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a. given: 3.00 mole Al
? g Al
MM_{Al} : $\frac{26.98\,g}{1\,mole}$

$$\frac{3.00\,mole\,Al \mid 26.98\,g\,Al}{1\,mole\,Al} = \boxed{80.9\,g\,Al}$$

b. 2.56×10^{24} atoms Li
? g Li
$MM_{Li} = \frac{6.94\,g}{1\,mole}$
$1\,mole = 6.02 \times 10^{23}$ atom Li

$$\frac{2.56\times10^{24}\,atom\,Li \mid 1\,mole\,Li \mid 6.94\,g\,Li}{6.02\times10^{23}\,atom\,Li \mid 1\,mole\,Li} = \boxed{29.5\,g\,Li}$$

c. 1.38 mol N
? g N
MM_{N} : $\frac{14.01\,g}{1\,mole}$

$$\frac{1.38\,mole\,N \mid 14.01\,g\,N}{1\,mole\,N} = \boxed{19.3\,g\,N}$$

d. 4.86×10^{24} atom Au
? g Au
$MM_{Au} = \frac{196.97\,g}{1\,mole}$
$1\,mole = 6.02 \times 10^{23}$ atom

$$\frac{4.86\times10^{24}\,atom\,Au \mid 1\,mole\,Au \mid 196.97\,g\,Au}{6.02\times10^{23}\,atom\,Au \mid 1\,mole\,Au} = \boxed{1.59\times10^{3}\,g\,Au}$$

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e.] 6.50 mol Cu
? g Cu
MM_{Cu}: 63.55 g/mol

$$6.50 \text{ mol Cu} \left| \frac{63.55 \text{ g Cu}}{1 \text{ mol Cu}} \right. = \boxed{413 \text{ g Cu}}$$

f.] 2.57×10^{8} mol S
? g S
MM_{S} = 32.07 g/mol

$$2.57 \times 10^{8} \text{ mol S} \left| \frac{32.07 \text{ g S}}{1 \text{ mol S}} \right. \quad \boxed{8.24 \times 10^{9} \text{ g S}}$$

g.] 1.05×10^{18} atom Hg
? g Hg
MM_{Hg}: 200.59 g/1 mol
1 mole Hg = 6.02×10^{23} atom Hg

$$1.05 \times 10^{18} \text{ atom Hg} \left| \frac{1 \text{ mole Hg}}{6.02 \times 10^{23} \text{ atom Hg}} \right| \frac{200.59 \text{ g Hg}}{1 \text{ mole Hg}}$$

$$\boxed{3.50 \times 10^{-4} \text{ g Hg}}$$