Exam Code

Class 12 Relation and Function Test 4

Test Booklet Code

1. Let $f(n)=\left[\frac{1}{4}+\frac{n}{100}\right]n$, where $[x]$ is greater integer function, then $\sum_{n=1}^{76} f(n)$ is equal to

(a) 75
(b) 0
(c) 151
(d) 2

2. If $f(x)+2f\left(\frac{1}{x}\right)=3x, x\neq 0$ and $S=\{x\in R: f(x)=f(-x)\}$ then

(a) $n(S)=2$
(b) $n(S)>2$
(c) $n(S)=1$
(d) $S=\phi$

3. Range of the function $f: W\to W f(x)=x-5\left[\frac{x}{5}\right]$, where $[x]$ is greater integer function, is

(a) W
(b) N
(c) $\{1,2,3,4,5\}$
(d) $\{0,1,2,3,4\}$

4. If $f(x)=\log\left(\frac{1-x}{1+x}\right), |x|<1$ then $f\left(\frac{2x}{1+x^2}\right)$ is equal to

(a) $(f(x))^2$
(b) $2f(x)$
(c) $-2f(x)$
(d) $2f\left(x^2\right)$

5. For $x\in R-\{-1,1\}$, range of the function $f(x)=\frac{x^2}{1-x^2}$ is

(a) $R-\{-1\}$
(b) $R-(-1,0)$
(c) $[0,\infty)$
(d) $R-[-1,0)$

6. Domain of the function $f(x)=\frac{1}{4-x^2}+\log_{10}\left(x^3-x\right)$ is

(a) $(-1,0)\cup(1,2)\cup(2,\infty)$
(b) $(1,2)\cup(2,\infty)$
(c) $(-1,0)\cup(1,2)\cup(3,\infty)$
(d) $(-2,-1)\cup(-1,0)\cup(2,\infty)$

7. For $x\in R$, $[x]$ is greatest integer function then $\left[\frac{-1}{3}\right]+\left[\frac{-1}{3}-\frac{1}{100}\right]+\left[-\frac{1}{3}-\frac{2}{100}\right]+\cdots+\left[-\frac{1}{3}-\frac{99}{100}\right]$ is equal to

(a) -135
(b) -131
(c) -153
(d) -133

8. Range of the function $f: N\to N, f(n)=\begin{cases}\frac{n+1}{2} \text{ when } n \text{ is odd}\\ \frac{n}{2} \text{ when } n \text{ is even}\end{cases}$ is

(a) W
(b) N
(c) R_0
(d) Q

9. Range of the function $f(x)=\frac{x}{1+x^2}$ is

(a) $R-[-1,1]$
(b) $(-1,1)-\{0\}$
(c) $R-\left[\frac{-1}{2},\frac{1}{2}\right]$
(d) $\left[\frac{-1}{2},\frac{1}{2}\right]$

10. Range of the function $f: R^+\to R, f(x)=\left|1-\frac{1}{x}\right|$ is

(a) $(-\infty,-1)$
(b) $(-\infty,1)$
(c) $(1,\infty)$
(d) $(0,\infty)$

11. $f(x) = a^x$ is written as $f(x) = f_1(x) + f_2(x)$ where $f_1(x)$ is even function $\& f_2(x)$ is odd function then $f_1(0)$ is equal to

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

12. Domain of the function $f(x) = \dfrac{1}{\sqrt{|x| - x}}$ is

(a) $\mathbf{R}$
(b) $\mathbf{R_0}$
(c) $\mathbf{R^+}$
(d) $\mathbf{R^-}$

13. Which of these relations is not a function.

(a) $R = \left\{(x, y) : y = \dfrac{1}{x}, x \in R_0\right\}$
(b) $R = \{(x, y) : x = |y|, x, y \in R\}$
(c) $R = \{(x, y) : |x + y| = 10, x, y \in R^+\}$
(d) $R = \{(x, y) : x^2 = y^2, x, y < 0\}$

14. The domain of the function $f(x) = \dfrac{1}{\sqrt{x - [x]}}$ is

(a) R^+
(b) $R - I$
(c) R_0
(d) $R_0 - I$

15. Find the domain of definition of $f(x) = \dfrac{\log_2(x + 3)}{x^2 + 3x + 2}$

(a) $(-3, \infty)$
(b) $\{-1, -2\}$
(c) $(-3, \infty) - \{-1, -2\}$
(d) $(-\infty, \infty)$

