MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 37

Total Marks : 27

Max. Time : 30 min.

Topics : **Sequence & Series, Application of Derivatives, Limits, Continuity & Derivability**

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. 6,7,8	**(4 marks, 5 min.)**	**[12, 15]**

1. If a, b,c,d, e are five positive numbers, then

(A) $\left(\frac{a}{b}+\frac{b}{c}\right)\left(\frac{c}{d}+\frac{d}{e}\right) \ge 4\sqrt{\frac{a}{e}}$ (B) $\frac{b}{a}+\frac{c}{b}+\frac{d}{c}+\frac{e}{d}+\frac{a}{e} \ge \frac{1}{5}$

(C) $\frac{a}{b}+\frac{b}{c}+\frac{c}{d}+\frac{d}{e}+\frac{e}{a} < 5$ (D) None of these

2. Set of all possible values of a such that $f(x) = e^{2x} - (a + 1)e^x + 2x$ is monotonically increasing for all $x \in R$, is

(A) (3, 4) (B) $(-\infty, 0)$ (C) $(-\infty, 3]$ (D) $(3, \infty)$

3. If at each point of the curve $y = x^3 - ax^2 + x + 1$, tangent is inclined at an acute angle with the positive direction of the x-axis then

(A) $a > 0$ (B) $a \le \sqrt{3}$ (C) $-\sqrt{3} < a < \sqrt{3}$ (D) none of these

4. If f(x) is differentiable for all $x \in R$ so that $f(2) = 4$ and $f'(x) \ge 5$ for all $x \in [2, 6]$, then f(6)

(A) ≥ 24 (B) ≤ 24 (C) ≥ 9 (D) none of these

5. Let $U_n = \frac{n!}{(n+2)!}$ where $n \in N$. If $S_n = \sum_{n=1}^{n} U_n$, then $\lim_{n\to\infty} S_n$ equals

(A) 2 (B)1 (C) $\frac{1}{2}$ (D) non existent

6. If the equation $x^2 e^x = k$ possess three real roots then the range of values of k is ______

7. Find value of a, b, c such that curves $y = x^2 + ax + b$ and $y = cx - x^2$ will touch each other at the point (1, 0).

8. If f(x) and g(x) are continuous functions in [a, b] and they are differentiable in (a, b) then prove that

$\begin{vmatrix} f(a) & f(b) \\ g(a) & g(b) \end{vmatrix} = (b-a)\begin{vmatrix} f(a) & f'(c) \\ g(a) & g'(c) \end{vmatrix}$ where $a < c < b$.

Answers Key

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

5. (C) **6.** $k \in (0, 4e^{-2})$ **7.** $a = -3$, $b = 2$, $c = 1$