[STRAIGHT OBJECTIVE TYPE] [4 × 3 = 12]

Q.1 The value of $\log_2\left((\log_{81} 3)^{\log_3 81}\right)$ is equal to

(A*) -8 (B) $-4\log_2 3$ (C) 8 (D) $-4\log_3 2$

Q.2 The real x and y satisfy simultaneously $\log_8 x + \log_4 y^2 = 5$ and $\log_8 y + \log_4 x^2 = 7$ then the value of xy is equal to

(A*) 2^9 (B) 2^{12} (C) 2^{18} (D) 2^{24}

Q.3 Number of digits in $4^{16} \cdot 5^{25}$ is (use $\log_{10} 2 = 0.3010$)

(A) 27 (B*) 28 (C) 29 (D) 30

Q.4 Number of real x satisfying the equation $|x-2|+|x-3|=|x-1|$ is

(A) 1 (B*) 2 (C) 3 (D) more than 3

[MULTIPLE OBJECTIVE TYPE] [1 × 4 = 4]

Q.5 The expression, $\log_p \log_p \underbrace{\sqrt[p]{\sqrt[p]{\sqrt[p]{\ldots\ldots\sqrt[p]{p}}}}}_{n \text{ radical sign}}$ where $p \geq 2$, $p \in N$, when simplified is

(A*) independent of p, but dependent on n (B) independent of n, but dependent on p

(C) dependent on both p & n (D*) negative.

[MATCH THE COLUMN] [3+3+3+3=12]

Q.6

	Column-I		Column-II	
(A)	If $4^x - 3^{x-\frac{1}{2}} = 3^{x+\frac{1}{2}} - 2^{2x-1}$ then $(2x)$ equals	(P)	1
(B)	The number of solutions of $\log_7 \log_5\left(\sqrt{x+5}+\sqrt{x}\right)=0$ is	(Q)	2
(C)	The number of values of x such that the middle term of $\log_3 2,\ \log_3(2^x-5),\ \log_3\left(2^x-\frac{7}{2}\right)$ is the average of the other two is	(R)	3
		(S)	4
(D)	If α, β are the roots of the equation $x^2 - \left(3+2^{\sqrt{\log_2 3}} - 3^{\sqrt{\log_3 2}}\right)x - 2\left(3^{\log_3 2} - 2^{\log_2 3}\right)=0$ then $2(\alpha+\beta)-\alpha\beta$ equals		

[Ans. (A) R; (B) P ; (C) P; (D) S]

[SUBJECTIVE]

Q.7 The circumference of a circle circumscribing an equilateral triangle is 24π units. Find

(a) the area of the circle inscribed in the equilateral triangle.

(b) area of the equilateral triangle inscribed in the inner circle. **[3+3]**

[Ans. (a) 36π, (b) $27\sqrt{3}$]

Q.8 If $0 < x < \frac{\pi}{4}$ and $\cos x + \sin x = \frac{5}{4}$, find the numerical values of $\cos x - \sin x$. **[5]**