I.D = 16630
Name = Altaf Hussain

(1)

Question No:2

Part (a)

Solution:- let $A=\begin{bmatrix}1 & 3 & -1 & 5\\ 0 & 1 & -4 & 2\\ 0 & 2 & -5 & -1\end{bmatrix}$, $B=\begin{bmatrix}1 & 3 & -1 & 5\\ 0 & 1 & -4 & 2\\ 0 & 0 & 3 & -5\end{bmatrix}$

By row operation A matrix change into B matrix

and

B matrix change in to A matrix.

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

$\begin{array}{cccc} & & & 2 \\ 0 & 2 & -8 & 2 \\ - & 0 & -2 & -5 \quad -1 \\ \hline 0 & 0 & -3 & 3 \end{array}$

$A \begin{bmatrix}1 & 3 & -1 & 5\\ 0 & 1 & -4 & 2\\ 0 & 0 & +3 & -5\end{bmatrix} R_3 - 2R_2$

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

So A matrix is change into matrix B by row operation.

p-T-O

I.D = 16630
Name = Altaf Hussain

(2)

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

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

B)

$$\begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 2 & -5 & -1 \end{bmatrix} \quad R_3 + 2R_2$$

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

So matrix B is change into matrix A.

I.d = 16630
name = Altaf Hussain

(3)

Q No 2:- part "B"

a) $\begin{bmatrix} e & 0 & 0 & 0 \\ 0 & \pi & 0 & 0 \\ 0 & 0 & -\pi & 0 \\ 0 & 0 & 0 & e \end{bmatrix}$ is in echelon form.

Justification :-

Yes it is a echelon form because under

(i) number of zero after non zero entry is increases row by row.

(ii) under the main diagnal all the entry are zero.

(b) $\begin{bmatrix} 1 & 0 & \pi \\ 0 & 1 & e \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ is in echelon form

Justification :-

Yes it is echelon form. because

(i) number of zero is increases row by row after non zero entry in any row

(2) under the main diagnal all elements are zero so it is a echelon form.

I.d = 16630
name = Altaf Hossain

(4)

(c) $\begin{bmatrix} 5 & 0 & 0 & 7 \\ 0 & 1 & 0 & 5 \\ 0 & 0 & 1 & 4 \end{bmatrix}$ is in reduced echelon form.

Justifications

No it is not reduced echelon form. because,

(1) The leading entry must be zero, but their is leading entry is 5 so it is not a reduced echelon form.

(2) all elements must be zero above and below the main diagnal. So above the diagnal element are not zero at all.

I.d: 16630
name: Altaf Hussain

(5)

(d) $\begin{bmatrix} 1 & 0 & 0 & 7 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 4 \end{bmatrix}$ is in reduced echelon form.

Justification:

No it is not in redred echelon form because

(2) number of zero after leading entry (1) can't increase row by row, but first increase then decrease.

(3) All element are not zero above and below the main diagnol.

I.d = 16630

(6)

Question-No-03

Part (a)

Solution:

echelon form:

A matrixs is said to be in echelon form if it satisfies the following Conditions.

i.e (i) In each successive non-zero row, the number of zeros before the first non-zero entry of a row increases row by row.

(ii) All the zeros rows below the non zeros rows of a matrix.

Reduce echelon form:

A matrix is said to be Reduce echelon form if they satisfies the following condities.

(i) It is in echelon form.

(ii) the first non-zero element in each row is one and all the other elements lies on that column are zero except 1.

I.d = 16630
name = Altaf Hussain

(7)

Practical use of Reduced echelon form :-

Natural Science research which balance chimical equation on using elementary row operation to reduce echelon form.

we show that the solution abtaind is actually nullspace of the matrix, the solution can be infinitly many.

the reduced echelon form also used for solving linear equation by process of elementary row operation.

I.d = 16630
name = Altaf Hossain

16630

(8)

QUESTION - 3

Part (b)

$$\begin{bmatrix} 1 & ID_2 & 8 \\ 2 & 8 & -1 \\ ID_3 & 0 & 0 \\ 1 & -4 & ID, \text{First, last} \end{bmatrix}$$

$ID_2 = 6 \rightarrow ID_3 = 6$, $ID = 10$ (first, last)

$$\begin{bmatrix} 1 & 6 & 8 \\ 2 & 8 & -1 \\ 6 & 0 & 0 \\ 1 & -4 & 10 \end{bmatrix}$$

$$\overset{R}{\sim} \begin{bmatrix} 1 & 6 & 8 \\ 0 & -4 & -17 \\ 0 & -24 & 3 \\ 0 & -10 & 2 \end{bmatrix} \begin{matrix} R_2 - 2R_1 \\ R_3 - 3R_2 \\ R_4 - R_1 \end{matrix}$$

$$\overset{R}{\sim} \begin{bmatrix} 1 & 6 & 8 \\ 0 & -4 & -17 \\ 0 & 0 & 85 \\ 0 & -10 & 2 \end{bmatrix} R_3 + 6R_2$$

I.d: 16630
name = Altaf Hossain

(9)

$$\begin{bmatrix} 1 & 6 & 8 \\ 0 & -10 & 2 \\ 0 & 0 & 85 \\ 0 & -4 & -17 \end{bmatrix} \quad R_4 \rightarrow R_2$$

$$\begin{bmatrix} 1 & 6 & 8 \\ 0 & -10 & 2 \\ 0 & 0 & 85 \\ 0 & 0 & -17 \end{bmatrix} \quad 6R_4 + 4R_1$$

$$\begin{bmatrix} 1 & 6 & 8 \\ 0 & -10 & 2 \\ 0 & 0 & 85 \\ 0 & 0 & 0 \end{bmatrix} \quad 5R_4 + R_3$$

So these are echelon form.