

Topics : Definite Integration , Indefinite Integration

Type of Questions

M.M., Min.

Single choice Objective (no negative marking) Q.1,2,3,4

(3 marks, 3 min.)

[12, 12]

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

(4 marks, 5 min.)

[12, 15]

Match the Following (no negative marking) Q.8

(8 marks, 8 min.)

[8, 8]

1. The value of the integral $\int_{-\pi}^{\pi} (\cos px - \sin qx)^2 dx$ where p, q are integers, is equal to :

(A) $-\pi$

(B) 0

(C) π

(D) 2π

2. The value of the integral $\int_{\pi/3}^{\pi/2} x \sin (\pi [x] - x) dx$ is (where $[x]$ denotes greater integer function)

(A) $\frac{1}{2} + \frac{\pi}{6}$

(B) $-\frac{1}{2} - \frac{\pi}{6}$

(C) $1 - \frac{\sqrt{3}}{2} + \frac{\pi}{6}$

(D) $\frac{\sqrt{3}}{2} - 1 - \frac{\pi}{6}$

3. If $\int_0^a \frac{dx}{\sqrt{x+a} + \sqrt{x}} = \int_0^{\pi/8} \frac{2 \tan \theta}{\sin 2\theta} d\theta$, then value of 'a' is equal to ($a > 0$)

(A) $\frac{3}{4}$

(B) $\frac{\pi}{4}$

(C) $\frac{3\pi}{4}$

(D) $\frac{9}{16}$

4. If the value of the integral $\int_1^2 e^{x^2} dx$ is α then $\int_e^{e^4} \sqrt{\ln x} dx$ is equal to :

(A) $e^4 - e - \alpha$

(B) $2e^4 - e - \alpha$

(C) $2(e^4 - e) - \alpha$

(D) none of these

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

6. Evaluate :

(i) $\int_0^{\pi/2} \frac{\cos x dx}{(1 + \sin x)(2 + \sin x)}$

(ii) $\int_1^2 \frac{dx}{x(x^4 + 1)}$

(iii) $\int_0^5 (|x-3| + |1-x|) dx$

7. Evaluate :

(i) $\int_0^{3\pi} \sin^{-1}(\sin x) dx$

(ii) $\int_{-2}^2 \min(x - [x], -x - [-x]) dx$ (where $[x]$ represents greatest integer less than or equal to x)

(iii) $\int_0^{\infty} \frac{x \log x}{(1+x^2)^2} dx$

8. Column – I

Column – II

(A) $f(x) = \min \{x + 1, 2 \operatorname{sgn}(|x|)\}, \forall x \in \mathbb{R},$

(p) 3

then $\int_{-5}^4 f(x) dx =$

(B) If $f(x)$ is a continuous function for all real values of x and

(q) 0

satisfies $\int_n^{n+1} f(|x|) dx = \frac{n^2}{2}, \forall n \in \mathbb{I},$ then $\int_{-3}^5 f(|x|) dx =$

(C) If $\int_n^{n+1} [x + [x + [x]]] dx = kn, n \in \mathbb{I}$ (where $[.]$ denotes the greatest

(r) 22

integer function), then k is/are

(D) If $f(x) = \int_1^x \frac{e^t}{t} dt, x \in \mathbb{R}^+,$ then the number of solutions of $f'(x) = 1$ is

(s) 1



Answers Key

1. (D) 2. (C) 3. (D) 4. (B)

$$5. -\frac{1}{\sqrt{2}} \log \left| \frac{\sqrt{1+x^2} - \sqrt{2}x}{\sqrt{1+x^2} + \sqrt{2}x} \right| - \log \left| x + \sqrt{1+x^2} \right| + c$$

$$6. \text{ (i) } \ln \frac{4}{3} \quad \text{ (ii) } \frac{1}{4} \ln \frac{32}{17} \quad \text{ (iii) } 15$$

$$7. \text{ (i) } \frac{\pi^2}{4} \quad \text{ (ii) } 1 \quad \text{ (iii) } 0$$

8. (A) $\rightarrow$ (q), (B) $\rightarrow$ (r), (C) $\rightarrow$ (p), (D) $\rightarrow$ (q)