

PART 1 - MATHEMATICS

Topic : Matrices

SECTION-A : (Maximum Marks : 24)

This section contains **SIX** questions.

Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct answer(s).

For each question, choose the option(s) corresponding to (all) the correct answer(s).

Answer to each question will be evaluated according to the following marking scheme :

Full Marks : +4 ONLY if (all) the correct option(s) is(are) chosen;

Partial Marks : +3 If all the four options are correct but ONLY three options are chosen;

Partial Marks : +2 If three or more options are correct but ONLY two options are chosen, both of which are correct;

Partial Marks : +1 If two or more options are correct but ONLY one option is chosen and it is a correct option;

Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered);

Negative Marks : -1 In all other cases.

For example, in a question, if (A), (B) and (D) are the ONLY three options corresponding to correct answers, then choosing ONLY (A), (B) and (D) will get +4 marks; choosing ONLY (A) and (B) will get +2 marks; choosing ONLY (A) and (D) will get +2 marks; choosing ONLY (B) and (D) will get +2 marks; choosing ONLY (A) will get +1 mark; choosing ONLY (B) will get +1 mark; choosing ONLY (D) will get +1 mark; choosing no option (i.e. the question is unanswered) will get 0 marks; and choosing any other combination of options will get -1 marks.

1. Which one of the following matrices can be obtained by performing elementary row transformations on the 3×3 identity matrix ? [JEE Advanced 2026 Paper 1]

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

(B) $\begin{bmatrix} 1 & 1 & 1 \\ 2 & 3 & 4 \\ 1 & 2 & 1 \end{bmatrix}$

(C) $\begin{bmatrix} 1 & 1 & 1 \\ 2 & 3 & 4 \\ 2 & 5 & 8 \end{bmatrix}$

(D) $\begin{bmatrix} 1 & 1 & 1 \\ -1 & 1 & 2 \\ 0 & 2 & 3 \end{bmatrix}$

Scan or tap for the full solution



2. Consider the matrix

$$M = \begin{bmatrix} 2 & -1 \\ 1 & 0 \end{bmatrix}.$$

Let p, q, r, s, a, b, c and d be integers such that

$$M^{26} = \begin{bmatrix} p & q \\ r & s \end{bmatrix} \text{ and } \sum_{k=1}^{26} M^k = \begin{bmatrix} a & b \\ c & d \end{bmatrix}.$$

Then which of the following statements is (are) TRUE ?

[JEE Advanced 2026 Paper 1]

Space for Rough Work

(A) There exists a 2×2 invertible matrix N with real entries such that

$$MN = N \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$$

(B) The value of a is 378

(C) For any two given integers m and n , there exist unique integers x and y such that $px + qy = m$ and $rx + sy = n$

(D) For each positive real number t , the system of linear equations

$$(a + t)x + by = 1$$

$$cx + (d + t)y = -1$$

has a unique solution

Scan or tap for the full solution



3. Let R denote the set of all real numbers and let $i = \sqrt{-1}$. Consider the matrices

$$S = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix} \text{ and } T = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}.$$

Let a, b, c, d be real numbers such that

$$ST = \begin{bmatrix} a & b \\ c & d \end{bmatrix}.$$

Let

$$H = \{x + iy : x, y \in R \text{ and } y > 0\}.$$

Then which of the following statements is (are) TRUE ?

[JEE Advanced 2026 Paper 2]

(A) $\frac{b + ia}{d + ic} = i$

(B) If $\omega = \frac{-1 + i\sqrt{3}}{2}$, then $\frac{a\omega + b}{c\omega + d} = \omega$

(C) If m is an integer greater than 2 such that $(ST)^2 = (ST)^m$, then m is an integer multiple of 8

(D) If $z \in H$, then $\frac{az + b}{cz + d} \in H$

Scan or tap for the full solution



Space for Rough Work

4. Consider the matrix

$$P = \begin{pmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{pmatrix}.$$

Let the transpose of a matrix X be denoted by X^T . Then the number of 3×3 invertible matrices Q with integer entries, such that

$$Q^{-1} = Q^T \text{ and } PQ = QP,$$

is

(A) 32

(B) 8

(C) 16

(D) 24

[JEE Advanced 2025 Paper 1]

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5. Let $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ and $P = \begin{pmatrix} 2 & 0 \\ 0 & 3 \end{pmatrix}$. Let $Q = \begin{pmatrix} x & y \\ z & 4 \end{pmatrix}$ for some non-zero real numbers x, y , and z , for which there is a 2×2 matrix R with all entries being non-zero real numbers, such that $QR = RP$.

Then which of the following statements is (are) TRUE?

[JEE Advanced 2025 Paper 2]

(A) The determinant of $Q-2I$ is zero

(B) The determinant of $Q-6I$ is 12

(C) The determinant of $Q-3I$ is 15

(D) $yz = 2$

Scan or tap for the full solution



6. Let α and β be the distinct roots of the equation $x^2 + x - 1 = 0$. Consider the set $T = \{1, \alpha, \beta\}$. For a 3×3 matrix $M = (a_{ij})_{3 \times 3}$, define $R_i = a_{i1} + a_{i2} + a_{i3}$ and $C_j = a_{1j} + a_{2j} + a_{3j}$ for $i = 1, 2, 3$ and $j = 1, 2, 3$.

Match each entry in **List-I** to the correct entry in **List-II**.

[JEE Advanced 2024 Paper 1]

List-I		List-II	
P.	The number of matrices $M = (a_{ij})_{3 \times 3}$ with all entries in T such that $R_i = C_j = 0$ for all i, j , is	1.	1
Q.	The number of symmetric matrices $M = (a_{ij})_{3 \times 3}$ with all entries in T such that $C_j = 0$ for all j , is	2.	12
R.	Let $M = (a_{ij})_{3 \times 3}$ be a skew symmetric matrix such that $a_{ij} \in T$ for $i > j$. Then the number of elements in the set $\left\{ \begin{pmatrix} x \\ y \\ z \end{pmatrix} : x, y, z \in \mathbb{R}, M \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} a_{12} \\ 0 \\ -a_{23} \end{pmatrix} \right\}$ is	3.	infinite
S.	Let $M = (a_{ij})_{3 \times 3}$ be a matrix with all entries in T such that $R_i = 0$ for all i . Then the absolute value of the determinant of M is	4.	6
		5.	0

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(A) $(P) \rightarrow (4) (Q) \rightarrow (2) (R) \rightarrow (5) (S) \rightarrow (1)$

(B) $(P) \rightarrow (2) (Q) \rightarrow (4) (R) \rightarrow (1) (S) \rightarrow (5)$

(C) $(P) \rightarrow (2) (Q) \rightarrow (4) (R) \rightarrow (3) (S) \rightarrow (5)$

(D) $(P) \rightarrow (1) (Q) \rightarrow (5) (R) \rightarrow (3) (S) \rightarrow (4)$

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full solution



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JEE ADVANCED MATRICES — PYQS

Test Pattern : JEE (Advanced)

ANSWER KEY

SECTION-A															
Ques.	1	2	3	4	5	6									
Ans.	B	A, C, D	B, D	C	A, B	C									