Keep remember this definitions, questionsare made heavily on this concepts ans can be easily solved if definitions are remembered:

(i) **Identity function:**

The function $f: \mathbf{R} \to \mathbf{R}$ defined by $y = f(x) = x$ for each $x \in \mathbf{R}$ is called the **identity function.**

Domain of $f = \mathbf{R}$

Range of $f = \mathbf{R}$

(ii) **Constant function:** The function $f: \mathbf{R} \to \mathbf{R}$ defined by $y = f(x) = C$, $x \in \mathbf{R}$, where C is a constant $\in \mathbf{R}$, is a **constant function**.

Domain of $f = \mathbf{R}$

Range of $f = \{C\}$

(iii) **Polynomial function:** A real valued function $f: \mathbf{R} \to \mathbf{R}$ defined by $y = f(x) = a_0 + a_1x + ... + a_nx^n$, where $n \in \mathbf{N}$, and $a_0, a_1, a_2 ... a_n \in \mathbf{R}$, for each $x \in \mathbf{R}$, is called Polynomial functions.

(iv) **Rational function:** These are the real functions of the type $\dfrac{f(x)}{g(x)}$, where $f(x)$ and $g(x)$ are polynomial functions of x defined in a domain, where $g(x) \neq 0$. For example $f: \mathbf{R} - \{-2\} \to \mathbf{R}$ defined by $f(x) = \dfrac{x+1}{x+2}$, $\forall x \in \mathbf{R} - \{-2\}$ is a rational function.

(v) **The Modulus function:** The real function $f: \mathbf{R} \to \mathbf{R}$ defined by $f(x) = |x| =$

$x,\ x \geq 0$

$-x,\ x < 0$

$\forall x \in \mathbf{R}$ is called the modulus function.

Domain of $f = \mathbf{R}$

Range of $f = \mathbf{R}^+ \cup \{0\}$

(vi) **Signum function:** The real function $f: \mathbf{R} \to \mathbf{R}$ defined by

$$f(x) = \begin{cases} \dfrac{|x|}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases} = \begin{cases} 1, & \text{if } x > 0 \\ 0, & \text{if } x = 0 \\ -1, & \text{if } x < 0 \end{cases}$$

is called the **signum function**. Domain of $f = \mathbf{R}$, Range of $f = \{1, 0, -1\}$

(vii) **Greatest integer function:** The real function $f: \mathbf{R} \to \mathbf{R}$ defined by $f(x) = [x]$, $x \in \mathbf{R}$ assumes the value of the greatest integer less than or equal to x, is called the **greatest integer function**.

Thus $f(x) = [x] = -1$ for $-1 \leq x < 0$

$f(x) = [x] = 0$ for $0 \leq x < 1$

$[x] = 1$ for $1 \leq x < 2$

$[x] = 2$ for $2 \leq x < 3$ and so on

Source: NCERT