(4A) $I_{2(g)} \rightleftharpoons 2I_{(g)}$ $K_c = 3.1 \times 10^{-5}$

$$[I] = \frac{2.81 \times 10^{-2}\ g\ I}{10.L} \left| \frac{1\ mol\ I}{126.9\ g\ I} \right. = 2.214 \times 10^{-4} M$$

$$K_c = \frac{[I]^2}{[I_2]} \qquad 3.1 \times 10^{-5} = \frac{[2.214 \times 10^{-5} M]^2}{[I_2]}$$

$$[I_2] = 1.58 \times 10^{-5}$$

$$\frac{1.58 \times 10^{-5}\ mol}{L} \left| \frac{10.0L}{} \right| \frac{253.8\ g\ I_2}{1\ mol\ I_2} = \boxed{.0401\ g\ I_2}$$

4B $2SO_2 + O_2 \rightleftharpoons 2SO_3$ $K_p = 3.0 \times 10^4$

? .113g 1.89g

Use $PV = nRT$ $P = \frac{gRT}{MM\ V}$

$$P_{SO_3} = \frac{1.89g\left(.0821 \frac{atm \cdot L}{mol \cdot K}\right)(700K)}{(80.06\ g/mol)(2.00L)} = .678\ atm.$$

$$P_{O_2} = \frac{.113g\ \left(.0821 \frac{atm \cdot L}{mol \cdot K}\right)(700K)}{(32\ g/mol)(2.00L)} = .101\ atm$$

$$K_p = 3.0 \times 10^4 = \frac{P_{SO_3}^2}{P_{SO_2}^2 \cdot P_{O_2}}$$

$$P_{SO_2}^2 = \frac{(.678)^2}{(3.0 \times 10^4)(.101)} = \sqrt{1.55 \times 10^{-6}} = .0012\ atm.$$

Rearranging the ideal Gas Law:

$$g\ SO_2 = \frac{MM \cdot V \cdot P}{RT} = \frac{(64.06\ g/mol\ SO_2)(2.00L)(.0012\ atm)}{\left(.0821 \frac{atm \cdot L}{mol \cdot K}\right)(700K)}$$

$$g\ SO_2 = \boxed{.0027\ g}$$

15.6 On-line

$$2\,NO_{(g)} \rightleftarrows N_{2(g)} + O_{2(g)}$$

#5 $K_c = \dfrac{[N_2][O_2]}{[NO]^2}$ $\quad K_c = 2.4 \times 10^{3}$

	$2\,NO$	$\rightleftarrows$	N_2	+	O_2
I	.130M		0		0
C	$-2x$		$+x$		$+x$
E	$.130-2x$		x		x

$$2.4 \times 10^{3} = \frac{x^2}{(.130-2x)^2}$$

Take Square Root of both sides

$$x^2 = (2.4 \times 10^{3})(.130-2x)^2$$

$$x = (49)(.130-2x)$$

$$x = 6.37 - 98x$$

$$99x = 6.37$$

$$x = .0643$$

$[O_2] = x = \boxed{.0643\,M}$

$[N_2] = x = \boxed{.0643\,M}$

$[NO] = .130 - 2(.0643) = \boxed{.0014\,M}$