Limits and Derivatives

Q.No.1:

$\lim\limits_{x\to 0}\dfrac{(1-\cos 2x)(3+\cos x)}{x\tan 4x}$ is equal to:

JEE 2013

A. $-\dfrac{1}{4}$

B. $\dfrac{1}{2}$

C. 1

D. 2

Q.No.2: $\lim\limits_{x\to 0}\dfrac{(1-\cos 2x)\,(3+\cos x)}{x\tan 4x}$ is equal to :

JEE 2015

A. 4

B. 3

C. 2

D. $\frac{1}{2}$

Q.No.3: Let $p=\lim\limits_{x\to 0^+}\left(1+\tan^2\sqrt{x}\right)^{\frac{1}{2x}}$ then log p is equal to :

JEE 2016

A. 1

B. $\frac{1}{2}$

C. $\frac{1}{4}$

D. 2

Q.No.4: $\lim\limits_{x\to\frac{\pi}{2}} \frac{\cot x-\cos x}{(\pi-2x)^3}$ equals **JEE 2017**

A. $\frac{1}{24}$

B. $\frac{1}{16}$

C. $\frac{1}{8}$

D. $\frac{1}{4}$

Q.No.5: For each $t \in \mathbf{R}$, let $[t]$ be the greatest integer less than or equal to t. Then

$\lim\limits_{x\to 0+} x\left(\left[\frac{1}{x}\right]+\left[\frac{2}{x}\right]+\ldots.+\left[\frac{15}{x}\right]\right)$ **JEE 2018**

A. is equal to 120.

B. does not exist (in **R**).

C. is equal to 0.

D. is equal to 15.

Q.No.6: For each $x \in \mathbf{R}$, let $[x]$ be the greatest integer less than or equal to x. Then $\lim\limits_{x\to 0^-} \frac{x([x]+|x|)\sin[x]}{|x|}$ is equal to: **JEE 2019**

A. – sin 1

B. 1

C. sin 1

D. 0

Q.No.7: For each $t \in \boldsymbol{R}$, let $[t]$ be the greatest integer less than or equal to t. Then,

$\lim\limits_{x\to 1+} \frac{(1-|x|+\sin|1-x|)\ \sin\left(\frac{\pi}{2}[1-x]\right)}{|1-x|\ [1-x]}$ **JEE 2019**

A. equals 1

B. equals 0

C. equals –1

D. does not exist

Q.No.8: $\lim_{x \to 0} \frac{x \cot(4x)}{\sin^2 x \cot^2(2x)}$ is equal to: **JEE 2019**

A. 0

B. 2

C. 4

D. 1

Q.No.9: Let [x] denote the greatest integer less than or equal to x. Then: **JEE 2019**

$\lim_{x \to 0} \frac{\tan(\pi \sin^2 x) + (|x| - \sin([x]))^2}{x^2}$:

A. does not exist

B. equals π

C. equals π + 1

D. equals 0

Q.No.10: $\lim_{x \to \frac{\pi}{4}} \frac{\cot^3 x - \tan x}{\cos\left(x + \frac{\pi}{4}\right)}$ is **JEE 2019**

A. 4

B. $4\sqrt{2}$

C. $8\sqrt{2}$

D. 8