

LIMITS AND CONTINUITY

17

Marks	1	2	6	Total Marks
No. of Questions	1(S)	1(A)	1(K)	9

1 MARK QUESTIONS

(Skill based)

1. Evaluate : $\lim_{x \rightarrow 1} x^2 + 6x + 4$

2. Evaluate : $\lim_{x \rightarrow 4} \frac{x^3 + 4}{1 - x}$

3. Evaluate : $\lim_{x \rightarrow 2} \sqrt{36 - x^2}$

4. Evaluate : $\lim_{x \rightarrow 2} \frac{x^3 - 8}{x - 2}$

5. Evaluate : $\lim_{x \rightarrow -2} \frac{x^5 + 32}{x + 2}$

6. Evaluate : $\lim_{x \rightarrow 2} \frac{x^{10} - 1024}{x^4 - 16}$

7. Evaluate : $\lim_{x \rightarrow 4} \left(\frac{4x + 3}{x - 2} \right)$

8. Evaluate : $\lim_{x \rightarrow -3} \frac{x^2 + 9}{x + 3}$

9. Evaluate : $\lim_{x \rightarrow 3} \left(\frac{x^2 - 4x}{x - 2} \right)$

10. Evaluate : $\lim_{x \rightarrow \frac{1}{2}} \left(\frac{4x^2 - 1}{2x - 1} \right)$

11. Evaluate : $\lim_{x \rightarrow 2} \frac{x - 2}{\frac{1}{x^3} - \frac{1}{2^3}}$

12. Evaluate : $\lim_{\theta \rightarrow 0} \frac{\theta}{\sin \theta}$

13. Evaluate : $\lim_{\theta \rightarrow 0} \frac{\tan \theta}{\theta}$

14. Evaluate : $\lim_{x \rightarrow 0} \frac{\sin x^0}{x}$

15. Evaluate : $\lim_{x \rightarrow 0} \frac{\sin ax}{\sin bx}$

16. Evaluate : $\lim_{x \rightarrow 0} \frac{\sin ax}{bx}$

17. Evaluate : $\lim_{x \rightarrow 0} \frac{\sin x^2}{x}$

18. Evaluate : $\lim_{x \rightarrow 0} \frac{\sin 4x}{\sin 2x}$

19. Evaluate : $\lim_{\theta \rightarrow 0} \frac{\sin 3\theta}{\tan 2\theta}$

20. Evaluate : $\lim_{x \rightarrow 0} \frac{\tan 4x}{\tan 3x}$

QUESTION BANK

II PUC

21. Evaluate : $\text{Lt}_{x \rightarrow 0} \frac{e^{-x} - 1}{x}$

23. Evaluate : $\text{Lt}_{x \rightarrow \infty} \frac{3x^2 + x + 5}{7x - 9}$

25. Evaluate : $\text{Lt}_{x \rightarrow 0} \frac{e^{-3x} - 1}{x}$

27. Evaluate : $\text{Lt}_{x \rightarrow \infty} \frac{3x^2 - 4x + 2}{2x^2 + 5x + 7}$

29. Evaluate : $\text{Lt}_{x \rightarrow \infty} \frac{3x^3 - 4x + 7}{2x^4 - 3x + 6}$

22. Evaluate : $\text{Lt}_{x \rightarrow \infty} \left(1 + \frac{2}{n}\right)^n$

24. Evaluate : $\text{Lt}_{x \rightarrow \infty} \frac{(3x+4)(4x+3)}{(2x-7)(x+4)}$

26. Evaluate : $\text{Lt}_{n \rightarrow \infty} \left(\frac{n+1}{n}\right)^{3n}$

28. Evaluate : $\text{Lt}_{x \rightarrow \infty} \frac{x^7 + x^3 + 1}{x^8 - 3x^6 + 5}$

30. Evaluate : $\text{Lt}_{x \rightarrow \infty} \frac{(2x-1)^{30}(3x-1)^{30}}{(2x+4)^{60}}$

2 MARKS QUESTIONS

(Application)

