

Topics : Permutation & Combination, Indefinite Integration, Definite 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 to Q.8

(4 marks, 5 min.)

[24, 24]

1. How many maximum points of intersection can we get by arranging 8 straight lines and 4 circles in a plane ?

(A) 100

(B) 104

(C) 64

(D) 92

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

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

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

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

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

3. 20 points lie on a circle. Find the number of triangle that can be formed such that no two vertices are consecutive.

4. Evaluate :

(i) $\int_0^2 |x^2 + 2x - 3| dx$

(ii) $\int_0^4 \{x\} dx$, where $\{.\}$ denotes fractional part function

5. (i) $\int_1^4 \{x\}^{[x]} dx$ is equal to (where $[.]$ and $\{.\}$ represent greatest integer function and fractional part function respectively).

(ii) The value of $\int_0^2 [x + [x + [x]]] dx$ is (where $[.]$ represent greatest integer function).

6. Evaluate :

(i) $\int_{-1}^3 (|x| + |x - 1|) dx$

(ii) $\int_0^\pi |\cos x| dx$

7. Evaluate :

(i) $\int_{-1}^1 e^{|x|} dx$

(ii) $\int_0^1 |\sin 2\pi x| dx$

(iii) $\int_{-1}^1 \frac{x dx}{\sqrt{5 - 4x}}$

8. Integrate :

(i) $\int \frac{x^4 + 1}{x(x^2 + 1)^2} dx$

(ii) $\int \frac{(3x^2 - 1)\cot^{-1} x}{2x\sqrt{x}} dx$

Answers Key

1. B 2. B 3. 800 4. (i) 4 (ii) 2

5. (i) $\frac{13}{12}$ (ii) 3 6. (i) 9 (ii) 2

7. (i) $2e - 2$ (ii) $\frac{1}{6}$ (iii) $\frac{2}{\pi}$

8. (i) $\ln x + \frac{1}{1+x^2} + c$

(ii) $\frac{(x^2 + 1)\cot^{-1} x}{\sqrt{x}} + 2\sqrt{x} + c$