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Ramanasri IAS/IFoS Institute: Your Ultimate Choice for UPSC Maths Optional Coaching

If you are an aspiring civil servant, choosing the right coaching institute is crucial for your success. With the increasing competition, it is essential to have an edge over others, and that's where Ramanasri IAS/IFoS Institute comes in. We are a premier coaching center that offers exceptional UPSC Maths optional coaching. Our courses are designed to provide you with the best preparation possible to help you crack the UPSC exam.

At Ramanasri IAS/IFoS Institute, we are focused on helping students achieve their goals. We understand the importance of proper guidance and mentorship, and therefore, our team of experts is dedicated to providing you with the best possible learning experience. Our courses are designed to cater to the needs of every student, whether you are a beginner or an experienced candidate.

We offer various UPSC Maths optional courses like offline regular classrooms, weekend, hybrid , online coaching, pendrive courses, study materials, and test series. Our courses are meticulously crafted to cover all the essential topics and provide extensive practice sessions. Our online coaching is a virtual classroom with live classes, doubt clearing sessions, interactive and study materials. Our pendrive courses come with high-quality video lectures and study materials that can be accessed anytime, anywhere. Our study materials are designed by experts with years of experience in the field, and our test series provides mock tests to simulate the actual exam environment.

Our faculty Ramanasri Sir is our pride. We are proud to have one of the best faculties in the country, with over 22 years of teaching experience in higher-level mathematics. Our faculty is passionate about teaching and is dedicated to providing the best possible guidance to every student. Our faculty is approachable and always available to solve any doubts and queries you might have.

Join us today and take the first step towards your dream of becoming a civil servant.

Syllabus for IAS Maths Optional

PAPER – I

(1) Linear Algebra:

Vector spaces over R and C, linear dependence and independence, subspaces, bases, dimension; Linear transformations, rank and nullity, matrix of a linear transformation. Algebra of Matrices; Row and column reduction, Echelon form, congruence's and similarity; Rank of a matrix; Inverse of a matrix; Solution of system of linear equations; Eigen values and eigenvectors, characteristic polynomial, Cayley-Hamilton theorem, Symmetric, skew-symmetric, Hermitian, Skew-Hermitian, orthogonal and unitary matrices and their eigen values.

(2) Calculus:

Real numbers, functions of a real variable, limits, continuity, differentiability, mean value theorem, Taylor's theorem with remainders, indeterminate forms, maxima and minima, asymptotes; Curve tracing; Functions of two or three variables: limits, continuity, partial derivatives, maxima and minima, Lagrange's method of multipliers, Jacobian. Riemann's definition of definite integrals; Indefinite integrals; Infinite and improper integrals; Double and triple integrals (evaluation techniques only); Areas, surface and volumes.

(3) Analytic Geometry:

Cartesian and polar coordinates in three dimensions, second degree equations in three variables, reduction to canonical forms, straight lines, shortest distance between two skew lines; Plane, sphere, cone, cylinder, paraboloid, ellipsoid, hyperboloid of one and two sheets and their properties.

(4) Ordinary Differential Equations:

Formulation of differential equations; Equations of first order and first degree, integrating factor; Orthogonal trajectory; Equations of first order but not of first degree, Clairaut's equation, singular solution. Second and higher order linear equations with constant coefficients, complementary function, particular integral and general solution. Second order linear equations with variable coefficients, Euler-Cauchy equation (Homogeneous linear equations); Determination of complete solution when one solution is known using method of variation of parameters. Laplace and Inverse Laplace transforms and their properties; Laplace transforms of elementary functions. Application to initial value problems for 2nd order linear equations with constant coefficients.

(5) Dynamics & Statics:

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. 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.

(6) Vector Analysis:

Scalar and vector fields, differentiation of vector field of a scalar variable; Gradient, divergence and curl in Cartesian and cylindrical coordinates; Higher order derivatives; Vector identities and vector equations. Application to geometry: Curves in space, Curvature and torsion; Serret-Frenet's formulae. Gauss and Stokes' theorems, Green's identities.

PAPER – II

(1) Modern Algebra:

Groups, subgroups, cyclic groups, cosets, Lagrange's Theorem, normal subgroups, quotient groups, homomorphism of groups, basic isomorphism theorems, permutation groups, Cayley's theorem. Rings, sub rings and ideals, homeomorphisms of rings; Integral domains, principal Ideal domains, Euclidean

domains and unique factorization domains; Fields, quotient fields.

