37. Calculate the empirical and molecular formula for the following compound.
skip
38. Complete the following reaction:
$2C_2H_2 + 5O_2 \rightarrow$ __4 CO_2 + 2 H_2O_____
39. How many atoms enter the reaction? 18 How many atoms leave the reaction? 18
40. How many molecules of carbon dioxide produced? __4_____
41. How many atoms of oxygen gas are consumed? __10_____

For questions 42-45 complete the word problem by predicting the product, write the balanced equation and identify the type of reaction.

42. Ammonia when heated produces ___nitrogen gas and hydrogen gas_____
Type of reaction: __decomp_____
Equation:
2 $NH_3 \rightarrow N_2$ (g) + 3 H_2 (g)

43. Carbon reacts with ferric oxide produces _carbon dioxide and iron_____
Type of reaction: __single replacement_____
Equation:
3 C + 2 $Fe_2O_3 \rightarrow$ 3 CO_2 + 4 Fe

44. Chlorine gas and potassium bromide react to form potassium chloride and bromine gas
Type of reaction: _single replacement_____
Equation:
Cl_2 (g) + 2 KBr $\rightarrow$ 2 KCl + Br_2 (g)

45. Silver nitrate and sodium chloride react to form silver chloride and sodium nitrate
Type of reaction: __double replacement_____
Equation:
$AgNO_3$ + NaCl $\rightarrow$ AgCl + $NaNO_3$

Find the mass in one mole of:

46. $Hg_2(SO_3)$ 481.25 g/mol

47. Al_2O_3 101.96 g/mol

48. $Ca(MnO_4)_2$ 277.96 g/mol

How many moles are in the following:

49. 98g of H_2SO_4 1.0 mol H_2SO_4

50. 7g of N_2 0.2 mol N_2

51. 0.051g of NH_3 0.0030 mol NH_3

master equation - Stoichs.

amt. given $\times \frac{1\text{ mol given}}{\text{molar mass or 22.4L given}} \times \frac{\text{molar ratio}}{} \times \frac{\text{molar mass or 22.4L needed}}{1\text{ mol needed}}$

STP

1 mol = 22.4 L

molar ratio uses coefficients of the balanced equation

$\frac{\#\text{ mol needed}}{\#\text{ mol given}}$

Find the volumes of the following:

52. 1 mole of oxygen gas 22.4L O_2
53. 3.5 moles water 78.4L H_2O
54. 10.0 moles of nitrogen gas 224L N_2

Consider the following equation:

$2\ Ca + O_2\ (g) \rightarrow 2\ CaO$

55. How many moles of CaO would be produced by 3 moles of Ca?

$3\text{ mol Ca} \times \frac{2\text{ mol CaO}}{2\text{ mol Ca}} = 3\text{ mol CaO}$ mol→mol 1step

56. How many grams of CaO would be produced by 54.3 grams of oxygen gas?

$54.3\text{g } O_2 \times \frac{1\text{ mol } O_2}{32.00\text{g } O_2} \times \frac{2\text{ mol CaO}}{1\text{ mol } O_2} \times \frac{56.08\text{g CaO}}{1\text{ mol CaO}} = 190.\text{g CaO}$ mass→mass 3steps

57. How many liters of oxygen gas would be needed to produce 23.7 grams of CaO?

$23.7\text{g CaO} \times \frac{1\text{ mol CaO}}{56.08\text{g CaO}} \times \frac{1\text{ mol } O_2}{2\text{ mol CaO}} \times \frac{22.4\text{L } O_2}{1\text{ mol } O_2} = 4.73\text{L } O_2$ start 3steps

mass→vol.

Consider the following equation:

$Zn + 2\ HCl\ (aq) \rightarrow H_2(g) + ZnCl_2$

58. How many grams of Zn are needed to produce 11.2L of hydrogen gas?

$11.2\text{L } H_2 \times \frac{1\text{ mol } H_2}{22.4\text{L}} \times \frac{1\text{ mol Zn}}{1\text{ mol } H_2} \times \frac{65.39\text{g Zn}}{1\text{ mol Zn}} = 32.7\text{g Zn}$ VH→mass 3steps

Complete the following word problems.

$\frac{V_1P_1}{T_1} = \frac{V_2P_2}{T_2}$

$PV = nRT$

$PV_m = gRT$

$P_{TOT} = P_1 + P_2 + P_3$

59. A gas at STP occupies 4L, if the pressure was lowered to 560mmHg what would the new volume be?

$(4\text{L})(760\text{ mmHg}) = (V_2)(560\text{mmHg})$ $V_2 = 5\text{L}$

60. The pressure exerted by a confined gas at 250K is 600 mmHg. What pressure would be exerted at 750K?

$\frac{600\text{mmHg}}{250\text{K}} = \frac{P_2}{750\text{K}}$ $P_2 = 2000\text{mmHg}$

61. A gas at 4 atm and 350K occupies a volume of 52.3cm^3, what is the new volume if we bring everything to STP?

$\frac{(52.3\text{cm}^3)(4\text{ atm})}{350\text{K}} = \frac{V_2(1\text{ atm})}{273\text{K}}$ $V_2 = 200\text{cm}^3$

62. How many grams of oxygen gas are present if it occupies 2.62L at 285°C and 3.42 atm?

$(3.42\text{atm})(2.62\text{L}) = n(0.0821\text{ Latm/molK})(558\text{K})$ $n = 0.196\text{mol} \rightarrow 6.26\text{g } O_2$

63. We need to inflate a ballon to a volume of 1.250L with 0.2494g of helium, if the pressure is 1.26atm what temperature do we need (in °C)?

$(1.26\text{atm})(1.250\text{L}) = (0.06235\text{mol})(0.0821\text{ Latm/molK})(T)$ $T = 34.7°\text{C}$

64. What is the molarity of a glucose solution if the is 0.20 mol of glucose dissolved in 750ml of water?

$M = \frac{0.20\text{mol}}{0.750\text{L}} = 0.27\text{M}$

63. $(1.26\text{atm})(1.25\text{L})\left(4.00\frac{\text{g}}{\text{mol}}\right) = (0.2494\text{g})\left(0.0821\frac{\text{Latm}}{\text{molK}}\right)T$