PART 1 - MATHEMATICS

Topic : Integrals

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. The value of the definite integral

$$\int_0^2 \frac{1}{3^x + 3}\, dx$$

is

[JEE Advanced 2026 Paper 2]

(A) $\frac{1}{2}$ (B) $\frac{1}{3}$ (C) $\frac{\log_e 3}{3}$ (D) $\frac{\log_e 3}{2}$

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SECTION–B : (Maximum Marks : 12)

This section contains **ONE** paragraph.

Based on each paragraph, there are **THREE** 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.

2. If

$$\alpha = \int_{\frac{1}{2}}^{2} \frac{\tan^{-1} x}{2x^2 - 3x + 2}\, dx,$$

then the value of $\sqrt{7}\tan\left(\frac{2\alpha\sqrt{7}}{\pi}\right)$ is _____.

(Here, the inverse trigonometric function $\tan^{-1} x$ assumes values in $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$.)

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Paragraph for Questions 3 and 4

Let $f : \left[0, \frac{\pi}{2}\right] \longrightarrow [0, 1]$ be the function defined by $f(x) = \sin^2 x$ and let $g : \left[0, \frac{\pi}{2}\right] \longrightarrow [0, \infty)$ be the function defined by $g(x) = \sqrt{\frac{\pi x}{2} - x^2}$.

3. The value of $2\int_0^{\frac{\pi}{2}} f(x)g(x)\,dx - \int_0^{\frac{\pi}{2}} g(x)\,dx$ is _____. [JEE Advanced 2024 Paper 2]

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4. The value of $\frac{16}{\pi^3}\int_0^{\frac{\pi}{2}} f(x)g(x)\,dx$ is _____. [JEE Advanced 2024 Paper 2]

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TEST SERIES
(Academic Session : 2026-2027)

JEE ADVANCED INTEGRALS — PROPERTIES OF DEFINITE INTEGRALS — PYQS

Test Pattern : **JEE (Advanced)**

ANSWER KEY

SECTION–A

Ques.	1
Ans.	B

SECTION–B

Ques.	2	3	4
Ans.	21	0	0.25

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