MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 3

Total Marks : 29

Max. Time : 29 min.

Topics : **Complex Number, Sequence & Progression, Permutation & Combination, Fundamentals of Mathematics, Quadratic Equation**

Type of Questions		**M.M., Min.**
Single choice Objective (no negative marking) Q. 1, 2, 3, 4	**(3 marks, 3 min.)**	**[12, 12]**
Short Subjective Questions (no negative marking) Q. 5, 6, 7	**(3 marks, 3 min.)**	**[9, 9]**
Match the Following (no negative marking) Q.8	**(8 marks, 8 min.)**	**[8, 8]**

1. If z_1, z_2, z_3 are the vertices of the ΔABC on the complex plane and are also the roots of the equation $z^3 - 3\alpha z^2 + 3\beta z + \gamma = 0$ then the condition for the ΔABC to be equilateral triangle is :

(A) $\alpha^2 = \beta$ (B) $\alpha = \beta^2$ (C) $\alpha^2 = 3\beta$ (D) $\alpha = 3\beta^2$

2. The sum of first 100 terms common to the series 17, 21, 25,.... & 16, 21, 26.... is

(A) 101100 (B) 111000 (C) 110010 (D) 100101

3. How many seven digit number is to be formed using the digits 1 to 9 (without repetition) which is divisible by 9

(A) 4.7! (B) $^9P_7$ (C) 7! (D) 9^6

4. The complete solution set of the equation $x^8 - x^5 + x^2 - x + 1 > 0$ is given by

(A) $0 < x < 1$ (B) $-1 < x < 1$ (C) $x > 1$ (D) $x \in R$.

5. If the inequality $\sin^2 x + a\cos x + a^2 \geq 1 + \cos x$ holds for any $x \in R$, find the range of values of a .

6. If α, β are the roots of the equation $ax^2 + bx + c = 0$. Find the quadratic equation whose roots are $(a\alpha + b)^{-2}$, $(a\beta + b)^{-2}$.

7. Find the solution of the equation, $2\log_9\left(2\left(\frac{1}{2}\right)^x - 1\right) = \log_{27}\left(\left(\frac{1}{4}\right)^x - 4\right)^3$. Also state whether the solution is rational or irrational.

8. **Match the column**

Column – I		**Column – II**	
(A)	The number of integral solutions of the inequality $\frac{(e^x - 1)(x-2)(x-1)^7}{(\ell nx + 1)(x-3)(x-5)} \leq 0$	(p)	4
(C)	Number of solution of sgn (sgn sin x) = 0 in $x \in [-2\pi, 2\pi]$	(r)	3
(D)	Number of solution of $x = \tan x$ in $x \in (-\pi, \pi)$	(s)	1
		(t)	0

Answers Key

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

5. $(-\infty, -2] \cup [1, \infty)$ **6.** $a^2c^2x^2 - (b^2 - 2ac)x + 1 = 0$

7. $-\log_2 3$, Irrational

8. $(A \to r), (B \to r), (C \to q), (D \to s)$