

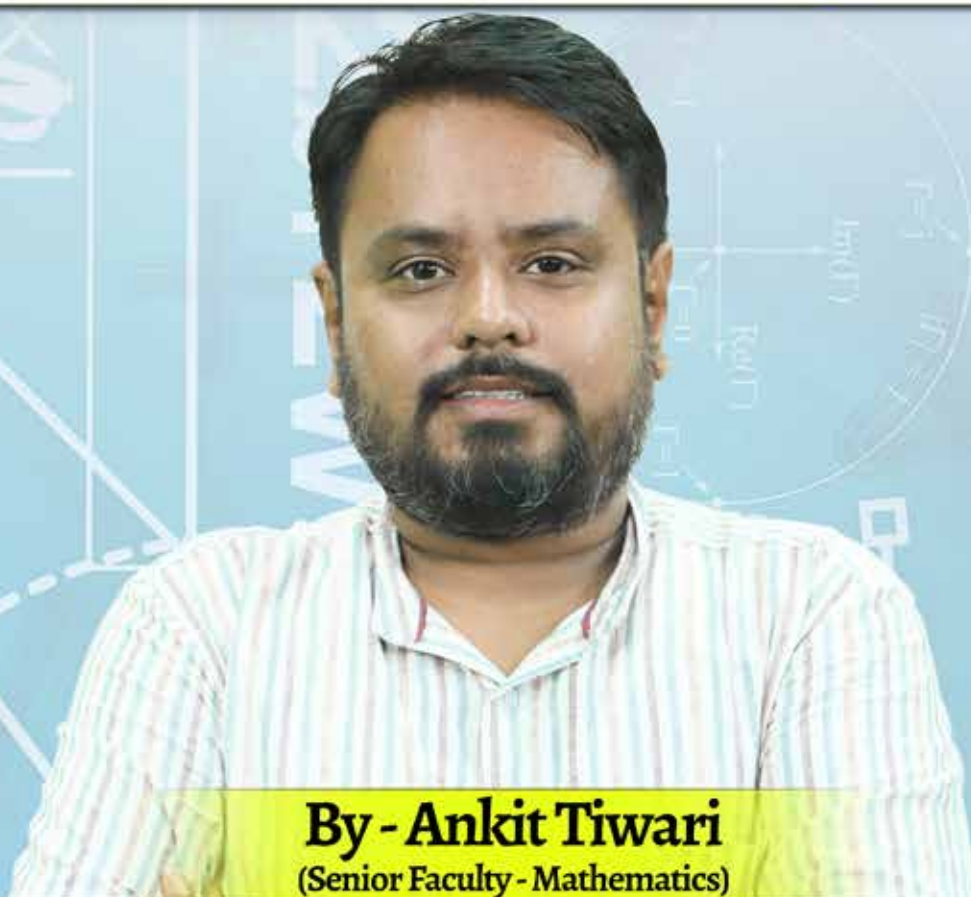
# Complete Maths Through 500+ Question

• **MATHS OPTIONAL** •

Comprehensive Test Series Along  
with Answer Writing

**40 Tests to Score 350+**

(Basic & Advanced) + Full Length Tests



**By - Ankit Tiwari**  
(Senior Faculty - Mathematics)

**Starting On 25<sup>th</sup> July 2024**

**It is said that Optional determines the destiny of UPSC journey. It is the most important weapon to conquer this exam. To get into the final list, one must ace the Optionals.**

**To help you sail with a comfortable margin in Maths Optional, StudyIQ is here with its Maths Test Series.**

## **Why Should You Choose StudyIQ's Maths Test Series ?**

**01**

The language style and nature of the questions are in line with the questions asked by the Union Public Service Commission and based on deep understanding and knowledge.

