

PART 1 - MATHEMATICS

Topic : Differential equations

SECTION-A : (Maximum Marks : 4)

This section contains **ONE** question.

Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four options is the correct answer.

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 $y : (-\infty, \infty) \rightarrow (0, \infty)$ be the solution of the differential equation

$$\frac{dy}{dx} = \frac{e^{5x}y^3 + y^3}{e^x + e^xy^4},$$

satisfying $y(0) = \frac{1}{\sqrt{2}}$. Then the value of $y(\log_e 2)$ is

[JEE Advanced 2026 Paper 2]

- (A) $\sqrt{\frac{5 + \sqrt{35}}{2}}$ (B) $\sqrt{\frac{7 + \sqrt{53}}{2}}$ (C) $\frac{7 + \sqrt{53}}{2}$ (D) $\frac{5 + \sqrt{35}}{2}$

Scan or tap for the full solution



Space for Rough Work

SECTION-B : (Maximum Marks : 4)

This section contains **ONE** question.

The answer to each question is a **NON-NEGATIVE INTEGER**.

For each question, enter the correct integer corresponding to the answer 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.

2. For all $x > 0$, let $y_1(x)$, $y_2(x)$, and $y_3(x)$ be the functions satisfying

$$\frac{dy_1}{dx} - (\sin x)^2 y_1 = 0, \quad y_1(1) = 5,$$

$$\frac{dy_2}{dx} - (\cos x)^2 y_2 = 0, \quad y_2(1) = \frac{1}{3},$$

$$\frac{dy_3}{dx} - \left(\frac{2 - x^3}{x^3} \right) y_3 = 0, \quad y_3(1) = \frac{3}{5e},$$

respectively. Then

$$\lim_{x \rightarrow 0^+} \frac{y_1(x)y_2(x)y_3(x) + 2x}{e^{3x}\sin x}$$

is equal to _____.

[JEE Advanced 2025 Paper 1]

Scan or tap for the
full solution



Space for Rough Work

JEE ADVANCED DIFFERENTIAL EQUATIONS — VARIABLES SEPARABLE METHOD — PYQS

Test Pattern : **JEE (Advanced)**

ANSWER KEY

SECTION-A

[illegible]

SECTION-B

[illegible]