

Topic : Indefinite Integration

Type of Questions

M.M., Min.

Single choice Objective (no negative marking) Q.1, 2

(3 marks, 3 min.)

[6, 6]

Subjective Questions (no negative marking) Q.3,4,5,6,7

(4 marks, 5 min.)

[20, 25]

Match the Following (no negative marking) Q.8

(8 marks, 8 min.)

[8, 8]

1. $\int \frac{dx}{(x^2 + 4x + 5)^2}$ is equal to

(A) $\frac{1}{2} \left[\tan^{-1}(x+1) + \frac{x+2}{x^2 + 4x + 5} \right] + c$

(B) $\frac{1}{2} \left[\tan^{-1}(x+2) - \frac{x+2}{x^2 + 4x + 5} \right] + c$

(C) $\frac{1}{2} \left[\tan^{-1}(x+1) - \frac{x+2}{x^2 + 4x + 5} \right] + c$

(D) $\frac{1}{2} \left[\tan^{-1}(x+2) + \frac{x+2}{x^2 + 4x + 5} \right] + c$

2. $\int \frac{x dx}{\sqrt{(1+x^2)} + \sqrt{(1+x^2)^3}}$ is equal to

(A) $\frac{1}{2} \ln(1 + \sqrt{1+x^2}) + c$

(B) $2\sqrt{1+\sqrt{1+x^2}} + c$

(C) $2(1 + \sqrt{1+x^2}) + c$

(D) $4\sqrt{1+\sqrt{1+x^2}} + c$

3. Integrate : $\int \frac{(x + \sqrt{1+x^2})^{2009}}{\sqrt{1+x^2}} dx$

4. Integrate : $x^{13/2} \cdot (1 + x^{5/2})^{1/2}$ w. r. t. x

5. Evaluate : $\int \frac{x+2}{(x^2+3x+3)\sqrt{x+1}} dx$

6. Evaluate : $\int \frac{(\sin^{3/2} \theta + \cos^{3/2} \theta) d\theta}{\sqrt{\sin^3 \theta \cos^3 \theta} \sin(\theta + \alpha)}$

7. Evaluate : $\int \frac{(x^2 - 4)}{(x^2 + 1)(x^2 + 2)(x^2 + 3)} dx$.

8. Column - I

Column - II

(A) $\int \sqrt{1 + \sec x} dx$ is equal to

(p) $\tan^{-1}(\tan^2 x) + c$

(B) $\int \frac{dx}{(\sin x - 2\cos x)(2\sin x + \cos x)}$ is equal to

(q) $\tan^{-1}(\sqrt{\cos x + \sec x + 1}) + c$

(C) $\int \frac{\sin 2x}{\sin^4 x + \cos^4 x} dx$ is equal to

(r) $\frac{1}{5} \log_e \left| \frac{\tan x - 2}{2 \tan x + 1} \right| + c$

(D) $\int \frac{\sin^3(x/2)}{\cos(x/2) \cdot \sqrt{\cos^3 x + \cos^2 x + \cos x}} dx$ is equal to

(s) $2 \tan^{-1} \sqrt{\frac{1 - \cos x}{\cos x}} + c$

Answers Key

1. (D) 2. (B) 3. $\frac{(x + \sqrt{1+x^2})^{2009}}{2009} + c$
4. $\left[\frac{4}{5} \left[\frac{t^7}{7} - \frac{2t^5}{5} + \frac{t^3}{3} \right] + c \text{ where } t^2 = 1 + x^{5/2} \right] s$
5. $\frac{2}{\sqrt{3}} \tan^{-1} \left\{ \frac{x}{\sqrt{3}(x+1)} \right\} + C$
6. $\frac{2}{\cos \alpha} \sqrt{(\cos \alpha \tan \theta + \sin \alpha)}$
 $-\frac{2}{\sin \alpha} \sqrt{(\cos \alpha + \cot \theta \sin \alpha)} + c$
7. $-\frac{5}{2} \tan^{-1} x + \frac{6}{\sqrt{2}} \tan^{-1} \left(\frac{x}{\sqrt{2}} \right) - \frac{7}{2\sqrt{3}} \tan^{-1} \left(\frac{x}{\sqrt{3}} \right) + c$
8. (A) $\rightarrow s$; (B) $\rightarrow r$; (C) $\rightarrow p$; (D) $\rightarrow q$