**02**

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**03**

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# • Features of our Test Series •

**01**

**Questions Themes Chosen After Detailed PYQ Analysis, UPSC latest Trend Analysis.**

**02**

**Paper Designed, Evaluated and Discussed by Designated Math's Faculty.**

**03**

**Total 40 Tests (34 basics & advanced and 6 Full Length Tests)**

**04**

**Every Month 1-1 Live Interaction With Designated Math's Faculty.**

**05**

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**06**

**Test Series Covering Entire Syllabus of The Indian Forest Service (IFoS), CSE Mains.**

**07**

**Facility to write tests in exam environment at StudyIQ offline centre, ORN.**

# Test Pattern

```
graph TD; A[Test Pattern] -- Red --> B[Sectional test: 6 Questions 10 marks each + 6 Questions 15 marks each]; A -- Orange --> C[Total - 12 Questions (150marks)]; A -- Blue --> D[Full Length test - 250 marks - As per UPSC patterns];
```



**Sectional test: 6  
Questions 10 marks  
each  
+ 6 Questions 15  
marks each**



**Total - 12 Questions  
( 150marks)**



**Full Length test -  
250 marks - As per  
UPSC patterns**

# Schedule Of The Test Series

| Test                                               | Detailed Topic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test 1<br>Matrices - Basics<br>25th July' 2024     | <ul style="list-style-type: none"><li>• Rank of Matrix</li><li>• Nullity</li><li>• Algebra of Matrices</li><li>• Row &amp; Column reduction</li><li>• Echelon form, Rank of Matrices</li><li>• Types of Matrices</li><li>• Eigen values &amp; Vectors</li><li>• Solution of System of Linear equations</li><li>• Characteristics Values &amp; Vectors</li><li>• Caley Hamilton theorem</li><li>• Quadratic form</li></ul>                                                                                                                                                                                                                                                                                                                                                                           |
| Test 2<br>Vector Space - Basics<br>28th July' 2024 | <ul style="list-style-type: none"><li>• Vector space- Introduction, Vector spaces over <math>\mathbb{R}</math> &amp; <math>\mathbb{C}</math></li><li>• Linear Dependence &amp; Independence</li><li>• Sub Spaces &amp; Bases</li><li>• Dimensions, Matrix of linear transformation</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Test 3<br>Calculus - Basics<br>31th July' 2024     | <ul style="list-style-type: none"><li>• Calculus-</li><li>• Introduction to Calculus, Functions</li><li>• Limits &amp; Continuity</li><li>• Continuity &amp; Differentiability</li><li>• Mean Values theorem &amp; problems</li><li>• Taylor theorem, Indeterminate form</li><li>• Maxima &amp; Minima, Asymptotes</li><li>• Curve tracing</li><li>• Function of 2 or 3 variables</li><li>• Partial derivatives</li><li>• Lagrange's method of multiplier</li><li>• Jacobian Functions</li><li>• Introduction to Integral Calculus</li><li>• Reimann's function</li><li>• Indefinite Integral</li><li>• Definite Integrals</li><li>• Infinite &amp; Improper Integrals</li><li>• Double Integrals</li><li>• Triple Integrals</li><li>• Area &amp; Surfaces</li><li>• Surface &amp; Volume</li></ul> |

## Test

## Detailed Topic

**Test 4**  
**Solid Geometry**  
**- Basics**  
**3rd Aug' 2024**

- solid geomatary-Introduction, Co-ordinate System
- Conversion of Co-ordinate system
- Planes
- Straight Lines
- Sphere
- Cone
- Cylinder
- Introduction to Conicoid
- Paraboloid
- Ellipsoid
- Hyperboloid

**Test 5**  
**Ordinary Differential equation - Basics**  
**6th Aug' 2024**

- Ordinary Differential Equation-
- Introduction to Differential Equation
- Formulation of Differential Equation
- Linear Differential equation
- Integrating Factor
- Orthogonal Trajectories
- Higher order Differential Equations
- Variation of Parameters
- Clairaut's equation
- Cauchy Euler Equation
- Laplace Transform & Theorems
- Inverse Laplace transform
- \* Application of Laplace transform

**Test 6**  
**Vector Calculas**  
**- Basics**  
**11th Aug'2024**

- Vector Calculus Advanced-
- Introduction to Vector Calculus
- Scalar & Vector fields
- Differentiation of Vector Field of Scalar variables
- Gradient & Vectors
- Divergence & Curl
- Higher Order derivatives, Vector identities
- Vector equation
- Curvature & Torsion
- Serret & Fernet's Formulae
- Gauss divergence theorem, Stokes theorem
- Stokes theorem, Green's Identities

**Test 7**  
**Statics - Basics**  
**22nd Aug' 2024**

- Dynamics-
- Rectilinear motion, simple harmonic motion, motion in a plane, projectiles
- Constrained motion
- Work and energy, conservation of energy
- Kepler's laws, orbits under central forces.

## Test

## Detailed Topic

**Test 8**  
**Dynamic - Basics**  
**2nd Sept' 2024**

- Statics- Equilibrium of a system of particles
- Work and potential energy, friction,
- Common catenary
- Principle of virtual work
- Stability of equilibrium, equilibrium of
- forces in three dimensions.

**Test 9**  
**Modern Algebra**  
**- Basics**  
**15th Sept' 2024**

- Modern algebra advanced-
- Introduction to Abstract Algebra
- Sub groups, Normal groups
- Cosets
- Lagrange's theorem
- Homomorphism of groups
- Cyclic & Quotient groups
- Basic Isomorphism theorem
- Permutation groups
- Cayley's theorem
- Rings
- Subrings & Ideals
- Ideals & Homomorphism
- Euclidean Ring, Polynomial ring
- Integral domain, Principal ideal
- domain
- Euclidean domain, Unique
- factorization domain
- Finite & Quotient fields
- Sylow theorem

**Test 10**  
**Real Analysis**  
**- Basics**  
**23rd Sept' 2024**

- Real Analysis-
- Introduction to Real analysis
- Real analysis
- Sequences
- Cauchy's sequence
- Infinite & Alternating series
- Convergence
- Continuity & Differentiability
- Riemann Integral 1
- Riemann Integral 2
- Improper Integrals 1
- Improper Integrals 2
- Fundamental Theorems
- Integrability
- Revision session

**Test11**  
**Complex Analysis**  
**- Basics**  
**26th Sept' 2024**

- Complex Analysis
- Introduction to Complex Numbers
- Limits, Continuity & Differentiability
- Analytic Functions
- Cauchy Riemann's equation, Cauchy theorem
- Cauchy Integral Formula
- Power series representation

## Test

## Detailed Topic

**Test 12**  
**Linear Programming Problems - Basics**  
**29th Sept' 2024**

- Singularities
- Taylor, Laurent series
- Contour Integration
- Cauchy Residue theorem

- Linear programming Problems-
- \* Introduction to Linear programming
- \* Graphical method & Simplex method
- \* Simplex method
- \* Duality
- \* Basic feasible solution
- \* Optimal solution
- \* Transportation & Assignment problems 1
- \* Transportation & Assignment problems 2

**Test 13**  
**Partial Differential Equation - Basics**  
**2nd Oct' 2024**

- Partial Differential Equation-
- Introduction to PDE
- Formation of PDE & Family of surfaces in 3D
- Solution of Quasi linear PDE
- Cauchy's method
- Higher order Homogenous PDE
- Application of PDE
- Vibration strings
- Heat equation
- Laplace equation
- Canonical form

**Test14**  
**Numerical Analysis - Basics**  
**5th Oct' 2024**

- Numerical Analysis:
- Solution of Algebraic equation
- Bisection & Regular falsi method
- Newton Raphson, Gauss elimination
- Gauss Jordan, gauss seidel method
- Newton Interpolation, Lagrange's
- Interpolation
- Simpson rule, Trapezoidal rule
- Gaussian quadrature formula,
- Numerical solution of ODE
- Euler's & Ranga Kutta method

**Test15**  
**Computer Programming - Basics**  
**8th Oct' 2024**

- Computer programming:
- Binary, Octal, Hexa decimal Number system
- Conversion & Algebra of Binary numbers
- Elements of Computer system &
- Concept of memory
- Truth table, Boolean algebra
- Representation of Integers, Algorithm & Flowcharts

