DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 7**

Topic :- RELATIONS AND FUNCTIONS

1. The value of $n \in Z$ (the set of integers) for which the function $f(x) = \sin\frac{\sin nx}{\sin\left(\frac{x}{n}\right)}$ has 4π as its period is

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

2. The inverse of the function $f: R \to R$ given by $f(x) = \log_a\left(x + \sqrt{x^2+1}\right)(a > 0, a \neq 1)$, is

a) $\frac{1}{2}(a^x + a^{-x})$ b) $\frac{1}{2}(a^x - a^{-x})$ c) $\frac{1}{2}\left(\frac{a^x + a^{-x}}{a^x - a^{-x}}\right)$ d) Not defined

3. The domain of definition of the function

$f(x) = x \cdot \frac{1 + 2(x+4)^{-0.5}}{2 - (x+4)^{0.5}} + (x+4)^{0.5} + 4(x+4)^{0.5}$ is

a) R b) $(-4, 4)$ c) R^+ d) $(-4, 0) \cup (0, \infty)$

4. If $f(x) = \frac{\alpha x}{x+1}, x \neq -1$, for what value of α is $f[f(x)] = x$?

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

5. The period of the function $f(x) = \text{cosec}^2 3x + \cot 4x$ is

a) $\frac{\pi}{3}$ b) $\frac{\pi}{4}$ c) $\frac{\pi}{6}$ d) π

6. The domain of the definition of the function $f(x) = \sqrt{1 + \log_e(1-x)}$ is

a) $-\infty < x \leq 0$ b) $-\infty < x \leq \frac{e-1}{e}$ c) $-\infty < x \leq 1$ d) $x \geq 1 - e$

7. The range of the function $\sin\left(\sin^{-1}x + \cos^{-1}x\right), |x| \leq 1$ is

a) [-1, 1] b) [1, -1] c) {0} d) {1}

8. The range of $f(x) = \cos x - \sin x$ is

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

9. The range of function $f(x) = x^2 + \frac{1}{x^2+1}$

a) $[1, \infty)$ b) $[2, \infty)$ c) $\left[\frac{3}{2}, \infty\right)$ d) None of these

10. If n is an integer, the domain of the function $\sqrt{\sin 2x}$ is

a) $\left[n\pi - \frac{\pi}{2}, n\pi\right]$ b) $\left[n\pi, n\pi + \frac{\pi}{4}\right]$ c) $[(2n-1)\pi, 2n\pi]$ d) $[2n\pi, (2n+1)\pi]$

11. If $f: R \to R$ is defined by $f(x) = x - [x] - \frac{1}{2}$ for all $x \in R$, where $[x]$ denotes the greatest integer function, then $\left\{x \in R : f(x) = \frac{1}{2}\right\}$ is equal to

a) Z b) N c) ϕ d) R

12. Suppose $f: [-2, 2] \to R$ is defined by $f(x) = \begin{cases} -1, \text{ for } -2 \le x \le 0 \\ x - 1 \text{ for } 0 \le x \le 2 \end{cases}$, then $\{x \in [-2, 2] : x \le 0 \text{ and } f(|x|) = x\}$ is equal to

a) $\{-1\}$ b) $\{0\}$ c) $\left\{-\frac{1}{2}\right\}$ d) ϕ

13. If $f: R \to R$ is defined by $f(x) = \sin x$ and $g: (1, \infty) \to R$ is defined by $g(x) = \sqrt{x^2 - 1}$, then $gof(x)$ is

a) $\sqrt{\sin(x^2 - 1)}$ b) $\sin\sqrt{x^2 - 1}$ c) $\cos x$ d) Not defined

14. Let R and C denote the set of real numbers and complex numbers respectively. The function $f: C \to R$ defined by $f(z) = |z|$ is

a) One to one b) Onto

c) Bijective d) Neither one to one nor onto

15. If $f(x) = \frac{x-1}{x+1}$, then $f(2\,x)$ is

a) $\frac{f(x)+1}{f(x)+3}$ b) $\frac{3f(x)+1}{f(x)+3}$ c) $\frac{f(x)+3}{f(x)+1}$ d) $\frac{f(x)+3}{3f(x)+1}$

16. The range of the function $f(x) = \tan\sqrt{\frac{\pi^2}{9} - x^2}$ is

a) $[0, 3]$ b) $[0, \sqrt{3}]$ c) $(-\infty, \infty)$ d) None of these

17. The domain of the function $f(x) = \text{cosec}^{-1}[\sin x]$ in $[0, 2\,\pi]$, where $[\cdot]$ denotes the greatest integer function, is

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

18. Let R be the relation on the set R of all real numbers defined by aRb if $|a - b| \le 1$, then R is

a) Reflexive and symmetric b) Symmetric only

c) Transitive only d) Anti-symmetric only

19. The domain of the function $f(x) = \log_e(x - [x])$ is

a) R b) $R - Z$ c) $(0, +\infty)$ d) Z

20. If $f: [0, \infty] \to [0, \infty]$ and $f(x) = \frac{x}{1+x}$, then f is

a) One-one and onto b) One-one but not onto

c) Onto but not one-one d) Neither one-one nor onto