(2) Real Analysis:

Real number system as an ordered field with least upper bound property; Sequences, limit of a sequence, Cauchy sequence, completeness of real line; Series and its convergence, absolute and conditional convergence of series of real and complex terms, rearrangement of series. Continuity and uniform continuity of functions, properties of continuous functions on compact sets. Riemann integral, improper integrals; Fundamental theorems of integral calculus. Uniform convergence, continuity, differentiability and integrability for sequences and series of functions; Partial derivatives of functions of several (two or three) variables, maxima and minima.

(3) Complex Analysis:

Analytic functions, Cauchy-Riemann equations, Cauchy's theorem, Cauchy's integral formula, power series representation of an analytic function, Taylor's series; Singularities; Laurent's series; Cauchy's residue theorem; Contour integration.

(4) Linear Programming:

Linear programming problems, basic solution, basic feasible solution and optimal solution; Graphical method and simplex method of solutions; Duality. Transportation and assignment problems.

(5) Partial differential equations:

Family of surfaces in three dimensions and formulation of partial differential equations; Solution of quasi linear partial differential equations of the first order, Cauchy's method of characteristics; Linear partial differential equations of the second order with constant coefficients, canonical form; Equation of a vibrating string, heat equation, Laplace equation and their solutions.

(6) Numerical Analysis & Computer Programming:

Numerical methods: Solution of algebraic and transcendental equations of one variable by bisection, Regula-Falsi and Newton-Raphson methods; solution of system of linear equations by Gaussian elimination and Gauss-Jordan (direct), Gauss-Seidel (iterative) methods. Newton's (forward and backward) interpolation, Lagrange's interpolation.
Numerical integration: Trapezoidal rule, Simpson's rules, Gaussian quadrature formula. Numerical solution of ordinary differential equations: Euler and Runge- Kutta methods.
Computer Programming: Binary system; Arithmetic and logical operations on numbers; Octal and Hexadecimal systems; Conversion to and from decimal systems; Algebra of binary numbers. Elements of computer systems and concept of memory; Basic logic gates and truth tables, Boolean algebra, normal forms. Representation of unsigned integers, signed integers and reals, double precision reals and long integers. Algorithms and flow charts for solving numerical analysis problems.

(7) Mechanics and Fluid Dynamics:

Generalized coordinates; D' Alembert's principle and Lagrange's equations; Hamilton equations; Moment of inertia; Motion of rigid bodies in two dimensions. Equation of continuity; Euler's equation of motion for in viscid flow; Stream-lines, path of a particle; Potential flow; Two-dimensional and axisymmetric motion; Sources and sinks, vortex motion; Navier-Stokes Equation for a viscous fluid.

IAS MATHS OPTIONAL ANALYSIS Note:

LA	Linear Algebra
CAL	Calculus
AG	Analytical Geometry
ODE	Ordinary Differential Equations
VA	Vector Analysis
D&S	Dynamics & Statics
MA	Modern Algebra
RA	Real Analysis
CA	Complex Analysis
LP	Linear Programming
PDE	Partial Differential Equations

NA&CP	Numerical Analysis & Computer Programming
M&FD	Mechanics & Fluid Dynamics

IAS-2022 Maths question & Topic wise Analysis

Paper-I

Section A

Q. No	Sub Q. No	Topic	Marks
1	1.a	LA	10
	1.b	LA	10
	1.c	CAL	10
	1.d	CAL	10
	1.e	AG	10
2	2.a	LA	15
	2.b	CAL	15
	2.c	AG	20
3	3.a	LA	20
	3.b	CAL	15
	3.c	AG	15
4	4.a	LA	15
	4.b	CAL	20
	4.c	AG	15

Section B

5	5.a	ODE	10
	5.b	ODE	10
	5.c	D&S	10
	5.d	D&S	10
	5.e	VA	10
6	6.a	D&S	20
	6.b	ODE	15
	6.c	VA	15
7	7.a	VA	20
	7.b	ODE	15
	7.c	D&S	15
8	8.a (i)	ODE	10
	8.a (ii)	ODE	10
	8.b	D&S	15
	8.c	VA	15

