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B1) Given : 2.25 mol Fe
Want : g Fe
Need : 1 mol Fe = molar mass Fe = 55.85 g Fe

$$\frac{1\text{ mol Fe}}{55.85\text{ g Fe}} \quad \text{OR} \quad \frac{55.85\text{ g Fe}}{1\text{ mol Fe}}$$

$$2.25\text{ mol Fe} \left| \frac{55.85\text{ g Fe}}{1\text{ mol Fe}} \right. = 125.6625\text{ g Fe} = \boxed{126\text{ g Fe}}$$

B2) Given : 0.375 mol K
Want : g K
Need : 1 mol K = molar mass K = 39.10 g K

$$\frac{1\text{ mol K}}{39.10\text{ g K}} \quad \text{OR} \quad \frac{39.10\text{ g K}}{1\text{ mol K}}$$

$$0.375\text{ mol K} \left| \frac{39.10\text{ g K}}{1\text{ mol K}} \right. = 14.6625\text{ g K} = \boxed{14.7\text{ g K}}$$

B3) Given: 0.0135 mol Na

Want: g Na

Need: 1 mol Na = molar mass Na = 22.99 g Na

$$\frac{1 \text{ mol Na}}{22.99 \text{ g Na}} \quad \text{OR} \quad \frac{22.99 \text{ g Na}}{1 \text{ mol Na}}$$

$$0.0135 \text{ mol Na} \left| \frac{22.99 \text{ g Na}}{1 \text{ mol Na}} \right. = .310365 \text{ g Na} = \boxed{.310 \text{ g Na}}$$

B4) Given: 16.3 mol Ni

Want: g Ni

Need: 1 mol Ni = 58.69 g Ni

$$\frac{1 \text{ mol Ni}}{58.69 \text{ g Ni}} \quad \text{OR} \quad \frac{58.69 \text{ g Ni}}{1 \text{ mol Ni}}$$

$$16.3 \text{ mol Ni} \left| \frac{58.69 \text{ g Ni}}{1 \text{ mol Ni}} \right. = 956.647 \text{ g Ni} = \boxed{957 \text{ g Ni}}$$

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C1) Given: 5.00 g Ca

Want: mol Ca

Need: 1 mol Ca = molar mass Ca = 40.08 g Ca

$$\frac{1 \text{ mol Ca}}{40.08 \text{ g Ca}} \quad \text{OR} \quad \frac{40.08 \text{ g Ca}}{1 \text{ mol Ca}}$$

$$\frac{5.00 \text{ g Ca} \mid 1 \text{ mol Ca}}{\mid 40.08 \text{ g Ca}} = .12475 \text{ mol Ca} = \boxed{.125 \text{ mol Ca}}$$

C2) Given: 3.60×10^{-5} g Au

Want: mol Au

Need: 1 mol Au = 196.97 g Au

$$\frac{1 \text{ mol Au}}{196.97 \text{ g Au}} \quad \text{OR} \quad \frac{196.97 \text{ g Au}}{1 \text{ mol Au}}$$

$$\frac{3.60 \times 10^{-5} \text{ g Au} \mid 1 \text{ mol Au}}{\mid 196.97 \text{ g Au}} = 1.827689 \times 10^{-7} \text{ mol Au}$$

$$= \boxed{1.83 \times 10^{-7} \text{ mol Au}}$$

C3) Given: 0.535 g Zn

Want: mol Zn

Need: 1 mol Zn = 65.41 g Zn

$$\frac{1 \text{ mol Zn}}{65.41 \text{ g Zn}} \quad \text{OR} \quad \frac{65.41 \text{ g Zn}}{1 \text{ mol Zn}}$$

$$\frac{0.535 \text{ g Zn} \mid 1 \text{ mol Zn}}{\mid 65.41 \text{ g Zn}} = .0081791775 \text{ mol Zn}$$

$$= \boxed{.00818 \text{ mol Zn}}$$

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D1) Given: 1.50×10^{12} atoms Pb

