

PART 1 - MATHEMATICS

Topic : Differential equations

SECTION-A : (Maximum Marks : 8)

This section contains **TWO** 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. Let $y = f(x)$ be the real valued function defined on the interval $(0, \infty)$, satisfying $y(1) = 0$ and the differential equation

$$x \frac{dy}{dx} = y - x^3.$$

Then which of the following statements is (are) TRUE ?

[JEE Advanced 2026 Paper 2]

(A) The function f has a local minimum at $x = \frac{1}{\sqrt{3}}$

(B) The function f has a local maximum at $x = \frac{1}{\sqrt{3}}$

(C) The function f is increasing in the interval $(1, 2)$

(D) If $g(x) = 4x^3 - 5x^2 + \frac{3}{2}x$ for $x > 0$, then the number of elements in the set

$$\{x \in (0, \infty) : f(x) = g(x)\}$$

is 2

Scan or tap for the full solution



Space for Rough Work

2. Let $f(x)$ be a continuously differentiable function on the interval $(0, \infty)$ such that $f(1) = 2$ and

$$\lim_{t \rightarrow x} \frac{t^{10}f(x) - x^{10}f(t)}{t^9 - x^9} = 1$$

for each $x > 0$. Then, for all $x > 0$, $f(x)$ is equal to

[JEE Advanced 2024 Paper 1]

- (A) $\frac{31}{11x} - \frac{9}{11}x^{10}$ (B) $\frac{9}{11x} + \frac{13}{11}x^{10}$ (C) $\frac{-9}{11x} + \frac{31}{11}x^{10}$ (D) $\frac{13}{11x} + \frac{9}{11}x^{10}$

Scan or tap for the
full solution



Space for Rough Work

JEE ADVANCED DIFFERENTIAL EQUATIONS —
LINEAR DIFFERENTIAL EQUATIONS — PYQS

Test Pattern : JEE (Advanced)

ANSWER KEY

SECTION-A																					
Ques.	1	2																			
Ans.	B, D	B																			