①

$C = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$ $H = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$ $O = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$ $C_2H_6 = \begin{bmatrix} 2 \\ 6 \\ 0 \end{bmatrix}$

$2x_1 + 0x_2 - x_3 + 0x_4 = 0$
$6x_1 + 0x_2 - 0x_3 - 2x_4 = 0$
$0x_1 + 2x_2 - 2x_3 - x_4 = 0$

$$\begin{bmatrix} 2 & 0 & -1 & 0 & 1 & 0 \\ 6 & 0 & 0 & -2 & 1 & 0 \\ 0 & 2 & -2 & -1 & 1 & 0 \end{bmatrix}$$

$x_1 = \frac{1}{3}x_4$, $x_2 = \frac{7}{6}x_4$, $x_3 = \frac{2}{3}x_4$

$$\begin{bmatrix} 1 & 0 & 0 & -\frac{1}{3} & 1 & 0 \\ 0 & 1 & 0 & -\frac{7}{6} & 1 & 0 \\ 0 & 0 & 1 & -\frac{2}{3} & 1 & 0 \end{bmatrix}$$

$x_4 = 6$,

$x_1 = 2$, $x_2 = 7$, $x_3 = 4$, $x_4 = 6$

$2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$

②

$$\begin{cases} x_1 + x_4 = 500 \\ x_1 + x_2 = 800 \\ x_2 + x_3 = 1100 \\ x_3 + x_4 = 800 \end{cases}$$

$$\begin{cases} x_1 + x_4 = 500 \\ x_2 - x_4 = 300 \\ x_2 + x_3 = 1100 \\ x_3 + x_4 = 800 \end{cases}$$

$$\begin{cases} x_1 + x_4 = 500 \\ x_2 - x_4 = 300 \\ x_3 + x_4 = 800 \\ x_3 + x_4 = 800 \end{cases}$$

$$\begin{cases} x_1 = 500 - x_4 \\ x_2 = 300 + x_4 \\ x_3 = 800 - x_4 \end{cases}$$

무한개의 해가 존재.

③ $x_1 - x_2 + x_3 = 0$

$-x_1 + x_2 - x_3 = 0$

$4x_1 + 2x_2 = 16$

$2x_2 + 5x_3 = 18$

$$\left[\begin{array}{cccc} 1 & -1 & 1 & 0 \\ -1 & 1 & -1 & 0 \\ 4 & 2 & 0 & 16 \\ 0 & 2 & 5 & 18 \end{array}\right] \qquad \left[\begin{array}{cccc} 1 & -1 & 1 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 6 & -4 & 16 \\ 0 & 2 & 5 & 18 \end{array}\right]$$

$$\left[\begin{array}{cccc} 1 & -1 & 1 & 0 \\ 0 & 6 & -4 & 16 \\ 0 & 2 & 5 & 18 \\ 0 & 0 & 0 & 0 \end{array}\right] \qquad \left[\begin{array}{cccc} 1 & -1 & 1 & 0 \\ 0 & 3 & -2 & 8 \\ 0 & 2 & 5 & 18 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

$$\left[\begin{array}{cccc} 1 & -1 & 1 & 0 \\ 0 & 3 & -2 & 8 \\ 0 & 0 & \frac{19}{3} & \frac{38}{3} \\ 0 & 0 & 0 & 0 \end{array}\right]$$

$x_1 = 2,\ x_2 = 4,\ x_3 = 2.$