Paper-II

Section A

Q. No	Sub Q. No	Topic	Marks
1	1.a	MA	10
	1.b	CA	10
	1.c	RA	10
	1.d	CA	10
	1.e	LPP	10
2	2.a	RA	15
	2.b	MA	15
	2.c	CA	20
3	3.a	CA	15
	3.b	RA	20
	3.c	LPP	15
4	4.a	MA	15
	4.b	RA	15

	4.c	LPP	20
	Section B		
5	5.a	PDE	10
	5.b	NA&CP	10
	5.c	NA&CP	10
	5.d	M&FD	10
	5.e	M&FD	10
6	6.a	PDE	20
	6.b	NA&CP	15
	6.c	M&FD	15
7	7.a	PDE	15
	7.b	NA&CP	15
	7.c	M&FD	20
8	8.a	PDE	15
	8.b	NA&CP	15
	8.c	M&FD	20

IAS-2021 Maths question & Topic wise Analysis

Paper-I

Section A

Q. No	Sub Q. No	Topic	Marks
1	1.a	LA	10
	1.b	LA	10
	1.c	CAL	10
	1.d	CAL	10
	1.e	AG	10
2	2.a	AG	20
	2.b	CAL	15
	2.c	LA	15
3	3.a (i)	CAL	7
	3.a (ii)	CAL	5
	3.a (iii)	CAL	8
	3.b	AG	15
	3.c (i)	LA	8
	3.c (ii)	LA	7
4	4.a(i)	LA	10
	4.a(ii)	LA	10
	4.b	CAL	15
	4.c	AG	15
	Section B		
5	5.a	ODE	10
	5.b	ODE	10
	5.c	D&S	10
	5.d	D&S	10
	5.e	VA	10
6	6.a	D&S	20
	6.b	ODE	15
	6.c	VA	15
7	7.a	VA	20
	7.b	ODE	15
	7.c	D&S	15
8	8.a (i)	ODE	10
	8.a (ii)	ODE	10
	8.b	D&S	15

	8.c	VA	15

Paper-II

Section A

Q. No	Sub Q. No	Topic	Marks
1	1.a	MA	10
	1.b	RA	10
	1.c	RA	10
	1.d	CA	10
	1.e	LPP	10
2	2.a	RA	15
	2.b	MA	15
	2.c	CA	20
3	3.a	CA	15
	3.b	RA	20
	3.c	LPP	15
4	4.a	MA	15
	4.b	CA	20
	4.c	LPP	15

Section B

5	5.a	PDE	10
	5.b	NA&CP	10
	5.c	NA&CP	10
	5.d	M&FD	10
	5.e	M&FD	10
6	6.a	PDE	20
	6.b	NA&CP	15
	6.c	NA&CP	15
7	7.a	PDE	15
	7.b	NA&CP	15
	7.c	M&FD	20
8	8.a	PDE	15
	8.b	NA&CP	15
	8.c	M&FD	20

