CHAPTER - 10
Functions

EE24BTECH11039 - Ranjith

A: Fill in the Blanks

1) The values of $f(x) = 3 \sin\left(\sqrt{\frac{\pi^2}{16} - x^2}\right)$ lie in the interval ....

   (1983 - 1 Mark)

2) For the function $f(x) = \frac{x}{1+e^{1/x}}$, $x \neq 0 = 0$, $x = 0$ the derivative from the right, $f'(0+) =$ ...., and the derivative from the left, $f'(0-) = $ ....

   (1983 - 2mark)

3) The domain of the function $f(x) = \sin^{-1}\left(\log_2\left(\frac{x^2}{2}\right)\right)$ is given by ...

   (1984 - 2mark)

4) Let A be a set of n distinct elements. Then the total number of distinct functions from A to A is _____ and out of these _____ are onto functions.

   (1985- 2mark)

5) If $f(x) = \sin \ln\left(\frac{\sqrt{4-x^2}}{1-x}\right)$, then domain of f(x) is... and its range is ....

   (1985 - 2Mark)

6) There are exactly two distinct linear functions,...and...which map [-1,1]onto [0,2]

   (1989 - 1Mark)

7) If f is a even function defined on the interval (-5,5),then four real values of x satisfying the equation $f(x) = f(\frac{x+2}{x+1})$ are.......... and.......

   (1996 - 1mark)

B: True/ False

1) If $f(x) = (a - x^n)^{1/n}$ where $a > 0$ n is a positive integer then $f(f(x)) = x$.

   (1983 - 1Mark)

2) The function $f(x) = \frac{x^2+4x+30}{x^2-8x+18}$ is not one-to one.
   (1983 - 1Mark)

3) If $f_1(x)$ and $f_2(x)$ are defined on domains $D_1 and D_2$ respectively, then $f_1(x) + f_2(x)$ is defined on $D_1 \cup D_2$.

   (1988 - 1Mark)

C: MCQ's with One Correct Answer

1) Let R be the set of real numbers.If $f : R \mapsto R$ is a function defined by $f(x) = x^2$,then f is:
   (a) Injective but not surgective
   (b)Surjective but not injective
   (c)Bijective
   (d)None of these.

   (1987)

2) The entire graphs of the equation $y = x^2 + kx - x + 9$ is strictly above the x-axis if and only if
   (a) $k < 7$
   (b)$-5 < k < 7$
   (c)$k > -5$
   (d)None of these.   (1979)

3) Let $f(x) = |x - 1|$.then
   (a) $f(x^2) = (f(x))^2$
   (b) $f(x + y) = f(x) + f(y)$
   (c) $f(|x|) = |f(x)|$
   (d) None of these.   (1983 - 1Mark)

4) If x satisfies $|x - 1| + |x - 2| + |x - 3| \geq 6$, then
   (a)$0 \leq x \leq 4$
   (b)$x \leq -2$ or $x \geq 4$
   (c)$x \leq 0$ or$x \geq 4$
   (d)None of these.   (1983-1Mark)