NAME: MANASSEH DAVID
MATRIC: 15/ENG02/036
DEPT: Computer Eng

$$T_1 + T_2 - 2T_3 + T_4 + 3T_5 - T_6 = 4$$
$$2T_1 - T_2 + T_3 + 2T_4 + T_5 - 3T_6 = 20$$
$$T_1 + 3T_2 - 3T_3 - T_4 + 2T_5 + T_6 = -15$$
$$5T_1 + 2T_2 - T_3 - T_4 + 2T_5 + T_6 = -3$$
$$-3T_1 - T_2 + 2T_3 + 3T_4 + T_5 + 3T_6 = 16$$
$$4T_1 + 3T_2 + T_3 - 6T_4 - 3T_5 - 2T_6 = -27$$

Augmented matrix:

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ [2] & -1 & 1 & 2 & 1 & -3 \\ [1] & [3] & -3 & -1 & 2 & 1 \\ [5] & [2] & [1] & -1 & 2 & 1 \\ [3] & [1] & 2 & [3] & 1 & 3 \\ [4] & [3] & 1 & [6] & [3] & -2 \end{bmatrix} \begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 20 \\ -15 \\ -3 \\ 16 \\ -27 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 2-(2/1)1 & -1-(2/1)1 & 1-(2/1)-2 & 2-(2/1)1 & 1-(2/1)3 & -3-(2/1)-1 \\ 1-(1/1)1 & 3-(1/1)1 & -3-(1/1)-2 & -1-(1/1) & 2-(1/1)3 & 1-(1/1)-1 \\ 5-(5/1)1 & 2-(5/1)1 & -1-(5/1)2 & -1-(5/1)1 & 2-(5/1)3 & 1-(5/1)-1 \\ -3-(-3/1)1 & -1-(-3/1)1 & 2-(-3/1)-2 & 3-(-3/1)1 & 1-(-3/1)3 & 3-(-3/1)-1 \\ 4-(4/1)1 & 3-(4/1)1 & 1-(4/1)-2 & -6-(4/1)1 & -3-(4/1)3 & -2-(4/1) \end{bmatrix}$$

$$\begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} \quad \begin{matrix} 4 \\ 20-(2/1)4 \\ -15-(1/1)4 \\ -3-(5/1)4 \\ 16-(-3/1)4 \\ -27-(4/1)4 \end{matrix}$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 2 & -1 & -2 & -1 & 2 \\ 0 & -3 & 4 & -6 & -13 & 6 \\ 0 & 2 & -4 & 6 & 10 & 0 \\ 0 & -1 & 4 & -10 & -15 & 2 \end{bmatrix} \begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -19 \\ -23 \\ 28 \\ 43 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 2.4 & -2 & -4.4 & 1.4 \\ 0 & 0 & [4] & -6 & -8 & 7 \\ 0 & 0 & [0.7] & [6] & 6.7 & -0.7 \\ 0 & 0 & (7.4) & [10] & [13.4] & 2.4 \end{bmatrix} \begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} \quad \begin{matrix} 4 \\ 12 \\ -11 \\ 35 \\ 36 \\ -47 \end{matrix}$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 2.4 & -2 & -4.4 & 1.4 \\ 0 & 0 & 4-\left(\frac{4}{2.4}\right)2.4 & -6-\left(\frac{4}{2.4}\right)-2 & -8\left(\frac{4}{2.4}\right) & 7-\left(\frac{4}{2.4}\right)1.4 \\ 0 & 0 & 0.7-\left(\frac{0.7}{2.4}\right)2.4 & 6-\left(\frac{-0.7}{2.4}\right)-2 & 6.7-\left(\frac{-0.7}{2.4}\right)-4.4 & -0.7-\left(\frac{0.7}{2.4}\right) \\ 0 & 0 & 7.4-\left(\frac{7.4}{2.4}\right)2.4 & -10-\left(\frac{7.4}{2.4}\right)-2 & -13.4-\left(\frac{7.4}{2.4}\right)-4.4 & 2.4-\left(\frac{7.4}{2.4}\right)1.4 \end{bmatrix}$$

