## Step-1

We have to find that which of the following rules give a correct definition of the rank of A.

Let *R* be the row reduced echelon form of the matrix '*A*'

a) The number of non zero rows in R.

The above definition gives the correct definition for the rank of A.

## Step-2

b) The number of columns minus the total number of rows.

The above definition does not give the correct definition for the rank of A.

For example, 
$$A = \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$$
 has rank 1.

But number of columns minus the total number of rows = 0

## Step-3

c) The number of columns minus the number of free columns.

The above definition gives the correct definition for the rank of A.

## Step-4

d) The number 1s in R.

The above definition does not give the correct definition for the rank of A.

$$A = \begin{bmatrix} 1 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}, \text{ rank of } A = 1 \text{ but } A \text{ has four } \hat{a} \in \mathbb{C}^{TM} \text{ s.}$$