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Program : BC (gE)
Section : A

Ans 1:-

ID = 16175

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

Applying row operation

$$= \begin{vmatrix} 0 & 0 & -2 & 0 & 2 \\ 0 & 1 & -5 & 0 & 7 \\ 0 & 0 & 1 & 0 & -6 \\ 0 & 0 & 0 & 1 & 1 \end{vmatrix} \quad R_1 - R_2$$

$$\begin{vmatrix} 0 & 0 & -2 & 0 & 2 \\ 0 & 1 & 0 & 0 & 7 \\ 0 & 0 & 1 & 0 & -6 \\ 0 & 0 & 0 & 1 & 1 \end{vmatrix} \quad R_2 (-5) R_2$$

Sugmented matrix Converted into linear equation.

$$x_1 = 2 \quad , \quad x_2 = 7$$

$$x_3 = -6 \quad , \quad x_4 = 1.$$

Q2 **Ans 2 Part (A)**

(A)

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

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

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

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

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

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

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

Ans 2 Part No B 4 parts

Part No 1 A

$$\begin{bmatrix} e & 0 & 0 & 0 \\ 0 & \pi & 0 & 0 \\ 0 & 0 & -\pi & 0 \\ 0 & 0 & 0 & e \end{bmatrix}$$

Sol:-

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

Yes in echelon from becauses no of zero. increases as we goes down row by row before 1^{m} non-zero

Ans 2 part (C)

$$C = \begin{bmatrix} 5 & 0 & 0 & 7 \\ 0 & 1 & 0 & 5 \\ 0 & 0 & 1 & 4 \end{bmatrix}$$

Sol:-

$$\begin{bmatrix} 5 & 0 & 0 & 7 \\ 0 & 1 & 0 & 5 \\ 0 & 0 & 1 & 4 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 0 & 0 & 7 \\ 0 & 1 & 0 & 5 \\ 0 & 0 & 1 & 4 \end{bmatrix}$$

its in echelon from because it Salisties the 4^{th} Condition That is in a Column That Contains the leading entry of row all The other element are Zero.

Ans 2

Part (D)

$$\begin{bmatrix} 1 & 0 & 0 & 7 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 4 \end{bmatrix}$$

Sol:-

$$\begin{bmatrix} 1 & 0 & 0 & 7 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 4 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 0 & 7 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 4 \end{bmatrix}$$

is in echelon foom becauses it Satists the 4^{Th} Condition That is in a Column That cantains the leading entry row all the eThel element are Zero.

Ans 2

part (B)

$$B = \begin{bmatrix} 1 & 0 & \pi \\ 0 & 1 & e \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

Sol:-

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

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

These are echelon from A matric (A) is Said to
i) The First non-zero element in each row, is called its leading entry is 1

Q3 part A The row echelon from is used to Solve the system of linear equation Give one example.

Sol (A)

Difference b/w Row Echelon From and reduced row echelon forms:-
The matric in row echelon from meets The following requireds (i) The first non-zero number from the left is always to the right of the first non-zero number in the row above

(ii) Rows conisting of all zero are at the botton of the matric.

For example

$$\begin{bmatrix} 1 & a_0 & a_1 & a_2 & a_3 \\ 0 & 0 & 2 & a_4 & a_5 \\ 0 & 0 & 0 & 1 & a_6 \end{bmatrix}$$

1) But on the other hand reduced row echelon from meets different required

P.T.O

Ans 3 part A

(i) It is in row echelon from
(ii) The leading entry in each row is a 1 (called a leading 1)

For example

$$\begin{pmatrix} 1 & 0 & a_1 & 0 & b_1 \\ 0 & 1 & a_2 & 0 & b_2 \\ 0 & 0 & 0 & 1 & b_3 \end{pmatrix}$$

Practical use of Reduced Row Echelon From:-

Reduce row echelon form is a type of matric used to solve systems of linear equation. It has Fair main Required which we can talk before. It is used to solve System of linear echelon form or reduced it to row echelon Form, using determinants, row echelon Form, using determinants and so the using row echelon form seems to be very inefficient and on easy way to make mistake.

Ans 3

Part (B)

(B)

$$\begin{bmatrix} 1 & 1D2 & 8 \\ 2 & 8 & -1 \\ -1D3 & 0 & 0 \\ 1 & -4 & 1D\text{- First Last} \end{bmatrix}$$

(b) Sol:-

$$\begin{pmatrix} 1 & ID2 & 8 \\ 2 & 8 & -1 \\ -ID3 & 0 & 0 \\ 1 & -4 & \text{ID First last} \end{pmatrix}$$

Matric

$$\begin{pmatrix} 1 & 5 & 8 \\ 2 & 8 & -1 \\ -8 & 0 & 0 \\ 1 & -4 & \text{ID First last} \end{pmatrix}$$

1) Applying Row operations:-

3) $\sim \begin{pmatrix} -8 & 2 & 0 \\ -1 & 5 & 8 \\ 1 & -4 & 13 \end{pmatrix}$ interchange R_1 and R_3

$\sim \begin{pmatrix} -8 & 2 & 0 \\ 0 & -2 & -17 \\ 1 & 5 & 8 \\ 1 & -4 & 13 \end{pmatrix}$ $R_2 - 2R_1$

$\sim \begin{pmatrix} -8 & 0 & 0 \\ 0 & -2 & -17 \\ 0 & 40 & 64 \\ 1 & -4 & 13 \end{pmatrix}$ $8R_3 + R_1$

$$\sim \begin{bmatrix} -8 & 0 & 0 \\ 0 & -2 & -17 \\ 0 & 0 & 64 \\ 1 & -4 & 13 \end{bmatrix} \quad R_3 + 20R_2$$

$$\sim \begin{bmatrix} -8 & 0 & 0 \\ 0 & -2 & 17 \\ 0 & 0 & 64 \\ 0 & -32 & 104 \end{bmatrix} \quad 8R_4 + R_1$$

$$\sim \begin{bmatrix} -8 & 0 & 0 \\ 0 & -2 & -17 \\ 0 & 0 & 64 \\ 0 & 0 & 376 \end{bmatrix} \quad R_4 - 16R_2$$

$$\sim \begin{bmatrix} -8 & 0 & 0 \\ 0 & -2 & -17 \\ 0 & 0 & 64 \\ 0 & 0 & 0.32 \end{bmatrix} \quad R_4 + 5.88R_3$$

$$\sim \begin{bmatrix} -8 & 0 & 0 \\ 0 & .8 & 0.08 \\ 0 & 0 & 64 \\ & 0 & 0.32 \end{bmatrix} \quad 376R_2 + R_3$$

- After Row operation the echelon form is given as