MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 71

Total Marks : 31

Max. Time : 33 min.

Topic : Definite Integration

Type of Questions		**M.M., Min.**
Single choice Objective (no negative marking) Q.1,2,3,4,5	**(3 marks, 3 min.)**	**[15, 15]**
Subjective Questions (no negative marking) Q.6,7	**(4 marks, 5 min.)**	**[8, 10]**
Match the Following (no negative marking) Q.8	**(8 marks, 8 min.)**	**[8, 8]**

1. $\int_2^4 \left(\log_x 2 - \frac{(\log_x 2)^2}{\ell n 2} \right) dx$ equals to :

(A) 0 (B) 1 (C) 2 (D) 4

2. The value of $\int_1^2 \left(\left[x^2\right] - [x]^2 \right) dx$, where [.] denotes the greatest integer function, is equal to :

(A) $4 + \sqrt{2} - \sqrt{3}$ (B) $4 - \sqrt{2} + \sqrt{3}$ (C) $4 - \sqrt{3} - \sqrt{2}$ (D) none of these

3. The area of the closed figure bounded by x = – 1, x = 2 and $y = \begin{cases} -x^2 + 2, & x \le 1 \\ 2x - 1, & x > 1 \end{cases}$ and the abscissa axis is

(A) 16/3 sq. units (B) 10/3 sq. units (C) 13/3 sq. units (D) 7/3 sq. units

4. The area of the region for which $0 < y < 3 - 2x - x^2$ and $x > 0$ is

(A) $\int_1^3 (3 - 2x - x^2)\, dx$ (B) $\int_0^3 (3 - 2x - x^2)\, dx$

(C) $\int_0^1 (3 - 2x - x^2)\, dx$ (D) $\int_{-1}^3 (3 - 2x - x^2)\, dx$

5. The area bounded by the curves $\sqrt{x} + \sqrt{y} = 1$ and x + y = 1 is

(A) $\frac{1}{3}$ (B) $\frac{1}{6}$ (C) $\frac{1}{2}$ (D) none of these

6. Evaluate : $\int_{-1/\sqrt{3}}^{1/\sqrt{3}} \frac{\cos^{-1}\left(\frac{2x}{x^2+1}\right)+\tan^{-1}\left(\frac{2x}{1-x^2}\right)}{e^x+1}dx$

7. For $\theta \in (0, \pi) \cup (\pi, 2\pi)$ show that $\int_0^{\infty} \frac{dx}{x^2+2x\cos\theta+1} = 2\int_0^{1} \frac{dx}{x^2+2x\cos\theta+1}$

8.

	Column – I		**Column – II**
(A)	Let f : R $\to$ R be a differentiable function and f (1) = 1, f'(1) = 3. Then the value of $\lim_{x\to 1} \frac{\int_1^{x^2}(f(t)-t)\,dt}{(x-1)^2}$ is	(P)	2
(B)	If $\int_0^3 (3ax^2+2bx+c)\,dx = \int_1^3 (3ax^2+2bx+c)\,dx$ where a, b, c are constants, then a + b + c =	(Q)	0
(C)	Number of rational points P $\equiv (\alpha, \beta)$ lying on $\left(x-\sqrt{2}\right)^2 + \left(y-\sqrt{3}\right)^2 = 4$ is (rational point means x and y co-ordinate both are rational)	(R)	1
(D)	Number of integral values of 'a' for which the function $f(x) = x^3 + (a + 2)x^2 + 3ax + 5$ is monotonic in R is	(S)	4

Answers Key

1. (A) **2.** (C) **3.** (A) **4.** (C)

5. (A) **6.** $\frac{\pi}{2\sqrt{3}}$

8. (A) $\rightarrow$ (S),(B) $\rightarrow$ (Q),(C) $\rightarrow$ (Q),(D) $\rightarrow$ (S)