

A CONSOLIDATED QUESTION PAPER-CUM-ANSWER BOOKLET**MAINS TEST SERIES-2021****(JUNE. to DEC.-2021)**

IAS/IFoS

MATHEMATICS

BATCH-I

Under the guidance of K. Venkanna**FULL SYLLABUS (PAPER-I)****TEST CODE: TEST-13: IAS(M)/31-OCT.-2021****Time: 3 Hours****Maximum Marks: 250****INSTRUCTIONS**

1. This question paper-cum-answer booklet has 58 pages and has **34 PART/SUBPART** questions. Please ensure that the copy of the question paper-cum-answer booklet you have received contains all the questions.
2. Write your Name, Roll Number, Name of the Test Centre and Medium in the appropriate space provided on the right side.
3. A consolidated Question Paper-cum-Answer Booklet, having space below each part/sub part of a question shall be provided to them for writing the answers. Candidates shall be required to attempt answer to the part/sub-part of a question strictly within the pre-defined space. Any attempt outside the pre-defined space shall not be evaluated. "
4. Answer must be written in the medium specified in the admission Certificate issued to you, which must be stated clearly on the right side. No marks will be given for the answers written in a medium other than that specified in the Admission Certificate.
5. Candidates should attempt Question Nos. 1 and 5, which are compulsory, and any **THREE** of the remaining questions selecting at least **ONE** question from each Section.
6. The number of marks carried by each question is indicated at the end of the question. Assume suitable data if considered necessary and indicate the same clearly.
7. Symbols/notations carry their usual meanings, unless otherwise indicated.
8. All questions carry equal marks.
9. All answers must be written in blue/black ink only. Sketch pen, pencil or ink of any other colour should not be used.
10. All rough work should be done in the space provided and scored out finally.
11. The candidate should respect the instructions given by the invigilator.
12. The question paper-cum-answer booklet must be returned in its entirety to the invigilator before leaving the examination hall. Do not remove any page from this booklet.

READ INSTRUCTIONS ON THE LEFT SIDE OF THIS PAGE CAREFULLY

Name

Roll No.

Test Centre

Medium

Do not write your Roll Number or Name anywhere else in this Question Paper-cum-Answer Booklet.

I have read all the instructions and shall abide by them

Signature of the Candidate

I have verified the information filled by the candidate above

Signature of the invigilator

IMPORTANT NOTE:

Whenever a question is being attempted, all its parts/ sub-parts must be attempted contiguously. This means that before moving on to the next question to be attempted, candidates must finish attempting all parts/ sub-parts of the previous question attempted. This is to be strictly followed. Pages left blank in the answer-book are to be clearly struck out in ink. Any answers that follow pages left blank may not be given credit.

**DO NOT WRITE ON
THIS SPACE**

INDEX TABLE

QUESTION	No.	PAGE NO.	MAX. MARKS	MARKS OBTAINED
1	(a)			
	(b)			
	(c)			
	(d)			
	(e)			
2	(a)			
	(b)			
	(c)			
	(d)			
3	(a)			
	(b)			
	(c)			
	(d)			
4	(a)			
	(b)			
	(c)			
	(d)			
5	(a)			
	(b)			
	(c)			
	(d)			
	(e)			
6	(a)			
	(b)			
	(c)			
	(d)			
7	(a)			
	(b)			
	(c)			
	(d)			
8	(a)			
	(b)			
	(c)			
	(d)			
Total Marks				

**DO NOT WRITE ON
THIS SPACE**

SECTION – A

1. (a) A single linear equation can be treated as a very simple system of equations. Describe all solutions of the homogeneous “system” $10x_1 - 3x_2 - 2x_3 = 0$ [10]

1. (b) Find a basis for the null space of the matrix

$$A = \begin{bmatrix} -3 & 6 & -1 & 1 & -7 \\ 1 & -2 & 2 & 3 & -1 \\ 2 & -4 & 5 & 8 & -4 \end{bmatrix}$$

[10]

1. (c) Let the function $f(x, y)$ be defined by the relations

$$f(x, y) = \frac{\sin(x-y)}{|x|+|y|} \text{ for } |x| + |y| \neq 0, f(0, 0) = 0.$$

If f continuous at $x = 0, y = 0$?

[10]

1. (d) Find the area of the portion of the sphere $x^2 + y^2 + z^2 = 9$ lying inside the cylinder $x^2 + y^2 = 3y$. [10]

1. (e) Show that the straight line whose direction cosines are given by the equations :
 $ul + vm + wn = 0$ $al^2 + bm^2 + cn^2 = 0$ are (α) parallel, if $(u^2/a) + (v^2/b) + (w^2/c) = 0$.
[10]

2. (a) Let us pose the following problem. Let W be the subspace of \mathbb{R}^4 spanned by the vectors

$$\alpha_1 = (1, 2, 2, 1)$$

$$\alpha_2 = (0, 2, 0, 1)$$

$$\alpha_3 = (-2, 0, -4, 3)$$

- (i) Prove that $\alpha_1, \alpha_2, \alpha_3$ form a basis for W , i.e., that these vectors are linearly independent.
- (ii) Let $\beta = (b_1, b_2, b_3, b_4)$ be a vector in W . What are the coordinates of β relative to the ordered basis $\{\alpha_1, \alpha_2, \alpha_3\}$?

