विद्या ददाति विनयम्
Knowledge is Discipline

BJNP

Learning with the Speed of Mumbai and the Tradition of Kota

Max. Marks: 100 **Date: 27.11.2022**

ABHIMANYU BATCH

MATHEMATICS : REVISION TEST 4 (SET B)

Topics: Limits, Function and Continuity

1. $\lim_{x\to 0} \frac{\cos(mx) - \cos(nx)}{x^2} =$

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

2. $\lim_{x\to 1} \left[\frac{\sqrt{x} - 1}{\log x}\right] =$

(a) -2 (b) $-\frac{1}{2}$ (c) 2 (d) $\frac{1}{2}$

3. $\lim_{x\to 0} \frac{\sqrt{1 - \cos x^2}}{1 - \cos x} =$

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

4. $\lim_{x\to 1} \frac{ab^x - a^x b}{x^2 - 1} =$

(a) $\frac{-ab}{2}\log\left(\frac{b}{a}\right)$ (b) $\frac{ab}{2}\log\left(\frac{b}{a}\right)$ (c) $ab\log\left(\frac{b}{a}\right)$ (d) $-ab\log\left(\frac{b}{a}\right)$

5. If $\lim_{x\to 3} \frac{x^k - 3^k}{x - 3} = 405$, then k is

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

Space for Rough Work

6. If $f(x) = \begin{cases} x + \frac{2}{3} & , \text{ for } x > \frac{1}{3} \\ 0 & , \text{ for } x = \frac{1}{3} \\ 3x & , \text{ for } x < \frac{1}{3} \end{cases}$, then

$\lim_{x \to (1/3)} f(x)$ is

(a) 0 (b) 1 (c) 3 (d) does not exist

7. $\lim_{x \to 4} [x] =$

where [.] is the greatest integer function.

(a) 3 (b) 4 (c) 0 (d) does not exit

8. $\lim_{x \to 3} \frac{[x] + |x - 3|}{x^2 + 5x} =$

where [.] is the greatest integer function.

(a) $\frac{1}{8}$ (b) $\frac{1}{12}$ (c) 0 (d) done not exist

9. If $f(x) = \begin{cases} 3x - 8, & \text{if } x \le 4 \\ k - 2x, & \text{if } x > 4 \end{cases}$

and $\lim_{x \to 4} f(x)$ exists, then $\frac{k}{3}$ is

(a) 12 (b) 6 (c) 4 (d) 2

10. $\lim_{x \to 1} \left[\frac{x + 2}{x^2 - 5x + 4} + \frac{x - 4}{3(x^2 - 3x + 2)} \right] =$

(a) 0 (b) 1 (c) 2 (d) –1

Space for Rough Work

11. $\lim_{x \to \frac{\pi}{4}} \frac{\sqrt{2} - \cos\theta - \sin\theta}{(4\theta - \pi)^2} =$

(a) $\frac{1}{4\sqrt{2}}$ (b) $\frac{1}{8\sqrt{2}}$ (c) $\frac{1}{16\sqrt{2}}$ (d) $\frac{1}{32\sqrt{2}}$

12. If β is the repeated root of the equation $ax^2 + bx + c = 0$, then

$\lim_{x \to \beta} \frac{\sin(ax^2 + bx + c)}{(x - \beta)^2} =$

(a) β (b) $\alpha - \beta$ (c) a (d) $a + b + c$

13. $\lim_{x \to 0} \left(\frac{a^x + b^x + c^x}{3} \right)^{4/x} = \ldots$ (a, b, c > 0)

(a) abc (b) $a^4b^4c^4$ (c) $(abc)^{4/3}$ (d) $(abc)^{3/4}$

14. $\lim_{n \to \infty} \left(\frac{n+6}{n+1} \right)^{n+4} = \ldots.$

(a) e (b) e^2 (c) e^5 (d) e^6

15. If then function $f(x) = \begin{cases} \frac{2^{x+2} - 16}{4^x - 16}, & x \neq 2 \\ k/2, & x = 2 \end{cases}$ is continuous at x = 2, then k =