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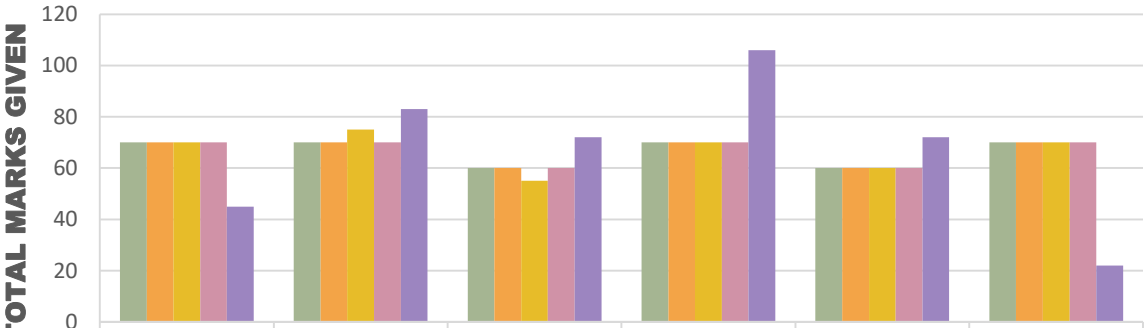
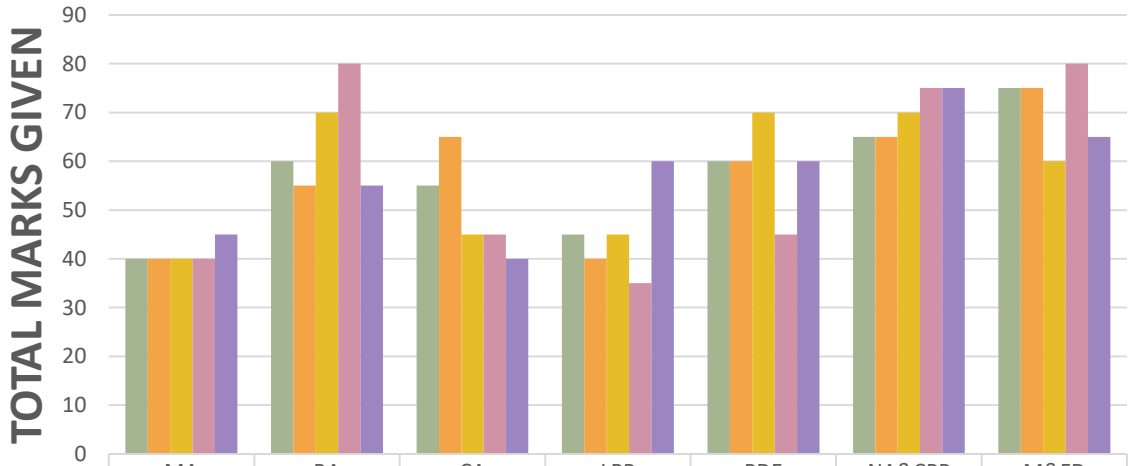
MATHS OPTIONAL PAPER-1 ANALYSIS FROM 2022 TO 2018



	LA	CAL	AG	ODE	VA	D&S
2022	70	70	60	70	60	70
2021	70	70	60	70	60	70
2020	70	75	55	70	60	70
2019	70	70	60	70	60	70
2018	45	83	72	106	72	22

MATHS OPTIONAL PAPER-2 ANALYSIS FROM 2022 TO 2018



	MA	RA	CA	LPP	PDE	NA&CPP	M&FD
2022	40	60	55	45	60	65	75
2021	40	55	65	40	60	65	75
2020	40	70	45	45	70	70	60
2019	40	80	45	35	45	75	80
2018	45	55	40	60	60	75	65

IAS Mathematics Optional Books List

PAPER – I Books

1. **Linear Algebra**

    1. **Linear Algebra –** A.R. Vasistha (Krishna Series)
    2. **Matrices –** A. R. Vasistha (Krishna Series)
    3. **Linear Algebra** Schaum series

2. **Calculus**
    1. **Differential Calculus–** A.R. Vasistha, Dr. S.K Sharma (Krishna Series)
    2. **Advanced Integral Calculus –** Dr. D.C. Agarwal (Krishna Series)
    3. **Mathematical Analysis**- S C Malik & Sabita Arora
    4. **Elements of Real Analysis -** M.D. Raisinghania (S. Chand Series)

3. **Analytic Geometry**
    1. **3D Geometry –** P.N. Chatterjee
4. **Ordinary Differential Equations**
    1. **Ordinary and Partial Differential Equations –** M.D. Raisinghania (S. Chand)
    2. **Laplace Transformation-Class handout.**
5. **Dynamics & Statics –** Krishna Series
    1. **Statics –** Krishna Series
    2. **Dynamics –** Krishna Series
6. **Vector Analysis**
    1. **Vector Calculus –** A.R. Vasistha & J.N. Sharma
    2. **Vector Calculus –** Shanti Narayana
    3. **Curves in Spaces –** P.N. Chatterjee (**Class Handout**)

PAPER – II Books

1. **Modern (Abstract) Algebra**

    1. **Modern Algebra** – Vasistha (Krishna Series)
    2. **A course in Abstract Algebra** – Khanna and Bhambri
    3. **Modern Algebra** – I. N. Herstein (John Wiley Publications)
    4. **Modern Algebra**– **A** Galliean
2. **Real Analysis**

    1. **Elements of Real Analysis -** M.D. Raisinghania (S. Chand Series)
    2. **Mathematical Analysis**- S C Malik & Sabita Arora

