[A 10]

(0) $\quad n_A = n_{A0} - n_{A0} x_A = n_{A0}(1-x_A)$

$\quad n_B = n_{B0} - 2n_{A0}x_A = 3n_{A0} - 2n_{A0}x_A = n_{A0}(3-2x_A)$

体積変化がないので、$\quad C_A = C_{A0}(1-x_A)$

$\quad\quad\quad\quad\quad\quad\quad\quad C_B = C_{A0}(3-2x_A)$ が いえる。

$\therefore \quad -r_A = kC_A C_B = \underline{kC_{A0}^2(1-x_A)(3-2x_A)}$

(b) $\quad \tau = \dfrac{V}{v_0} = \dfrac{1.5\,m^3}{4\times10^{-4}\,m^3/s} = \underline{3750\,s}$

(c) $\quad \tau = \dfrac{C_A - C_{A0}}{-r_A} = \dfrac{C_{A0}x_A}{kC_{A0}^2(1-x_A)(3-2x_A)} = \dfrac{x_A}{kC_{A0}(1-x_A)(3-2x_A)}$

$\therefore \quad k = \dfrac{1}{\tau}\times\dfrac{x_A}{(1-x_A)(3-2x_A)} = \underline{1.33\times10^{-7}\,m^3/mol\cdot s}$

(d) $\quad V = v_0\cdot\dfrac{1}{k}\dfrac{x_A}{C_{A0}(1-x_A)(3-2x_A)} = \underline{6.\,m^3}$

(e) $\quad F_A = C_{A0}v_0(1-x_A) = \underline{0.1\,mol/s}$

(f) $\quad F_B = C_{A0}v_0(3-2x_A) = \underline{0.6\,mol/s}$

(g) $\quad F_C = F_{A0}-F_A = C_{A0}v_0 x_A = \underline{0.3\,mol/s}$