

Since $S(T(v)) = 0 \quad \forall v \in V$

$\Rightarrow T(v)$ belongs to null space of S

$\Rightarrow$ Range space of T is contained in Null space of S .

$\Rightarrow \boxed{p(T) \leq n(S)} \rightarrow \underline{\text{option (c) correct}}$

$\Rightarrow n - n(T) \leq n - p(S) \quad [\text{by Rank-nullity th.}]$

$\Rightarrow -n(T) \leq -p(S)$

$\Rightarrow \boxed{p(S) \leq n(T)} \rightarrow \underline{\text{option (d) correct}}$