Day: M T W T F S Date: __/__/__

p.1

Name:- Salman Khan
ID :- 16359
BS(SE) 2nd Semester
Sub:- Linear Algebra.

Q.No.1

$$\begin{bmatrix} 1 & ID_3 & 3 & 0 & 5 \\ 0 & 1 & -ID_{last} & 0 & 7 \\ 0 & 0 & 1 & 0 & -6 \\ 0 & 0 & 0 & 1 & ID_3 \end{bmatrix}$$

Sol

let Suppose
ID = 12345
ID_3 = 3
ID-last = 5
inverse of ID last is = -5
putting values

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

$$\overset{R}{\sim} \begin{bmatrix} 1 & 3 & 0 & 0 & 23 \\ 0 & 1 & 0 & 0 & -23 \\ 0 & 0 & 1 & 0 & -6 \\ 0 & 0 & 0 & 1 & 3 \end{bmatrix} \begin{matrix} R_1 - 3R_3 \\ R_2 + 5R_3 \end{matrix}$$

P.T.O

Checked By:............Parents:............Excellent ☐ Good ☐ Need Improvement ay: M T W T F S

p.2

Date: ___/___/___

$$\sim_R \left[\begin{array}{ccccc} 1 & 0 & 0 & 0 & 92 \\ 0 & 1 & 0 & 0 & -23 \\ 0 & 0 & 1 & 0 & -6 \\ 0 & 0 & 0 & 1 & 3 \end{array}\right] R_1 - 3R_2$$

$x_1 = 92$

$x_2 = -23$

$x_3 = -6$

$x_4 = 3$

Q.No.2

(a)

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

Solo

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

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

We know that the first two rows is both matrix are same, there for only the third row are different of bouth matrix

So

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

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

P.T.O

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

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

⇒ In first (A) matrix we Multiply 2 with row Send and the Subtract it from third row which Give the Same Result like Matrix B

⇒ iN Second (B) Matrix we ALSO Multiply 2 with Sond Row but here we Add the Sond row with third row and Give the Same Result like (A)

Q.No.2

Part B

$$a - \begin{bmatrix} e & 0 & 0 & 0 \\ 0 & x & 0 & 0 \\ 0 & 0 & -x & 0 \\ 0 & 0 & 0 & e \end{bmatrix}$$

is in echelon form

it is an echelon form beccaus in echenut form the number of zero incerase ~~then~~ by row

(b)

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

is in echelon form

⇒ it is not in echelon form
it is in reduce echelon form

(c)

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

is in reduced row echelon form

it is an echelon form
Not in reduced row echelon form.

P.T.O

d

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

it is not echelon form and Not ~~[illegible]~~ reduced row echelon form.

Q. No. 3

(A)

The echelon form of a Matrix isn't onique, which means there are infinite answers possible where you perform row reduction. Reduced row echelon form is at the other end of the Spectrum: it is onique which mean row-reducton on a Matrix will produce the Same answer no mather how you peform the Same row operation.

<u>Practicle use</u>

The reduce row echelon form is used to Solved the System of liners equation

e.g

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & -5 \end{array}\right]$$

QNo. 3

B

$$\begin{bmatrix} 1 & 102 & 8 \\ 2 & 8 & -1 \\ 103 & 0 & 0 \\ 1 & -4 & 10\text{-first-last} \end{bmatrix}$$

Sol

Given $102 = 2$

$103 = 3$

$10\text{-1st-last} = 15$

put the value

$$\begin{bmatrix} 1 & 2 & 8 \\ 2 & 8 & -1 \\ -3 & 0 & 0 \\ 1 & -4 & 15 \end{bmatrix}$$

$$\underset{\sim}{R} \begin{bmatrix} 1 & 2 & 8 \\ 0 & 4 & -17 \\ 0 & 6 & 24 \\ 0 & -6 & 7 \end{bmatrix} \begin{matrix} R_2 - 2R_1 \\ R_3 + 3R_1 \\ R_4 - R_1 \end{matrix}$$

$$\underset{\sim}{R} \begin{bmatrix} 1 & 2 & 8 \\ 0 & 1 & -17/4 \\ 0 & 6 & 24 \\ 0 & -6 & 7 \end{bmatrix} \frac{1}{4} R_2$$

$$\underset{\sim}{R} \begin{bmatrix} 1 & 2 & 8 \\ 0 & 1 & -17/4 \\ 0 & 0 & 99/2 \\ 0 & 0 & -3/2 \end{bmatrix} \begin{matrix} R_3 - 6R_2 \\ R_4 + 6R_2 \end{matrix}$$

Day: M T W T F S   Date: __/__/__

p. 9

$$\underset{\sim}{R} \begin{bmatrix} 1 & 2 & 8 \\ 0 & 1 & -17/4 \\ 0 & 0 & 1 \\ 0 & 0 & -3/2 \end{bmatrix} \quad \frac{2}{99}R_3$$

This is an echelon form

The END

---*---*---*---