

OUR ACHIEVEMENTS IN IAS (FROM 2008 TO 2019)



(1)

SECTION - A

1. (a) If H is a subgroup of a group G such that $x^2 \in H$ for every $x \in G$, then prove that H is a normal subgroup of G.

[10]

1. (b) Show that the set of matrices $S = \left\{ \begin{pmatrix} a & -b \\ b & a \end{pmatrix} \mid a, b \in \mathbb{R} \right\}$ is a field

under the usual binary operations of matrix addition and matrix multiplication. What are the additive and multiplicative identities and what is the inverse of $\begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$

? Consider the map $f: \mathbb{C} \rightarrow S$ defined by $f(a + ib) = \begin{pmatrix} a & b \\ b & a \end{pmatrix}$

Show that f is an isomorphism. (Here \mathbb{R} is the set of real numbers and \mathbb{C} is the set of complex numbers.) [10]

1. (c) Let $f(x) = \begin{cases} \frac{|x|}{2} + 1 & \text{if } x < 1 \\ \frac{x}{2} + 1 & \text{if } 1 \leq x < 2 \\ -\frac{|x|}{2} + 1 & \text{if } 2 \leq x \end{cases}$

What are the points of discontinuity of f, if any?

What are the points where f is not differentiable, if any?
Justify yours answers. [10]

1. (d) If $f(z) = u + iv$ is an analytic function of $z = x + iy$ and $u - v = \frac{e^y - \cos x + \sin x}{\cos hy - \cos x}$, find f(z) subject to the condition,

$$f\left(\frac{\pi}{2}\right) = \frac{3-i}{2}$$

[10]

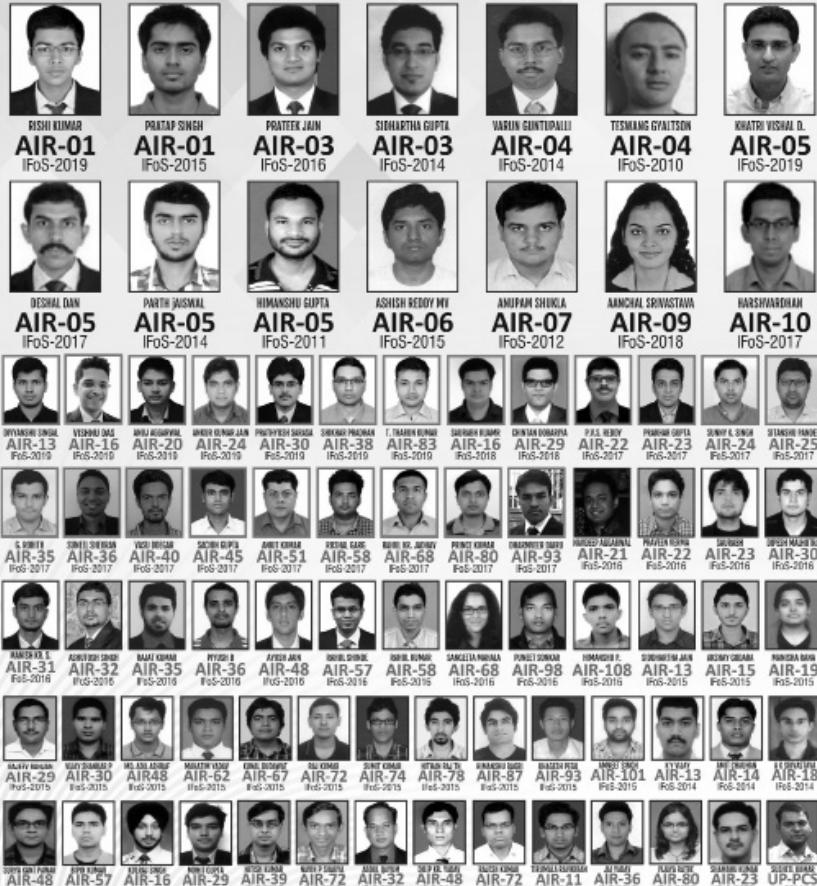
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OUR ACHIEVEMENTS IN IFoS (FROM 2008 TO 2019)

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IAS/IFoS MATHEMATICS (Optional)
by K. Venkanna

YEARS OF EARNED WORTHINESS OUR TOP-20 RANKERS IN IAS

GANESH KUMAR BASKAR (2019) AIR-07 MARKS 310/500	KANISHAK KATARIA (2018) AIR-01 MARKS 361/500	K. VARUN REDDY (2018) AIR-07 MARKS 324/500	TANMAY V. SHARMA (2018) AIR-10 MARKS 336/500	ATUL PRAKASH (2017) AIR-04 MARKS 368/500
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ASHISH S. (2015) AIR-12 MARKS 284/500	SIDHARTH JAIN (2015) AIR-13 MARKS 268/500	PRATAP SINGH (2015) AIR-15 MARKS 283/500	NITISH K. (2014) AIR-08 MARKS 346/500	HIMANSHU GUPTA (2011) AIR-07 MARKS 430/500
And Many More...				

