

Matrices and Determinants - Class XII

Related Questions with Solutions

Questions

Question: 01

Let P and Q be 3×3 matrices with $P \neq Q$. If $P^3 = Q^3$ and $P^2Q = Q^2P$, then determinant of $(P^2 + Q^2)$ is equal to

- A. 0
- B. -1
- C. -2
- D. 1

Solutions

Solution: 01

We have, $P^3 = Q^3$ and $P^2Q = Q^2P$ or $Q^2P = P^2Q$

$$\Rightarrow (P^2 + Q^2)P = (Q^2 + P^2)Q$$

$$\Rightarrow (P^2 + Q^2)P = (P^2 + Q^2)Q$$

$$\Rightarrow (P^2 + Q^2)(P - Q) = 0$$

Now, if $|P^2 + Q^2| \neq 0$, then $P^2 + Q^2$ is invertible and hence $P - Q = O \Rightarrow P = Q$, which is a contradiction.

Correct Options

Answer:01

Correct Options: A