## Test

## Detailed Topic

**Test 16**  
**Mechanics- Basics**  
**11th Oct' 2024**

- Introduction to Mechanics
- Moment of Inertia
- D Alembert's principle
- Generalized co-ordinates
- Lagrange's equation
- Hamilton equation
- Motion of body in 2D

**Test 17**  
**Partial Differential**  
**Equation - Basics**  
**14th Oct' 2024**

- Fluid Dynamics - Introduction to Fluid
- Euler's & Lagrange's equation
- Kinematics of Fluid flow
- Boundary condition
- Stream line flow, Path of particles
- Sources & Sinks
- Method of Images
- Axisymmetric flow
- Vortex flow 1
- Vortex flow 2
- Navier's – Stokes equation

# Basics.

# Advanced

## Test

## Detailed Topic

**Test 18**  
**Matrices - Advanced**  
**17th Oct' 2024**

- Rank of Matrix
- Nullity
- Algebra of Matrices
- Row & Column reduction
- Echelon form, Rank of Matrices
- Types of Matrices
- Eigen values & Vectors
- Solution of System of Linear equations
- Characteristics Values & Vectors
- Caley Hamilton theorem
- Quadratic form

**Test 19**  
**Vector Space**  
**- Advanced**  
**20th Oct' 2024**

- Vector space- Introduction, Vector spaces over  $\mathbb{R}$  &  $\mathbb{C}$
- Linear Dependence & Independence
- Sub Spaces & Bases
- Dimensions, Matrix of linear transformation

**Test 20**  
**Calculus - Advanced**  
**23rd Oct' 2024**

- Calculus-
- Introduction to Calculus, Functions
- Limits & Continuity
- Continuity & Differentiability
- Mean Values theorem & problems
- Taylor theorem, Indeterminate form
- Maxima & Minima, Asymptotes
- Curve tracing
- Function of 2 or 3 variables
- Partial derivatives
- Lagrange's method of multiplier
- Jacobian Functions
- Introduction to Integral Calculus
- Reimann's function
- Indefinite Integral
- Definite Integrals
- Infinite & Improper Integrals
- Double Integrals
- Triple Integrals
- Area & Surfaces
- Surface & Volume

## Test

## Detailed Topic

**Test 21**  
**Solid Geometry**  
- Advanced  
26th Oct' 2024

- solid geomatary-Introduction, Co-ordinate System
- Conversion of Co-ordinate system
- Planes
- Straight Lines
- Sphere
- Cone
- Cylinder
- Introduction to Conicoid
- Paraboloid
- Ellipsoid
- Hyperboloid

**Test 22**  
**Ordinary Differential equation** - Advanced  
29th Oct' 2024

- Ordinary Differential Equation-
- Introduction to Differential Equation
- Formulation of Differential Equation
- Linear Differential equation
- Integrating Factor
- Orthogonal Trajectories
- Higher order Differential Equations
- Variation of Parameters
- Clairaut's equation
- Cauchy Euler Equation
- Laplace Transform & Theorems
- Inverse Laplace transform
- \* Application of Laplace transform

**Test 23**  
**Vector Calculas**  
-Advanced  
1st Nov' 2024

- Vector Calculus Advanced-
- Introduction to Vector Calculus
- Scalar & Vector fields
- Differentiation of Vector Field of Scalar variables
- Gradient & Vectors
- Divergence & Curl
- Higher Order derivatives, Vector identities
- Vector equation
- Curvature & Torsion
- Serret & Fernet's Formulae
- Gauss divergence theorem, Stokes theorem
- Stokes theorem, Green's Identities

**Test 24**  
**Statics** - Advanced  
4th Nov' 2024

- Dynamics-
- Rectilinear motion, simple harmonic motion, motion in a plane, projectiles
- Constrained motion
- Work and energy, conservation of energy
- Kepler's laws, orbits under central forces.

## Test

## Detailed Topic

**Test 25**  
**Dynamic - Advanced**  
**7th Nov' 2024**

- Statics- Equilibrium of a system of particles
- Work and potential energy, friction,
- Common catenary
- Principle of virtual work
- Stability of equilibrium, equilibrium of
- forces in three dimensions.

