

PYQSide

JEE MAIN INTEGRALS — INTEGRATION BY PARTS — PYQS

Max. Marks: 20

Questions: 5

Section A (MCQ)

Q.1 Let $f(t) = \int \left(\frac{1 - \sin(\log_e t)}{1 - \cos(\log_e t)} \right) dt$, $t > 1$.

If $f(e^{\pi/2}) = -e^{\pi/2}$ and $f(e^{\pi/4}) = \alpha e^{\pi/4}$, then α equals

[JEE Main 2026 (Online) 24th January Morning Shift]

- (1) $1 + \sqrt{2}$ (2) $-1 - 2\sqrt{2}$
(3) $-1 - \sqrt{2}$ (4) $-1 + \sqrt{2}$

Scan or tap for the
full solution



Q.2 Let $f(x) = \int \frac{(2 - x^2) \cdot e^x}{(\sqrt{1+x})(1-x)^{3/2}} dx$. If $f(0) = 0$, then $f\left(\frac{1}{2}\right)$ is equal to:

[JEE Main 2026 (Online) 23rd January Morning Shift]

- (1) $\sqrt{2e} - 1$ (2) $\sqrt{2e} + 1$
(3) $\sqrt{3e} - 1$ (4) $\sqrt{3e} + 1$

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full solution



Q.3 Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a twice differentiable function such that $f(2) = 1$. If $F(x) = xf(x)$ for all $x \in \mathbb{R}$, $\int_0^2 xF'(x) dx = 6$ and $\int_0^2 x^2 F''(x) dx = 40$, then $F'(2) + \int_0^2 F(x) dx$ is equal to:

[JEE Main 2025 (Online) 28th January Evening Shift]

- (1) 13 (2) 11 (3) 9 (4) 15

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Section B (Numerical)

Q.4 The number of elements in the set $S = \{x : x \in [0, 100] \text{ and } \int_0^x t^2 \sin(x-t) dt = x^2\}$ is

[JEE Main 2026 (Online) 23rd January Evening Shift]

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Q.5 If $\int_0^1 4\cot^{-1}(1 - 2x + 4x^2) dx = a \tan^{-1}(2) - b \log_e(5)$, where $a, b \in \mathbb{N}$, then $(2a + b)$ is equal to _____.

[JEE Main 2026 (Online) 21st January Evening Shift]

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ANSWER KEY

Section A (MCQ)

Ques.	1	2	3								
Ans.	3	3	2								

Section B (Numerical)

Ques.	4	5									
Ans.	16	9									