Linear Algebra

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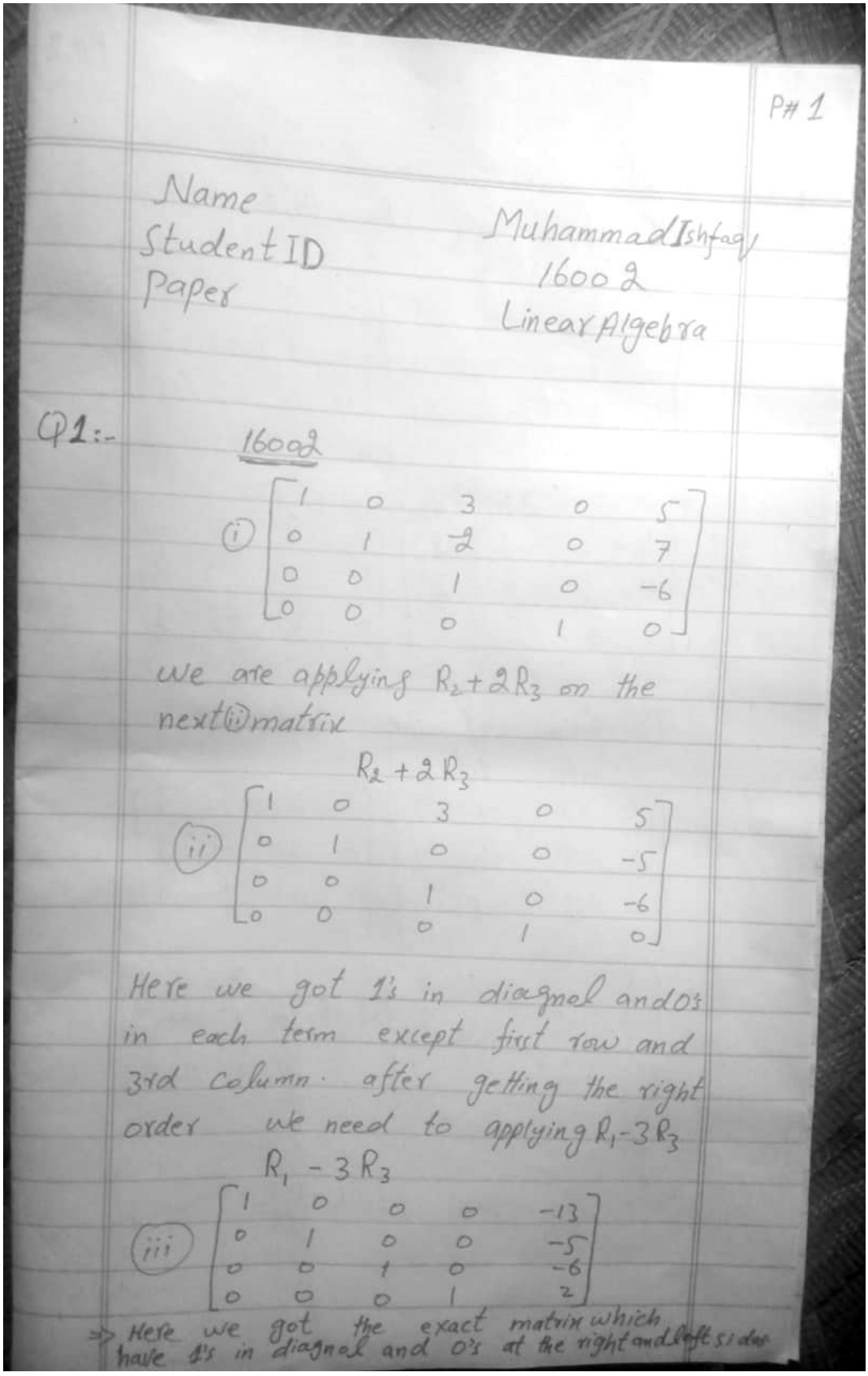
Page Number 1:



P# 1

Name Muhammad Ishfaq
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Paper Linear Algebra

Q1:- 16002

(i)
$$\begin{bmatrix} 1 & 0 & 3 & 0 & 5 \\ 0 & 1 & -2 & 0 & 7 \\ 0 & 0 & 1 & 0 & -6 \\ 0 & 0 & 0 & 1 & 0 \end{bmatrix}$$

we are applying $R_2 + 2R_3$ on the next (ii) matrix

$R_2 + 2R_3$

(ii)
$$\begin{bmatrix} 1 & 0 & 3 & 0 & 5 \\ 0 & 1 & 0 & 0 & -5 \\ 0 & 0 & 1 & 0 & -6 \\ 0 & 0 & 0 & 1 & 0 \end{bmatrix}$$

Here we got 1's in diagnol and 0's in each term except first row and 3rd column. after getting the right order we need to applying $R_1 - 3R_3$

$R_1 - 3R_3$

(iii)
$$\begin{bmatrix} 1 & 0 & 0 & 0 & -13 \\ 0 & 1 & 0 & 0 & -5 \\ 0 & 0 & 1 & 0 & -6 \\ 0 & 0 & 0 & 1 & 2 \end{bmatrix}$$

=> Here we got the exact matrix which have 1's in diagnol and 0's at the right and left side

Page Number 2:

Q2:- (A)

Transform of the first matrix into second.

