

Assignment #3A

① 3.01×10^{23} atoms Na = 7 moles Na

$$\frac{3.01 \times 10^{23} \text{ atoms Na}}{1} \left| \frac{1 \text{ mole Na}}{6.02 \times 10^{23} \text{ atoms Na}} \right. = \boxed{5.0 \times 10^{-1} \text{ mol Na}}$$

② 2.4×10^{24} molecules CO_2 = 3.99×10^0 mol CO_2

$$\frac{2.4 \times 10^{24} \text{ molecules CO}_2}{1} \left| \frac{1 \text{ mole CO}_2}{6.02 \times 10^{23} \text{ molecules CO}_2} \right. = \boxed{3.99 \times 10^0 \text{ mol CO}_2}$$

③ 2.56 moles Ca = 1.54×10^{24} atoms Ca

$$\frac{2.56 \text{ moles Ca}}{1} \left| \frac{6.02 \times 10^{23} \text{ atoms Ca}}{1 \text{ mol}} \right. = \boxed{1.54 \times 10^{24} \text{ atoms Ca}}$$

④ 0.75 moles AlCl_3 = 4.52×10^{23} f.u. AlCl_3

$$\frac{0.75 \text{ moles AlCl}_3}{1} \left| \frac{6.02 \times 10^{23} \text{ f.u. AlCl}_3}{1 \text{ mol AlCl}_3} \right. = \boxed{4.52 \times 10^{23} \text{ f.u. AlCl}_3}$$

⑤ 7.43×10^{30} f.u. KCN = 1.23×10^7 mol KCN

$$\frac{7.43 \times 10^{30} \text{ f.u. KCN}}{1} \left| \frac{1 \text{ mole KCN}}{6.02 \times 10^{23} \text{ f.u. KCN}} \right. = \boxed{1.23 \times 10^7 \text{ mol KCN}}$$

⑥ 2.41×10^{24} molecules CCl_4 = 4.00×10^0 mol CCl_4

$$\frac{2.41 \times 10^{24} \text{ molecules CCl}_4}{1} \left| \frac{1 \text{ mol CCl}_4}{6.02 \times 10^{23} \text{ molecules CCl}_4} \right. = \boxed{4.00 \times 10^0 \text{ mol CCl}_4}$$

⑦ 1.2 moles ZnO = 7.22×10^{23} f.u. ZnO

$$\frac{1.2 \text{ moles ZnO}}{1} \left| \frac{6.02 \times 10^{23} \text{ f.u. ZnO}}{1 \text{ mol ZnO}} \right. = \boxed{7.22 \times 10^{23} \text{ f.u. ZnO}}$$

⑧ 2.41×10^{24} f.u. FeBr_3 = 4.00×10^0 mol FeBr_3

$$\frac{2.41 \times 10^{24} \text{ f.u. FeBr}_3}{1} \left| \frac{1 \text{ mol FeBr}_3}{6.02 \times 10^{23} \text{ f.u. FeBr}_3} \right. = \boxed{4.00 \times 10^0 \text{ mol FeBr}_3}$$

⑨ 0.25 mol $\text{Ba}(\text{NO}_3)_2$ = 1.51×10^{23} f.u. $\text{Ba}(\text{NO}_3)_2$

$$\frac{0.25 \text{ mol Ba(NO}_3)_2}{1} \left| \frac{6.02 \times 10^{23} \text{ f.u. Ba(NO}_3)_2}{1 \text{ mol Ba(NO}_3)_2} \right. = \boxed{1.51 \times 10^{23} \text{ f.u. Ba(NO}_3)_2}$$

⑩ 6.15 mol Ag = 3.70×10^{24} atoms Ag

$$\frac{6.15 \text{ mol Ag}}{1} \left| \frac{6.02 \times 10^{23} \text{ atoms Ag}}{1 \text{ mol Ag}} \right. = \boxed{3.70 \times 10^{24} \text{ atoms Ag}}$$

⑪

72 g ZnSO ₄	1 mol ZnSO ₄	6.02 × 10 ²³ f.u. ZnSO ₄	=	2.69 × 10 ⁰ f.u. ZnSO ₄
1	161 g ZnSO ₄	1 mol ZnSO ₄		

Zn 1 × 65 = 65
S 1 × 32 = 32
O 4 × 16 = 64

N 2 × 14 = 28
O 5 × 16 = 80

⑫

98.4 g N ₂ O ₅	1 mol N ₂ O ₅	6.02 × 10 ²³ molecules N ₂ O ₅	=	5.48 × 10 ²³ molecules N ₂ O ₅
1	108 g N ₂ O ₅	1 mol N ₂ O ₅		

S 1 × 32 = 32
O 2 × 16 = 32

⑬

1.45 × 10 ²⁵ molecules SO ₂	1 mol SO ₂	64 g SO ₂	=	1.54 × 10 ³ g SO ₂
1	6.02 × 10 ²³ molecules SO ₂	1 mol SO ₂		

Ti 1 × 48 = 48
O 2 × 16 = 32

⑭

4.47 × 10 ²³ f.u. TiO ₂	1 mol TiO ₂	80 g TiO ₂	=	5.94 × 10 ¹ g TiO ₂
1	6.02 × 10 ²³ f.u. TiO ₂	1 mol TiO ₂		