3. **Complex Analysis**
    1. **Functions of a Complex Variable** –J.N. Sharma (Krishna Series)
    2. **Complex Analysis –**Schaum's Series

4. **Linear Programming**
    1. **Operations Research –**KantiSwarup, P. K. Gupta, Man Mohan (S. Chand)
    2. **Linear Programming –** Krishna Series

5. **Partial Differential Equations**
    1. Ordinary and Partial Differential Equations – M.D. Raisinghania (S. Chand)
    2. Boundary Value Problems-Class handout.
6. **Numerical Analysis & Computer Programming**
    1. A. R. Vasistha (Krishna Series)
    2. Introductory Methods of Numerical Analysis – Sastry
    3. Numerical Methods – V. RajaRaman
    4. Computer Programming – Class Handout
7. **Mechanics & Fluid Dynamics**
    1. **Fluid Dynamics** – M.D. Raisinghania
    2. **Mechanics** – Krishna Series Rigid Dynamics Vol I & Rigid Dynamics II

UNION PUBLIC SERVICE COMMISSION

PROGRAMME OF EXAMINATIONS/RECRUITMENT TESTS (RTs) -2023

S. No.	Name of Examination	Date of Notification	Last Date for receipt of Applications	Date of commencement of Exam	Duration of Exam
1	Civil Services (Preliminary) Examination, 2023	01.02.2023	21.02.2023	28.05.2023 (SUNDAY)	1 DAY
2	Indian Forest Service (Preliminary) Examination, 2023 through CS(P) Examination 2023				
3	Civil Services (Main) Examination, 2023	-	-	15.09.2023 (FRIDAY)	5 DAYS
4	Indian Forest Service (Main) Examination, 2023	-	-	26.11.2023 (SUNDAY)	10 DAYS

Limited seats Hurry up!!!

Regular Batches (Monday to Friday)

Batch No	Timings
I	8:00 AM to 10:30 AM
II	11:00 AM to 1:30 PM
III	3:00 PM to 5:30 PM
IV	6:30 PM to 8:45 PM

Note:
Classes will be Monday to Friday and Sunday will be Chapter/unit wise Tests for whatever we have covered during the last 5 days (Monday to Friday). Why because revision & presentation answers is very important for what you have understood during the daily classes.

Weekend Batches Saturday & Sunday only

Batch No	Timings
I	8:00 AM to 1:30 PM (Including 30min Break)
II	2:30 PM to 5:30 PM (Including 30min Break)

Note:
Classes will be only on Saturday & Sunday and every Friday @ 6 PM will be Chapter/unit wise Tests for whatever we have covered during the last 2 days (Saturday & Sunday). Why because revision & presentation of answers is very important for what you have understood during the weekend classes.

Key Features of Online/Offline/Pen Drive/etc UPSC Maths optional

The following Special and salient features make us why we are different from the others in the market.

- Teaching based organization, quality Teaching with focus on conceptual clarity
- Permanent, full-time, highly qualified and dedicated faculty
- Prime focus on concept building & Problem-solving techniques
- Focus on Individual attention. Co-operative, caring administrative staff
- Appreciable result ratio of successful student to enrolled students
- The study materials have been thoughtfully curated in a plain and simple language that both bilingual and English-speaking students can grasp.
- The study materials align with the UPSC CSE syllabus and are updated frequently
- Scientifically designed, clear and precise study material
- Ample questions capturing all flavours and difficulty level
- Formula booklet for quick revision
- Lots of home assignments for practice
- Exclusive class tests for continuous assessments & improvement
- Complete academic year planning at start of session
- Include 81 test series.
- Regular Tests (weekly / chapter-wise / phase / complete length / E-Test series)
- Thorough discussion on each test in successive lecture
- All tests will be evaluated and gives individual feedback
- Fixed timetable
- Individual doubt clearance sessions
- Comfortable speed of syllabus coverage with enough buffers
- Complete information on various competitive examinations
- Motivational counselling sessions
- The course duration is 7-8 months
- The Course validity for 11 months + 1month (free extension) from date of joining
- The classes will be conducted 2.5 hrs per day and 5 days a week
- Live Interactive classes
- Reasonable fees
- Finishing the Syllabus in time 28-36 weeks Classes
- Small Batches i.e., Batch Size 35
- For doubts, can contact us through **WhatsApp** and **Google/Zoom** sessions
- 22 years of teaching experience in teaching **Mathematics**

