

SECTION-A1 \times 5

(Answer all the question)

1. Let $A = \begin{bmatrix} 0 & 0 & -1 \\ 0 & -1 & 0 \\ -1 & 0 & 0 \end{bmatrix}$. The only correct statement about the matrix A is
(a) $A^2 = I$ (b) $A' = -I$ (c) $|A| = 0$ (d) A is a scalar matrix

2. If $P = \begin{bmatrix} 1 & \alpha & 3 \\ 1 & 3 & 3 \\ 2 & 4 & 4 \end{bmatrix}$ is adjoint of a 3×3 matrix A and $|A| = 4$, then α is equal to
(a) 4 (b) 8 (c) 11 (d) 256

3. If A and B are two square matrices such that $B = -A^{-1}BA$, then $(A + B)^2$ is equal to
(a) 0 (b) $A^2 + B^2$ (c) $A^2 + B^2 + 2AB$ (d) $A^2 + B^2 - 2AB$

4. A and B are square matrices of order 3. The determinants of A and B are 5 and 4 respectively, then the determinant of the matrix $4A^2B$ is
(a) 64 (b) 400 (c) 1600 (d) 6400

5. **Assertion (A):** Let A be a 2×2 matrix, then $\text{adj}(\text{adj } A) = A$
Reason (R): $|\text{adj } A| = |A|$
Then which of the following is true
(a) Both Assertion (A) and Reason (R) are true and (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) but (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true but Reason (R) is false.
(d) Assertion (A) is false but Reason (R) is true.

SECTION-B2 \times 2

(Answer all the question)

6. If A is a square matrix $\begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix}$ such that $A^2 = pA$, then find the value of p .

7. There are two real value(s) of x , for which the value of the determinant $\Delta = \begin{vmatrix} 1 & -2 & 5 \\ 2 & x & -1 \\ 0 & 4 & 2x \end{vmatrix}$ is 86. Find the value(s) of x .

SECTION-C
(Answer all the question)

3×2

8. If $A = \begin{bmatrix} \alpha & 0 \\ 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 5 & 1 \end{bmatrix}$, then find the value of α (if exists) for which $A^2 = B$
9. Two badminton teams A and B are staying in the same hotel. Team A has 2 male and 3 female players accompanied by 1 coach. Team B comprises of 1 male, 2 female players and 2 coaches. The daily diet requirement (calories and protein) for each person is as given below:

	Calories	Protein
Male Player	2500	65gm
Female Player	1900	50gm
Coach	2000	54gm

Use matrix algebra to calculate the total diet requirement of calories and protein for each team.

SECTION-D
(Answer all the question)

5×1

10. The equilibrium conditions for three competitive markets are described as given below, where p_1 , p_2 and p_3 are the equilibrium price for each market respectively.

$$\begin{aligned} p_1 + 2p_2 + 3p_3 &= 85 \\ 3p_1 + 2p_2 + 2p_3 &= 105 \\ 2p_1 + 3p_2 + 2p_3 &= 110 \end{aligned}$$

Using matrix method, find the values of respective equilibrium prices.