MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 64

Total Marks : 34

Max. Time : 39 min.

Topics : Indefinite Integration, Sequence & Series

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

(A) $\ell n \left|\frac{xe^x}{1+xe^x}\right| + C$ (B) $\ell n \left|\frac{xe^x}{1+xe^x}\right| + \frac{1}{1+xe^x} + C$ (C) $\frac{1}{1+xe^x} + C$ (D) None of these

2. $\int \frac{dx}{\tan x + \cot x + \sec x + \operatorname{cosec} x}$ is equal to

(A) $\frac{1}{2}(\sin x + \cos x + x) + c$ (B) $\frac{1}{2}(\sin x - \cos x - x) + c$

(C) $\frac{1}{2}(\cos x - x + \sin x) + c$ (D) None of these

3. If a and b are the arithmetic means of $a_1, a_2, \ldots\ldots, a_n$ and $b_1, b_2, \ldots, b_n$ respectively, and $a_i + b_i = 1$ $(i = 1, 2, \ldots, n)$, show that $\sum_{i=1}^{n} a_i b_i = nab - \sum_{i=1}^{n} (a_i - a)^2$.

4. Evaluate : (i) $\int \frac{dx}{\sin^6 x}$ (ii) $\int \frac{\cos x + \sin x}{\sqrt{\sin 2x}}\,dx$

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

6. Evaluate : $\int \frac{x}{x^4 + x^2 + 1}\,dx$

7. Evaluate : $\int \frac{1-x^7}{x\left(1+x^7\right)}\,dx$

8.

Column - I	**Column - II**
(A) $\int \frac{x^4-1}{x^2\sqrt{x^4+x^2+1}}dx$	(p) $\ell n\left(\frac{(x^2+1)+\sqrt{x^4+1}}{x}\right)+C$
(B) $\int \frac{x^2-1}{x\sqrt{1+x^4}}dx$	(q) $-\frac{1}{\sqrt{2}}\ln\left(\frac{\sqrt{x^4+1}-\sqrt{2}x}{(x^2-1)}\right)+C$
(C) $\int \frac{1+x^2}{(1-x^2)\sqrt{1+x^4}}dx$	(r) $-\tan^{-1}\left(\sqrt{\sqrt{1+\frac{1}{x^4}}-1}\right)+C$
(D) $\int \frac{1}{(1+x^4)\sqrt{\sqrt{1+x^4}-x^2}}dx$	(s) $\frac{\sqrt{x^4+x^2+1}}{x}+C$

Answers Key

1. (B) **2.** (B)

4. (i) $c - \cot x - \frac{2}{3}\cot^3 x - \frac{1}{5}\cot^5 x$

(ii) $\sin^{-1}(\sin x - \cos x) + c$

5. $\ell n\left\{\frac{\sqrt{2xe^{\sin x}+1}-1}{\sqrt{2xe^{\sin x}+1}+1}\right\} + c$

6. $\frac{1}{\sqrt{3}}\tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right) + c$

7. $\ell n\, x - (2/7)\, ln\,(1 + x^7) + c$