16. The domain of definition of the function $y(x)$ given by $2^x + 2^y = 2$ is

(a) $(0, 1]$
(b) $[0, 1]$
(c) $(-\infty, 0]$
(d) $(-\infty, 1)$

17. The domain of the function $f(x) = \log_{3+x}(x^2 - 1)$ is

(a) $(-3, -1) \cup (1, \infty)$
(b) $[-3, -1) \cup [1, \infty)$
(c) $(-3, -2) \cup (-2, -1) \cup (1, \infty)$
(d) $[-3, -2) \cup (-2, -1) \cup [1, \infty]$

18. Range of the function {tex} f (x) = \frac { x ^ { 2 } + x + 2 } { x ^ { 2 } + x + 1 } {/tex} is

(a) x \in R
(b) $(1, \infty)$
(c) $(1, 11/7)$
(d) $(1, 7/3]$

19. Which of the following is an even function

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

20. Domain of $\mathbf{f(x)} = \sqrt{2\{x\}^2 - 3\{x\} + 1}$ where $\{.\}$ denotes the fractional part, in $[-1, 1]$, is

(a) $[-1, 1] \sim \left(\dfrac{1}{2}, 1\right)$
(b) $\left[-1, -\dfrac{1}{2}\right] \cup \left[0, \dfrac{1}{2}\right] \cup \{1\}$
(c) $\left[-1, \dfrac{1}{2}\right]$
(d) $\left[-\dfrac{1}{2}, 1\right]$

21. If $f(x) =$ maximum $\left\{x^3, x^2, \dfrac{1}{64}\right\} \forall x \in [0, \infty)$, then

(a) $f(x) = \begin{cases} x^2, & 0 \le x \le 1 \\ x^3, & x > 1 \end{cases}$
(b) $f(x) = \begin{cases} \frac{1}{64}, & 0 \le x \le \frac{1}{4} \\ x^2, & \frac{1}{4} < x \le 1 \\ x^3, & x > 1 \end{cases}$
(c) $f(x) = \begin{cases} \frac{1}{64}, & 0 \le x \le \frac{1}{8} \\ x^2, & \frac{1}{8} < x \le 1 \\ x^3, & x > 1 \end{cases}$
(d) $f(x) = \begin{cases} \frac{1}{64}, & 0 \le x \le \frac{1}{8} \\ x^3, & x > 1/x \end{cases}$

22. If x satisfies $|x-1|+|x-2|+|x-3| \geq 6$, then

(a) $0 \leq x \leq 4$
(b) $x \leq -2$ or $x \geq 4$
(c) $x \leq 0$ or $x \geq 4$
(d) None of these

23. Complete solution set of the inequality $x\left(e^{x}-1\right)(x+2)(x-3)^{2} \leq 0$ is

(a) $[-2,3]$
(b) $(-2,0]$
(c) $(-\infty,-2] \cup \{0,3\}$
(d) $(-\infty,-2] \cup [0,3]$

24. The minimum value of $f(x)=|x-1|+|x-2|+|x-3|$ is equal to.

(a) 1
(b) 2
(c) 3
(d) Zero

25. $f: R \rightarrow R$, where $f(x)=\dfrac{x^{2}+a x+1}{x^{2}+x+1}$. Complete set of values of $'a'$ such that range of $f(x)$ is R.

(a) $(-\infty,\infty)$
(b) $(-\infty,0)$
(c) $(0,\infty)$
(d) None

26. If f is a function such that $f(0)=2, f(1)=3$ and $f(x+2)=2f(x)-f(x+1)$ for every real x then $f(5)$ is

(a) 7
(b) 13
(c) 1
(d) 5

27. $|x-3|+|x-1| \geq 3$, set of values of x satisfying the equation is

(a) $[4,\infty]$
(b) $(-\infty,0]$
(c) $\left(-\infty,\dfrac{1}{2}\right] \cup \left[\dfrac{7}{2},\infty\right)$
(d) $\left[\dfrac{7}{2},\infty\right)$

28. Period of the function $|\sin 2x|+|\cos 2x|$ is

(a) $\dfrac{\pi}{2}$
(b) π
(c) 2π
(d) $\dfrac{\pi}{4}$

29. The range of $f(x)=\sec\left(\dfrac{\pi}{4}\cos^{2} x\right), -\infty < x < \infty$ is

(a) $[1,\sqrt{2}]$
(b) $[1,\infty)$
(c) $[-\sqrt{2},-1] \cup [1,\sqrt{2}]$
(d) $(-\infty,-1] \cup [1,\infty)$

30. Period of $f(x)=x-[x+a]-b$, where $a, b \in R$ and $[.]$ denotes the greatest integer function, is

(a) a
(b) b
(c) $|a-b|$
(d) 1