Step-1

4764-1.6-16P AID: 124

RID: 232

(a) Let $A = LDU$ with 1s on the main diagonals of L and U.

We have to find the corresponding factorization of A^T.

Step-2

Since $A = LDU$ where L, D are permutation matrices consists 1s on the diagonal

Now

$A = LDU$

Taking transpose on the both sides gives

$$(A)^T = (LDU)^T$$

$$A^T = U^T D^T L^T \qquad \left(\text{Since } (AB)^T = B^T A^T\right)$$

$$A^T = U^T D L^T \qquad \left(\text{Since } D^T = D\right)$$

Hence $\boxed{A^T = U^T D L^T}$

Step-3

(b) We have to explain what triangular systems will give the solution to $A^T y = b$.

The upper triangular systems give the solution to the system $A^T y = b$ since the product becomes upper triangular matrices.