Step-1

We have to give 3×3 matrices as examples for diagonal, symmetric, uppertriangular and skew symmetric matrices.

Step-2

(a) Let $A_1=\left[a_{ij}\right]$ be a 3×3 diagonal matrix with $a_{ij}=0$ if $i\neq j$

Therefore $A_1=\begin{pmatrix}a_{11}&0&0\\0&a_{22}&0\\0&0&a_{33}\end{pmatrix}$

$$=\begin{pmatrix}1&0&0\\0&2&0\\0&0&7\end{pmatrix}$$

Step-3

(b) Let $A_2=\left[a_{ij}\right]$ be a 3×3 symmetric matrix i.e. $A=A^T$ and $a_{ij}=a_{ji}$ for all i and j

$$A_2=\begin{pmatrix}1&3&4\\3&2&0\\4&0&7\end{pmatrix}$$

Step-4

(c) Let $A_3=\left[a_{ij}\right]$ be a 3×3 an upper triangular matrix i.e. $a_{ij}=0$ if $i>j$

$$A_3=\begin{pmatrix}1&3&4\\0&2&0\\0&0&7\end{pmatrix}$$

Step-5

(d) Let $A_4=\left[a_{ij}\right]$ be a 3×3 skew symmetric matrix i.e. $A=-A^T$ and $a_{ij}=-a_{ji}$

for all i and j

$$A_4 = \begin{pmatrix} 0 & 3 & 4 \\ -3 & 0 & 0 \\ -4 & 0 & 0 \end{pmatrix}$$