DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth **SUBJECT : MATHS**
DATE : **DPP NO. :2**

Topic :-LIMITS AND DERIVATIVES

1. The value of $\lim_{x\to 0}\frac{1+\sin x-\cos x+\log(1-x)}{x^3}$, is
   a) $1/2$ b) $-1/2$ c) 0 d) 1

2. $\lim_{x\to 0}\left\{\frac{1+\tan x}{1+\sin x}\right\}^{\operatorname{cosec} x}$ is equal to
   a) $\frac{1}{e}$ b) 1 c) e d) e^2

3. $\lim_{x\to\frac{\pi}{6}}\frac{2\sin^2 x+\sin x-1}{2\sin^2 x-3\sin x+1}$ is equal to
   a) 3 b) -3 c) 6 d) 0

4. The value of $\lim_{x\to 0}\left(\frac{1+5x^2}{1+3x^2}\right)^{1/x^2}$ is
   a) e^2 b) e c) $\frac{1}{e}$ d) $\frac{1}{e^2}$

5. If $f(x)=\begin{cases}x, x<0\\ 1, x=0\\ x^2, x>0\end{cases}$, then $\lim_{x\to 0} f(x)$ is
   a) 0 b) 1 c) 2 d) Does not exist

6. If x is a real number in $[0, 1]$, then the value of $\lim_{m\to\infty}\lim_{n\to\infty}[1+\cos^{2m}(n!\ \pi x)]$ is given by
   a) 2 or 1 according as x is rational or irrational
   b) 1 or 2 according as x is rational or irrational
   c) 1 for all x
   d) 2 or 1 for all x

7. $\lim_{x\to 1}(1+\cos\pi x)\cot^2\pi$ is equal to
   a) 1 b) -1 c) $1/2$ d) $-1/2$

8. If $\lim_{x\to 0}\frac{(e^{kx}-1)\sin kx}{x^2}=4$, then k is equal to
   a) 2 b) -2 c) ± 2 d) ± 4

9. $\lim_{x\to 0}\frac{\log(1+x^3)}{\sin^3 x}$ is equal to
   a) 0 b) 1 c) 3 d) None of these

10. If $l_1=\lim_{x\to 2^+}(x+[x])$, $l_2=\lim_{x\to 2^-}(2x-[x])$ and $l_3=\lim_{x\to\pi/2}\frac{\cos x}{(x-\pi/2)}$, then
    a) $l_1<l_2<l_3$ b) $l_2<l_3<l_1$ c) $l_3<l_2<l_1$ d) $l_1<l_3<l_2$

11. If $f(x) = \begin{cases} \frac{\sin(1+[x])}{[x]}, & for\ [x] \neq 0 \\ 0, & for\ [x] = 0 \end{cases}$

Where $[x]$ denotes the greatest integer not exceeding x, then $\lim_{x\to 0^-} f(x)$ is equal to

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

12. $\lim_{x\to 0} \frac{(1-cos\ 2x)\sin 5x}{x^2 \sin 3x}$ equals

a) $10/3$ b) $3/10$ c) $6/5$ d) $5/6$

13. If $f(x) = \frac{\sin(e^{x-2}-1)}{\log(x-1)}$, then $\lim_{x\to 2} f(x)$ is given by

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

14. If $S_n = \sum_{k=1}^{n} a_k$ and $\lim_{n\to\infty} a_n = a$, then $\lim_{n\to\infty} \frac{S_{n+1}-S_n}{\sqrt{\sum_{k=1}^{n} k}}$ is equal to

a) 0 b) a c) $\sqrt{2}\,a$ d) $2a$

15. $\lim_{h\to 0} \frac{\sin\sqrt{x+h}-\sin\sqrt{x}}{h}$ is equal to

a) $\cos\sqrt{x}$ b) $1/(2\sin\sqrt{x})$ c) $(\cos\sqrt{x})/2\sqrt{x}$ d) $\sin\sqrt{x}$

16. The value of $\lim_{x\to\frac{\pi}{2}} (\sin x)^{\tan x}$ is

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

17. The value of

$\lim_{n\to\infty} \cos\left(\frac{x}{2}\right)\cos\left(\frac{x}{4}\right)\cos\left(\frac{x}{8}\right)\ldots\cos\left(\frac{x}{2^n}\right)$ is

a) $\frac{x}{\sin x}$ b) $\frac{x}{\cos x}$ c) $\frac{(\sin x)}{x}$ d) $\frac{(\cos x)}{x}$

18. The value of the limit $\lim_{x\to 1} \frac{\sin(e^{x-1}-1)}{\log x}$ is

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

19. If $l = \lim_{x\to -2} \frac{\tan \pi x}{x+2} + \lim_{x\to\infty} \left(1+\frac{1}{x^2}\right)^x$, then which one of the following is not correct?

a) $l > 3$
b) $l > 4$
c) $l < 4$
d) l is a transcendental number

20. $\lim_{x\to 1} \frac{\sqrt{1-\cos 2(x-1)}}{x-1}$

a) Exists and is equals $\sqrt{2}$
b) Exists and is equals $-\sqrt{2}$
c) Does not exist because $x - 1 \to 0$
d) Does not exist because left hand limit is not equal to right hand limit