Summary: P 813, # 1-15

1)
V = 2.00 L X 98.0 kPa / 82.0 kPa = 2.39 L

2)
V= 1.50L X 361K / 305K = 1.78 L

3)
P = 135.0 kPa X 398K / 298K = 180 kPa

4)
V= 101.2kPa X 2.75 L X 310K / (295K X 90.0 kPa) = 3.25 L

5)
V = 700.0 kPa X 1.00 L X 273 K / (295K X 101.3 kPa) = 6.39 L

6)
V = 2.50 mol X 8.314 (kPa•L/mol•K) X 233 K / 58.6 kPa = 82.6 L

7)
$n(CO_2)$ = 6.60 g / 44.01 g/mol = 0.150 mol
P = 0.150 mol X 8.314 (kPa•L/mol•K) X 298K / 2.00 L = 185 kPa

8)
n = 450.0 kPa X 0.5000 L / (8.314 (kPa•L/mol•K) X 293K) = 0.0924 mol

9)
$n(H_2)$ = 240.0 g / 2.02 g/mol = 118.8 mol
V = 118.8 mol X 8.314 (kPa•L/mol•K) X 273K / 101.3 kPa = 2661 L

10)
n(unknown) = 101.3 kPa X 1.00 / (8.314 (kPa•L/mol•K) X 273K) = 0.0446 mol
M(unknown) = 1.25 g / 0.0446 mol = 28.0 g/mol

11)
n(total) = 101.3kPa X 1.00 L / (8.314 (kPa•L/mol•K) X 273K) = 0.0446 mol
mass = 0.80 X 0.0446 mol X 28.01 g/mol + 0.20 X 0.0446 mol X 32.00 g/mol = 1.28 g

12) Since T and P are kept constant than V's can be used as moles in a BCE
$3H_{2(g)} + N_{2(g)} \rightarrow 2NH_{3(g)}$
a) $V(N_2)$ = 75.0L X 1/3 = 25.0 L
b) $V(NH_{3(g)})$ = 75.0L X 2/3 = 50.0 L

13)
$P_{tot} = P(H_2) + P(H_2O)$
$P(H_2) = 98.2\ kPa - 2.64\ kPa = 95.6\ kPa$

14)
$Zn + 2HCl \rightarrow H_2 + ZnCl_2$
$n(H_2) = 101.3kPa \times 0.2500L / (8.314\ (kPa \bullet L/mol \bullet K) \times 273K) = 0.0112\ mol$
$n(Zn) = 0.0112\ mol$
$m(Zn) = 0.0112\ mol \times 65.38\ g/mol = 0.732\ g$

15)
$2NH_4NO_{3(s)} \rightarrow 2N_{2(g)} + O_{2(g)} + 4H_2O_{(g)}$
$n(NH_4NO_{3(s)}) = 1.00 \times 10_3\ g / 80.04\ g/mol = 12.5\ mol$
$V(N_2) = 12.5\ mol \times 8.314\ (kPa \bullet L/mol \bullet K) \times 298K / 100.0\ kPa = 310\ L$
Total volume of gases $= 310\ L \times 7/2 = 1.09 \times 10^3\ L$