

2 FUNCTIONS

1VSAQ + 1 SAQ = 2M + 4M = 6Marks

SINGLE PAGE SYNOPSIS

FUNCTIONS-I & II

- Function:** A relation $f:A \rightarrow B$ is said to be a **function**, if **each** element of A is associated with a **unique** element of B .
- In the function $f:A \rightarrow B$, the **domain** is A , **codomain** is B and Range is $f(A) = \{f(a)/a \in A\}$.
- A function $f:A \rightarrow B$ is said to be an **injection(one-one function)** if, $a_1, a_2 \in A$ and $f(a_1) = f(a_2) \Rightarrow a_1 = a_2$
- $f:A \rightarrow B$ is said to be **surjection(onto function)** if $\forall b \in B \exists a \in A$ such that $f(a) = b$.
In an onto function, Range = Codomain $\Rightarrow f(A) = B$
- A function which is both oneone and onto, is said to be a **bijective function**.
- A function $f:A \rightarrow B$ is said to be an **identity function** if $f(x) = x, \forall x \in A$.
Identity function on A is defined as $I_A(a) = a, \forall a \in A$.
- A function $f:A \rightarrow B$ is said to be a **constant function** if $f(x) = k, \forall x \in A, k \in B$.
- Equality of functions:** Two functions f, g are said to be equal, written as $f = g$, if
(i) f, g have the same domain, say A (ii) $\forall a \in A, f(a) = g(a)$
- If $f:A \rightarrow B, g:B \rightarrow C$ are two functions then their **composition** is defined as $g \circ f: A \rightarrow C$ such that $(g \circ f)(a) = g(f(a)), \forall a \in A$.
- $f(x)$ is said to be an (i) **even** function if $f(-x) = f(x)$ (ii) **odd** function if $f(-x) = -f(x)$

FUNCTIONS-III

- Domain** of a real function f is a set of all **input values** that f can accept as a real and **range** is the set of all its **output values** for those input values.

Type 1: If the function is of the form $\sqrt{f(x)}$ then its domain is $\{x / f(x) \geq 0\}$.

Type 2: If the function is of the form $\frac{1}{\sqrt{f(x)}}$ (or) $\log f(x)$ then its domain is $\{x / f(x) > 0\}$.

Type 3: If the function is of the form $\frac{1}{f(x)}$ then its domain is $\mathbb{R} \setminus \{x / f(x) = 0\}$.