$$\begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ 35-\left(\frac{4}{2.4}\right)(-11) \\ 36-\left(\frac{-0.7}{2.4}\right)(-11) \\ -47-\left(\frac{7.4}{2.4}\right)(-11) \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 2.4 & -2 & -4.4 & 1.4 \\ 0 & 0 & 0 & -2.7 & -0.7 & 4.7 \\ 0 & 0 & 0 & [5.42] & 5.42 & -0.29 \\ 0 & 0 & 0 & [3.84] & [0.17] & -1.91 \end{bmatrix} \begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ -16.7 \\ 32.79 \\ -13.08 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 2.4 & -2 & -4.4 & 1.4 \\ 0 & 0 & 0 & -2.7 & -0.7 & 4.7 \\ 0 & 0 & 0 & 0 & 4.01 & 9.2 \\ 0 & 0 & 0 & 0 & [1.16] & -8.59 \end{bmatrix} \begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ -16.7 \\ -0.74 \\ 10.7 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 2.4 & -2 & -4.4 & 1.4 \\ 0 & 0 & 0 & -2.7 & -0.7 & 4.7 \\ 0 & 0 & 0 & 5.42 - \left(\frac{5.42}{-2.7}\right)-2.7 & 5.42 - \left(\frac{5.42}{-2.7}\right)0.7 & -0.29 - \left(\frac{5.42}{-2.7}\right)4.7 \\ 0 & 0 & 0 & -3.84 - \left(\frac{3.84}{2.7}\right)-2.7 & 0.17 - \left(\frac{-3.84}{2.7}\right)0.7 & -1.91 - \left(\frac{-3.84}{-2.7}\right)4.7 \end{bmatrix}$$

$$\begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ -16.7 \\ 32.79 - \left(\frac{5.42}{-2.7}\right)(-16.7) \\ -13.08 - \left(\frac{-3.84}{-2.7}\right)(-16.7) \end{bmatrix}$$

$$\Downarrow$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 2.4 & -2 & -4.4 & 1.4 \\ 0 & 0 & 0 & -2.7 & -0.7 & 4.7 \\ 0 & 0 & 0 & 0 & 4.01 & 9.2 \\ 0 & 0 & 0 & 0 & 1.16 - \left(\frac{1.16}{4.01}\right)4.01 & -8.59 - \left(\frac{1.16}{4.01}\right)(9.2) \end{bmatrix}$$

$$\begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ -16.7 \\ -0.74 \\ 10.7 - \left(\frac{1.16}{4.01}\right)(-0.74) \end{bmatrix}$$

Final matrix.

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 2.4 & -2 & -4.4 & 1.4 \\ 0 & 0 & 0 & 2.7 & -0.7 & 4.7 \\ 0 & 0 & 0 & 0 & 4.01 & 9.2 \\ 0 & 0 & 0 & 0 & 0 & -11.3 \end{bmatrix} \begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ -16.7 \\ -0.74 \\ 10.92 \end{bmatrix}$$

$$-11.3T_6 = 10.92$$

$$T_6 = \frac{-10.92}{11.3}$$

$$T_6 = -0.966 \quad \text{——— (1)}$$

$$4.01T_5 + 9.2T_6 = -0.74$$

$$T_5 = \frac{-0.74 - 9.2(-0.966)}{4.01}$$

$$T_5 = \frac{8.1472}{4.01} = 2.031 \quad \text{——— (2)}$$

$$-2.7T_4 - 0.7T_5 + 4.7T_6 = -16.7$$

$$-2.7T_4 - 0.7(2.031) + 4.7(-0.966) = -16.7$$

$$-2.7T_4 - 1.4217 - 4.5402 = -16.7$$

$$-2.7T_4 = -16.7 + 1.4217 + 4.5402$$

$$-2.7T_4 = -10.7381$$

$$T_4 = 3.977 \quad \text{——— (3)}$$

$$2.4T_3 - 2T_4 - 4.4T_5 + 1.4T_6 = -11$$

$$2.4T_3 - 2(3.977) - 4.4(2.031) + 1.4(0.966) = -11$$

$$2.4T_3 = -11 + 18.2428$$

$$T_3 = 3.017 \quad \text{——— (4)}$$

$-3T_2 + 5T_3 + 8T_4 - 5T_5 - 1T_6 = 12$

$-3T_2 + 5(3.017) + 8 - 5(2.031) - 1(-0.966) = 12$

$-3T_2 = 6.104$

$T_2 = -2.034$ ——— (5)

$T_1 + T_2 - 2T_3 + T_4 + 3T_5 - T_6 = 4$

$T_1 + (2.034) - 2(3.017) + 3.977 + 3(2.031) + 0.966 = 4$

$T_1 = 1.032$ ——— (6)

$\therefore$ $T_1 = 1.032°C$ $\quad$ $T_4 = 3.977°C$

$T_2 = -2.034°C$ $\quad$ $T_5 = 2.031°C$

$T_3 = 3.017°C$ $\quad$ $T_6 = -0.966°C$