O_4
44. N_2O
45. CO_2
46. CuCl
47. Na_2SO_3
48. $MgSO_4$
49. H_2SO_3
50. H_2S

PUT THE FOLLOWING IN THEIR EMPIRICAL FORMULA

51. $C_2H_6O_3$
52. $CaCl_2$
53. H_2O_2
54. Cl_2H_6

55. What is the percentage by mass of oxygen in $CaCO_3$?
    a. 48% b. 64.0% c. 60.0% d. 92.3%

56. The normal melting point of ice on the Kelvin scale is
    a. 0.0 K b. 32 K c. 80 K d. 273 K

57. The empirical formula of a compound is CH. If the molecular mass of the compound is 78 g/mol, then the molecular formula is:
    a. CH b. C_3H_6 c. C_5H_{18} d. C_6H_6

58. Which expression gives the number of atoms in 44 g of CO_2?
    a. 6.02×10^{23} b. 1.81×10^{24} c. 22.4 d. 2 moles

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59. What is the molar mass of ammonium sulfide?
a. 38 g/mol b. 44 g/mol c. 50 g g/mol d. 68 g/mol

60. A compound consists of 72.2% magnesium and 27.8% nitrogen by mass. What is the empirical formula?

Balance the following equations:

61. $C_2H_3 + O_2 \text{ -------> } CO_2 + H_2O$

62. $Na + H_2O \text{ ---> } NaOH + H_2$

63. $H_3PO_4 \text{ ---> } H_4P_2O_7 + H_2O$

64. $C_{10}H_{16} + Cl_2 \text{ ---> } C + HCl$

65. $CO_2 + NH_3 \text{ ---> } OC(NH_2)_2 + H_2O$

Identify whether the following are metals, nonmetals or metalloids.

66. Zn
67. He
68. H
69. Re
70. B
71. Ba

Nuclear Chemistry

Write the balanced nuclear equation for the decay of each of the following nuclides

72. beta decay of I-136
73. alpha decay of Pu-234
74. positron production by C-11
75. Write a balanced nuclear equation for the bombardment of Al-27 with alpha particles to produce P-30 and a neutron.
76. What is the difference between nuclear fission and nuclear fusion?
77. $^{210}_{84}Po \rightarrow {}^{4}_{2}He + ?$ What is the second product (also known as the daughter)?
78. What type of decay is demonstrated in the following reaction?
$^{60}_{27}Co \rightarrow$ _____ + $^{60}_{28}Ni$

List what type the following reactions are:

double displacement, single displacement, oxidation/reduction (redox), combustion, acid-base, decomposition, precipitation, synthesis

79. $NaOH + KNO_3 \rightarrow NaNO_3 + KOH$
80. $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$
82. $2\ Fe + 6\ NaBr \rightarrow 2\ FeBr_3 + 6\ Na$
83. $CaSO_4 + Mg(OH)_2 \rightarrow Ca(OH)_2 + MgSO_4$
84. $NH_4OH + HBr \rightarrow H_2O + NH_4Br$
85. $Pb + O_2 \rightarrow PbO_2$
86. $Na_2CO_3 \rightarrow Na_2O + CO_2$

87. Which is a precipitate in this equation?
$AgNO_3(aq) + NaCl(aq) \text{ -------> } AgCl(s) + NaNO_3(aq)$
88. Write the net ionic equation for the following equation
$AgNO_3(aq) + NaCl(aq) \rightarrow AgCl(s) + NaNO_3(aq)$
89. Write the net ionic equation for the following equation
$Fe(s) + 2AgNO_3(aq) \rightarrow 2Ag(s) + Fe(NO_3)_2(aq)$
90. According to the following unbalanced equation:
$\_\_\_CH_3OH + \_\_\_O_2 \rightarrow \_\_\_H_2O + \_\_\_CO_2$
how many grams of oxygen would be required to react completely with 198 g of CH_3OH?
91. What is the % yield of water in a reaction in which the theoretical yield is 45.52 g of H_2O and actual yield is 36.25 g of H_2O?

Limiting Reactant Problem

$2C_2H_6 + 7\ O_2 \rightarrow 4\ CO_2 + 6\ H_2O$

If we begin with 2.36 moles of C_2H_6 and 7.31 moles of O_2, and the reaction goes to completion,

92. How many moles of CO_2 will be produced?
93. How many grams of H_2O will be produced?
94. How many moles of C_2H_6 will be left un-reacted?