STANDARD

Multiple Choice Questions

1. If the set A contains 5 elements and B contains 6 elements , then how many bijections can be defined from A to B.
   (a)720 (b) 120 (c)0 (d)none
2. Let A={1,2,3...n} and B={a,b}. Then number of surjections from A to B is
   (a) P(n,2) (b)2^n-1 (c)2^{n-1} (d) None
3. Let f:R-{0}→R-{0} be defined by $f(x)=\frac{1}{x}$, then f is
   (a)one-one (b)onto (c)bijective (d)none
4. If $f(x)+2f\left(\frac{1}{x}\right)=3x\,, x\neq 0\ and\ S=\{x\epsilon R: f(x)=f(-x)\}$, then S
   (a)contains exactly one element (b)contains exactly two elements
   (c)contains more than two elements (d) none
5. If $f: R\to R$ given by $f(x)=x+\sqrt{x^2}$ is
   (a)injective (b)surjective (c)bijective (d)none

Fill in the blanks

6. If $f(x)=\frac{x}{x-1}\,, x\neq 1$ then $f^{-1}(x)=$ _____ .
7. If $f(x)=1-\frac{1}{x}$, then $\left(f\left(\frac{1}{x}\right)\right)=$ _____ .
8. If f(1)=1 and f(n+1)=2 f(n)+1 if $n\geq 1$, then f(n)=_____ .
9. Let $g(x)=1+x-[x]$ and $f(x)=sgn(x)$, then (fog)(x)=___ .
10. Let $f: R\to R$ defined by $(x)=2x+|x|$, then find $f(x)+f(-x)$.

Answer the followings in a word or in a sentence

11. If the mappings f and g are given by f={(1,2),(3,5),(4,1)} and g={(2,3),(5,1),(1,3)}, then write fog.
12. If $f(x)=\begin{cases}2x-3, & x\geq 2\\ x\ , & x<2\end{cases}$, then find $f(1)$.
13. If $x\neq 1$ and $(x)=\frac{x+1}{x-1}$, then find $f(f(2))$.
14. If $f: R\to R$ and $g: R\to R$ defined by $f(x)=2x+3$ and $g(x)=x^2+7$ then find 'x' such that (fog)(x)=25 .
15. If $(x)=3x-5$, then find $f^{-1}(x)$.

SHORT ANSWER TYPE QUESTIONS

16.If $f(x) = \cos(\log x)$,then find $f(x).f(y) - \frac{1}{2}\left[f\left(\frac{x}{y}\right) + f(xy)\right]$.

17. If $f(x) = 1 + \alpha x$, $\alpha \neq 0$ is the inverse of itself , then find α .

18. If $f(x) = ax^2 + bx + c$, then find a and b for which f(x+3)-f(x)=8x+3 .

19.If $f(x + 3y, x - 3y) = 12xy$, then find $f(x, y)$.

20.If $f(x) = \frac{1-x}{1+x}$, then find the domain of $f^{-1}(x)$.

21.Let $(x) = x[x]$ and $g(x) = \sqrt{|x|}$, then find the number of elements for which $f(x) = g(x)$.

22. If $f: R \to R$ defined by $f(x) = x^4 + 2$,then find $f^{-1}(83)$ and $f^{-1}(-2)$.