MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 18

Total Marks : 28

Max. Time : 29 min.

Topics : Fundamentals of Mathematics, Quadratic Equation

Type of Questions		**M.M., Min.**
Comprehension (no negative marking) Q.1 to 3	**(3 marks, 3 min.)**	**[9, 9]**
Single choice Objective (no negative marking) Q.4,5	**(3 marks, 3 min.)**	**[6, 6]**
Multiple choice objective (no negative marking) Q.6	**(5 marks, 4 min.)**	**[5, 4]**
Subjective Questions (no negative marking) Q.7,8	**(4 marks, 5 min.)**	**[8, 10]**

COMPREHENSION (For Q.1 to 3)

Consider the equation $||x - 1| - 2| = \lambda$

1. If the given equation has two solutions, then λ belongs to

(A) $(2, \infty) \cup \{0\}$ (B) $(2, \infty)$ (C) $(0, 2)$ (D) none of these

2. If the given equation has three solutions, then λ belongs to

(A) $(0, 2)$ (B) $\{2\}$ (C) $(0, \infty)$ (D) $(-\infty, 0)$

3. Number of integral values of λ so that the given equation has four solutions, is

(A) 0 (B) 1 (C) 2 (D) 3

4. If α, β, γ are the roots of the equation $x^3 - px^2 + qx - r = 0$, then the value of $\sum \frac{\alpha\beta}{\gamma}$ is equal to

(A) $pq + 3r$ (B) $pq + r$ (C) $pq - 3r$ (D) $\frac{q^2 - 2pr}{r}$

5. **S_1 :** For $ax^2 + bx + c = 0$ $(a \neq 0)$ if $a + b + c = 0$, then the roots are 1 and c/a
S_2 : If $f(x) = ax^2 + bx + c$ $(a \neq 0)$ has finite minimum value and both roots are of opposite sign, then $f(0) < 0$
S_3 : If α is repeated root of $ax^2 + bx + c = 0$, $a \neq 0$, then $ax^2 + bx + c = (x - \alpha)^2$
S_4 : For $ax^2 + bx + c = 0$ $(a \neq 0)$, irrational roots occur in conjugate pairs only

State in order, whether S_1, S_2, S_3, S_4 are true or false

(A) TFTF (B) TTFF (C) FTFT (D) TTTT

6. If α, β are the roots of the equation $x^2 + \alpha x + \beta = 0$ such that $\alpha \neq \beta$ and $||x - \beta| - \alpha| < \alpha$, then

(A) inequality is satisfied by exactly two integral values of x
(B) inequality is satisfied by all values of $x \in (-4, -2)$
(C) Roots of the equation are opposite in sign
(D) $x^2 + \alpha x + \beta < 0 \ \forall \ x \in [-1, 0]$

7. Find the set of values of 'a' for which the roots of the quadratic equation

$(a - 5)x^2 + (\sqrt{4a - a^2})x + (a^2 - 2a - 3) = 0$ are of opposite sign.

8. If inequality $\frac{ax^2 + 3x + 4}{x^2 + 2x + 2} < 5$ is satisfied for all real values of x then find out greatest integral value of 'a'.

Answers Key

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

5. (B) **6.** (A)(B)(C)(D) **7.** $a \in (3, 4]$

8. 2