DPP
DAILY PRACTICE PROBLEMS

**CLASS : XIIth** **SUBJECT : MATHS**
**DATE :** **DPP NO. : 10**

# Topic :- RELATIONS AND FUNCTIONS

1. Let $f:(-1,1)\to B$, be a function defined by $f(x)=\tan^{-1}\frac{2x}{1-x^2}$, then $f$ is both one-one and onto when $B$ is the interval

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

2. If $f:R\to R$ 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) $\{2,2\}$

3. The set of all $x$ for which there are no functions $f(x)=\log_{(x-2)/(x+3)}2$ and $g(x)=\frac{1}{\sqrt{x^2-9}}$, is

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

4. Which of the following functions is (are) not an injective map(s)?

a) $f(x)=|x+1|, x\in[-1,\infty)$

b) $g(x)=x+\frac{1}{x}, x\in(0,\infty)$

c) $h(x)=x^2+4x-5, x\in(0,\infty)$

d) $k(x)=e^{-x}, x\in[0,\infty)$

5. If $f:N\to Z$ is defined by

$$f(n)=\begin{cases}2 \text{ if } n=3k, k\in Z\\ 10 \text{ if } n=3k+1, k\in Z,\\ 0 \text{ if } n=3k+2, k\in Z\end{cases}$$

Then $\{n\in N:f(n)>2\}$ is equal to

a) $\{3,6,4\}$ b) $\{1,4,7\}$ c) $\{4,7\}$ d) $\{7\}$

6. 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) $\frac{x-5}{2x+1}, x\neq\frac{1}{2}$ d) $\frac{5x-1}{2-x}, x\neq 2$

7. If $a,b$ are two fixed positive integers such that

$f(a+x)=b+[b^3+1-3b^2f(x)+3b\{f(x)\}^2-\{f(x)\}^3]^{1/3}$

For all $x\in R$, then $f(x)$ is a periodic function with period

a) $a$ b) $2a$ c) $b$ d) $2b$

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) $2^{10}-1$

9. If $Q$ denotes the set of all rational numbers and $f\left(\frac{p}{q}\right)=\sqrt{p^2-q^2}$ for any $\frac{p}{q}\in Q$, then observe the following statements.

I. $f\left(\frac{p}{q}\right)$ is real for each $\frac{p}{q}\in Q$.

II. $f\left(\frac{p}{q}\right)$ is a complex number for each $\frac{p}{q}\in Q$.

Which of the following is correct?

a) Both I and II are true
b) I is true, II is false
c) I is false, II is true
d) Both I and II are false

10. 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) $[-3,-2)\cup(-2,-1)\cup(1,\infty)$

11. Let $A=R-\{3\}, B=R-\{1\}$. Let $f: A\to B$ be defined by $f(x)=\frac{x-2}{x-3}$. Then,

a) $f$ is bijective
b) $f$ is one-one but not onto
c) $f$ is onto but not one-one
d) None of the above

12. Let $f(x)=\frac{\sqrt{\sin x}}{1+\sqrt[3]{\sin x}}$. If $D$ is the domain of $f$, then $D$ contains

a) $(0,\pi)$ b) $(-2\pi,-\pi)$ c) $(3\pi,4\pi)$ d) $(4\pi,6\pi)$

13. 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 $x\in R$. Then,

a) $fog(x)=27x^2-18x+5$
b) $fog(x)=27x^2+18x-5$
c) $gof\ (x)=9x^2-5$
d) $gof\ (x)=9x^2+15$

14. The domain of definition of the function $f(x)=\frac{1}{\sqrt{|x|-x}}$, is

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

15. Let $f: A\to B$ and g: $B\to A$ be two functions such that $fog=I_B$. Then,

a) $f$ and g both are injections
b) $f$ and g both are surjections
c) $f$ is an injection and g is a surjection
d) $f$ is a surjection and g is an injection

16. If $f(x)=x^2-1$ and $g(x)=(x+1)^2$, then $(gof)(x)$ is

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

17. 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) $\frac{7n(n+1)}{2}$

18. 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) $(2, 9)$

19. Let $f:R \to R$ 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

20. 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) $[2, 3]$