1. (e) Consider the following linear programming problem:

$$\text{Maximize } Z = x_1 + 2x_2 - 3x_3 + 4x_4$$

subject to

$$x_1 + x_2 + 2x_3 + 3x_4 = 12$$

$$x_2 + 2x_3 + x_4 = 8$$

$$x_1, x_2, x_3, x_4 \geq 0$$

(i) Using the definition, find its all *basic solutions*. Which of them degenerate basic feasible solutions and which are non-degenerate feasible solutions?
(ii) Without solving the problem, show that it has an optimal solutions of the basic feasible solution(s) is/are optimal? [10]
2. (a) (i) How many generators are there of the cyclic group G of order 8 ? Explain.
(ii) Give an example of a group G in which every proper subgroup is cyclic but the group itself is not cyclic. [5+13=18]

2. (b) Let $f_n(x) = \begin{cases} 0, & \text{if } x < \frac{1}{n+1}, \\ \sin \frac{\pi}{x}, & \text{if } \frac{1}{n+1} \leq x \leq \frac{1}{n}, \\ 0, & \text{if } x > \frac{1}{n} \end{cases}$

Show that $f_n(x)$ converges to a continuous function but not uniformly. [14]

2. (c) If α, β, γ are real numbers such that $\alpha^2 > \beta^2 + \gamma^2$ Show

that: $\int_0^{2\pi} \frac{d\theta}{\alpha + \beta \cos \theta + \gamma \sin \theta} = \frac{2\pi}{\sqrt{\alpha^2 - \beta^2 - \gamma^2}}$ [18]

(3)

3. (a) Let 'S' be the set of all real numbers except -1. Define $a * b = a + b + ab$. Is $(S, *)$ a group?

Find the solution of the equation $2*x*3 = 7$ in S. [17]

3. (b) Examine the series

$$\sum_{n=1}^{\infty} u_n(x) = \sum_{n=1}^{\infty} \left[\frac{nx}{1+n^2x^2} - \frac{(n-1)x}{1+(n-1)^2x^2} \right]$$

for uniform convergence. Also, with the help of this example, show that the condition of uniform convergence of $\sum_{n=1}^{\infty} u_n(x)$ is sufficient but not necessary for the sum $S(x)$

of the series to be continuous. [15]

3. (c) Maximize $z = 2x_1 + 3x_2 + 6x_3$
 subject to $2x_1 + x_2 + x_3 \leq 5$
 $3x_2 + 2x_3 \leq 6$
 $x_0 \geq 0, x_2 \geq 0, x_3 \geq 0.$

Is the optimal solution unique? Justify your answer.

[18]

4. (a) If Z is the set of integers then show that $Z[\sqrt{-3}] = \{a + \sqrt{-3}b / a, b \in Z\}$ is not a unique factorization domain. [15]

4. (b) The function f is defined on $(0, 1]$ by

$$f(x) = (-1)^{n+1} n(n+1), \frac{1}{n+1} \leq x \leq \frac{1}{n}, n \in N.$$

Show that $\int_0^1 f(x) dx$ does not converge. [12]

4. (c) Expand $f(z) = \frac{1}{(z+1)(z+3)}$ in Laurent's series which is

(16)

Anyone who has done B.Tech / M.Tech / B.Sc / M.Sc and has an interest in Maths.

Usually commit and their mitigation measures. For example, I commit a lot of mistakes when doing Integration by parts and usually the error involves missing negative (-) sign etc. Therefore whenever I come across such type of question I try to devote extra 1 minute to re-check all my steps.

Maths.stackexchange.com is the best online resource for preparation. You can create an account and get your maths questions answered within minutes.

Why did I score only 262?

Among all the students in the final list who had Maths as an optional, I have scored the least. My paper - 1 was a complete disaster and I only scored 92 marks in it. In fact I could only attempt 160 marks paper and had to leave 90 marks paper completely.

The reasons for the above situation in Paper - 1 are as follows:

- Lack of written practice:** In many topics (especially statics and dynamics) I used to just look at a question and its solution without solving it first. As a result I forgot the exact method in the exam hall!
- Left many topics:** I prepared only 25% 3-D, 80% Calculus and 25% Statics & Dynamics and had to pay a heavy price in the exam.

