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197a national university of Peshawar

Day: M T W T F S

Date: / /

Name

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ID #

16603

Department

Bs (CS)

Subject

Linear Algebra

Submitted to

Mansoor Qadi

Date

17/4/2020

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Q# 1

$$= \begin{bmatrix} 1 & 103 & 3 & 0 & 5 \\ 0 & 1 & 1010 & 0 & 7 \\ 0 & 1 & 1 & 0 & -6 \\ 0 & 0 & 0 & 1 & 0 \end{bmatrix}$$

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

$$R_1 - 5R_2 \rightarrow R_1$$

$$= \begin{bmatrix} 1 & 0 & 38 & 0 & -30 \\ 0 & 1 & -7 & 0 & 7 \\ 0 & 0 & 1 & 0 & -6 \\ 0 & 0 & 0 & 1 & 5 \end{bmatrix}$$

$$R_1 - 38R_3 - R_4 : R_2 + 7R_3$$

$$= \begin{bmatrix} 1 & 0 & 0 & 0 & 198 \\ 0 & 1 & 0 & 0 & -35 \\ 0 & 0 & 1 & 0 & -6 \\ 0 & 0 & 0 & 1 & 5 \end{bmatrix}$$

It is reduce echelon form

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$$= \begin{bmatrix} 1 & 3 & -10 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 2 & -5 & -1 \end{bmatrix}, \begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 0 & 3 & -5 \end{bmatrix}$$

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

$R_3 - 2R_2 \rightarrow R_3$

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

Note Hence its metric transformal into 2nd meterial.

Now

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

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$$R_3 + R_2 \rightarrow R_3$$

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

again

$$R_3 + R_2 + R_1$$

Hence 2nd matrix
transformed into
1st matrix.

Q No 2 (b)

$$\begin{bmatrix} e & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 11 & 0 & 0 \\ 0 & 0 & 11 & e \\ 0 & 0 & 0 & e \end{bmatrix}$$

it is e e e e

form because its row
because e and below
it all zero 2nd row
element become 1 and
below it all zero
similarly in 3rd row

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1 and below at all
zero.

$$b \rightarrow \begin{pmatrix} 1 & 0 & 11 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}$$

Q No 2 (C)

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

It is reduce echelon form because in 1st row element becomes one and below its all zero. In the 2nd row 2nd element is one and below it all zero similarly in 3rd row 3rd element is 1 and below.

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Q No 2 (d)

same as in

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

&

it is reduced echelon form because first row first element is 1 and below all element are zero. In 2nd row 2nd element is zero and because and below above all zero. and in 3rd row 3rd element is 1 and below above all element zero. so it is reduced echelon form.

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Q NO 3 #

(a) Difference b/w row echolan and reduced row echolen form.

In the row echolen form 1st element of 2nd row is one and below its all zero. in 2 and row row 2nd elements one below all zero. and so on.

while. In reduced echolen form first element of first row one and its zero similarly 2nd element of 2nd row is one and it below above all zero. The row reduced In echolen form

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need to solve

matrix for Exam.

$$2x_1 + 3x_2 - x_3 = 1$$

$$-x_1 + 5x_2 + 3x_3 = 0$$

$$4x_1 - x_2 - x_3 = 2$$

Q No 3 (b)

$$= \begin{bmatrix} 1 & 10^2 & 8 \\ 2 & 8 & -1 \\ 10^3 & 0 & 0 \\ 1 & -4 & 10^1 + 10^2 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 6 & 8 \\ 2 & 8 & 1 \\ -5 & 0 & 0 \\ 1 & -4 & 9 \end{bmatrix}$$

$$R_2 - 2R_1 \rightarrow R_2$$

$$R_3 + 5R_1 \rightarrow R_3$$

$$R_4 - R_1 \rightarrow R_4$$

$$\begin{bmatrix} 1 & 6 & 8 \\ 0 & 4 & -17 \\ 0 & 30 & 42 \\ 0 & -10 & 9 \end{bmatrix}$$

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Divided by $R_2/4$

$R_3/10$

$$= \begin{bmatrix} 1 & 6 & 8 \\ 0 & 1 & 12 \\ 0 & 3 & 4 \\ 0 & 10 & 4 \end{bmatrix}$$

$R_3 - R_2 \rightarrow R_3$

$R_4 + 10R_2 \rightarrow R_4$

$$\begin{bmatrix} 1 & 6 & 8 \\ 0 & 1 & 12 \\ 0 & 0 & 4 \\ 0 & 0 & 35 \end{bmatrix}$$

it is reduced.

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$$R_3 \left(-\frac{4}{35} \right)$$

~~Handwritten scribble~~

$$\begin{bmatrix} 1 & 6 & 8 \\ 0 & 1 & \frac{17}{4} \\ 0 & 0 & \frac{93}{4} \\ 0 & 0 & 2 \end{bmatrix}$$

↔ End