**34. If A and B are invertible matrices, then which of the following is not correct?**

$A$ $\mathbf{adj\ A} = |\mathbf{A}|\,.\,\mathbf{A}^{-1}$

$B$ $\mathbf{det}(\mathbf{A})^{-1} = [\mathbf{det}\,(\mathbf{A})]^{-1}$

$C$ $(\mathbf{AB})^{-1} = \mathbf{B}^{-1}\mathbf{A}^{-1}$

$D$ $(\mathbf{A} + \mathbf{B})^{-1} = \mathbf{B}^{-1} + \mathbf{A}^{-1}$

**Ans:** The correct answer is option $D$.

Since, A and B are invertible matrices. So, we can say that

$(AB)^{-1} = B^{-1}A^{-1} \qquad itiscorrect$

Also, $A^{-1} = \frac{1}{|A|}(adj\ A)$

$\Rightarrow adj\ A = |A|\,.\,A^{-1} \qquad itiscorrect$

And $AA^{-1} = I$

$\Rightarrow |AA^{-1}| = |I|$

$\Rightarrow |A|\,.\,|A^{-1}| = 1$

$\Rightarrow |A^{-1}| = \frac{1}{|A|}$

$\Rightarrow det(A)^{-1} = [det\,(A)]^{-1} \quad itiscorrect$

Now, $(A + B)^{-1} = B^{-1} + A^{-1}$

L.H.S = $(A + B)^{-1}$

= $\frac{1}{|A + B|}(adj\ A + B)$

R.H.S = $B^{-1} + A^{-1}$

= $\frac{1}{|B|}(adj\ B) + \frac{1}{|A|}(adj\ A)$

Thus, L.H.S $\neq$ R.H.S $itisincorrect$

Hence, option $D$ is the correct answer.