CHAPTER 2

Relations and Functions

1. Domain of definition of the function

$f(x)=\dfrac{3}{4-x^2}+\log_{10}(x^3-x)$, is **[2003]**

(a) $(-1,0)\cup(1,2)\cup(2,\infty)$ (b) $(a,2)$

(c) $(-1,0)\cup(a,2)$ (d) $(1,2)\cup(2,\infty)$.

2. If $f:R\to R$ satisfies $f(x+y)=f(x)+f(y)$, for all $x,\ y\in R$ and $f(1)=7$, then $\sum\limits_{r=1}^{n} f(r)$ is **[2003]**

(a) $\dfrac{7n(n+1)}{2}$ (b) $\dfrac{7n}{2}$

(c) $\dfrac{7(n+1)}{2}$ (d) $7n+(n+1)$.

3. The graph of the function $y=f(x)$ is symmetrical about the line $x=2$, then **[2004]**

(a) $f(x)=-f(-x)$

(b) $f(2+x)=f(2-x)$

(c) $f(x)=f(-x)$

(d) $f(x+2)=f(x-2)$

4. The domain of the function $f(x)=\dfrac{1}{\sqrt{|x|-x}}$ is **[2011]**

(a) $(0,\infty)$ (b) $(-\infty,0)$

(c) $(-\infty,\infty)-\{0\}$ (d) $(-\infty,\infty)$

Answer Key

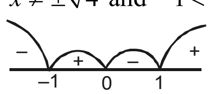
1	2	3	4											
(a)	(a)	(b)	(b)											

SOLUTIONS

1. (a) $f(x)=\dfrac{3}{4-x^2}+\log_{10}(x^3-x)$

$4-x^2\neq 0;\ x^3-x>0;$

$x\neq\pm\sqrt{4}$ and $-1<x<0$ or $1<x<\infty$



$\therefore D=(-1,0)\cup(1,\infty)-\{\sqrt{4}\}$

$D=(-1,0)\cup(1,2)\cup(2,\infty)$.

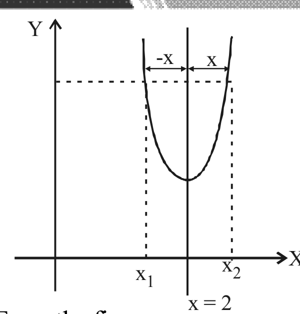
2. (a) $f(x+y)=f(x)+f(y)$.

Function should be $f(x)=mx$

$f(1)=7;\ \therefore m=7,\ f(x)=7x$

$\sum\limits_{r=1}^{n} f(r)=7\sum\limits_{1}^{n} r=\dfrac{7n(n+1)}{2}$

3. (b) Let us consider a graph symm. with respect to line $x=2$ as shown in the figure.



From the figure

$f(x_1)=f(x_2)$, where $x_1=2-x$

and $x_2=2+x$

$\therefore f(2-x)=f(2+x)$

4. (b) $f(x)=\dfrac{1}{\sqrt{|x|-x}}$, define if $|x|-x>0$

$\Rightarrow |x|>x,\ \Rightarrow x<0$

Hence domain of $f(x)$ is $(-\infty,0)$