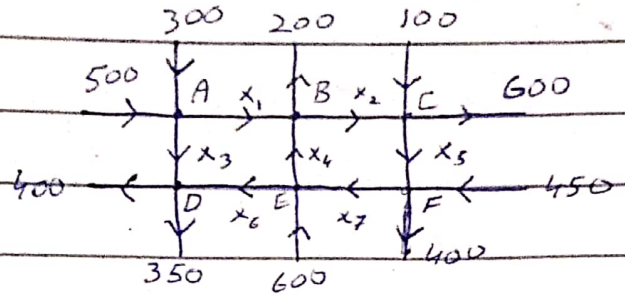
Question No. 4



a)

A: $x_1 + x_3 = 800$

B: $x_1 - x_2 + x_4 = 200$

C: $x_2 + x_5 = 500$

D: $x_3 + x_6 = 750$

E: $x_4 + x_6 - x_7 = 600$

F: $x_5 - x_7 = -50$

$$\left[\begin{array}{ccccccc|c} 1 & 0 & 1 & 0 & 0 & 0 & 0 & 800 \\ 1 & -1 & 0 & 1 & 0 & 0 & 0 & 200 \\ 0 & 1 & 0 & 0 & -1 & 0 & 0 & 500 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 & 750 \\ 0 & 0 & 0 & 1 & 0 & 1 & -1 & 600 \\ 0 & 0 & 0 & 0 & 1 & 0 & -1 & -50 \end{array}\right]$$

$$\left[\begin{array}{ccccccc|c} 1 & 0 & 1 & 0 & 0 & 0 & 0 & 800 \\ 0 & -1 & -1 & 1 & 0 & 0 & 0 & -600 \\ 0 & 1 & 0 & 0 & -1 & 0 & 0 & 500 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 & 750 \\ 0 & 0 & 0 & 1 & 0 & 1 & -1 & 600 \\ 0 & 0 & 0 & 0 & 1 & 0 & -1 & -50 \end{array}\right] \quad R_2 - R_1$$

$$\left[\begin{array}{cccccccc} 1 & 0 & 1 & 0 & 0 & 0 & 0 & 800 \\ 0 & -1 & -1 & 1 & 0 & 0 & 0 & -600 \\ 0 & 0 & -1 & 1 & -1 & 0 & 0 & -100 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 & 750 \\ 0 & 0 & 0 & 1 & 0 & 1 & -1 & 600 \\ 0 & 0 & 0 & 0 & 1 & 0 & -1 & -50 \end{array}\right] \quad R_3 + R_2$$

$$\left[\begin{array}{cccccccc} 1 & 0 & 1 & 0 & 0 & 0 & 0 & 800 \\ 0 & -1 & -1 & 1 & 0 & 0 & 0 & -600 \\ 0 & 0 & -1 & 1 & -1 & 0 & 0 & -100 \\ 0 & 0 & 0 & 1 & -1 & 1 & 0 & 650 \\ 0 & 0 & 0 & 1 & 0 & 1 & -1 & 600 \\ 0 & 0 & 0 & 0 & 1 & 0 & -1 & -50 \end{array}\right] \quad R_4 + R_3$$

$$\left[\begin{array}{cccccccc} 1 & 0 & 1 & 0 & 0 & 0 & 0 & 800 \\ 0 & -1 & -1 & 1 & 0 & 0 & 0 & -600 \\ 0 & 0 & -1 & 1 & -1 & 0 & 0 & -100 \\ 0 & 0 & 0 & 1 & -1 & 1 & 0 & 650 \\ 0 & 0 & 0 & 0 & 1 & 0 & -1 & -50 \\ 0 & 0 & 0 & 0 & 1 & 0 & -1 & -50 \end{array}\right] \quad R_5 - R_4$$

$$\left[\begin{array}{cccccccc} 1 & 0 & 1 & 0 & 0 & 0 & 0 & 800 \\ 0 & -1 & -1 & 1 & 0 & 0 & 0 & -600 \\ 0 & 0 & -1 & 1 & -1 & 0 & 0 & -100 \\ 0 & 0 & 0 & 1 & -1 & 1 & 0 & 650 \\ 0 & 0 & 0 & 0 & 1 & 0 & -1 & -50 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{array}\right] \quad R_6 - R_5$$

$$\left[\begin{array}{ccccccc|c} 1 & 0 & 1 & 0 & 0 & 0 & 0 & 800 \\ 0 & 1 & 1 & -1 & 0 & 0 & 0 & 600 \\ 0 & 0 & 1 & -1 & 1 & 0 & 0 & 100 \\ 0 & 0 & 0 & 1 & -1 & 1 & 0 & 650 \\ 0 & 0 & 0 & 0 & 1 & 0 & 1 & -50 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{array}\right] \quad (-R_2, (-)R_3$$

$x_1 + x_3 = 800$

$x_2 + x_3 - x_4 = 600$

$x_3 - x_4 + x_5 = 100$

$x_4 - x_5 + x_6 = 650$

$x_5 + x_7 = -50$

let $x_7 = t$, $x_6 = u$

$x_5 + t = -50$

$\boxed{x_5 = -50 - t}$

$x_4 - (-50 - t) + u = 650$

$x_4 + 50 + t + u = 650$

$\boxed{x_4 = 600 - t - u}$

$x_3 - (600 - t - u) + (-50 - t) = 100$

$x_3 - 600 + t + u - 50 - t = 100$

$x_3 = -u + 750$

$\boxed{x_3 = 750 - u}$

$x_2 + (750 - u) - (600 - t - u) = 600$

$x_2 + 750 - u - 600 + t + u = 600$

$x_2 + 150 + t = 600$

$\boxed{x_2 = 450 - t}$

$x_1 + (750 - u) = 800$

$\boxed{x_1 = 50 + u}$

Infinite many Solution

c) If $A \rightarrow B$ is close for Construction $x_1 = 0$.

$x_1 = 50 + u$

$0 = 50 + u$

$u = -50$

$\boxed{x_2 = 450 - t}$

$x_3 = 750 - (-50)$

$x_3 = 750 + 50$

$\boxed{x_3 = 800}$

$x_4 = 600 - t - (-50)$

$\boxed{x_4 = 650 - t}$

$$x_5 = -50 - t$$

$$x_6 = -50$$

$$x_7 = t$$