

PART 1 - MATHEMATICS

Topic : Matrices

SECTION-A : (Maximum Marks : 4)

This section contains **ONE** question.

Each question has **TWO** lists: **List-I** and **List-II**.

Four options are given representing matching of elements from List-I and List-II. **ONLY ONE** of these four options corresponds to a correct matching.

For each question, choose the option corresponding to the correct answer.

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

Full Marks : +4 If **ONLY** the correct option is chosen;

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

Negative Marks : -1 In all other cases.

1. 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**.

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	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 — TRANSPOSE,
SYMMETRIC AND SKEW-SYMMETRIC MATRICES —
PYQS

Test Pattern : JEE (Advanced)

ANSWER KEY

SECTION-A																											
Ques.	1																										
Ans.	C																										