Matrices - Class XII

Related Questions with Solutions

Questions

Quetion: 01

If the system of linear equations :
$x + ay + z = 3$
$x + 2y + 2z = 6$
$x + 5y + 3z = b$
has no solution, then

A. $a = -1, b = 9$
B. $a \neq -1, b = 9$
C. $a = 1, b \neq 9$
D. $a = -1, b \neq 9$

Solutions

Solution: 01

The given system of equations has no solution.

$$\therefore \begin{vmatrix} 1 & a & 1 \\ 1 & 2 & 2 \\ 1 & 5 & 3 \end{vmatrix} = 0$$

Applying $R_1 \to R_1 - R_2$ and then $R_2 \to R_2 - R_3$, we get

$$\begin{vmatrix} 0 & a-2 & -1 \\ 0 & -3 & -1 \\ 1 & 5 & 3 \end{vmatrix} = 0 \Rightarrow a = -1$$

Also in addition to above $(\text{adj } A)B \neq O \Rightarrow$ no solution

Here, $\text{adj}(A) = \begin{bmatrix} -4 & 8 & -4 \\ -1 & 2 & -1 \\ 3 & -6 & 3 \end{bmatrix}$

$$\Rightarrow \quad (\text{adj } A)(B) = \begin{bmatrix} -4 & 8 & -4 \\ -1 & 2 & -1 \\ 3 & -6 & 3 \end{bmatrix} \begin{bmatrix} 3 \\ 6 \\ b \end{bmatrix} \neq O$$

$\Rightarrow -12 + 48 - 4b \neq 0 \Rightarrow b \neq 9$

Correct Options

Answer:01
Correct Options: D