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

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

Transform of the 2nd matrix into 1st.

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

$$\Rightarrow \begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 2 & -5 & -1 \end{bmatrix} \xrightarrow{3R_2 + R_3} \begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 5 & -17 & 5 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 5 & -17 & 5 \end{bmatrix} \xrightarrow{-3R_2 + R_3} \begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 2 & -5 & -1 \end{bmatrix}$$

Page Number 3:

Q2:- (B)

(a) Row Echelon form.
⇒ (Because the all Constants in diagnols are not = 1)

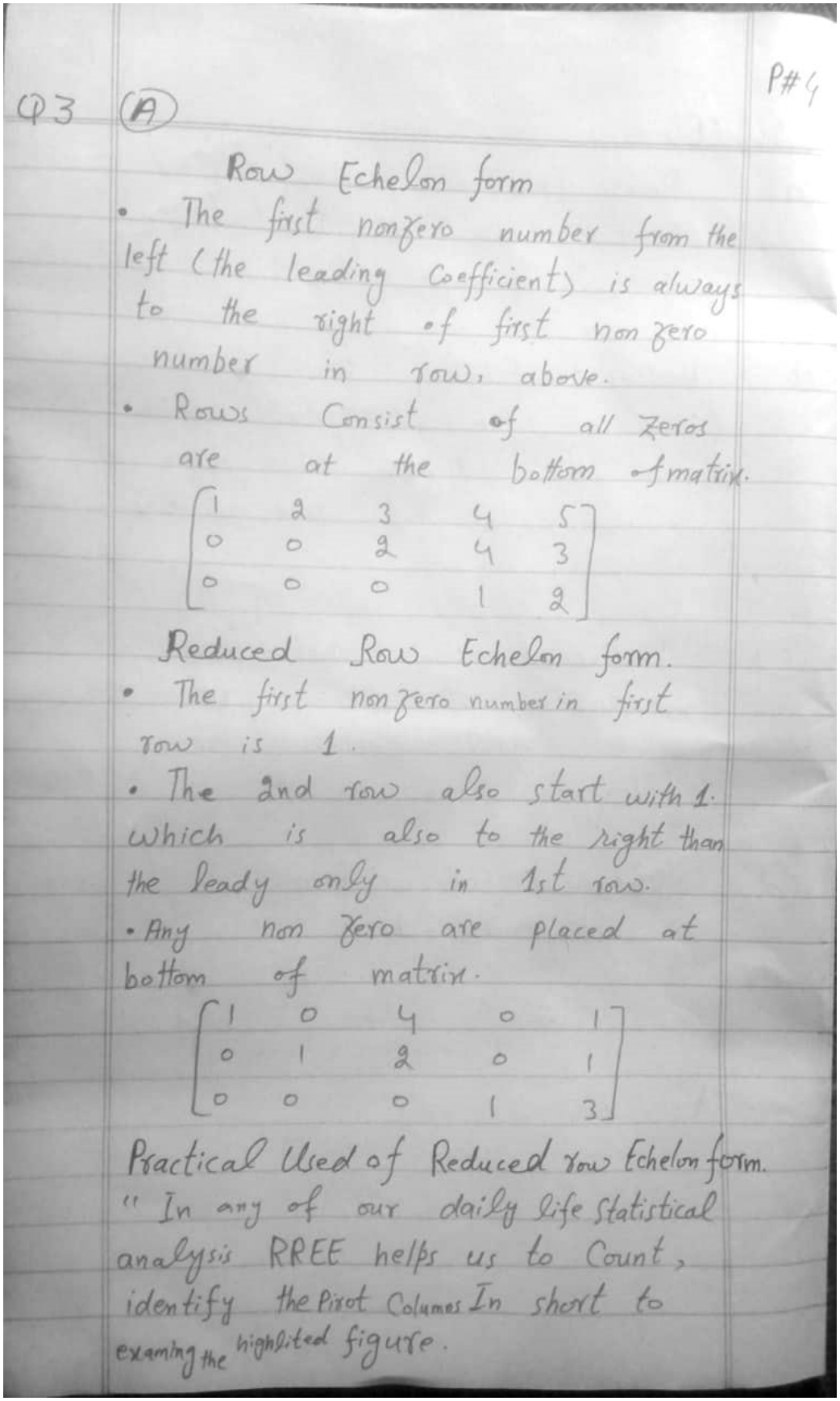
(b) Reduced row Echelon form.
(Because the diagonal are=2 and the digits above & below the 1's are all =0).

(c) Reduced row Echelon form.
(Because all the digits above and below the diagonals are 0)

(d) Reduced Echelon form.
diagonal = 1.

" " " "

Page Number 4:



Q3 (A) P#4

Row Echelon form

- The first nonzero number from the left (the leading coefficient) is always to the right of first non zero number in row, above.
- Rows Consist of all zeros are at the bottom of matrix.

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

Reduced Row Echelon form.

- The first non zero number in first row is 1.
- The 2nd row also start with 1. which is also to the right than the leady only in 1st row.
- Any non zero are placed at bottom of matrix.

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

Practical Used of Reduced row Echelon form.

" In any of our daily life statistical analysis RREE helps us to Count, identify the Pivot Columes In short to examing the highlited figure.

Page Number 5: