

## Content-MATHEMATICAL METHODS

<b>1. Linear Algebra and Matrices.....</b>	<b>(1-43)</b>
1.1 Linear Dependence and Dimensionality of a Vector Space	
1.2 Properties of Matrices	
1.3 Eigen value problem	
1.4 Different Types of Matrices and their properties	
1.5 Cayley–Hamilton Theorem	
1.6 Diagonalisation of Matrix	
1.7 Function of Matrix	
<b>2. Complex Number.....</b>	<b>(44-90)</b>
2.1 Definition	
2.2 Geometric Representation of Complex Numbers	
2.3 De Moivre’s Theorem	
2.4 Complex Function	
2.4.1 Exponential Function of a Complex Variable	
2.4.2 Circular Functions of a Complex Variable	
2.4.3 Hyperbolic Functions	
2.4.4 Inverse Hyperbolic Functions	
2.4.5 Logarithmic Function of a Complex Variable	
2.5 Summation of Series $C + iS$ Method	
<b>3. Fourier Series.....</b>	<b>(91-127)</b>
3.1 Half-Range Fourier Series	
3.2 Functions defined in two or more sub-ranges	
3.3 Complex Notation for Fourier series	
<b>4 Calculus of Single and Multiple Variables.....</b>	<b>(128-163)</b>
4.1 Limits	
4.1.1 Right Hand and Left hand Limits	
4.1.2 Theorem of Limits	
4.1.3 L’Hospital’s Rule	

### Head office

fiziks, H.No. 23, G.F, Jia Sarai,  
Near IIT, Hauz Khas, New Delhi-16  
Phone: 011-26865455/+91-9871145498

### Branch office

Anand Institute of Mathematics,  
28-B/6, Jia Sarai, Near IIT  
Hauz Khas, New Delhi-16

- 4.1.4 Continuity
- 4.2 Differentiability
  - 4.2.1 Tangents and Normal
  - 4.2.2 Condition for tangent to be parallel or perpendicular to  $x$ -axis
  - 4.2.3 Maxima and Minima
- 4.3 Partial Differentiation
  - 4.3.1 Euler theorem of Homogeneous function
  - 4.3.2 Maxima and Minima (of function of two independent variable)
- 4.4 Jacobian
  - 4.4.1 Properties of Jacobian
- 4.5 Taylor's series and Maclaurine series expansion
  - 4.5.1 Maclaurine's Development
- 5. Differential Equations of the first Order and first Degree.....(164-187)**
- 5.1 Linear Differential Equations of First Order
  - 5.1.1 Separation of the variables
  - 5.1.2 Homogeneous Equation
  - 5.1.3 Equations Reducible to homogeneous form
  - 5.1.4 Linear Differential Equations
  - 5.1.5 Equation Reducible to Linear Form
  - 5.1.6 Exact Differential Equation
  - 5.1.7 Equations Reducible to the Exact Form
- 5.2 Linear Differential Equations of Second Order with constant Coefficients

---

**Head office**

fiziks, H.No. 23, G.F, Jia Sarai,  
Near IIT, Hauz Khas, New Delhi-16  
Phone: 011-26865455/+91-9871145498

**Branch office**

Anand Institute of Mathematics,  
28-B/6, Jia Sarai, Near IIT  
Hauz Khas, New Delhi-16