On the other hand my preparation for paper - 2 was excellent and therefore I scored an amazing 170 marks in it

BHAVESH MISHRA

AIR-58 in CSE-2014

(15)

Easy paper: The difficulty level of paper is quite moderate and almost all questions are directly picked from the IMS Test Series / Standard Textbooks.

WHO SHOULD TAKE IT?

Myths around science subjects.

Coaching institutions have mastered the art of brainwashing students and creating an atmosphere of gloom and doom around science subjects. There are lots of myths circulating among students. Let's bust these myths.

1. **Maths optional is only for students from IITs: Definitely not.** Anyone willing to put in hard work can easily score very high marks. The best example being **Nitish K (Rank 8) who is not from any IIT.**
2. **There is heavy scaling:** Let the data speak for itself. I attempted 240 marks in Paper 2 and got 170 marks. Now would you call it a scaling?
3. **It plays no role in GS:** Yes it's true that science optional subjects don't overlap with GS but it's equally true that GS has never been a rank decider in UPSC IAS.
4. **There are 3 major things that decides your rank:** Essay, Optional and Interview. Even if one puts in 5 years of efforts in GS the advantage in terms of marks would be around 30 marks or so but 1 year of dedicated effort in maths would give you 50+ marks advantage straightaway.

Do's and Dont's:

1. Practice, Practice and Practice. The key to success in maths is filling up as many notebooks as you can, during the preparation stage. The more you sweat during preparation the less you will bleed in the battlefield!
2. Don't read Maths book / notes like GS. It is a recipe for disaster. Rather always study with pen, paper and calculator.
3. While solving examples don't jump to see solution first. Try giving your best shot and after making sure that you are not able to solve it using your present knowledge then only look at the answer. This will ensure that better retention.
4. Generally we make lots of silly mistakes while solving a question. It is best to catch these errors early and not repeat them in exam hall. The best strategy for this is to maintain a notebook of errors that you

(4)

valid for (i) $1 < |z| < 3$ (ii) $|z| > 3$ (iii) $|z| < 1$. [10]

4. (d) A construction company has to move four large cranes from old construction site to new construction site. The distance in kilometres between the old and new locations are as given in the adjoining table. The crane at O_3 cannot be used at N_2 but all the cranes can work equally well at any of the other new sites. Determine a plan for moving the cranes that will minimise the total distance involved in the move.

New Cons. Sites

	N_1	N_2	N_3	N_4
O_1	15	20	13	40
<i>Old Cons. Sites</i>				
O_2	38	42	15	20
O_3	25	17	30	18
O_4	19	30	40	35

[13]

SECTION - B

5. (a) Find complete integral of $(x^2 - y^2) pq - xy(p^2 - q^2) = 1$. [10]
5. (b) Solve $(D^2 - DD' - 2D'^2) z = (2x^2 + xy - y^2) \sin xy - \cos xy$. [10]
5. (c) Use Newton-Raphson method to find the real root of the equation $3x = \cos x + 1$ correct to four decimal places. [10]
5. (d) Convert the following decimal numbers to equivalent binary and hexadecimal numbers :
 - (i) 4096
 - (ii) 0.4375
 - (iii) 2048.0625

[10]

(5)

5. (e) If velocity distribution of an incompressible fluid at point (x, y, z) is given by $\{3xz/r^5, 3yz/r^5, (kz^2 - r^2)/r^5\}$, determine the parameter k such that it is a possible motion. Hence find its velocity potential. [10]

6. (a) Find the equation of the surface satisfying $4yz = p + q + 2y = 0$ and passing through $y^2 + z^2 = 1$ and $x + z = 2$. [10]

6. (b) Reduce $x (\partial^2 z / \partial x^2) + \partial^2 z / \partial y^2 = x^2$ ($x > 0$) to canonical form. [10]

6. (c) A square plate is bounded by the lines $x = 0$, $y = 0$, $x = 10$ and $y = 10$. Its faces are insulated. The temperature along the upper horizontal edge is given by $u(x, 10) = x(10 - x)$ while the other three faces are kept at 0°C . Find the steady state temperature in the plate. [15]

6. (d) If the string of length l is initially at rest in equilibrium position and each of the points is given the velocity $v_0 \sin(3\pi x/l) \cos(2\pi x/l)$ where $0 < x < l$ at $t = 0$. Find the displacement function. [15]

7. (a) Using Gauss-Siedel iterative method, find the solution of the following system.

$$4x - y + 8z = 26, 5x + 2y - z = 6, x - 10y + 2z = -13 \text{ upto three iterations.} \quad [12]$$

7. (b) Obtain the Simpson's rule for the integral $I = \int_a^b f(x)dx$ and

show that this rule is exact for polynomials of degree $n \leq 3$. In general show that the error of approximation

for Simpson's rule is given by $R = -\frac{(b-a)^5}{2880} f''''(\eta), \eta \in (0,2)$.

