Step-1

Suppose A is an upper triangular matrix

Then $$A=\begin{bmatrix} a_{11} & a_{12} & - & - & a_{1n} \\ 0 & a_{22} & - & - & a_{2n} \\ - & - & - & - & - \\ - & - & - & - & - \\ 0 & 0 & - & - & a_{nn} \end{bmatrix}$$

Step-2

Suppose A is orthogonal

That is;

$A^{-1} = A^T$ â€¦â€¦ (1)

Observe that if A is an upper triangular matrix, then A^{-1} is also upper triangular.

Further, A is upper triangular gives A^T is lower triangular.

In view of (1), obtain that A^T is both upper triangular and a lower triangular matrix.

In other words, A is $\boxed{\text{a diagonal matrix}}$.

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