(a) $\frac{1}{2}$ (b) 1 (c) 2 (d) $\frac{1}{4}$

16. If the function

Space for Rough Work

$$f(x) = \begin{cases} \left(\dfrac{4x+1}{1-4x}\right)^{1/x}, & x \neq 0 \\ e^k, & x = 0 \end{cases}$$

is continuous at x = 0, then k =

(a) –8 (b) 8 (c) 4 (d) 16

17. If the function

$$f(x) = \begin{cases} \dfrac{(e^{kx} - 1)\tan kx}{4x^2}, & x \neq 0 \\ 16, & x = 0 \end{cases}$$

is continuous at x = 0, then k =

(a) $\pm\dfrac{1}{8}$ (b) ±4 (c) ±2 (d) ±8

18. If the function

$$f(x) = \frac{\log(1+ax) - \log(1-bx)}{x}, \ x \neq 0$$

is continuous at x = 0, then f(0) is

(a) log a – log b (b) a + b (c) log a + log b (d) a – b

19. Which of the following function is not continuous at x = 0?

Space for Rough Work

(a) $f(x) = \begin{cases} (1+2x)^{1/x}, & x \neq 0 \\ e^2, & x \neq 0 \end{cases}$

(b) $f(x) = \begin{cases} \sin x - \cos x, & x \neq 0 \\ -1, & x = 0 \end{cases}$

(c) $f(x) = \begin{cases} \dfrac{e^{1/x} - 1}{e^{1/x} + 1}, & x \neq 0 \\ -1, & x = 0 \end{cases}$

(d) $f(x) = \begin{cases} \dfrac{e^{5x} - e^{2x}}{\sin 3x}, & x \neq 0 \\ 1, & x = 0 \end{cases}$

20. If the function $f(x) = (x+1)^{\cot x}$, $x \neq 0$ is continuous at x = 0, then f(0) is

(a) $\dfrac{1}{e^3}$ (b) $\dfrac{1}{e}$ (c) $\dfrac{1}{e^2}$ (d) e

21. If the function $f(x) = \dfrac{(1-\cos 5x)\sin 5x}{x^2 \sin 3x}$,

$x \neq 0$ is continuous at x = 0, then f(0) is

(a) $\dfrac{375}{2}$ (b) $\dfrac{125}{3}$ (c) $\dfrac{125}{6}$ (d) $\dfrac{25}{3}$

22. If the function

$$f(x) = \begin{cases} \left[\tan\left(\dfrac{\pi}{4} + x\right)\right]^{1/x}, & x \neq 0 \\ e^{h+1}, & x = 0 \end{cases}$$

is continuous at x = 0, then k is

(a) –1 (b) 1 (c) –2 (d) 2

23. If $f(x) = \begin{cases} \dfrac{8^x - 2^x}{k^x - 1}, & \text{for } x \neq 0 \\ 2, & \text{for } x = 0 \end{cases}$

Space for Rough Work

is continuous at x = 0, then k =

(a) –2 (b) 2 (c) 0 (d) ± 2

24. If the function

$$f(x) = \begin{cases} \dfrac{1+\sin x-\cos x}{1-\sin x-\cos x}, & x \neq 0 \\ k, & x = 0 \end{cases}$$

is continuous at x = 0, then k =

(a) –1 (b) 1 (c) 2 (d) 0

25. If $f(x) = \dfrac{\sqrt{2}-\sqrt{1+\sin x}}{\cos^2 x}, x \neq \dfrac{\pi}{2}$

is continuous at $x = \dfrac{\pi}{2}$, then $f\left(\dfrac{\pi}{2}\right)$ is …

(a) $\sqrt{2}$ (b) $\dfrac{1}{4\sqrt{2}}$ (c) $\dfrac{1}{2\sqrt{2}}$ (d) $\dfrac{1}{\sqrt{2}}$