Apply this rule to the integral $\int_0^1 \frac{dx}{1+x}$ and show that

$$|R| \leq 0.008333. \quad [14]$$

(14)

Irrespective of whether you are very happy or deeply unsatisfied about paper 1, try to forget about it and stay calm for paper 2.

INTERVIEW

In the interview, you can expect some questions related to mathematics optional. Generally you won't be asked to solve a problem because that ability has been tested in mains. They would like to see whether you have a genuine curiosity regarding mathematics outside what is mentioned in syllabus. In both my UPSC interviews, I was asked about Ramanujan's work. There were questions on Vedic Mathematics, National Mathematics Day, important Indian Mathematical Institutions, Field medalist Manjula Bhargava etc. Hence while preparing for interview, try to be aware about these non-theoretical aspects of maths as well.

I hope above tips provide some clarity regarding maths optional to UPSC aspirants.

All the best!

Bhavesh Mishra (AIR-58)
in IAS-2014 Examination
CLASSROOM STUDENT

Why Maths?

Simply because it is the best performing optional subject in UPSC/IAS.

Extremely high scoring: If you get your maths optional right then you will make it to the final list. This year one of my batch mate in IMS Nitish K (Rank 8) has got a mind boggling 346 marks.

Certainty: If you have attempted your paper well then you are sure that you will get good marks. For example this year just by attempting 400 marks paper you could get a decent 260+ marks. Even if you don't get good marks in first attempt but you can be sure that you will increase your marks in subsequent attempt(s).

Fun: Mathematics is a delightful subject and therefore doing maths takes you away from somewhat boring humanities.

Good Impression: The fact that you have taken Maths makes a good impression on interview board members

(it happened in my case!). They are very pleased to see that you have opted for a tough optional.

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PRACTICE

Just knowing theory is not enough. It needs to be accompanied by consistent problem solving practice. It is best to solve questions that have already been asked in mains. If some problem seems very non-intuitive, it would help if the trick to solve such problem is written in your notebook.

TEST SERIES

Test series is very important for this optional. I had joined IMS test series which helped me in identifying my weak areas. In both CSE and IFoS mains, there were many questions similar to those covered in IMS test series. With enough practice, a candidate can achieve the ability to complete the maths paper in 3 hours. It is important to assess your performance after each test. Necessary steps should be taken to rectify common mistakes that you are committing in the test series. You should be alert not to repeat the same mistakes again & again. As your performance improves with every test, the actual mains paper will seem just like any other test & you will be able to comfortably complete it. Presentation of your answer matters a lot. Your aim should be to make examiner's life as easy as possible so that he/she will award you maximum marks. Only the final answer doesn't matter. Writing proper steps is also important to show the logical flow with which you arrived at the solution. Specifically mention whichever theorem or property you are using in a particular step. Wherever possible, draw neat diagrams with proper labelling. Such small things will collectively fetch you the extra marks that you are expecting from this optional. The habit of writing such detailed answers will not develop overnight and hence you have to consciously work through the test series in this direction.

DURING MAINS

The mains exam schedule does not provide much gap between General Studies & Maths papers. You will generally have 1 day in between. Your notebook containing important formulae & theorems will be very useful at such times. You will be able to go through this summary of each chapter and it will provide much needed confidence before the actual paper. During the main exam, I would advise completing the compulsory questions 1 & 5 first. Then you can choose 3 out of remaining 6 questions. Easier questions like those from topics like linear programming, numerical analysis, linear algebra etc. should be the priority. Even if you don't know the complete answer to any question, write as many steps as you can since partial marks also matter.

Once you finish paper 1, don't start immediately analyzing your performance.

(6)

7. (c) Use Runge-Kutta formula of fourth order to find the value of y at $x = 0.8$,

$$\text{where } \frac{dy}{dx} = \sqrt{x+y}, y(0.4) = 0.41.$$

Take the step length $h = 0.2$.

[14]

7. (d) Draw a flowchart for Simpson's one-third rule. [10]

8. (a) A uniform rod, of mass $3m$ and length $2l$, has its middle point fixed and a mass m attached at one extremity. The rod when in a horizontal position is set rotating about a vertical axis through its centre with an angular velocity equal to $\sqrt{(2ng/l)}$. Show that the heavy end of the rod will fall till the inclination of the rod to the vertical is $\cos^{-1}[\sqrt{(n^2+1)} - n]$, and will then rise again.

