DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth **SUBJECT : MATHS**
DATE : **DPP NO. :5**

Topic :-LIMITS AND DERIVATIVES

1. The value of $\lim_{x\to\infty} x^{3/2}\left(\sqrt{x^3+1}-\sqrt{x^3-1}\right)$, is

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

2. If $\lim_{x\to a}\frac{a^x-x^a}{x^x-a^a}=-1$, then a equal to

   a) 1 b) 0 c) e d) $(1/e)$

3. If $\lim_{x\to 0}\left\{\frac{x^3+1}{x^2+1}-(ax+b)\right\}=2$, then

   a) $a=1, b=1$ b) $a=1, b=2$ c) $a=1, b=-2$ d) None of these

4. $\lim_{x\to 0}\frac{e^{x^2}-\cos x}{x^2}$ is equal to

   a) 0 b) $\frac{1}{2}$ c) 1 d) $\frac{3}{2}$

5. $\lim_{n\to\infty}\left(\frac{1^2}{1-n^3}+\frac{2^2}{1-n^3}+\ldots+\frac{n^2}{1-n^3}\right)$ is equal to

   a) $\frac{1}{3}$ b) $-\frac{1}{3}$ c) $\frac{1}{6}$ d) $-\frac{1}{6}$

6. $\lim_{x\to\frac{\pi}{6}}\frac{\sin 2x}{\sin x}$ is equal to

   a) $\sqrt{3}$ b) $\frac{1}{\sqrt{3}}$ c) 2 d) $\frac{1}{2}$

7. The value of $\lim_{x\to 0}\frac{1-\cos(1-\cos x)}{x^4}$, is

   a) $\frac{1}{8}$ b) $\frac{1}{2}$ c) $\frac{1}{4}$ d) None of these

8. Let α and β be the roots of the equation $ax^2+bx+c=0$, where $1<\alpha<\beta$. If $\lim_{x\to m}\frac{|ax^2+bx+c|}{ax^2+bx+c}=1$, then

   a) $a<0$ and $\alpha<m<\beta$ b) $a>0$ and $m>1$ c) $a>0$ and $m<1$ d) All the above

9. $\lim_{x\to 1}\frac{x^m-1}{x^n-1}$ is equal to

   a) $\frac{n}{m}$ b) $\frac{m}{n}$ c) $\frac{2m}{n}$ d) $\frac{2n}{m}$

10. Let α and β be the distinct roots of $ax^2 + bx + c = 0$, then $\lim_{x\to\alpha} \frac{1-\cos(ax^2+bx+c)}{(x-\alpha)^2}$ is equal to

a) $\frac{1}{2}(\alpha-\beta)^2$ b) $-\frac{a^2}{2}(\alpha-\beta)^2$ c) 0 d) $\frac{a^2}{2}(\alpha-\beta)^2$

11. $\lim_{x\to 0}\left[\frac{2^x-1}{\sqrt{1+x}-1}\right]$ is equal to

a) $\log_e 2$ b) $\log_e \sqrt{2}$ c) $\log_e 4$ d) 2

12. $\lim_{x\to 0}\left(\frac{x}{\sqrt{1+x}-\sqrt{1-x}}\right)$ is equal to

a) 0 b) 1 c) 2 d) -1

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

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

14. If a, b, c, d are positive, then $\lim_{x\to\infty}\left(1+\frac{1}{a+bx}\right)^{c+dx} =$

a) $e^{d/b}$ b) $e^{c/a}$ c) $e^{(c+d)/a+b}$ d) e

15. The value of $\lim_{x\to 0}\left(\frac{\int_0^{x^2}\sec^2 t\,dt}{x\sin x}\right)$ is

a) 3 b) 2 c) 1 d) 0

16. $\lim_{x\to\infty}\frac{\sin x}{x}$ is equal to

a) ∞ b) 1 c) 0 d) Does not exist

17. $\lim_{x\to 0}\frac{x\cos x - \log(1+x)}{x^2}$ equals

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

18. Given that $\lim_{n\to\infty}\sum_{r=1}^{n}\frac{\log(r+n)-\log n}{n} = 2\left(\log 2 - \frac{1}{2}\right)$, $\lim_{n\to\infty}\frac{1}{n^k}[(n+1)^k(n+2)^k\ldots(n+n)^k]^{1/n}$, is

a) $\frac{4k}{e}$ b) $\sqrt[k]{\frac{4}{e}}$ c) $\left(\frac{4}{e}\right)^k$ d) $\left(\frac{e}{4}\right)^k$

19. $\lim_{x\to 0}\frac{\sin|x|}{x}$ is equal to

a) 1 b) 0 c) positive infinity d) does not exist

20. The value of $\lim_{x\to\infty}\left\{\frac{x^2\sin\left(\frac{1}{x}\right)-x}{1-|x|}\right\}$, is

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