MATRICES

INVERTIBLE MATRICES

EXERCISE

Q.1 If $A=\begin{bmatrix}1 & 2 & 0\\ 2 & -1 & 0\\ 0 & 0 & -1\end{bmatrix}$, demonstrat that $5A^{-1}=A^2+A-5I$

Q.2 If $A=\begin{bmatrix}1 & 3 & 5\\ 3 & 5 & 1\\ 5 & 1 & 3\end{bmatrix}$ then adjoint A is equal to

Q.3 For any 2×2 matrix A, $A(\text{adj } A)=\begin{bmatrix}3 & 0\\ 0 & 3\end{bmatrix}$, then $|A|$ equals to

(A) 0 (B) 3 (C) 6 (D) 9

Q.4 If $A=\begin{bmatrix}1 & 2 & 3\\ 2 & 3 & 4\\ 0 & 0 & 2\end{bmatrix}$, then the value of adj (adj A) is-

(A) $|A|^2$ (B) – 2A (C) 2A (D) A^2

Q.5 If $A=\begin{bmatrix}\cos x & \sin x\\ -\sin x & \cos x\end{bmatrix}$ and A. adj A= $k\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$, then the value of k is

(A) sin x cos x (B) 1 (C) 2 (D) 3

Q.6 If $A=\begin{bmatrix}1 & 2 & 3\\ 0 & 3 & 1\\ 2 & 1 & 2\end{bmatrix}$, then A (adj A) equals-

(A) $\begin{bmatrix}9 & 0 & 0\\ 0 & 9 & 0\\ 0 & 0 & 9\end{bmatrix}$ (B) – $\begin{bmatrix}9 & 0 & 0\\ 0 & 9 & 0\\ 0 & 0 & 9\end{bmatrix}$

(C) $\begin{bmatrix} 0 & 0 & 9 \\ 0 & 9 & 0 \\ 9 & 0 & 0 \end{bmatrix}$ (D) None of these

Q.7 If A and B are square matrices of same orders, then adj (AB) is equal to.

(A) adj A . adj B (B) adj B . adj A

(C) adj A + adj B (D) adj A – adj B

Q.8 If $A = \begin{bmatrix} 1 & -2 & 3 \\ 4 & 0 & -1 \\ -3 & 1 & 5 \end{bmatrix}$, then the value of the element in the 2nd row and 3rd column of the adjoint of A, represented as $(\text{adj A})_{23}$ is equal to.

(A) 13 (B) – 13 (C) 5 (D) – 5

Q.9 The inverse matrix of $\begin{bmatrix} 4 & 7 \\ 1 & 2 \end{bmatrix}$ is -

(A) $\begin{bmatrix} 2 & -7 \\ -1 & 4 \end{bmatrix}$ (B) $\begin{bmatrix} 2 & -1 \\ -7 & 4 \end{bmatrix}$

(C) $\begin{bmatrix} -2 & 7 \\ 1 & -4 \end{bmatrix}$ (D) $\begin{bmatrix} -2 & 1 \\ 7 & -4 \end{bmatrix}$

Q.10 Matrix $\begin{bmatrix} \lambda & -1 & 4 \\ -3 & 0 & 1 \\ -1 & 1 & 2 \end{bmatrix}$ is non-invertible when

(A) $\lambda = -15$ (B) $\lambda = -17$

(C) $\lambda = -16$ (D) $\lambda = -18$

Q.11 If $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$, then the value of A^{-1} is-

(A) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

(B) $\begin{bmatrix} \frac{1}{2} & 0 & 0 \\ 0 & \frac{1}{2} & 0 \\ 0 & 0 & \frac{1}{2} \end{bmatrix}$

(C) $\begin{bmatrix} -2 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & -2 \end{bmatrix}$

(D) None of these

Q.12 Which of the following statements is incorrect for any square matrix A.

(A) $(\text{adj } A)^{-1} = \text{adj } (A^{-1})$

(B) $(A^T)^{-1} = (A^{-1})^T$

(C) $(A^3)^{-1} = (A^{-1})^3$

(D) None of these

ANSWER KEY

2. $\begin{bmatrix} 14 & -4 & -22 \\ -4 & -22 & 14 \\ -22 & 14 & -4 \end{bmatrix}$

3. (B)

4. (B)

5. (B)

6. (B)

7. (B)

8. (A)

9. (B)

10. (B)

11. (B)

12. (D)