[17]

8. (b) Determine the motion of a spherical pendulum, by using Hamilton's equations. [17]

8. (c) When a pair of equal and opposite rectilinear vortices are situated in a long circular cylinder at equal distance from its axis, show that path of each vortex is given by the equation.

$$(r^2 \sin^2 \theta - b^2)(r^2 - a^2)2 = 4a^2b^2r^2 \sin^2 \theta,$$

[16]

OUR TOPPER'S MARKS LIST (IAS-2019)

- For your final selection, optional subject marks are crucial.
- Choose Optional Subject based on Your Graduation Studies & Score Highest Marks.
- Now Mathematics has become one of the most Cherished Optional Paper among Science Graduates, especially Students with Mathematics background including B.Tech.
- In the new pattern of exam, the average marks of successful candidates in Maths is more than 300 out of 500.
- Mathematics (Opt.) has proven to be the Most Reliable and High Scoring Subject in IAS/IFoS.
- IMS has been successfully providing consistent results since its inception.

MARKS ARE BEFORE YOU AND YOU SHOULD ANALYZE YOURSELF

SUBJECT		Max. Marks.	Marks. Obtained	SUBJECT		Max. Marks.	Marks. Obtained	
ESSAY (PAPER-I)		250	122	ESSAY (PAPER-I)		250	132	
GENERAL STUDIES-I (PAPER-II)		250	97	GENERAL STUDIES-I (PAPER-II)		250	98	
GENERAL STUDIES-II (PAPER-III)		250	100	GENERAL STUDIES-II (PAPER-III)		250	91	
GENERAL STUDIES-III (PAPER-IV)		250	81	GENERAL STUDIES-III (PAPER-IV)		250	85	
GENERAL STUDIES-IV (PAPER-V)		250	131	GENERAL STUDIES-IV (PAPER-V)		250	143	
OPTIONAL-I (MATHEMATICS) (PAPER-VI)	162/250	310/500		OPTIONAL-I (MATHEMATICS) (PAPER-VI)	149/250	316/500		
OPTIONAL-II (MATHEMATICS) (PAPER-VII)	148/250			OPTIONAL-II (MATHEMATICS) (PAPER-VII)	167/250			
WRITTEN TOTAL	1750	841		WRITTEN TOTAL	1750	865		
PERSONALITY TEST	275	205		PERSONALITY TEST	275	163		
TOTAL FINAL	2025	1046		TOTAL FINAL	2025	1028		
	GANESH KUMAR BASKAR	AIR-07	IAS-2019		NIDHI BANSAL	AIR-23	IAS-2019	
	SHISHIR GUPTA	AIR-50	IAS-2019		DIVYANSHU SINGAL	AIR-60	IAS-2019	
	KATTA RAVI TEJA	AIR-77	IAS-2019		HARDIK AGARWAL	AIR-96	IAS-2019	
	Y. MEGHA SWAROOP	AIR-98	IAS-2019		MAYUR KHANDELWAL	AIR-106	IAS-2019	
	KUMAR SHIVASHISH	AIR-108	IAS-2019		SUJIIT SHANKAR	AIR-122	IAS-2019	
SUBJECT	Max. Marks.	Marks. Obtained	SUBJECT	Max. Marks.	Marks. Obtained	SUBJECT	Max. Marks.	Marks. Obtained
ESSAY (PAPER-I)	250	126	ESSAY (PAPER-I)	250	118	ESSAY (PAPER-I)	250	143
GENERAL STUDIES-I (PAPER-II)	250	801	GENERAL STUDIES-I (PAPER-II)	250	100	GENERAL STUDIES-I (PAPER-II)	250	95
GENERAL STUDIES-II (PAPER-III)	250	091	GENERAL STUDIES-II (PAPER-III)	250	095	GENERAL STUDIES-II (PAPER-III)	250	085
GENERAL STUDIES-III (PAPER-IV)	250	080	GENERAL STUDIES-III (PAPER-IV)	250	133	GENERAL STUDIES-III (PAPER-IV)	250	122
GENERAL STUDIES-IV (PAPER-V)	250	133	GENERAL STUDIES-IV (PAPER-V)	250	143	GENERAL STUDIES-IV (PAPER-V)	250	152/250
OPTIONAL-I (MATHEMATICS) (PAPER-VI)	154/250	321/500	OPTIONAL-I (MATHEMATICS) (PAPER-VI)	167/250		OPTIONAL-I (MATHEMATICS) (PAPER-VI)	152/250	306/500
OPTIONAL-II (MATHEMATICS) (PAPER-VII)	1750	829	OPTIONAL-II (MATHEMATICS) (PAPER-VII)	154/250		OPTIONAL-II (MATHEMATICS) (PAPER-VII)	142/250	
WRITTEN TOTAL	1750	829	WRITTEN TOTAL	1750	826	WRITTEN TOTAL	1750	832
PERSONALITY TEST	275	184	PERSONALITY TEST	275	182	PERSONALITY TEST	275	165
TOTAL FINAL	2025	1013	TOTAL FINAL	2025	1008	TOTAL FINAL	2025	997
	GANESH KUMAR BASKAR	AIR-07	IAS-2019		NIDHI BANSAL	AIR-23	IAS-2019	
	SHISHIR GUPTA	AIR-50	IAS-2019		DIVYANSHU SINGAL	AIR-60	IAS-2019	
	KATTA RAVI TEJA	AIR-77	IAS-2019		HARDIK AGARWAL	AIR-96	IAS-2019	
	Y. MEGHA SWAROOP	AIR-98	IAS-2019		MAYUR KHANDELWAL	AIR-106	IAS-2019	
	KUMAR SHIVASHISH	AIR-108	IAS-2019		SUJIIT SHANKAR	AIR-122	IAS-2019	

