MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 33

Total Marks : 27

Max. Time : 30 min.

Topics : Method of Differentiation, Complex Number, Continuity & Derivability, Application of Derivatives, Sequence & Series, Straight Line

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. Sum to infinite terms of the series $\frac{1}{1.3} + \frac{2}{1.3.5} + \frac{3}{1.3.5.7} + \frac{4}{1.3.5.7.9} + ...$ is

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

2. Consider the funciton $f(x) = x - |x - x^2|$, $-1 \le x \le 2$. Then point of discontinuities of f(x) for $x \in [-1, 2]$ are

(A) x = 0, 1 (B) x = 1, 2 (C) x = 0, $\frac{1}{2}$,1 (D) None of these

3. Given that f is a real valued differentiable function such that $f(x)\, f'(x) < 0$ for all real x, it follows that

(A) f(x) is an increasing function (B) f(x) is a decreasing function

(C) |f(x)| is an increasing function (D) |f(x)| is a decreasing function

4. If $f'(1) = -2\sqrt{2}$ and $g'(\sqrt{2}) = 4$, then the derivative of f(tan x) with respect to g(sec x) at $x = \frac{\pi}{4}$, is

(A) 1 (B) – 1 (C) 2 (D) 4

5. If $y = (\sqrt{x})^{x^{x^{.....\text{to}\infty}}}$, then $\frac{dy}{dx}$ is equal to

(A) $\frac{y^3}{2x(1-y^2\ell nx)}$ (B) $\frac{y^2}{2x(1+y^2\ell nx)}$ (C) $\frac{y^2}{2x(1-y^2\ell nx)}$ (D) $\frac{y^3}{2x(1+y^2\ell nx)}$

6. If $y = \left(\frac{ax+b}{x^2+c}\right)$, then show that (2xy ' + y) y''' = 3 (xy'' + y')y'', where a, b, c are constants

7. If the lines $L_1 : 2x - 3y - 6 = 0$, $L_2 : x + y - 4 = 0$ and $L_3 : x + 2 = 0$ taken pair wise in order constitute the angles A, B and C respectively of ΔABC, then find the equation whose roots are tan A, tan B and tan C.

8. Sketch the region given by $|z| \le 4$ & $\text{Arg}(z - i - 1) > \pi/4$

Answers Key

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

5. (A) **7.** $2x^3 - 15x^2 + 28x - 15 = 0$

8.