

PART 1 - MATHEMATICS

Topic : Differential equations

SECTION-1 : (Maximum Marks : 3)

- 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 : +3 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

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(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-2 : (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 _____.

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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-1																											
Ques.	1																										
Ans.	B																										

SECTION-2																											
Ques.	2																										
Ans.	2																										