

PART 1 - MATHEMATICS

Topic : Trigonometric functions, Application of integrals

SECTION-A : (Maximum Marks : 8)

This section contains **TWO** questions.

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

[JEE Advanced 2026 Paper 1]

	List-I	List-II
P.	The number of elements in the set $\{x \in [-\pi, \pi] : \sin^6 x + \cos^4 x = 1\}$	1. is 1
Q.	The number of elements in the set $\left\{x \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right] : \sin^2 x + \cos^6 x = 1\right\}$	2. is 2
R.	The number of elements in the set $\left\{x \in [-\pi, \pi] : \cos^2\left(\frac{x}{2}\right) - \sin^2 x = \frac{1}{2}\right\}$	3. is 3
S.	The number of elements in the set $\left\{x \in [-2\pi, 2\pi] : 6\sin^2\left(\frac{x}{2}\right) - \cos 3x = 3\right\}$	4. is 4
		5. is 5

- (A) (P) $\rightarrow$ (2), (Q) $\rightarrow$ (5), (R) $\rightarrow$ (3), (S) $\rightarrow$ (4) (B) (P) $\rightarrow$ (5), (Q) $\rightarrow$ (3), (R) $\rightarrow$ (2), (S) $\rightarrow$ (4)
 (C) (P) $\rightarrow$ (5), (Q) $\rightarrow$ (4), (R) $\rightarrow$ (1), (S) $\rightarrow$ (3) (D) (P) $\rightarrow$ (4), (Q) $\rightarrow$ (3), (R) $\rightarrow$ (2), (S) $\rightarrow$ (5)

Scan or tap for the
full solution



2. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function defined by

$$f(x) = \begin{cases} x^2 \sin\left(\frac{\pi}{x^2}\right), & \text{if } x \neq 0, \\ 0, & \text{if } x = 0. \end{cases}$$

Then which of the following statements is TRUE?

[JEE Advanced 2024 Paper 2]

Space for Rough Work

- (A) $f(x) = 0$ has infinitely many solutions in the interval $\left[\frac{1}{10^{10}}, \infty\right)$.
- (B) $f(x) = 0$ has no solutions in the interval $\left[\frac{1}{\pi}, \infty\right)$.
- (C) The set of solutions of $f(x) = 0$ in the interval $\left(0, \frac{1}{10^{10}}\right)$ is finite.
- (D) $f(x) = 0$ has more than 25 solutions in the interval $\left(\frac{1}{\pi^2}, \frac{1}{\pi}\right)$.

Scan or tap for the
full solution



pyqside.com

Space for Rough Work

SECTION-B : (Maximum Marks : 8)

This section contains **ONE** paragraph.

Based on each paragraph, there are **TWO** questions.

The answer to each question is a **NUMERICAL VALUE**.

For each question, enter the correct numerical value of the answer (in decimal notation, truncated / rounded-off to the **SECOND DECIMAL PLACE**; e.g. 6.25, 7.00, -0.33, -.30, 30.27, -127.30) in the place designated to enter the answer.

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

Full Marks : +4 If **ONLY** the correct answer is entered;

Zero Marks : 0 In all other cases.

Paragraph for Questions 3 and 4

Consider the curve C_1 given by

$$y = e^{-x} \text{ for } x \in [0, 10\pi],$$

and the curve C_2 given by

$$y = e^{-x}(\sin x + \cos x) \text{ for } x \in [0, 10\pi].$$

Let n be the total number of points of intersection of the curves C_1 and C_2 .

Suppose that $\alpha_1, \alpha_2, \dots, \alpha_n \in [0, 10\pi]$ are the x -coordinates of the points of intersection of the curves C_1 and C_2 such that

$$\alpha_1 < \alpha_2 < \dots < \alpha_n.$$

3. The value of n is _____.

[JEE Advanced 2026 Paper 2]

Scan or tap for the full solution 

4. Let β be the area of the region enclosed between the curves C_1 , C_2 , and the lines $x = \alpha_1$ and $x = \alpha_4$. Then the value of

$$-\frac{1}{\pi} \log_e \left(\beta - 2e^{-\frac{\pi}{2}} \right)$$

is _____.

[JEE Advanced 2026 Paper 2]

Scan or tap for the full solution 

Space for Rough Work

JEE ADVANCED TRIGONOMETRIC FUNCTIONS — TRIGONOMETRIC EQUATIONS AND GENERAL SOLUTIONS — PYQS

Test Pattern : JEE (Advanced)

ANSWER KEY

SECTION-A

[illegible]

SECTION-B

[illegible]