- **Note 1:** All live, online course is available on Windows, Android phone, Apple iOS & IPAD and Apple MacBook.
- **Note 2:** For any further queries, please contact on this number **+91 87 5070 6262**

Fee Structure details

Batch	Fees	What you will get benefits from us
REGULAR	Rs. 65,500	a) 6 Month Classes b) Study Materials c) Test series d) Personal & Individual Guidance, Strategy Previous Year Questions Solutions e) Guaranteed 350+ Marks in your Mains Maths Optional
WEEKEND	Rs. 65,500	a) 6 Month Classes b) Study Materials c) Test series d) Personal & Individual Guidance, Strategy e) Previous year Questions Solution f) Guaranteed 350+ Marks in your Mains Maths Optional
ONLIINE	Rs. 62,500	a) 6 Month Classes b) Study Materials c) Test series d) Personal & Individual Guidance, Strategy e) Previous year Questions Solution f) Guaranteed 350+ Marks in your Mains Maths Optional
PEN DRIVE	Rs. 52,500	a) 6 Month Classes b) Study Materials c) Test series d) Personal & Individual Guidance, Strategy e) Previous year Questions Solution f) Guaranteed 350+ Marks in your Mains Maths Optional
MATHS OPTIONAL MAINS TEST SERIES	Rs. 13,500	a) Test Series with Solutions b) Paper correction on in time c) Personal & Individual Guidance, Strategy d) Guaranteed 300+ Marks in your Mains Maths Optional
MATHS OPTIONAL SELF-STUDY 40 TEST SERIES	Rs. 16,500	a) Test Series with Solutions b) Paper correction on in time c) Personal & Individual Guidance, Strategy d) Guaranteed 300+ Marks in your Mains Maths Optional
MATHS OPTIONAL SELF-STUDY 62 TEST SERIES	Rs. 26,500	a) Test Series with Solutions b) Paper correction on in time c) Personal & Individual Guidance, Strategy d) Guaranteed 330+ Marks in your Mains Maths Optional

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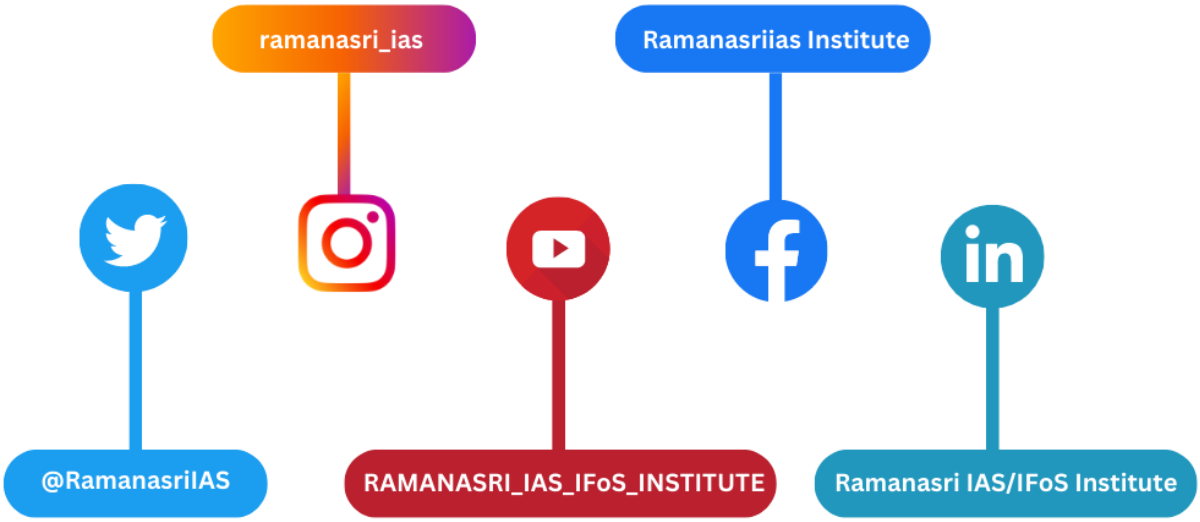

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