If A & B be two matrices such that $AB = B$ & $BA = A$, then $A^2 + B^2$ is:

Solution : $AB = B$ (given)

Pre-multiply B on both sides.

$\Rightarrow BAB = B^2$

$\Rightarrow AB = B^2$

$\Rightarrow B = B^2 \ldots (i) \quad (\because AB = B)$

$BA = A$ (given)

Pre-multiply A on both sides.

$ABA = A^2$

$\Rightarrow BA = A^2$

$\Rightarrow A = A^2 \ldots (ii) \quad (\because BA = A)$

$A^2 + B^2 = A + B$

A $2AB$

B $2BA$

C $A + B$

D AB

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