CTQ - 2023

CTQ : Concept Through Questions **Year : 2023**

Topic : Function

1. The domain of the function f(x)=$\frac{\sin^{-1}(x-3)}{\sqrt{9-x^2}}$, is
   (a) [1,2) (b) [2,3)
   (c) [1,2] (d) [2,3] Video solution
2. Let f:R→R be a function defined by f(x) = $\frac{x^2-8}{x^2+2}$ Then, f is
   (a) One-one but not onto
   (b) One-one and onto
   (c) Onto but not one-one
   (d) Neither one-one nor onto Video solution
3. If f(x)=$2x^4 - 13x^2 + ax + b$ is divisible by $x^2 - 3x + 2$, then (a,b) is equal to
   (a) (-9,-2) (b) (6, 4
   (c) (9, 2) (d) (2, 9) Video solution
4. If $f: R \to R$ satisfies $f(x + y) = f(x) + f(y)$, for all $x, y \in R$ and $f(1) = 7$, then $\sum_{r=1}^{n} f(r)$ is
   (a) $\frac{7n}{2}$ (b) $\frac{7(n+1)}{2}$
   (c) 7n(n+1) (d) $\frac{7n(n+1)}{2}$ Video solution
5. The domain of definition of the function $f(x) = \frac{1}{\sqrt{|x|-x}}$,is
   (a) R (b) (0,∞)
   (c) (-∞,0) (d) one of these Video solution
6. Let $f: R \to R$ and $g: R \to R$ be given by $f(x) = 3x^2 + 2$ and $g(x) = 3x - 1$ for all x∈R. Then,
   (a) $fog(x) = 27x^2 - 18x + 5$ (b) $fog(x) = 27x^2 + 18x - 5$
   (c) $gof\ (x) = 9x^2 - 5$ (d) $gof\ (x) = 9x^2 + 15$ Video solution
7. The domain of the function $f(x) = \log_{3+x}(x^2 - 1)$ is
   (a) (-3,-1)∪(1,∞) (b) [-3,-1]∪[1,∞]
   (c) (-3,-2)∪(-2,-1)∪(1,∞) (d) [-3,-2)∪(-2,-1)∪(1,∞) Video solution
8. Let A be a set containing 10 distinct elements, then the total number of distinct function from A to A is
   (a) 10^{10} (b) 101
   (c) 2^{10} (d) $2^{10} - 1$ Video solution
9. If $f(x) = \frac{2x-1}{x+5}(x \neq -5)$, then $f^{-1}(x)$ is equal to
   (a) $\frac{x+5}{2x-1}, x \neq \frac{1}{2}$ (b) $\frac{5x+1}{2-x}, x \neq 2$
   (c) $\frac{x-5}{2x+1}, x \neq 1/2$ (d) $\frac{5x-1}{2-x}, x \neq 2$ Video solution
10. Which of the following functions is (are) not an injective map(s)?
    (a) $f(x) = |x + 1|, x \in [-1, \infty)$

(b) $g(x) = x + 1/x, x \in (0, \infty)$
(c) $h(x) = x\text{^}2 + 4\,x - 5, x \in (0, \infty)$
(d) $k(x) = e\text{^}(-x), x \in [0, \infty)$ Video solution

11. If f:R→R defined by $f(x) = x^3$, then $f^{-1}(8)$ is equal to
(a) {2} (b) $\{2, \omega, 2\omega^2\}$
(c) {2,-2} (d) {2, 2} Video solution

12. If $g(x) = 1 + \sqrt{x}$ and $f(g(x)) = 3 + 2\sqrt{x} + x$ then, $f(x)$ is equal to
(a) $1 + 2x^2$ (b) $2 + x^2$
(c) 1+x (d) 2+x Video solution

13. The period of the function $f(\theta) = \sin\frac{\theta}{3} + \cos\frac{\theta}{2}$ is
(a) 3π (b) 6π
(c) 9π (d) 12π Video solution

14. Which of the following functions is periodic?
(a) $f(x) = x + \sin x$ (b) $f(x) = cos\ \sqrt{x}$
(c) $f(x) = \cos x^2$ (d) $f(x) = \cos^2 x$ Video solution

15. Which of the following functions has period 2π?
(a) $f(x) = \sin\left(2\,\pi\,x + \frac{\pi}{3}\right) + 2\sin\left(3\,\pi\,x + \frac{\pi}{4}\right) + 3\sin 5\,\pi\,x$
(b) $f(x) = \sin\frac{\pi\,x}{3} + \sin\frac{\pi\,x}{4}$
(c) $f(x) = \sin x + \cos 2\,x$
(d) None of these Video solution

16. The range of the function $f(x) = {}^{7-x}P_{x-3}$, is
(a) {1,2,3} (b) {1,2,3,4,5,6}
(c) {1,2,3,4} (d) {1,2,3,4,5} Video solution

17. If $f: R \to S$, defined by $f(x) = \sin x - \sqrt{3}\cos x - 1$, is onto, then the interval of s is
(a) [0, 3] (b) [-1, 1]
(c) [0, 1] (d) [-1, 3] Video solution

18. If $f(x)$ is defined on [0,1], then the domain of $f(3x^2)$, is
(a) $\left[0, \frac{1}{\sqrt{3}}\right]$ (b) $\left[-\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right]$
(c) $\left[-\sqrt{3}, \sqrt{3}\right]$ (d) None of these Video solution

