

6. If  $A$  is an idempotent matrix satisfying,  $(I - 0.4A)^{-1} = I - \alpha A$  where  $I$  is the unit matrix of the same order as that of  $A$  then the value of  $|\alpha|$  is equal to.

$$\text{Given } A^2 = A$$

$$\begin{aligned}\Rightarrow I &= (I - 0.4A)(I - \alpha A) \\ &= I - I\alpha A - 0.4AI + 0.4\alpha A^2 \\ &= I - A\alpha - 0.4A + 0.4\alpha A \\ &= I - A(0.4 + \alpha) + 0.4\alpha A \\ \Rightarrow 0.4\alpha &= 0.4 + \alpha \\ \Rightarrow \alpha &= -2/3 \\ \Rightarrow |\alpha| &= 2/3\end{aligned}$$