

$$\textcircled{1} \text{ Max } Z = 20x_1 + 25x_2$$

$$\text{s.t. } \begin{cases} 2x_1 + 3x_2 \leq 40 \\ x_1 + 2x_2 \leq 20 \\ 3x_1 + x_2 \leq 30 \\ x_1 \geq 0, x_2 \geq 0 \end{cases}$$

$$\textcircled{2} \text{ Max } Z = 2x_1 + 4x_2$$

$$\text{s.t. } \begin{cases} 4x_1 + 8x_2 \leq 40 \\ x_1 \leq 6 \\ x_2 \leq 4 \\ x_1 \geq 0, x_2 \geq 0 \end{cases}$$

$$\textcircled{3} \text{ Max } Z = x_1 + 2x_2 + 4x_3$$

$$\text{s.t. } \begin{cases} 2x_1 + x_2 + 2x_3 \leq 100 \\ 2x_1 + 4x_2 + 2x_3 \leq 60 \\ x_1 \geq 0, x_2 \geq 0, x_3 \geq 0 \end{cases}$$

$$\textcircled{4} \text{ Max } Z = 3x_1 + 5x_2$$

$$\text{s.t. } \begin{cases} x_1 \leq 4 \\ 2x_2 = 12 \\ 3x_1 + 2x_2 \geq 18 \\ x_1 \geq 0, x_2 \geq 0 \end{cases}$$

$$\textcircled{5} \text{Min } Z = 10x_1 + 30x_2$$

$$\text{s.t. } \begin{cases} 3x_1 + 2x_2 \geq 6 \\ 6x_1 + x_2 \geq 6 \\ x_2 \geq 2 \\ x_1 \geq 0 \quad x_2 \geq 0 \end{cases}$$

$$\textcircled{6} \text{Min } Z = -3x_1 + 5x_2 - 2x_3$$

$$\text{s.t. } \begin{cases} x_1 + 2x_2 + x_3 \leq 20 \\ x_1 + x_2 + 2x_3 \leq 30 \\ 2x_1 + 4x_2 + 3x_3 \leq 40 \\ x_1 \geq 0 \quad x_2 \geq 0 \quad x_3 \geq 0 \end{cases}$$

$$\textcircled{7} \text{Min } Z = 5x_1 + 7x_2$$

$$\text{s.t. } \begin{cases} x_1 + 2x_2 \leq 6 \\ x_1 \geq 2 \\ x_2 \leq 2 \\ x_1 \geq 0 \quad x_2 \geq 0 \end{cases}$$

$$\textcircled{8} \text{Min } Z = 2x_1 + 3x_2$$

$$\text{s.t. } \begin{cases} x_1 + 2x_2 \leq 6 \\ 2x_1 + 2x_2 \geq 4 \\ x_1 + x_2 = 3 \\ x_1 \geq 0 \quad x_2 \geq 0 \end{cases}$$