am awaiting the Mains result. This article is a humble attempt to share my experience of maths optional preparation for CSE/IFoS exam. I would be glad if it helps any UPSC aspirant who is undecided about choosing the optional or those who are already preparing with mathematics as their optional.

WHY MATHEMATICS

It is very important for a UPSC aspirant to have genuine interest in mathematics if he/she wants to choose this optional. Maths used to be my favourite subject in school and in IITB also I had pursued additional courses in mathematics out of interest. Since the syllabus is large & requires considerable practice, it is necessary to have a genuine interest. Apart from my inherent inclination, this optional offers certain advantages which made it an obvious choice. In this optional, the marks you get are almost proportional to your efforts. With proper hard work, a candidate can comfortably attempt all the questions in exam and expect to score around 50% marks even after heavy scaling which can offer the necessary edge in this intense competition. Such candidate generally would not find any question surprising in mains. This kind of certainty is not present in humanities optionals.

THE SYLLABUS

The prescribed syllabus for maths is quite large which makes it necessary to stick to limited sources. I relied on notes provided by Venkanna Sir at IMS for covering the syllabus. Since these notes were very comprehensive, I didn't have to spend time scanning reference books for relevant material. Venkanna Sir's classroom coaching helped me in completing the syllabus in a disciplined manner. Initially I would underline important theorems, formulae, results mentioned in the notes. Then I used to compile them in a notebook and this was useful for revision. So eventually I had a notebook with just the crux of the matter. I would advise all candidates with maths optional to prepare such a summary for all topics. Due to large syllabus, there is a natural tendency to skip a few chapters. But for the sake of compulsory questions, it is necessary to know at least basics of each chapter. The physics related chapters of statics, dynamics, mechanics are generally left untouched while preparing maths optional. Regarding these chapters, my preparation was such that I would be able to solve the compulsory 10 mark questions. They are quite manageable once you know the basic theory and there is no point in unnecessarily losing marks. The real analysis/calculus & modern algebra chapters are time consuming but candidates can't afford to skip them.

the best mode of judging your preparation. You can fairly evaluate your performance with your marks and then focus on the weak topics. Secondly, it's a rehearsal of Mains Exam and thus helps you greatly in time management.

Mains exam is nearly a marathon for your hand and thus you get very much trained for facing them.

Test Series also provided me another pool of questions to practise. They also helped in developing the ability of answer writing which definitely can't be developed overnight. I attended Test Series of IMS and luckily many questions of Test Series appeared in both IFoS Exam and CSE. I would also request all the candidates to give the test series by coming to classroom if possible and stick to the timelines as it really helps in completion of syllabus.

I hope this writeup clears some of the doubts and gives clarity on maths optional to UPSC IAS aspirants. All the Best

If anyone wants to contact me, please drop me an email - parthjaiswal512@gmail.com. I will be more than happy to help you.

