**Moles, Liters, Grams and Atoms**

1) 0.500 mol of Al = _____ Al atoms.

2) 1.50 mol $H_2O$ = _____ $H_2O$ molecules.

3) 12 X $10^{23}$ $H_2$ molecules =_____ mole $H_2$.

4) 12 X $10^{24}$ $H_2$ molecules = _____ mole $H_2$.

5) 18 X $10^{23}$ $O_2$ molecules = _____ mole $O_2$.

6) 4.50 mole $CO_2$ = _____ $CO_2$ molecules.

7) 1 mole $H_2O$ molecules = _____ moles of atoms.

8) 2 moles $CH_4$ molecules = _____ moles of atoms.

9) 2 moles $C_6H_{12}O_6$= _____ moles of C, _____ moles of H, and _____ moles of O.

10) 0.50 mole $Ca(OH)_2$= _____ mole Ca, _____ mole O, and _____ mole H.

For problems 11 through 28, use the following information:

| | | |
|---|---|---|
| $CaCO_3$ = 100.0 g/mol | $SiO_2$ = 60.0 | $H_3PO_4$ = 98.0 g/mol |
| $H_2$ = 2.0 g/mol | $N_2O_5$ = 108.0 g/mol | $C_3H_8O$ = 60.0 g/mol |
| $CH_4$ = 16.0 g/mol | $(NH_4)_2SO_4$ = 132 g/mol | |

| | |
|---|---|
| 11) 10.0 g $H_2$ = _____ mol H2 | 12) 5.89 g Co = _____ mol Co |
| 13) 600 g $SiO_2$ = _____ mol SiO2 | 14) 2.00 mol $SiO_2$ = _____ g $SiO_2$ |
| 15) 2.00 mol $N_2O_5$ = _____ g N2O5 | 16) 0.500 mol $H_3PO_4$ = _____ g $H_3PO_4$ |

| | |
|---|---|
| 17) 5.0 g $H_2$ = _____ mol H2 | 18) 3.2 mol $H_2$ = _____ g $H_2$ |
| 19) 1.32 g $(NH_4)_2SO_4$ = _____ mol | 20) 2.50 mol $C_3H_8O$ = _____ g $C_3H_8O$ |
| 21) 11.2 L $N_2$ @ STP = _____ mol | 22) 11.2 L $CH_4$ @ STP = _____ mol $CH_4$ |
| 23) 112 L $O_2$ @ STP = _____ mol | 24) 44.8 L $O_2$ @ STP = _____ mol $O_2$ |
| 25) 0.500 mol $H_2$ @ STP = _____ L | 26) 10.0 mol $N_2$ @ STP = _____ L |
| 27) 0.100 mol $Cl_2$ @ STP = _____ L | 28) 0.200 mol $F_2$ @ STP = _____ L |

29) 0.500 mol $CH_4$ = _____ g $CH_4$ = _____ L $CH_4$ @ STP

30) 12 X $10^{23}$ $O_2$ = _____ mol $O_2$ = _____ g $O_2$ = _____ L $O_2$ @ STP

31) 3.00 mol $N_2$ = _____ $N_2$ molecules = _____ g $N_2$ = _____ L $N_2$ @ STP

32) 2.24 L He @ STP = _____ mol He = _____ He atoms = _____ g He

33) 120.0 g NaOH = _____ mol NaOH = _____ NaOH formula units

34) 110.0 g $CO_2$ = _____ mol $CO_2$ = _____ $CO_2$ molecules = _____ L @ STP

35) 35.5 g $Cl_2$ = _____ mol $Cl_2$ = _____ L @ STP = _____ $Cl_2$ molecules

36) 1.60 g $CH_4$ = _____ mol $CH_4$ = _____ L @ STP = _____ $CH_4$ molecules

37) 44.8 L @ STP $CH_4$ = _____ mol $CH_4$ = _____ g $CH_4$ = _____ $CH_4$ molecules

38) 448 L @ STP $CO_2$ = _____ g $CO_2$ = _____ $CO_2$ molecules

39) 12 X $10^{23}$ NaOH molecules = _____ g NaOH = _____ mol NaOH

40) 24 X $10^{23}$ H2 = _____ g $H_2$ = _____ L $H_2$ @ STP

41) 1.5 X $10^{23}$ $CO_2$ = _____ g $CO_2$ = _____ L $CO_2$ @ STP

42) 1.0 g $H_2$ = _____ L $H_2$ @ STP = _____ $H_2$ molecules