19. If [x] denotes the greatest integer ≤x, then $\left[\frac{2}{3}\right] + \left[\frac{2}{3} + \frac{1}{99}\right] + \left[\frac{2}{3} + \frac{2}{99}\right] + \cdots + \left[\frac{2}{3} + \frac{98}{99}\right]$ is equal to
(a) 99 (b) 98
(c) 66 (d) 65 Video solution

20. Let $f: N \to N$ defined by $f(x) = x^2 + x + 1, x \in N$, then f is
(a) One-one onto (b) Many-one onto
(c) One -one but not onto (d) None of these Video solution

21. The range of function $f(x) = x^2 + \frac{1}{x^2+1}$
(a) [1,∞) (b) [2,∞)
(c) $\left[\frac{3}{2}, \infty\right)$ (d) None of these Video solution

22. The range of the function $\sin(\sin^{-1} x + \cos^{-1} x), |x| \leq 1$ is
    (a) [-1, 1] (b) [1, -1]
    (c) {0} (d) {1} Video solution

23. If $f(x) = \frac{\sin^4 x + \cos^2 x}{\sin^2 x + \cos^4 x}$ for x∈R, then $f(2010) =$
    (a) 1 (b) 2
    (c) 3 (d) 4 Video solution

24. If $X = \{1,2,3,4\}$, then one-one onto mappings f:X→X such that $f(1) = 1, f(2) \neq 2, f(4) \neq 4$ are given by
    (a) $f = \{(1,1), (2,3), (3,4), (4,2)\}$
    (b) $f = \{(1,2), (2,4), (3,3), (4,2)\}$
    (c) $f = \{(1,2), (2,4), (3,2), (4,3)\}$
    (d) None of these Video solution

25. Let $f: [4, \infty[\rightarrow [4, \infty[$ be defined by $f(x) = 5^{x(x-4)}$ then $f^{-1}(x)$
    (a) $2 - \sqrt{4 + \log_5 x}$ (b) $2 + \sqrt{4 + \log_5 x}$
    (c) $\left(\frac{1}{5}\right)^{x(x-4)}$ (d) Not defined Video solution

26. Number of onto (surjective) functions from A to B if n(A)=6 and n(B)=3, is
    (a) $2^6 - 2$ (b) $3^6 - 3$
    (c) 340 (d) 540 Video solution
    [NIMCET 2019]

27. Which of the following functions is the inverse of itself?
    (a) $f(x) = \frac{(1-x)}{1+x}$ (b) $f(x) = 3^{logx}$
    (c) $f(x) = 3^{x(x+1)}$ (d) None of these Video solution
    [NIMCET 2018]

28. The function $f(x) = \log\left(x + \sqrt{x^2 + 1}\right)$ is
    (a) An even function
    (b) An odd function
    (c) A periodic function
    (d) Neither an even nor an odd function Video solution
    [NIMCET 2018]

29. If the graph of $y = (x - 2)^2 - 3$ is shifted by 5 units up along y-axis and 2 units to the right along the x-axis, then the equation of the resultant graph is
    (a) $y = x^2 + 2$ (b) $y = (x - 2)^2 + 5$
    (c) $y = (x + 2)^2 + 2$ (d) $y = (x - 4)^2 + 2$ Video solution
    [NIMCET 2017]

30. The number of elements in the power set P(S) of the set S = {2,(1,4)} is
    (a) 2 (b) 4
    (c) 8 (d) 10 Video solution
    [NIMCET 2017]

31. The number of one-to-one function from {1, 2, 3} to {1, 2, 3, 4, 5} is
    (a) 125 (b) 243
    (c) 10 (d) 60 Video solution

[NIMCET 2015]

32. Set A has 3 elements and set B has 4 elements. The number of injection that can be defined from A to B is:
(a) 144 (b) 12
(c) 24 (d) 64 Video solution

[NIMCET 2010]

33. The total number of relations that exist from the set A with m elements into the set A × A is :
(a) m^2 (b) m^3
(c) m (d) None of these Video solution

[NIMCET 2009]

34. If $f(x) + f(1-x) = 2$, then the value of $f\left(\frac{1}{2001}\right) + f\left(\frac{2}{2001}\right) + \cdots . + f\left(\frac{2000}{2001}\right)$ is:
(a) 2000 (b) 2001
(c) 1999 (d) 1998 Video solution

[NIMCET 2008]

35. If f(x) is a polynomial satisfying $f(x)f\left(\frac{1}{x}\right) = f(x) + f\left(\frac{1}{x}\right)$ and f(3) = 28, then f(4) is given by :
(a) 63 (b) 65
(c) 67 (d) 68 Video solution

[NIMCET 2008]

36. The number of functions f from the set A = {0, 1, 2} into the set B = {0, 1, 2, 3, 4, 5, 6, 7} such that $f(i) \leq f(j)$ for i < j and i, j ∈ A is:
(a) ${}^8C_3$ (b) ${}^8C\ \ 3+{}^{28}C_2$
(c) ${}^{10}C_3$ (d) None of these Video solution

[NIMCET 2008]

Answer Key

Ques.	1	2	3	4	5	6	7	8	9	10
Ans.	B	D	C	D	C	A	C	A	B	B
Ques.	11	12	13	14	15	16	17	18	19	20
Ans.	A	B	D	D	C	A	D	B	C	C
Ques.	21	22	23	24	25	26	27	28	29	30
Ans.	A	D	A	A	B	D	A	B	D	B
Ques.	31	32	33	34	35	36				
Ans.	D	C	D	A	B	C				