1. Evaluate : $\text{Lt}_{x \rightarrow 2} \frac{x^2 - 4x + 3}{x^2 - 2x - 3}$

3. Evaluate : $\text{Lt}_{x \rightarrow 2} \frac{3x^2 - x - 10}{x^2 - 4}$

5. Evaluate : $\text{Lt}_{x \rightarrow 2} \frac{x^2 - 4}{x\sqrt{x} - 2\sqrt{2}}$

7. Evaluate : $\text{Lt}_{x \rightarrow 1} \frac{\sqrt{x+3} - 2}{x-1}$

9. Evaluate : $\text{Lt}_{x \rightarrow -2} \frac{\frac{1}{x} + \frac{1}{2}}{x+2}$

11. Evaluate : $\text{Lt}_{x \rightarrow 2} \frac{x^5\sqrt{x} - 32\sqrt{2}}{x^3\sqrt{x} - 8\sqrt{2}}$

2. Evaluate : $\text{Lt}_{x \rightarrow 2} \frac{2x^2 - 5x + 2}{x^2 - 3x + 2}$

4. Evaluate : $\text{Lt}_{x \rightarrow 3} \frac{x^4 - 81}{2x^2 - 5x - 3}$

6. Evaluate : $\text{Lt}_{x \rightarrow 0} \frac{\sqrt{1+x} - \sqrt{1-x}}{x}$

8. Evaluate : $\text{Lt}_{x \rightarrow a} \frac{x^{\frac{3}{8}} - a^{\frac{3}{8}}}{x^{\frac{1}{3}} - a^{\frac{1}{3}}}$

10. Evaluate : $\text{Lt}_{x \rightarrow 0} \frac{(x+1)^5 - 1}{x}$

12. Evaluate : $\text{Lt}_{x \rightarrow 2} \frac{x^{\frac{5}{2}} - 2^{\frac{5}{2}}}{x^{\frac{3}{2}} - 2^{\frac{3}{2}}}$

BASIC MATHEMATICS

13. Evaluate : $\text{Lt}_{x \rightarrow 0} \frac{\sqrt{2-x} - \sqrt{2+x}}{x}$

14. Evaluate : $\text{Lt}_{x \rightarrow 0} \frac{\cos^2 x}{1 - \sin x}$

15. Evaluate : $\text{Lt}_{x \rightarrow 0} \frac{ax + x \cos x}{b \sin x}$

16. Evaluate : $\text{Lt}_{x \rightarrow 0} \frac{\sin 3x + 7x}{4x + \sin 2x}$

17. Evaluate : $\text{Lt}_{x \rightarrow 0} \frac{3^x - 2^x}{x}$

18. Evaluate : $\text{Lt}_{x \rightarrow 0} \frac{3^{2x} - 1}{2^{3x} - 1}$

19. Evaluate : $\text{Lt}_{x \rightarrow 0} \frac{\log x}{x-1}$

20. Evaluate : $\text{Lt}_{x \rightarrow 0} \frac{9^x + 9^{-x} - 2}{x^2}$

21. Evaluate : $\text{Lt}_{x \rightarrow 0} \frac{3^{2x} - 2^{3x}}{x}$

22. Evaluate : $\text{Lt}_{x \rightarrow 0} \frac{3^{2+x} - 9}{x}$

23. Evaluate : $\text{Lt}_{n \rightarrow \infty} \frac{1+2+3+\dots+n}{n^2+3}$

24. Evaluate : $\text{Lt}_{n \rightarrow \infty} \frac{\sum n^2}{(n^2+2n+1)(n-1)}$

25. Evaluate : $\text{Lt}_{n \rightarrow \infty} \frac{\sum n^3}{n^2 \cdot \sum n}$

26. find k if $f(x) = \begin{cases} \frac{e^{5x}-1}{2x} & x \neq 0 \\ \frac{k+x}{2} & x = 0 \end{cases}$ is continuous at $x = 0$.

27. If $f(x) = \begin{cases} \frac{x^4-256}{x-4} & x \neq 4 \\ a & x = 4 \end{cases}$ is continuous at $x = 4$ find a .

28. Show that $f(x) = \begin{cases} \frac{x^2-25}{x-5} & x \neq 5 \\ 10 & x = 5 \end{cases}$ is continuous at $x = 5$.

29. Show that $f(x) = \begin{cases} \frac{x^2-9}{x-3} & x \neq 3 \\ 4 & x = 3 \end{cases}$ is continuous at $x = 3$.

QUESTION BANK**II PUC**

30. Show that $f(x) = \begin{cases} (1+3x)^{\frac{1}{x}} & x \neq 0 \\ e^3 & x = 0 \end{cases}$ is continuous at $x = 0$.

31. Find k for which $f(x) = \begin{cases} k+x & x=1 \\ 4x+3 & x \neq 1 \end{cases}$ is continuous at $x = 1$.

32. If function $f(x) = \begin{cases} (1+2x)^{\frac{1}{x}} & x \neq 0 \\ k & x = 0 \end{cases}$ is continuous at $x = 0$ find k .

33. Find k if $f(x) = \begin{cases} \frac{e^{2x}-1}{x} & x \neq 0 \\ k & x = 0 \end{cases}$ is continuous at $x = 0$.

6 MARK QUESTIONS**(Knowledge)**

1. Prove that $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$ where θ is in radians and hence deduce that $\lim_{\theta \rightarrow 0} \frac{\tan \theta}{\theta} = 1$.
2. Prove that $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = n a^{n-1}$ for all rationals (n is positive, negative and fraction).
