(i)

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Subject:- Linear Algebra.

Qi :-
$$\begin{bmatrix} 1 & 103 & 3 & 0 & 5 \\ 0 & 1 & -10+1 & 0 & 7 \\ 0 & 0 & 1 & 0 & -6 \\ 0 & 0 & 0 & 0 & 10 \end{bmatrix}$$

A
$$\begin{bmatrix} 1 & 0 & 3 & 0 & 5 \\ 0 & 1 & -3 & 0 & 7 \\ 0 & 0 & 1 & 0 & -6 \\ 0 & 0 & 0 & 1 & 0 \end{bmatrix}$$

The metric is already in raw reduce each from As it fulfil all the rules.

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H(Q)A1

$$A \begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 2 & -5 & -1 \end{bmatrix} \quad B = \begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 0 & 3 & -5 \end{bmatrix}$$

Elementry row opertion that transform first matric into second and reverse row operation that transform the 2nd materic into first.

$$\Rightarrow A \begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 2 & -6 & -1 \end{bmatrix} \begin{matrix} \rightarrow \text{row (i)} \\ \rightarrow \text{row (ii)} \\ \rightarrow \text{row (iii)} \end{matrix}$$

multipcy Row(2) with "2" and subtract it from row (3)

$$A = \begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & 4 & 2 \\ 0-(0\times2) & 2-(1\times2) & -5(-4\times2) & -1-(2\times2) \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0-0 & 2-2 & -5+8 & -1-4 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 0 & 3 & -5 \end{bmatrix}$$

Now A=B / the row operation used $(2R_2 - R_3)$

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Now let B (Reverse Row Operation)

$$B = \begin{pmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 0 & 3 & 5 \end{pmatrix} \begin{array}{l} \to \text{Row } 1 \\ \to \text{Row } 2 \\ \to \text{Row } 3 \end{array}$$

multiply Row2 with "2" and add it to Row 3

$$B = \begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0+(0\times 2 & 0\times(1\times 2) & 3+(-4+2) & -5+4 \end{bmatrix}$$

$$B = \begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 0\times 2 & 3-8 & -5+4 \end{bmatrix}$$

$$B = \begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 2 & -5 & -1 \end{bmatrix}$$

So (B = A)
the row operation used was
$2R_2 + R_3$.
consist at all zero. the leading "1 of the lower row s right to the leading row of the higher row.

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(ii) $\begin{bmatrix} 1 & 0 & \pi \\ 0 & 1 & e \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ is an echelon Form

The metric is in echelon from because it fail) all the rules

- It have all the zeros row of bottom
- The leading one of the non-zero same, row is right to the leading 1 of the opper row.

(iii) $\begin{bmatrix} 5 & 0 & 0 & 7 \\ 0 & 1 & 0 & 5 \\ 0 & 0 & 1 & 4 \end{bmatrix}$ is an reduced echelon from

The metric is an row reduced echelon from because it fulfil all the rules in reduced row echelon form. The row which conist of all zero enteries should be at the bottom mait. The metric does not have the zero's row in the bottom therefore is not in the row reduced echelon form.

Q3(A) Reduce Row Echelon form.

- A matrix is said to be in reduced row echelon form when it satisfies following condition.
- The matrix satisfies condition for a row echelon form.
- The leading entry in each row is the only non-zero in its row.

For example.

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

Q3 (B) Find an echelon form for the below matrix using row operation.

$$\begin{bmatrix} 1 & 5 & 8 \\ 2 & 8 & -1 \\ -7 & 0 & 0 \\ 1 & -4 & 14 \end{bmatrix} \quad R_3 + 7R_4$$

$$\begin{bmatrix} 1 & 5 & 8 \\ 2 & 8 & -1 \\ 0 & 0 & 0 \\ 1 & -4 & 14 \end{bmatrix} \quad R_3 \leftrightarrow R_4$$

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$$\begin{bmatrix} 1 & 5 & 8 \\ 2 & 8 & -1 \\ 1 & -4 & 14 \\ 0 & 0 & 0 \end{bmatrix} \quad R_2 - 2R_3$$

$$\begin{bmatrix} 1 & 5 & 8 \\ 0 & 0 & -29 \\ 1 & -4 & 14 \\ 0 & 0 & 0 \end{bmatrix} = \begin{bmatrix} 1 & 5 & 8 \\ 0 & 0 & -29 \\ 0 & -9 & 6 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 5 & 8 \\ 0 & -9 & 6 \\ 0 & 0 & -29 \\ 0 & 0 & 0 \end{bmatrix} \rightarrow \text{Echelon form}$$