DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth **SUBJECT : MATHS**
DATE : **DPP NO. :6**

Topic :-RELATIONS AND FUNCTIONS

1. If $2f(x^2)+3f\left(\frac{1}{x^2}\right)=x^2-1$ for all $x \in R-\{0\}$, then $f(x^4)$ is

   a) $\frac{(1-x^4)(2x^4+3)}{5x^4}$ b) $\frac{(1+x^4)(2x^4-3)}{5x^4}$ c) $\frac{(1-x^4)(2x^4-3)}{5x^4}$ d) None of these

2. The domain of definition of the function $f(x)={}^{7-x}P_{x-3}$, is

   a) $[3, 7]$ b) $\{3, 4, 5, 6, 7\}$ c) $\{3, 4, 5\}$ d) None of these

3. Let $f(x)=x$ and $g(x)=|x|$ for all $x \in R$.Then, the function $\phi(x)$ satisfying $\{\phi(x)-f(x)\}^2+\{\phi(x)-g(x)\}^2=0$, is

   a) $\phi(x)=x, x \in [0, \infty)$
   b) $\phi(x)=x, x \in R$
   c) $\phi(x)=-x, x \in (-\infty, 0]$
   d) $\phi(x)=x+|x|, x \in R$

4. The value of the function $f(x)=3\sin\left(\sqrt{\frac{\pi^2}{16}-x^2}\right)$ lies in the interval

   a) $[-\pi/4, \pi/4]$ b) $[0, 3/\sqrt{2}]$ c) $(-3, 3)$ d) None of these

5. The period of the function $f(x)=|\sin x|+|\cos x|$ is

   a) π b) $\pi/2$ c) 2π d) None of these

6. If $f(x)=(ax^2+b)^3$, then the function g such that $f(g(x))=g(f(x))$ is given by

   a) $g(x)=\left(\frac{b-x^{1/3}}{a}\right)^{1/2}$ b) $g(x)=\frac{1}{(a\,x^2+b)^3}$ c) $g(x)=(a\,x^2+b)^{1/3}$ d) $g(x)=\left(\frac{x^{1/3}-b}{a}\right)^{1/2}$

7. Let R be the real line. Consider the following subsets of the plane $R \times R$

$S=\{(x, y): y=x+1 \text{ and } o<x<2\}$
$T=\{(x, y): x-y \text{ is an integer}\}$
Which of the following is true?

a) T is an equivalent relation on R but S is not b) Neither S nor T is an equivalence relation on R
c) Both S and T are equivalence relations on R d) S is an equivalence relations on R and T is not

8. Let $A=[-1, 1]$ and $f: A \to A$ be defined as $f(x)=x|x|$ for all $x \in A$, then $f(x)$ is

   a) Many-one into function b) One-one into function
   c) Many-one onto function d) One-one onto function

9. If $f(x)=\frac{1-x}{1+x}, x\neq 0,-1$ and $\alpha=f(f(x))+f\left(f\left(\frac{1}{x}\right)\right)$, then

a) $\alpha>2$ b) $\alpha<-2$ c) $|\alpha|>2$ d) $\alpha=2$

10. Let R and S be two non-void relations on a set A. Which of the following statements is false?

a) R and S are transitive implies $R\cap S$ is transitive.

b) R and S are transitive implies $R\cup S$ is transitive.

c) R and S are symmetric implies $R\cup S$ is symmetric.

d) R and S are reflexive implies $R\cap S$ is reflexive.

11. $A=\{1,2,3,4\}$, $B\{1,2,3,4,5,6\}$ are two sets, and function $f:A\to B$ is defined by $f(x)=x+2\ \forall x\in A$, then the function f is

a) Bijective b) Onto c) One-one d) Many-one

12. Let $f(x)=x+1$ and $\phi(x)=x-2$. Then the values of x satisfying $|f(x)+\phi(x)|=|f(x)|+|\phi(x)|$ are :

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

13. The domain of the function $f(x)=\frac{\sin^{-1}(3-x)}{\log_e(|x|-2)}$, is

a) $[2,4]$ b) $(2,3)\cup(3,4]$ c) $[2,3)$ d) $(-\infty,-3)\cup[2,\infty)$

14. If $f(x)=\frac{1}{\sqrt{|x|-x}}$ then, domain of $f(x)$ is

a) $(-\infty,0)$ b) $(-\infty,2)$ c) $(-\infty,\infty)$ d) None of the above

15. The domain of definition of $f(x)=\log_{10}\{(\log_{10}x)^2-5\log_{10}x+6\}$, is

a) $(0,10^2)$ b) $(10^3,\infty)$ c) $(10^2,10^3)$ d) $(0,10^2)\cup(10^3,\infty)$

16. If a function $f(x)$ satisfies the condition $f\left(x+\frac{1}{x}\right)=x^2+\frac{1}{x^2}, x\neq 0$, then $f(x)$ equals

a) x^2-2 for all $x\neq 0$

b) x^2-2 for all x satisfying $|x|\geq 2$

c) x^2-2 for all x satisfying $|x|<2$

d) None of these

17. The period of the function $f(x)=\sin\left(\frac{2x+3}{6\pi}\right)$, is

a) 2π b) 6π c) $6\pi^2$ d) None of these

18. $f:R\to R$ is a function defined by $f(x)=10x-7$. If $g=f^{-1}$, then $g(x)=$

a) $\frac{1}{10x-7}$ b) $\frac{1}{10x+7}$ c) $\frac{x+7}{10}$ d) $\frac{x-7}{10}$

19. If $f(x) = [x - 2]$, where $[x]$ denotes the greatest integer less than or equal to x, then $f(2, 5)$ is equal to

a) $\frac{1}{2}$ b) 0 c) 1 d) Does not exist

20. The domain of definition of

$f(x) = \sqrt{\log_{10}(\log_{10} x) - \log_{10}(4 - \log_{10} x) - \log_{10} 3}$,is

a) $(10^3, 10^4)$ b) $[10^3, 10^4]$ c) $[10^3, 10^4)$ d) $(10^3, 10^4]$