Matrices

Q1. Classify the following matrices :

(*i*) $\begin{bmatrix} 2 & -1 \\ 5 & 1 \end{bmatrix}$

(*ii*) $[2 \quad 3 \quad -7]$

(*iii*) $\begin{bmatrix} 3 \\ 0 \\ -1 \end{bmatrix}$

(*iv*) $\begin{bmatrix} 2 & -4 \\ 0 & 0 \\ 1 & 7 \end{bmatrix}$.

(*v*) $\begin{bmatrix} 2 & 7 & 8 \\ -1 & \sqrt{2} & 0 \end{bmatrix}$

(*vi*) $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$.

Solution

Q1)

i) It is a square matrix of Order 2

ii) It is a row matrix of Order 1×3.

iii) It is a column matrix of Order 3×1

iv) It is a matrix of Order 3×2.

v) It is a matrix of Order 2×3

vi) It is a zero matrix of Order 2×3

Q2. (i) If a matrix has 4 elements, what are the possible orders it can have? ,

(ii) If a matrix has 8 elements, what are the possible orders it can have?

Solution

Q2

i) It can have 1×4, 4×1 or 2×2 order

ii) 1×8, 8×1, 2×4 or 4×2 order

Q3. Construct a 2 x 2 matrix whose elements a_{ij} are given by

(i) $a_{ij} = 2i-j$

(ii) $a_{ij} = i.j$

Solution

Q3

i) Given $a_{ij} = 2i - j$

2×2 matrix $= \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}$

$\therefore$ matrix $= \begin{bmatrix} 1 & 0 \\ 3 & 2 \end{bmatrix}$

ii)

$a_{ij} = i.j$

$= \begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$

Q4. Find the values of x and y if

$$\begin{bmatrix} 2x+y \\ 3x-2y \end{bmatrix} = \begin{bmatrix} 5 \\ 4 \end{bmatrix}$$

Solution

Q4)

$$(2x+y = 5) \quad \times 2$$
$$3x-2y = 4$$

$$4x+2y = 10$$
$$+\quad 3x-2y = 4$$
$$\overline{\qquad\qquad}$$
$$7x = 14$$

$$x = 2 \qquad \therefore \quad y = 1$$

Q5. Find the value

$$\begin{bmatrix} 3x+y & -y \\ 2y-x & 3 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ -5 & 3 \end{bmatrix}$$

Solution

Q5)

$$-y = 2$$
$$\therefore y = -2$$

$$2y - x = -5$$
$$2(-2) - x = -5$$
$$-4 - x = -5$$
$$x = 5 - 4 = 1$$