

Topics : Fundamentals of Mathematics, Function, Limits

Type of Questions

M.M., Min.

Single choice Objective (no negative marking) Q.1,2	(3 marks, 3 min.)	[6, 6]
Multiple choice objective (no negative marking) Q.3	(5 marks, 4 min.)	[5, 4]
Assertion and Reason (no negative marking) Q.4	(3 marks, 3 min.)	[3, 3]
Subjective Questions (no negative marking) Q.5,6,8	(4 marks, 5 min.)	[12, 15]
True or False (no negative marking) Q.7	(2 marks, 2 min.)	[2, 2]

1. The solution set of the inequality $\max\{1 - x^2, |x - 1|\} < 1$ is
 (A) $(-\infty, 0) \cup (1, \infty)$ (B) $(-\infty, 0) \cup (2, \infty)$ (C) $(0, 2)$ (D) $(-1, 1)$

2. If $h(x) = \log_{10} x$, then the value of $\sum_{n=1}^{89} h(\tan^n \circ) =$
 (A) 1 (B) 0 (C) -1 (D) none of these

3. If $f = \sin |\cos x|$, $g = \cos |\sin y|$, then
 (A) least value of $f + g$ is $\cos 1$ (B) greatest value of $f + g$ is $\sin 1$
 (C) period of g is $\frac{\pi}{2}$ (D) greatest value of $f + g$ is $1 + \sin 1$

4. In both the statements [.] represents greatest integer function.

STATEMENT-1 : The greatest value of $\sin\left(\frac{3}{2}x - \frac{3}{2}[x]\right)$ is $\sin \frac{3}{2}$.

STATEMENT-2 : The greatest value of $[\sin x]$ is 1, where $x \in \mathbb{R}$.

- (A) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
- (B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
- (C) Statement-1 is True, Statement-2 is False
- (D) Statement-1 is False, Statement-2 is True

5. Solve for $x : (|x| - 5)(|x - 1| - 1) < 0$

6. Evaluate the following limits

(i) $\lim_{x \rightarrow 0} \frac{\sin x^4 - x^4 \cdot \cos x^4}{x^4(e^{2x^4} - 1 - 2x^4)}$ (ii) $\lim_{x \rightarrow 0^+} (1 + 2 \cos x)^2$

7. The function, $\sqrt{x-1} + \sqrt[3]{x-3} + \sqrt[4]{5-x}$ and $\sin^{-1}\left(\frac{x-3}{2}\right)$ have identical domains . **[True or False]**

8. If $f(x)$ is non - zero polynomial function such that $f(2x) = f'(x) f''(x)$, then $f(x) = \underline{\hspace{2cm}}$.



Answers Key

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

5. $x \in (-5, 0) \cup (2, 5)$ 6. (i) $1/6$ (ii) 9

7. True 8. $\frac{4x^3}{9}$