⑮

1.45 × 10 ²⁴ atoms W	1 mol W	184 g W	=	4.43 × 10 ² g W
1	6.02 × 10 ²³ atoms W	1 mol W		

Assign # 3B

$$\textcircled{1} \frac{7 \text{ mol CO}_2}{1} \left| \frac{22.4 \text{ L CO}_2}{1 \text{ mol CO}_2} \right. = \boxed{156.8 \text{ L CO}_2}$$

$$\textcircled{2} \frac{0.8 \text{ mol NO}}{1} \left| \frac{22.4 \text{ L NO}}{1 \text{ mol NO}} \right. = \boxed{17.92 \text{ L NO}}$$

$$\textcircled{3} \frac{9.5 \text{ mol H}_2}{1} \left| \frac{22.4 \text{ L H}_2}{1 \text{ mol H}_2} \right. = \boxed{212.8 \text{ L H}_2}$$

$$\textcircled{4} \frac{0.985 \text{ mol Cl}_2}{1} \left| \frac{22.4 \text{ L Cl}_2}{1 \text{ mol Cl}_2} \right. = \boxed{22.06 \text{ L Cl}_2}$$

$$\textcircled{5} \frac{0.245 \text{ mol CH}_4}{1} \left| \frac{22.4 \text{ L CH}_4}{1 \text{ mol CH}_4} \right. = \boxed{5.49 \text{ L CH}_4}$$

$$\textcircled{6} \frac{2.5 \text{ L SO}_2}{1} \left| \frac{1 \text{ mol SO}_2}{22.4 \text{ L SO}_2} \right. = \boxed{0.11 \text{ mol SO}_2}$$

$$\textcircled{7} \frac{9.7 \text{ L He}}{1} \left| \frac{1 \text{ mol He}}{22.4 \text{ L He}} \right. = \boxed{0.43 \text{ mol He}}$$

$$\textcircled{8} \frac{20.4 \text{ L NH}_3}{1} \left| \frac{1 \text{ mol NH}_3}{22.4 \text{ L NH}_3} \right. = \boxed{0.91 \text{ mol NH}_3}$$

$$\textcircled{9} \frac{8.4 \text{ L CO}_2}{1} \left| \frac{1 \text{ mol CO}_2}{22.4 \text{ L CO}_2} \right. = \boxed{0.38 \text{ mol CO}_2}$$

$$\textcircled{10} \frac{12.75 \text{ L N}_2}{1} \left| \frac{1 \text{ mol N}_2}{22.4 \text{ L N}_2} \right. = \boxed{0.57 \text{ mol N}_2}$$

$$\textcircled{11} \quad \frac{9.95 \text{ L N}_2\text{O}}{1} \times \frac{1 \text{ mol N}_2\text{O}}{22.4 \text{ L N}_2\text{O}} \times \frac{44 \text{ g N}_2\text{O}}{1 \text{ mol N}_2\text{O}} = \boxed{19.5 \text{ g N}_2\text{O}}$$

N $2 \times 14 = 28$
O $1 \times 16 = 16$

$$\textcircled{12} \quad \frac{74.35 \text{ L C}_2\text{H}_6\text{O}}{1} \times \frac{1 \text{ mol C}_2\text{H}_6\text{O}}{22.4 \text{ L C}_2\text{H}_6\text{O}} \times \frac{46 \text{ g C}_2\text{H}_6\text{O}}{1 \text{ mol C}_2\text{H}_6\text{O}} = \boxed{152.7 \text{ g C}_2\text{H}_6\text{O}}$$

C $2 \times 12 = 24$
H $6 \times 1 = 6$
O $1 \times 16 = 16$

$$\textcircled{13} \quad \frac{65.4 \text{ g N}_2\text{O}_5}{1} \times \frac{1 \text{ mol N}_2\text{O}_5}{108 \text{ g N}_2\text{O}_5} \times \frac{22.4 \text{ L N}_2\text{O}_5}{1 \text{ mol N}_2\text{O}_5} = \boxed{13.6 \text{ L N}_2\text{O}_5}$$

N $2 \times 14 = 28$
O $5 \times 16 = 80$

$$\textcircled{14} \quad \frac{125.6 \text{ g N}_2\text{S}_3}{1} \times \frac{1 \text{ mol N}_2\text{S}_3}{124 \text{ g N}_2\text{S}_3} \times \frac{22.4 \text{ L N}_2\text{S}_3}{1 \text{ mol N}_2\text{S}_3} = \boxed{22.7 \text{ L N}_2\text{S}_3}$$

S $3 \times 32 = 96$
N $2 \times 14 = 28$

$$\textcircled{15} \quad \frac{42.5 \text{ L Ar}}{1} \times \frac{1 \text{ mol Ar}}{22.4 \text{ L Ar}} \times \frac{6.02 \times 10^{23} \text{ atoms Ar}}{1 \text{ mol Ar}} = \boxed{1.14 \times 10^{24} \text{ atoms Ar}}$$

$$\textcircled{16} \quad \frac{2.65 \times 10^{24} \text{ atoms Xe}}{1} \times \frac{1 \text{ mol Xe}}{6.02 \times 10^{23} \text{ atoms Xe}} \times \frac{22.4 \text{ L Xe}}{1 \text{ mol Xe}} = \boxed{98.6 \text{ L Xe}}$$