

THEORY OF EQUATIONS (1)

GENERAL PROPERTIES OF EQUATIONS

Algebraic function of x :- A function $f(x)$ is said to be an algebraic function of x , if it involves only the operations of addition, subtraction, multiplication, division, involution and evolution with constant exponents.

For example,

$$ax^2 + bx + c, \frac{ax+b}{cx+d}, (2x+3)(3x+4),$$

$$\sqrt{5x^2 - 2x + 1}$$

etc. are all algebraic functions of x . Functions of the form $\tan^{-1}x$, e^{ax} , $\log x$, $\sin x$, etc. are known as transcendental functions of x .

Integral function of x :-

A function of x is said to be integral function of x , if the quantity x does not occur in the denominator of a fraction or it never appears with -ve power. For example $\frac{2}{3}x^2 + \frac{1}{4}x + \frac{7}{6}$ is an integral function of x . But $2x^2 - \frac{5}{x} + 7$ is not an integral function of x .

Rational function of x :-

A function is said to be rational function of x , if it involves the operations of addition, subtraction, multiplication and division only. Thus $3x^2 + \sqrt{2}x + 5$ is a rational function of x .

$$\text{Thus } f(x) \equiv a_0 x^n + a_1 x^{n-1} + a_2 x^{n-2} + \dots$$

$+ a_{n-1} x + a_n$ is said to be a rational, integral, algebraic function of x . The above function is of n^{th} degree (n being assumed to be +ve) is called a polynomial.