Want: mol Pb

Need: 1 mol Pb = 6.02×10^{23} atoms Pb

$$\frac{1 \text{ mol Pb}}{6.02 \times 10^{23} \text{ atoms Pb}} \quad \text{OR} \quad \frac{6.02 \times 10^{23} \text{ atoms Pb}}{1 \text{ mol Pb}}$$

$$1.50 \times 10^{12} \text{ atoms Pb} \left| \frac{1 \text{ mol Pb}}{6.02 \times 10^{23} \text{ atoms Pb}} \right. = 2.49169 \times 10^{-} \text{ mol Pb}$$

$$= \boxed{2.49 \times 10^{-12} \text{ mol Pb}}$$

D2) Given: 2500 atoms Sn

Want: mol Sn

Need: 1 mol Sn = 6.02×10^{23} atoms Sn

$$\frac{1 \text{ mol Sn}}{6.02 \times 10^{23} \text{ atoms Sn}} \quad \text{OR} \quad \frac{6.02 \times 10^{23} \text{ atoms Sn}}{1 \text{ mol Sn}}$$

$$2500 \text{ atoms Sn} \left| \frac{1 \text{ mol Sn}}{6.02 \times 10^{23} \text{ atoms Sn}} \right. = 4.1528 \times 10^{-21} \text{ mol Sn}$$

$$= \boxed{4.2 \times 10^{-21} \text{ mol Sn}}$$

D3) Given: 2.75 mol Al

Want: atoms Al

Need: 1 mol Al = 6.02×10^{23} atoms Al

$$\frac{1 \text{ mol Al}}{6.02 \times 10^{23} \text{ atoms Al}} \quad \text{OR} \quad \frac{6.02 \times 10^{23} \text{ atoms Al}}{1 \text{ mol Al}}$$

$$2.75 \text{ mol Al} \left| \frac{6.02 \times 10^{23} \text{ atoms Al}}{1 \text{ mol Al}} \right. = 1.6555 \times 10^{24} \text{ atoms Al}$$

$$= \boxed{1.66 \times 10^{24} \text{ atoms Al}}$$

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E1) Given: 7.5×10^{15} atoms Ni

Want: g Ni

Need: 1 mol Ni = 6.02×10^{23} atoms Ni

$$\frac{1 \text{ mol Ni}}{6.02 \times 10^{23} \text{ atoms Ni}} \quad \text{OR} \quad \frac{6.02 \times 10^{23} \text{ atoms Ni}}{1 \text{ mol Ni}}$$

AND 1 mol Ni = 58.69 g Ni

$$\frac{1 \text{ mol Ni}}{58.69 \text{ g Ni}} \quad \text{OR} \quad \frac{58.69 \text{ g Ni}}{1 \text{ mol Ni}}$$

$$7.5 \times 10^{15} \text{ atoms Ni} \left| \frac{1 \text{ mol Ni}}{6.02 \times 10^{23} \text{ atoms Ni}} \right| \frac{58.69 \text{ g Ni}}{1 \text{ mol Ni}} = 7.311877 \times 10^{-7} \text{ g Ni}$$

$$= \boxed{7.3 \times 10^{-7} \text{ g Ni}}$$

E2) Given: 4.00 g S

Want: atoms S

Need: 1 mol S = 32.07 g S

$$\frac{1\text{ mol S}}{32.07\text{ g S}} \quad \text{OR} \quad \frac{32.07\text{ g S}}{1\text{ mol S}}$$

AND $1\text{ mol S} = 6.02 \times 10^{23}\text{ atoms S}$

$$\frac{1\text{ mol S}}{6.02 \times 10^{23}\text{ atoms S}} \quad \text{OR} \quad \frac{6.02 \times 10^{23}\text{ atoms S}}{1\text{ mol S}}$$

$$4.00\text{ g S} \left| \frac{1\text{ mol S}}{32.07\text{ g S}} \right| \frac{6.02 \times 10^{23}\text{ atoms S}}{1\text{ mol S}} = 7.50857 \times 10^{22}\text{ atoms S}$$

$$= \boxed{7.51 \times 10^{22}\text{ atoms S}}$$