DPP
DAILY PRACTICE PROBLEMS

**CLASS : XIth** **SUBJECT : MATHS**
**DATE :** **DPP NO. :8**

# Topic :-LIMITS AND DERIVATIVES

1. If $a = \min\{x^2 + 4x + 5 : x \in R\}$ and $b = \lim_{\theta \to 0} \frac{1 - \cos 2\theta}{\theta^2}$, then the value of $\sum_{r=0}^{n} {}^nC_r a^r b^{n-r}$, is

   a) $2n$ b) $3^n$ c) $2^{n+1}$ d) $2^{n-1}$

2. If $0 < x < y$, then $\lim_{n \to \infty} \left(y^n + x^n\right)^{1/n}$ is equal to

   a) $e$ b) $x$ c) $y$ d) None of these

3. $\lim_{x \to 1} (\log ex)^{1/\log x}$ is equal to

   a) $e^{-1}$ b) $e$ c) $e^2$ d) 0

4. If $\lim_{x \to \infty} \left\{ax - \frac{x^2 + 1}{x + 1}\right\} = b$, a finite number, then

   a) $a = 1, b = 1$ b) $a = 0, b = 1$ c) $a = -1, b = 1$ d) $b = -1, a = -1$

5. The value of $\lim_{x - 0} \frac{1}{x^3} \int_0^x \frac{t \log(1 + t)}{t^4 + 4} dt$ is

   a) 0 b) $\frac{1}{12}$ c) $\frac{1}{24}$ d) $\frac{1}{64}$

6. For the function

$f(x) = \lim_{n \to \infty} \frac{\log(2 + x) + x^{2n} \sin x}{1 + x^{2n}}$ Which of the flowing is true?

   a) $\lim_{x \to 1^-} f(x)$ does not exist

   b) $\lim_{x \to 1^+} f(x)$ does not exist

   c) Both limits exist and $\lim_{x \to 1^-} f(x) = \lim_{x \to 1^+} f(x)$

   d) Both limits exist and $\lim_{x \to 1^-} f(x) \neq \lim_{x \to 1^+} f(x)$

7. $\lim_{x \to \infty} \frac{\int_0^{2x} x\, e^{x^2}\, dx}{e^{4x^2}}$ equals

   a) 0 b) $\infty$ c) 2 d) 1/2

8. The value of

$\lim_{x \to \pi/2} \tan^2 x \left(\sqrt{2 \sin^2 x + 3 \sin x + 4} - \sqrt{\sin^2 x + 6 \sin x + 2}\right)$ is equal to

a) $\frac{1}{10}$ b) $\frac{1}{11}$ c) $\frac{1}{12}$ d) $\frac{1}{8}$

9. $\lim_{x\to\infty}\left(\frac{x+2}{x+1}\right)^{x+3}$ is

a) 1 b) $e$ c) $e^2$ d) $e^3$

10. If $f(x)=\cot^{-1}[(3x-x^3)/(1-3x^2)]$ and $g(x)=\cos^{-1}[(1-x^2)/(1+x^2)]$, then $\lim_{x\to a}\frac{f(x)-f(a)}{g(x)-g(a)}\left(0<a<\frac{1}{2}\right)$ is

a) $-\frac{3}{2}$ b) $\frac{1}{2}$ c) $\frac{3}{2}$ d) None of these

11. Let $f(x)=\begin{cases}x^2, & x\in Z\\ \frac{k(x^2-4)}{2-x}, & x\notin Z\end{cases}$ Then, $\lim_{x\to 2} f(x)$

a) Exists only when $k=1$
b) Exists for every real $k$
c) Exists for every real $k$ except $k=1$
d) Does not exist

12. The value of $\lim_{x\to 0}\frac{1-\cos^3 x}{x\sin x\cos x}$, is

a) 2/5 b) 3/5 c) 3/2 d) 3/4

13. $\lim_{x\to\infty}\sqrt{\frac{x+\sin x}{x-\cos x}}=$

a) 0 b) 1 c) $-1$ d) None of these

14. It is given that $f'(a)$ exists, then $\lim_{x\to a}\frac{xf(a)-af(x)}{x-a}$ is equal to

a) $f(a)-a\,f'(a)$ b) $f'(a)$ c) $-f'(a)$ d) $f(a)+a\,f'(a)$

15. $\lim_{h\to 0}\frac{\sin(a+3h)-3\sin(a+2h)+3\sin(a+h)-\sin a}{h^3}$ is equal to

a) $\sin a$ b) $-\sin a$ c) $\cos a$ d) $-\cos a$

16. $\lim_{x\to 0}\left\{\frac{1^x+2^x+3^x+\ldots+n^x}{n}\right\}^{1/x}$ is equal to

a) $(n!)^n$ b) $(n!)^{1/n}$ c) $n!$ d) $\ln n!$

17. The value of $\lim_{x\to 0}\frac{\int_0^{x^2}\cos t^2 dt}{x\sin x}$ is

a) 3/2 b) 1 c) $-1$ d) None of these

18. If $f(x)=\frac{2}{x-3}$, $g(x)=\frac{x-3}{x+4}$ and $h(x)=-\frac{2(2x+1)}{x^2+x-12}$, then $\lim_{x\to 3}\{f(x)+g(x)+h(x)\}$, is

a) $-2$ b) $-1$ c) $-2/7$ d) 0

19. $\lim_{x\to 0}\left[\frac{8\sin x + x\cos x}{3\tan x + x^2}\right]$ is equal to

a) 3 b) 2 c) -1 d) 4

20. If $\lim_{x\to 0}\frac{\log(3+x)-\log(3-x)}{x} = k$, the value of $k$ is

a) $-2/3$ b) 0 c) $-1/3$ d) $2/3$