

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



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

[JEE Advanced 2025 Paper 1]

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(A) 32

(B) 8

(C) 16

(D) 24

Scan or tap for the full solution



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

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

Scan or tap for the full solution



Space for Rough Work

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											