



The number of values of $\theta \in (0, \pi)$ for which the system of linear equations $x + 3y + 7z = 0$; $\sin 3\theta x + \cos 2\theta y + 2z = 0$; $-x + 4y + 7z = 0$, has a non – trivial solution, is :

Solution: $\theta \in (0, \pi)$

$$x + 3y + 7z = 0$$

$$\sin 3\theta x + \cos 2\theta y + 2z = 0$$

$$-x + 4y + 7z = 0$$

} non – trivial solution

For non – trivial solution : $\Delta = 0$

$$\begin{vmatrix} 1 & 3 & 7 \\ -1 & 4 & 7 \\ \sin 3\theta & \cos 2\theta & 2 \end{vmatrix} = 0 \quad R_1 \rightarrow R_1 + R_2$$

$$\begin{vmatrix} 0 & 7 & 14 \\ -1 & 4 & 7 \\ \sin 3\theta & \cos 2\theta & 2 \end{vmatrix} = 0 \quad C_3 \rightarrow C_3 - 2C_2$$

$$\begin{vmatrix} 0 & 1 & 0 \\ -1 & 4 & -1 \\ \sin 3\theta & \cos 2\theta & 2 - 2\cos 2\theta \end{vmatrix} = 0$$

A

Four

B

Three

C

Two

D

One