

THE O.P. GUPTA

ADVANCED MATH CLASSES

Class XII - Mathematics (041)

Topics - Indefinite Integrals

Alpha Test Series-6

(For Academic session 2025-26)

Max. Marks - 30

Time - 60 Minutes

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Followings are of 2 Marks each (Q01-05).

Q01. Find $\int \frac{e^x}{x^2+1} [2x + (x^2+1) \log(x^2+1)] dx$.

Q02. Find $\int \frac{x^{1/2}}{1+x^{3/4}} dx$.

Q03. Find $\int \frac{u x^3 + v x}{x^4 + w^2} dx$.

Q04. Evaluate $\int \left(\frac{\sqrt{\cot x^2}}{\cos x^2 \sin x^2} \right) 2x dx$.

Q05. Find $\int \frac{dx}{x\sqrt{1+x^3}}$. [2×5=10]

Followings are of 3 Marks each (Q06-07).

Q06. Find $\int \frac{d\theta}{\sin^2\theta + \sin 2\theta}$.

Q07. Find $\int \frac{\cos 3x}{\cos x} dx$.

OR

Find $\int \sec^4 x dx$. [3×2=6]

Following is of 4 Marks (Q08).

Q08. **PASSAGE BASED QUESTION :** If the derivative of a function is given and we have to find its primitive (the original function), then we follow inverse process of finding the differentiation. This process of finding the primitive is called the antidifferentiation or integration.

That is, $\frac{d}{dx}[F(x) + C] = f(x)$ implies that, $\int f(x) dx = F(x) + C$.

Hence, the primitive (antiderivative) of $f(x)$ is $F(x) + C$.

Based on the passage given above, answer the following.

(i) Determine the primitive of $x(1+x)^{2024}$.

(ii) Find the anti-derivative of $\sqrt{e^x+1}$. [2×2=4]

Followings are of 5 Marks each (Q09-10).

Q09. Find $\int \frac{(x^2+2)(x^2+3)}{(x^2+1)(x^2+4)} dx$.

OR

Find $\int \frac{\cos^{-1} \sqrt{x} - \sin^{-1} \sqrt{x}}{\cos^{-1} \sqrt{x} + \sin^{-1} \sqrt{x}} dx$.

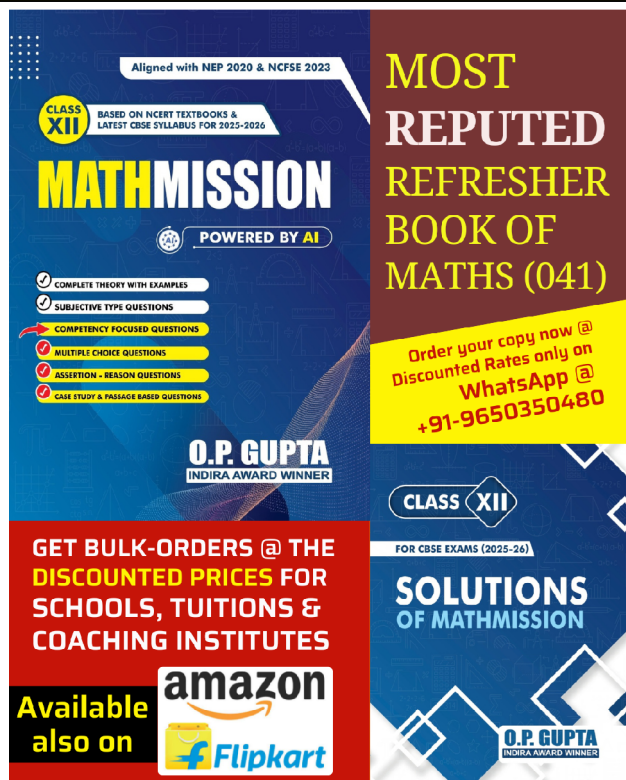
Q10. Evaluate $\int \frac{1}{x^4 + 49} dx$.

[5 × 2 = 10]

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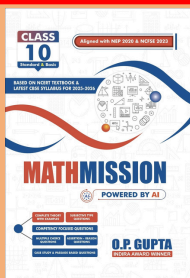
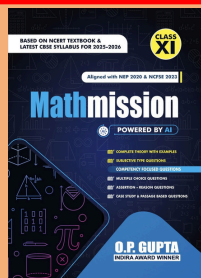
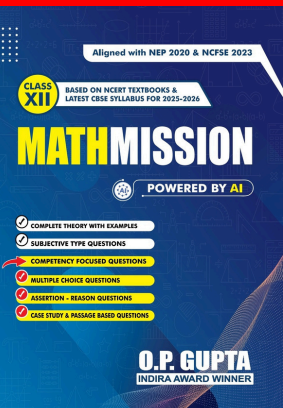
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