MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 34

Total Marks : 27

Max. Time : 27 min.

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

Type of Questions		**M.M., Min.**
Single choice Objective (no negative marking) Q.1,2,3,4,5,6	**(3 marks, 3 min.)**	**[18, 18]**
Multiple choice objective (no negative marking) Q.7	**(5 marks, 4 min.)**	**[5, 4]**
Subjective Questions (no negative marking) Q.8	**(4 marks, 5 min.)**	**[4, 5]**

1. If $f(x) = \max \{\sin x, \sin^{-1}(\cos x)\}$, then

(A) f is differentiable everywhere

(B) f is continuous but not differentiable everywhere

(C) f is discontinuous at $x = \frac{n\pi}{2}$, $n \in I$

(D) none of these

2. The radius of a right circular cyliner increases at a constant rate. Its altitude is a linear function of the radius and increases three times as fast as radius. When the radius is 1 cm the altitude is 6 cm. When the radius is 6cm, the volume is increasing at the rate of 1 Cu cm/sec. When the radius is 36cm, the volume is increasing at a rate of n cu. cm/sec. The value of 'n' is equal to :

(A) 12 (B) 22 (C) 30 (D) 33

3. If $y = (A + Bx)\, e^{mx} + (m-1)^{-2}\, .\, e^{x}$, then $\frac{d^2y}{dx^2} - 2m\frac{dy}{dx} + m^2y$ is equal to

(A) e^{mx} (B) e^{-mx} (C) $e^{(1-m)x}$ (D) e^{x}

4. If $\tan y = \frac{2^x}{1+2^{2x+1}}$, then $\frac{dy}{dx}$ at $x = 0$ is

(A) $-\frac{3}{10}$ (B) $-\frac{3}{10}\ell n\, 2$ (C) $-\frac{1}{10}$ (D) $-\frac{1}{10}\ell n\, 2$

5. If $y = \sin x$, then $\frac{d^2(\cos^7 x)}{dy^2}$ is equal to

(A) $35\cos^3 x - 42\cos^5 x$

(B) $35\cos^3 x + 42\cos^5 x$

(C) $42\cos^3 x - 35\cos^5 x$

(D) $-35\cos^3 x - 42\cos^5 x$

6. If $2a + 3b + c = 3$; $a > 0$, $b > 0$, $c > 0$, then the greatest value of $a^2 b^5 c^2$

(A) $\frac{5^5\, 2^2}{3^{23}}$ (B) $\frac{5^5 . 2^2}{3^{14}}$ (C) $\frac{4.5^5}{9^9}$ (D) $\frac{5^6 . 2^2}{3^4 . 9^{10}}$

7. The function $f(x) = (\tan^{-1}x)^3 - (\cot^{-1}x)^2 + \tan^{-1}x + 2$ is

(A) decreasing $\forall\, x \in R$.

(B) Increasing $\forall\, x \in R$.

(C) Bounded

(D) Many one function.

8. The tangent to $y = ax^2 + bx + \frac{7}{2}$ at (1, 2) is parallel to the normal at the point (–2, 2) on the curve $y = x^2 + 6x + 10$. Find the value of a and b.

Answers Key

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

5. (A) **6.** (B) **7.** (B)(C) **8.** $a = 1, b = -\frac{5}{2}$