**Test 26**  
**Modern Algebra**  
**- Advanced**  
**10th Nov' 2024**

- Modern algebra advanced-
- Introduction to Abstract Algebra
- Sub groups, Normal groups
- Cosets
- Lagrange's theorem
- Homomorphism of groups
- Cyclic & Quotient groups
- Basic Isomorphism theorem
- Permutation groups
- Cayley's theorem
- Rings
- Subrings & Ideals
- Ideals & Homomorphism
- Euclidean Ring, Polynomial ring
- Integral domain, Principal ideal
- domain
- Euclidean domain, Unique
- factorization domain
- Finite & Quotient fields
- Sylow theorem

**Test 27**  
**Real Analysis**  
**- Advanced**  
**13th Nov' 2024**

- Real Analysis-
- Introduction to Real analysis
- Real analysis
- Sequences
- Cauchy's sequence
- Infinite & Alternating series
- Convergence
- Continuity & Differentiability
- Riemann Integral 1
- Riemann Integral 2
- Improper Integrals 1
- Improper Integrals 2
- Fundamental Theorems
- Integrability
- Revision session

**Test 28**  
**Complex Analysis**  
**- Advanced**  
**16th Nov' 2024**

- Complex Analysis
- Introduction to Complex Numbers
- Limits, Continuity & Differentiability
- Analytic Functions
- Cauchy Riemann's equation, Cauchy theorem
- Cauchy Integral Formula
- Power series representation

## Test

## Detailed Topic

**Test 29**  
**Linear Programing**  
**Problems - Advanced**  
**19th Nov' 2024**

- Singularities
- Taylor, Laurent series
- Contour Integration
- Cauchy Residue theorem

- Linear programming Problems-
- \* Introduction to Linear programming
- \* Graphical method & Simplex method
- \* Simplex method
- \* Duality
- \* Basic feasible solution
- \* Optimal solution
- \* Transportation & Assignment problems 1
- \* Transportation & Assignment problems 2

**Test 30**  
**Partial Differential**  
**Equation - Advanced**  
**22nd Nov' 2024**

- Partial Differential Equation-
- Introduction to PDE
- Formation of PDE & Family of surfaces in 3D
- Solution of Quasi linear PDE
- Cauchy's method
- Higher order Homogenous PDE
- Application of PDE
- Vibration strings
- Heat equation
- Laplace equation
- Canonical form

**Test 31**  
**Numerical Analysis**  
**- Advanced**  
**25th Nov' 2024**

- Numerical Analysis:
- Solution of Algebraic equation
- Bisection & Regular falsi method
- Newton Raphson, Gauss elimination
- Gauss Jordan, gauss seidel method
- Newton Interpolation, Lagrange's
- Interpolation
- Simpson rule, Trapezoidal rule
- Gaussian quadrature formula,
- Numerical solution of ODE
- Euler's & Ranga Kutta method

**Test 32**  
**Computer**  
**Programming**  
**- Advanced**  
**28th Nov' 2024**

- Computer programming:
- Binary, Octal, Hexa decimal Number system
- Conversion & Algebra of Binary numbers
- Elements of Computer system &
- Concept of memory
- Truth table, Boolean algebra
- Representation of Integers, Algorithm & Flowcharts

## Test

## Detailed Topic

**Test 33**  
**Mechanics - Advanced**  
**1st Dec' 2024**

- Introduction to Mechanics
- Moment of Inertia
- D Alembert's principle
- Generalized co-ordinates
- Lagrange's equation
- Hamilton equation
- Motion of body in 2D

**Test 34**  
**Partial Differential**  
**Equation - Advanced**  
**4th Dec' 2024**

- Fluid Dynamics - Introduction to Fluid
- Euler's & Lagrange's equation
- Kinematics of Fluid flow
- Boundary condition
- Stream line flow, Path of particles
- Sources & Sinks
- Method of Images
- Axisymmetric flow
- Vortex flow 1
- Vortex flow 2
- Navier's – Stokes equation

**FLT**

**Paper 1**

**FLT**

**Paper 2**

**FLT**

**Paper 3**

**FLT**

**Paper 4**

# Advanced

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