11) Upper Triangular Matrix:

A square matrix is said to be upper triangular matrix if all elements below the leading diagonal are zero.

e.g. $\begin{bmatrix} 2 & 5 & 6 & 7 \\ 0 & 3 & 5 & 6 \\ 0 & 0 & 7 & 8 \\ 0 & 0 & 0 & 5 \end{bmatrix}$ is an upper triangular matrix.

12) Lower Triangular Matrix:

A square matrix is said to be lower triangular matrix if all elements above the leading diagonal are zero.

e.g. $\begin{bmatrix} 2 & 0 & 0 & 0 \\ 5 & 3 & 0 & 0 \\ 1 & 2 & 3 & 0 \\ 6 & 7 & 8 & 9 \end{bmatrix}$ is a lower triangular matrix.

13) Transpose Matrix:

If we interchange the rows and the corresponding columns in a given matrix A, the new matrix obtained is called transpose of the matrix A and denoted by A^T or A'.

e.g. Transpose of $A = \begin{bmatrix} 2 & 5 & 6 \\ 7 & 8 & 9 \\ 1 & 2 & 3 \end{bmatrix}$ is

$$A^T = \begin{bmatrix} 2 & 7 & 1 \\ 5 & 8 & 2 \\ 6 & 9 & 3 \end{bmatrix}$$

(14) Symmetric Matrix:

A square matrix A is said to be symmetric matrix, if $A' = A$ i.e. if for all the values of i and j, $a_{ij} = a_{ji}$.

e.g. $\begin{bmatrix} a & h & g \\ h & b & f \\ g & f & e \end{bmatrix}$ is a symmetric matrix.

(15) Skew - Symmetric Matrix:

A square matrix A is said to be skew-symmetric matrix, if $A' = -A$ i.e. if for all the values of i and j, $a_{ij} = -a_{ji}$

e.g. $\begin{bmatrix} 0 & -h & -g \\ h & 0 & -f \\ g & f & 0 \end{bmatrix}$ is a skew-symmetric matrix.

16) Orthogonal Matrix:

A square matrix A is said to be an orthogonal matrix, if $AA' = I = A'A$, where I is a unit matrix.

(17) Singular and Non-Singular Matrix:

The matrix A is said to be singular matrix, if $|A| = 0$ and the matrix A is said to be non-singular, if $|A| \neq 0$.