12.10.3.17

Lokesh Surana

Class 12, Chapter 10, Exercise 4.8

8) If either $\mathbf{a} = 0$ or $\mathbf{b} = 0$ then $\mathbf{a} \times \mathbf{b} = 0$. Is the converse true? Justify your answer with an example.
Solution: False.
Let $\mathbf{a} = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} m \\ 0 \\ 0 \end{pmatrix}$ $(m \neq 0)$.
Here neither of $\mathbf{a}$ or $\mathbf{b}$ is zero.

$$\mathbf{a} \times \mathbf{b} = \begin{vmatrix} a_{23} & b_{23} \\ a_{31} & b_{23} \\ a_{12} & b_{23} \end{vmatrix}$$
$$= \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}$$

Justfied.