Thank You

Parth Jaiswal

AIR-5 in IFoS-2014,
AIR-299 in CSE-2014

KUMBHEJKAR YOGESH VIJAY (AIR-08 in IAS-2015) (AIR-13 IFoS) & (AIR-143 IAS) in IFoS-2014 & IAS-2014 Examinations CLASSROOM STUDENT

MY BACKGROUND

I am Yogesh Kumbhejkar. I am an Electrical Engineer from IIT Bombay. I secured AIR 13 in Indian Forest Service Exam (IFoS) 2014 with Mathematics & Physics as the optional subjects. For Civil Service Exam (CSE) also, my optional is Mathematics. In IFoS exam, I scored 231/400 (118 + 113) in maths. In 2013 CSE Mains, my maths score was 250/500 (109 + 141). Hence mathematics has helped me in clearing mains in both CSE and IFoS. I was not selected in the final list of CSE 2013. In my second CSE attempt also I appeared for mains in 2014 with Maths as the optional subject. Now i

	PUNEET DWIVEDI	AIR-123	IAS-2019	SUBJECT	Max. Marks.	Marks. Obtained
				ESSAY (PAPER-I)	250	130
				GENERAL STUDIES-I (PAPER-II)	250	101
				GENERAL STUDIES-II (PAPER-III)	250	104
				GENERAL STUDIES-III (PAPER-IV)	250	086
				GENERAL STUDIES-IV (PAPER-V)	250	130
				OPTIONAL-I (MATHEMATICS) (PAPER-VI)	145/250	278/500
				OPTIONAL-II (MATHEMATICS) (PAPER-VII)	133/250	
				WRITTEN TOTAL	1750	829
				PERSONALITY TEST	275	162
				TOTAL FINAL	2025	991
	RAHUL GOEL	AIR-168	IAS-2019	SUBJECT	Max. Marks.	Marks. Obtained
				ESSAY (PAPER-I)	250	111
				GENERAL STUDIES-II (PAPER-II)	250	102
				GENERAL STUDIES-III (PAPER-III)	250	102
				GENERAL STUDIES-IV (PAPER-IV)	250	088
				GENERAL STUDIES-V (PAPER-V)	250	136
				OPTIONAL-I (MATHEMATICS) (PAPER-VI)	128/250	258/500
				OPTIONAL-II (MATHEMATICS) (PAPER-VII)	130/250	
				WRITTEN TOTAL	1750	797
				PERSONALITY TEST	275	187
				TOTAL FINAL	2025	984
	CHIRAG JAIN	AIR-215	IAS-2019	SUBJECT	Max. Marks.	Marks. Obtained
				ESSAY (PAPER-I)	250	132
				GENERAL STUDIES-I (PAPER-II)	250	087
				GENERAL STUDIES-II (PAPER-III)	250	088
				GENERAL STUDIES-III (PAPER-IV)	250	085
				GENERAL STUDIES-IV (PAPER-V)	250	130
				OPTIONAL-I (MATHEMATICS) (PAPER-VI)	159/250	294/500
				OPTIONAL-II (MATHEMATICS) (PAPER-VII)	135/250	
				WRITTEN TOTAL	1750	816
				PERSONALITY TEST	275	162
				TOTAL FINAL	2025	978
	DOBARIYA CHINTAN P.	AIR-376	IAS-2019	SUBJECT	Max. Marks.	Marks. Obtained
				ESSAY (PAPER-I)	250	130
				GENERAL STUDIES-I (PAPER-II)	250	087
				GENERAL STUDIES-II (PAPER-III)	250	088
				GENERAL STUDIES-III (PAPER-IV)	250	085
				GENERAL STUDIES-IV (PAPER-V)	250	130
				OPTIONAL-I (MATHEMATICS) (PAPER-VI)	149/250	317/500
				OPTIONAL-II (MATHEMATICS) (PAPER-VII)	168/250	
				WRITTEN TOTAL	1750	819
				PERSONALITY TEST	275	143
				TOTAL FINAL	2025	962
	PANKAJ KUMARAT	AIR-424	IAS-2019	SUBJECT	Max. Marks.	Marks. Obtained
				ESSAY (PAPER-I)	250	106
				GENERAL STUDIES-I (PAPER-II)	250	095
				GENERAL STUDIES-II (PAPER-III)	250	090
				GENERAL STUDIES-III (PAPER-IV)	250	090
				GENERAL STUDIES-IV (PAPER-V)	250	127
				OPTIONAL-I (MATHEMATICS) (PAPER-VI)	158/250	276/500
				OPTIONAL-II (MATHEMATICS) (PAPER-VII)	118/250	
				WRITTEN TOTAL	1750	784
				PERSONALITY TEST	275	168
				TOTAL FINAL	2025	952
	ANIL BASAK	AIR-616	IAS-2019	SUBJECT	Max. Marks.	Marks. Obtained
				ESSAY (PAPER-I)	250	120
				GENERAL STUDIES-I (PAPER-II)	250	088
				GENERAL STUDIES-II (PAPER-III)	250	093
				GENERAL STUDIES-III (PAPER-IV)	250	088
				GENERAL STUDIES-IV (PAPER-V)	250	128
				OPTIONAL-I (MATHEMATICS) (PAPER-VI)	128/250	251/500
				OPTIONAL-II (MATHEMATICS) (PAPER-VII)	123/250	
				WRITTEN TOTAL	1750	768
				PERSONALITY TEST	275	160
				TOTAL FINAL	2025	928
	VIDYASAGAR	AIR-634	IAS-2019	SUBJECT	Max. Marks.	Marks. Obtained
				ESSAY (PAPER-I)	250	117
				GENERAL STUDIES-I (PAPER-II)	250	081
				GENERAL STUDIES-II (PAPER-III)	250	090
				GENERAL STUDIES-III (PAPER-IV)	250	081
				GENERAL STUDIES-IV (PAPER-V)	250	125
				OPTIONAL-I (MATHEMATICS) (PAPER-VI)	149/250	289/500
				OPTIONAL-II (MATHEMATICS) (PAPER-VII)	140/250	
				WRITTEN TOTAL	1750	783
				PERSONALITY TEST	275	143
				TOTAL FINAL	2025	926

