MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 66

Total Marks : 29

Max. Time : 31 min.

Topics : Permutation & Combination, Binomial Theorem, Indefinite Integration

Type of Questions		**M.M., Min.**
Single choice Objective (no negative marking) Q.1 to 4	(3 marks, 3 min.)	[12, 12]
Multiple choice objective (no negative marking) Q.5	(5 marks, 4 min.)	[5, 4]
Subjective Questions (no negative marking) Q.6 to Q.8	(4 marks, 5 min.)	[12, 15]

1. There are 50 persons among whom 2 are brothers. The number of ways they can be arranged in a circle, if there is exactly one person between the two brothers is

(A) 47! (B) 48! (C) 2.48! (D) 2.47!

2. The streets of a city are arranged like the lines of a chess board. There are 5 streets running North to South & '3' streets running East to West. The number of ways in which a man can travel from NW to SE corner going the shortest possible distance is:

(A) 34 (B) 64 (C) $\frac{8!}{5!.3!}$ (D) 15

3. The cofficient of x^n in the polynomial $(x + {}^{2n+1}C_0)(x + {}^{2n+1}C_1)(x + {}^{2n+1}C_2) \ldots\ldots (x + {}^{2n+1}C_n)$ is

(A) 2^{n+1} (B) $2^{2n+1} - 1$ (C) 2^{2n} (D) None of these

4. $\int \sqrt{1+2\cot x(\cot x+\operatorname{cosec} x)}\,dx$ is equal to

(A) $2 \ln\left(\cos\frac{x}{2}\right) + c$ (B) $2\,\ell n\left(\sin\frac{x}{2}\right) + c$ (C) $\frac{1}{2}\,\ell n\left(\cos\frac{x}{2}\right) + c$ (D) $\frac{1}{2}\,\ell n\left(\sin\frac{x}{2}\right) + c$

5. If $\int \frac{(x^{-7/6} - x^{5/6})}{x^{1/3}(x^2+x+1)^{1/2} - x^{1/2}(x^2+x+1)^{1/3}}\,dx = -\lambda\left(\frac{z^3}{3} + \frac{z^p}{2} + \frac{z^q}{r} + \ell n|z-1|\right) + k$, where

$z = \left(x + \frac{1}{x} + 1\right)^{1/6}$, then

(A) $\lambda = 6$ (B) $\lambda = 1$ (C) $p + q = 3$ (D) $q = r = 1$

6. Out of 50 consecutive natural numbers in how many ways two numbers can be chosen such that their sum is divisible by 2.

7. Integrate : $\int \frac{\cos 2x - 3}{\sin^4 x\sqrt{4 - \tan^2 x}}\,dx$

8. Evaluate : $\int \frac{(1+\log_e x)^2}{1+\log_e x^{x+1} + \left(\log_e x^{\sqrt{x}}\right)^2}\,dx$

Answers Key

1. C **2.** D **3.** C **4.** B

5. ACD **6.** $2\ {}^{25}C_2$

7. $\frac{1}{8}\left(\frac{(4\cot^2 x-1)^{3/2}}{3}+9\sqrt{4\cot^2 x-1}\right)+c$

8. $\ell n(1+x\,\ell n\,x)+c$