MATRIC NO=18/SCI01/068

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$$A=\begin{pmatrix} 1 & 2 & 0 \\ 3 & 6 & 8 \\ 4 & 7 & 1 \end{pmatrix} \qquad B=\begin{pmatrix} 1 & 0 & 0 \\ 1 & 1 & 3 \\ 2 & 1 & 2 \end{pmatrix} \qquad C=\begin{pmatrix} 0 & 0 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 3 \end{pmatrix}$$

1)

$$A = \begin{pmatrix} 1 & 2 & 0 \\ 3 & 6 & 8 \\ 4 & 7 & 1 \end{pmatrix}$$

$$Tx = Ax$$

$$Ax= \begin{pmatrix} 1 & 2 & 0 \\ 3 & 6 & 8 \\ 4 & 7 & 1 \end{pmatrix}\begin{pmatrix} a \\ b \\ c \end{pmatrix}$$

$$Ax = \begin{pmatrix} a+2b \\ a+3b+c \\ a+5b+2c \end{pmatrix}$$

$$T:R^3 \longrightarrow R^3$$

2) $(B+C)^T = \begin{pmatrix} 1 & 2 & 3 \\ 0 & 2 & 2 \\ 1 & 4 & 5 \end{pmatrix}$

$|(B+C)^T| = 1(10-8)-2(0-2)+3(0-2)$

$= 2 + 4 - 6 = 0$, since the determinant is = 0, hence the rank=3

OR

Since the third row is a linear combination of the first and second row, hence the rank = 2

3)

i) $|A| = 1(6-5)-2(2-1)+0(5-3)$

$= 1-2+0$

$= -1 \neq 0$, hence the matrix is non-singular

ii) $|B| = 1(2-3)-0(2-6)+0(1-2)$

$= -1-0+0$

$= -1 \neq 0$, hence the matrix is non-singular

iii) $|C| = 0(3-1)-0(3-1)+1(1-1)$

$= 0$, hence the matrix is singular