PREPARATION STRATEGY

for IAS/IFoS
MATHEMATICS
 (Optional)
by Successful Candidate
PARTH JAISWAL
(AIR-5 IFoS) & (AIR-299 IAS)
in IFoS-2014 & IAS-2014 Examinations
CLASSROOM STUDENT

MY BACKGROUND

Hello, My name is Parth Jaiswal. I come from Jaipur, Rajasthan. I completed my graduation in Computer Science discipline from IIT Delhi in 2013. Soon afterwards I started preparing for Civil services and Indian Forest Service, aiming for the attempt of year 2014.

Luckily I was able to clear both the examinations in my first attempt. I secured AIR-5 in IFoS-2014 and AIR-299 in CSE-2014. My optional subject was Mathematics. In case of Forest Service Examination, candidate is required to choose 2 Optionals, thus my second optional was Forestry with Mathematics as my first optional. I secured 250/400 (125+125) marks in IFoS Exam and 300/500 (147+153) marks in CSE in Maths. Thus I would give much credit for my success to my correct choice of optional as well as performance in it. I am writing this to share my experience with Maths as an optional subject and would feel happy if I am able to clear some of the doubts as well as apprehensions regarding it which many UPSC aspirants possess.

Why I Chose Mathematics?

I chose **Mathematics** because of my inherent interest in it from childhood. I have performed well in this in my throughout education and thus was confident enough to handle it well. Another reason for choosing it was, I wanted to have my optional from my background and thus Maths proved to be appropriate choice. Having a science background, I found it much easier to study than any other subject, many of which we have to study for GS prep.

I would like to assert few points regarding it very clearly.

- This subject is vast in syllabus and takes more time to study than other optionals.
- It also requires consistent practise. But the positive part is - If you are thorough with the subject and have practised it well, you can comfortably attempt complete paper with correct answers and thus gives you a great opportunity to score well in your optional (inspite of the scaling often carried out in it) pushing you above the list.
- In this way, this optional gives a bit of security as well as certainty which again comes at a price i.e great amount of hard work. Also IFoS Exam prescribes certain optionals only and Mathematics is one of them. Not all optionals are available for this exam.
- So again it gives you the flexibility of giving IFoS Exam.

From where to study?

I attended classroom coaching of IMS, Rajinder Nagar. I restricted my preparation to the handouts provided by Venkanna Sir. Because of the voluminous syllabus, it is necessary to gauge the point where you have to stop. I found that the notes quite comprehensive and provided me a holistic coverage of the syllabus in a highly structured manner. I believe that those notes are sufficient from the theory point of view.

For practising questions which is of utmost importance, I solved all the questions given in the notes (whether solved or unsolved) multiple times in my registers. Besides that, I solved the questions of previous year papers provided by sir, again multiple times. I restricted my preparation upto this point. But if any student faces difficulty in understanding any particular topic or finds notes insufficient for it or wants to practise more, he/she can use any reference book for any particular topic which can easily be found on internet or available in market.

But again a word of caution, try to limit your preparation to the concepts relevant to the syllabus and don't delve into unnecessary theorems or proofs otherwise its a slippery slope to a massive ocean. We tend to skip the proofs of various theorems provided in the syllabus while studying them as they are of not much use. Proofs of theorems are generally not asked in the exams. But still I used to go through each and every proof in a brief manner provided in the notes. The reason being it would give me a better insight of the topic and often helped in me developing solutions of questions.

Test Series:

No optional is complete without writing a test series and it holds true in Maths also. Test Series is as important in your preparation as your notes + books. Firstly, Test Series is