DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth **SUBJECT : MATHS**
DATE : **DPP NO. :4**

Topic :-RELATIONS AND FUNCTIONS

1. Let $f:R\to R$ be define by $f(x)=3x-4$.Then, $f^{-1}(x)$ is
   a) $\frac{x+4}{3}$ b) $\frac{x}{3}-4$ c) $3x+4$ d) None of these

2. The interval in which the function $y=\frac{x-1}{x^2-3x+3}$ transforms the real line is
   a) $(0,\infty)$ b) $(-\infty,\infty)$ c) $[0,1]$ d) $[-1/3,1]-\{0\}$

3. The domain of definition of the function $f(x)=x^{\frac{1}{\log_{10}x}}$, is
   a) $(0,1)\cup(1,\infty)$ b) $(0,\infty)$ c) $[0,\infty)$ d) $[0,1)\cup(1,\infty)$

4. Let W denotes the words in the English dictionary. Define the relation R by $R=\{(x,y)\in W\times W$:the world x and y have at least one letter in common$\}$. Then, R is
   a) Reflexive, symmetric and not transitive b) Reflexive, symmetric and transitive
   c) Reflexive, not symmetric and transitive d) Not reflexive, symmetric and transitive

5. The function $f:C\to C$ defined by $f(x)=\frac{ax+b}{cx+d}$ for $x\in C$ where $bd\neq 0$ reduces to a constant function, if
   a) $a=c$ b) $b=d$ c) $ad=bc$ d) $ab=cd$

6. Let $A=\{x,y,z\}, B=\{u,v,\omega\}$ and $f:A\to B$ be defined by $f(x)=u, f(y)=v, f(z)=\omega$.Then, f is
   a) Surjective but not injective
   b) Injective but not surjective
   c) Bijective
   d) None of these

7. Consider the following relations $R=\{(x,y)\mid x, y$ are real numbers and x=wy for some rational number w$\}$; $S=\left\{\left(\frac{m}{n},\frac{p}{q}\right)\middle| m,n,p \text{ and } q \text{ are integers such that } n,q\neq 0 \text{ and } qm=pn\right\}$. Then
   a) R is an equivalence relation but S is not an equivalence relation b) Neither R nor S is an equivalence relation
   c) S is an equivalence relation but R is not an equivalence relation d) R and S both are equivalence relations

8. Which of the following functions has period π ?

a) $|-\tan x|+\cos 2x$

b) $2\sin\frac{\pi x}{3}+3\cos\frac{2\pi x}{3}$

c) $6\cos\left(2\pi x+\frac{\pi}{4}\right)+5\sin\left(\pi x+\frac{3\pi}{4}\right)$

d) $|\tan 2x|+|\sin 4x|$

9. The range of the function $f(x)=\sqrt{(x-1)(3-x)}$ is

a) [0, 1] b) (-1, 1) c) (-3, 3) d) (-3, 1)

10. Let $A=\{x, y, z\}$and $B=\{a, b, c, d\}$. Which one of the following is not a relation from $A$to B?

a) $\{(x, a), (x, c)\}$ b) $\{(y,c), (y, d)\}$ c) $\{(z,a), (z, d)\}$ d) $\{(z, b), (y, b), (a, d)\}$

11. If $f(x)$ defined on [0, 1] by the rule

$f(x)=\begin{cases} x, \text{ if } x \text{ is rational} \\ 1-x, \text{ if } x \text{ is irrational} \end{cases}$

Then, for all $x\in[0, 1]$,$f(f(x))$ is

a) Constant b) $1+x$ c) x d) None of these

12. Let $f(x)=\min\{x, x^2\}$, for every $x\in R$. Then,

a) $f(x)=\begin{cases} x, & x\geq 1 \\ x^2, & 0\leq x<1 \\ x, & x<0 \end{cases}$ b) $f(x)=\begin{cases} x^2, & x\geq 1 \\ x, & x<1 \end{cases}$

c) $f(x)=\begin{cases} x, & x\geq 1 \\ x^2, & x<1 \end{cases}$ d) $f(x)=\begin{cases} x^2, & x\geq 1 \\ x, & 0\leq x<1 \\ x^2, & x<0 \end{cases}$

13. 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

14. The domain of the function $f(x)=\exp(\sqrt{5x-3-2x^2})$ is

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

15. $f(x)=x+\sqrt{x^2}$ is a function from R to$R$, then $f(x)$ is

a) Injective b) Surjective c) Bijective d) None of these

16. If $f(x)=\frac{\sin^4 x+\cos^2 x}{\sin^2 x+\cos^4 x}$ for $x\in R$, then $f(2010)=$

a) 1 b) 2 c) 3 d) 4

17. If $b^2 - 4ac = 0, a > 0$, then the domain of the function $f(x) = \log\{ax^3 + (a+b)x^2 + (b+c)x + c)\}$ is

a) $R - \left\{-\frac{b}{2a}\right\}$

b) $R - \left\{\left\{-\frac{b}{2a}\right\} \cup \{x \mid x \geq -1\}\right\}$

c) $R - \left\{\left\{-\frac{b}{2a}\right\} \cap (-\infty, -1]\right\}$

d) None of these

18. The inverse of the function $y = \frac{10^x - 10^{-x}}{10^x + 10^{-x}}$ is

a) $\frac{1}{2}\log_{10}\left(\frac{1+x}{1-x}\right)$ b) $\frac{1}{2}\log_{10}\left(\frac{2+x}{2-x}\right)$ c) $\frac{1}{2}\log_{10}\left(\frac{1-x}{1+x}\right)$ d) None of these

19. If $f: R \to R$ is given by

$f(x) = \begin{cases} -1, \text{ when } x \text{ is rational} \\ 1, \text{ when } x \text{ is irrational} \end{cases}$,

Then $(fof)(1 - \sqrt{3})$ is equal to

a) 1 b) -1 c) $\sqrt{3}$ d) 0

20. The function $f: R \to R$ defined by $f(x) = 6^x + 6^{|x|}$, is

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