(9 Marks)

7

5.) Minimize $C=20x_1+60x_2+10x_3$

Subject to the conditions:

$$\begin{bmatrix} x_1+x_2+2x_3\geq 6 \\ x_1+2x_2+3x_3\geq 4 \\ x_1+x_2+x_3\geq 8 \\ x_1, x_2, x_3\geq 0 \end{bmatrix}$$

$$\begin{vmatrix} 1 & 1 & 2 & 6 \\ 1 & 2 & 3 & 4 \\ 1 & 1 & 1 & 8 \\ 20 & 60 & 10 & 0 \end{vmatrix}^T = \begin{vmatrix} 1 & 1 & 1 & 20 \\ 1 & 2 & 1 & 60 \\ 2 & 3 & 1 & 10 \\ 6 & 4 & 8 & 0 \end{vmatrix}$$ maximize

$$\begin{vmatrix} 1 & 1 & 1 & 20 \\ 0 & 1 & 0 & 40 \\ 0 & 1 & -1 & -30 \\ 0 & -2 & 2 & -120 \end{vmatrix} \rightarrow \begin{vmatrix} 1 & 1 & 1 & 20 \\ 0 & 1 & 0 & 40 \\ 0 & 0 & -1 & -70 \\ 0 & 0 & 2 & -40 \end{vmatrix} \rightarrow \begin{vmatrix} 1 & 1 & 1 & 20 \\ 0 & 1 & 0 & 40 \\ 0 & 0 & 1 & 70 \\ 0 & 0 & 0 & -180 \end{vmatrix}$$

X

$x + y + z = 20$

$y = 40$

$z = 70$

$x = -90$ → does not respect the inequalities or error somewhere

$20.(-90) + 60(40) + 70(10) = -180$

$-1800 + 2400 + 700 = -180$ should

$$\begin{matrix} 1 & 1 & 1 \\ 1 & 2 & 1 \\ 2 & 3 & 1 \\ 6 & 4 & 8 \end{matrix}$$