26. If $f(x) = \begin{cases} \dfrac{(e^{3x}-1)\sin x^\circ}{x^2}, & x \neq 0 \\ \dfrac{\pi}{60}, & x = 0 \end{cases}$

(a) f has removable discontinuity at x = 0 (b) f has irremovable discontinuity at x = 0

(c) $\lim\limits_{x\to 0} f(x) = 3$ (d) f is continuous at x = 0

27. If $f(x) = \begin{cases} \dfrac{4\sin \pi x}{5x}, & \text{for } x \neq 0 \\ 2k, & \text{for } x = 0 \end{cases}$

is continuous at x = 0, then value of k is

Space for Rough Work

(a) $\frac{4\pi}{5}$ (b) $\frac{2\pi}{5}$ (c) $\frac{\pi}{10}$ (d) $\frac{\pi}{5}$

28. If f(x) is continuous at x = a, where

$$f(x) = \frac{\sqrt{x} - \sqrt{a} + \sqrt{x-a}}{\sqrt{x^2 - a^2}} \text{ for } x \neq a,$$

then f(a) =

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

29. The function $f(x) = \frac{x+1}{9x + x^3}$ is =

(a) discontinuous at exactly one point (b) discontinuous at exactly two points

(c) continuous for all values of x (d) discontinuous at exactly three points

30. If the function

$$f(x) = \begin{cases} \frac{\cos ax - \cos bx}{\cos cx - \cos bx}, & x \neq 0 \\ -1, & x = 0 \end{cases}$$

is continuous at x = 0, the a^2, b^2, c^2 are in

(a) G.P. (b) A.P. (c) H.P. (d) None of the above

31. If f(x) = 3x + 6, g(x) = 4x + k and fog(x) = gof (x), then k =

(a) –9 (b) 18 (c) $\frac{1}{9}$ (d) 9

32. The domain of the function

Space for Rough Work

$f(x) = \sqrt{\sin x} + \sqrt{16 - x^2}$ is

(a) $[-4, \pi]$ (b) $[-4, 0) \cup (0, \pi]$ (c) $[-4, -\pi] \cup [0, \pi]$ (d) $(-4, 4)$

33. Which of the following is an even function?

(a) $f(x) = 3 \cos x + 4$ (b) $f(x) = 2 \sin x + 3$ (c) $f(x) = x^2 + x$ (d) $f(x) = x^2 \sin x$

34. Which of the following function has period 2?

(a) $\cos(\pi x)$ (b) $\cos(2\pi x)$ (c) $\cos\left[\left(\frac{\pi}{2}\right)x\right]$ (d) $\cos\left[\left(\frac{\pi}{3}\right)x\right]$

35. The domain of the real valued function

$f(x) = \sqrt{\frac{x-2}{3-x}}$ is

(a) $[2, 3]$ (b) $(2, 3]$ (c) $(2, 3)$ (d) $[2, 3)$

36. If $f(x) = 3x - 2$ and $g(x) = x^2$, then $fog(x) =$

(a) $3x^2 - 2$ (b) $3x^2 + 2$ (c) $3x - 2$ (d) $2 - 3x^2$

37. Function $f : R \to R$ defined by $f(x) = x^2 + 5$ is

(a) one-one and into (b) many-one and into

(c) many-one and onto (d) one-one and onto

38. The range of function $f(x) = \sin x + \operatorname{cosec} x$ is

(a) $[-1, 1]$ (b) $R - [-2, 2]$ (c) $R - (2, 2)$ (d) $(-1, 1)$

39. Function $f: N \to N$ defined by $f(x) = x - 1; x > 1$ is

(a) one-one and into (b) many-one and into (c) one-one and onto (d) many-one and onto

