Big Chem: Unit 5 The Mole

PRINT Name _____ Period _____

1. **Calculate the molecular or formula masses of the following compounds, all in amu (g/mol):**

a. C_2H_6, b. $SiCl_4$, c. $MgCO_3$, d. $Ca_3(PO_4)_2$, e. K_2S, f. CH_2CHCH_2OH, g. $Pb_3(AsO_4)_2$, h. $C_{12}H_{22}O_{11}$.
Ans: a=30, b=170, c=84, d=310, e=110, f=58, g=899, h=342.

Make the following conversions SHOWING YOUR METHOD, the *Hup, Two, Three, Four!*

2. 1.00 x 10^{26} molecules of $SnCl_2$ to moles. Ans: 1.66 X 10^{2} mol.
3. 0.400 moles of H_2O to molecules. Ans: 2.41 X 10^{23} molecules.
4. 76.0 grams $CaBr_2$ to moles. Ans: 0.380 mol. Or 3.80 X 10^{-1} mol.
5. 18.0 grams HBr to moles. Ans: 0.222 mol. Or 2.22 X 10^{-1} mol.
6. 9.30 moles SiH_4 to molecules. Ans: 5.60 X !0^{24} molecules.
7. Find the mass of one atom of Na. Ans. 3.82 X 10^{-23}g/atom
8. Find the mass of one molecule of H_2SO_4. Ans. 1.63 X 10^{-22} g/molecule.

Compute the molarity of the following solutions:

9. 145 g NH_4Cl in 500 ml of solution. Ans: 5.4 M
10. 41.3 g $Fe(NO_3)_2$ in 100 ml of solution. Ans: 2.3 M
11. 35.0 g $MnSiF_6$ in 50.0 ml of solution. Ans: 3.56 M

SHOW YOUR METHOD, the *Hup, Two, Three, Four!*

Describe the preparation of the following solution:

12. 500 ml of 1.50 M AgF.
Ans: Dissolve 95.3 g of AgF in enough water to make 500ml of solution.

Find the percentage composition of the following:

13. CsF. Ans: 87.5%; 12.5%.
14. Bi_2O_3. Ans: 89.7%, 10.3%.
15. BaH_2. Ans: 98.6%, 1.44%.

Find the empirical formulas of the following compounds:

16. l.67 g Ce, 4.54 g I. Ans: CeI_3
17. 6.27 g Ca, 1.46 g N. Ans: Ca_3N_2

18. The molecular mass of benzene is 78 and its empirical formula is CH. What is the molecular formula for benzene? Ans: C_6H_6
19. What is the molecular formula of dichloroacetic acid, if the empirical formula is CHOCl and the molecular mass is 129g/mol? Ans: $C_2H_2O_2Cl_2$

Find the formulas for the following hydrates:

20. 95.3 g $LiNO_3$, 74.7 g H_2O. Ans: $LiNO_3 \bullet 3H_2O$
21. 89.2% $BaBr_2$, 44.6% H_2O *(Note: %-ages may be replaced with grams because they are in the same ratio).* *Ans:* $BaBr_2 \bullet 8H_2O$
22. Explain the difference between the terms mole and molarity.
23. Explain the difference between an empirical formula and a molecular formula.

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Turn in at the Beginning of the Period when due.