40. If $f(x) = x^2 + bx + c$ and $f(1) = 9$, $f(3) = 27$, then $b =$

(a) -5 (b) 5 (c) 3 (d) -3

Space for Rough Work

41. If $f(x) = x^2 + 1$, then $f[f(x)] =$

(a) $x^4 + x^2 + 2$ (b) $x^4 + 2x^2 + 2$ (c) $x^4 - x^2 - 2$ (d) $x^4 + 1$

42. The range of the function

$f(x) = \dfrac{1}{\sqrt{x^2 - 9}}, x \in (3, \infty)$ is

(a) $(-3, 3)$ (b) $(0, \infty)$ (c) $[-3, 3]$ (d) $(3, \infty)$

43. If $f(x) = x^4 - \dfrac{1}{x^4}$, then $f(x) + f\left(\dfrac{1}{x}\right) =$

(a) 4 (b) 0 (c) 2 (d) 16

44. If $f : R \to R$ is given by $f(x) = 7x + 8$ and

$f^{-1}(12) = \dfrac{k}{7}$, then the value of k is

(a) 7 (b) 1 (c) 8 (d) 4

45. If a function $f : R \to R$ is defined by

$f(x) = \left(\dfrac{4x}{5}\right) + 3$, then $f^{-1}(x) =$

(a) $\dfrac{5(x+3)}{4}$ (b) $\dfrac{4(x+3)}{5}$ (c) $\dfrac{4(x-3)}{5}$ (d) $\dfrac{5(x-3)}{4}$

46. If $f(x) = \dfrac{x}{2x+1}$, $g(x) = \dfrac{x}{1-x}$,

then $(fog)(x) =$

(a) $\dfrac{2x-1}{x+1}$ (b) $\dfrac{x-1}{2x+1}$ (c) $\dfrac{x+1}{x+2}$ (d) $\dfrac{x}{x+1}$

Space for Rough Work

47. Range of the function $f(x) = 3 + 2^x + 4^x$ is

(a) $[3, \infty)$ (b) $(-\infty, 3]$ (c) $(3, \infty)$ (d) $(-\infty, \infty)$

48. If $\lim_{x \to 5} \frac{x^k - 5^k}{x - 5} = 500$, then the value of k,

where $k \in N$ is

(a) 6 (b) 4 (c) 3 (d) 5

49. $\lim_{x \to 1} \frac{(2x - 3)(\sqrt{x} - 1)}{2x^2 + x - 3} =$

(a) $\frac{1}{10}$ (b) $\frac{-1}{5}$ (c) $\frac{1}{5}$ (d) $\frac{-1}{10}$

50. $\lim_{x \to 2} (x - 1)^{\frac{1}{3x-6}} =$

(a) $e^{1/3}$ (b) e^2 (c) $e^{1/2}$ (d) e^3

Space for Rough Work

विद्या ददाति विनयम्
Knowledge is Discipline
BJNP
Learning with the Speed of Mumbai and the Tradition of Kota

Max. Marks: 100 **Date: 27.11.2022**

ABHIMANYU BATCH

MATHEMATICS : REVISION TEST 4 (SET B)

Topics: Limits, Function and Continuity

Answer Key

1.	(b)	2.	(d)	3.	(c)	4.	(b)	5.	(d)
6.	(b)	7.	(d)	8.	(b)	9.	(c)	10.	(a)
11.	(c)	12.	(c)	13.	(c)	14.	(c)	15.	(b)
16.	(b)	17.	(d)	18.	(b)	19.	(c)	20.	(d)
21.	(c)	22.	(b)	23.	(b)	24.	(b)	25.	(b)
26.	(d)	27.	(b)	28.	(a)	29.	(a)	30.	(b)
31.	(d)	32.	(c)	33.	(a)	34.	(a)	35.	(d)
36.	(a)	37.	(b)	38.	(c)	39.	(c)	40.	(b)
41.	(b)	42.	(b)	43.	(b)	44.	(d)	45.	(d)
46.	(d)	47.	(c)	48.	(b)	49.	(d)	50.	(a)