- (iii) Let $\alpha'_1 = (1, 0, 2, 0)$

$$\alpha'_2 = (0, 2, 0, 1)$$

$$\alpha'_3 = (0, 0, 0, 3)$$

Show that $\alpha'_1, \alpha'_2, \alpha'_3$ form a basis for W .

- (iv) If β is in W , let X denote the coordinate matrix of β relative to the α -basis and X' the coordinate matrix of β relative to the α' -basis. Find the 3×3 matrix P such that $X = PX'$ for every such β . [18]

2. (b) (i) Find $\lim_{x \rightarrow -\infty} (x^2 \sin(\cos x))$

(ii) If $w = f(x + y, x - y)$ has continuous partial derivatives with respect to $u = x + y$, $v = x - y$, show that

$$\frac{\partial w}{\partial x} \frac{\partial w}{\partial y} = \left(\frac{\partial f}{\partial u} \right)^2 - \left(\frac{\partial f}{\partial v} \right)^2. \quad [16]$$

2. (c) Through a point $P(\alpha, \beta, \gamma)$ a plane is drawn at right angles to OP to meet the axes in A, B, C . Prove that the area of the triangle ABC is $p^5/(2\alpha\beta\gamma)$, where $OP = p$.
[16]

3. (a) Let $A = \begin{bmatrix} 1 & -3 \\ 3 & 5 \\ -1 & 7 \end{bmatrix}$, $\mathbf{u} = \begin{bmatrix} 2 \\ -1 \end{bmatrix}$, $\mathbf{b} = \begin{bmatrix} 3 \\ 2 \\ -5 \end{bmatrix}$, $\mathbf{c} = \begin{bmatrix} 3 \\ 2 \\ 5 \end{bmatrix}$, and define a transformation $T : \mathbb{R}^2 \rightarrow \mathbb{R}^3$

by $T(\mathbf{x}) = A\mathbf{x}$, so that

$$T(\mathbf{x}) = A\mathbf{x} = \begin{bmatrix} 1 & -3 \\ 3 & 5 \\ -1 & 7 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} x_1 - 3x_2 \\ 3x_1 + 5x_2 \\ -x_1 + 7x_2 \end{bmatrix}$$

- (i) Find $T(\mathbf{u})$, the image of \mathbf{u} under the transformation T .
- (ii) Find an \mathbf{x} in \mathbb{R}^2 whose image under T is \mathbf{b} .
- (iii) Is there more than one \mathbf{x} whose image under T is \mathbf{b} ?
- (iv) Determine if \mathbf{c} is in the range of the transformation T .

[20]

3. (b) A horizontal water tank is to be constructed in the form of a cylinder with hemispherical ends. Find the diameter and the length of the cylindrical portion of the tank if the tank is to hold 8000 cubic feet of water and the least amount of material is to be used in constructing the tank. [15]

3. (c) A cone has as base the circle $x^2 + y^2 + 2ax + 2by = 0, z = 0$ and passes through the fixed point $(0, 0, c)$. If the section of the cone by zx -plane is a rectangular hyperbola, prove that the vertex lies on a fixed circle. **[15]**

4. (a) (i) Let V be a two-dimensional vector space over the field F , and let β be an ordered basis for V . If T is a linear operator on V and $[T]_{\beta} = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ prove that $T^2 - (a + d)T + (ad - bc)I = 0$. [17]

4. (b) (i) Show that if $a > 1$, $\int_0^{\infty} \frac{x^a}{a^x} dx = \frac{\Gamma(a+1)}{(\log a)^{a+1}}$.

(ii) If $v = At^{-1/2}e^{-x^2/4a^2t}$, Prove that $\frac{\partial v}{\partial t} = a^2 \frac{\partial^2 v}{\partial x^2}$. [15]

4. (c) CP, CQ are any two conjugate semi-diameters of the ellipse $(x^2/a^2) + (y^2/b^2) = 1$, $z = c$, CP', CQ' are the conjugate diameters of the ellipse $(x^2/a^2) + (y^2/b^2) = 1$, $z = -c$ drawn in the same directions as CP and CQ. Prove that the hyperboloid $(2x^2/a^2) + (2y^2/b^2) - (z^2/c^2) = 1$ is generated by either PQ' or P' Q'. **[18]**

SECTION – B

5. (a) Solve $x = py + p^2$

[10]

5. (b) (i) If $L\left\{2\sqrt{\left(\frac{t}{\pi}\right)}\right\} = \frac{1}{s^{3/2}}$, show $\frac{1}{s^{1/2}} = L\left\{\frac{1}{\sqrt{(\pi t)}}\right\}$.

(ii) Find a function $F(t)$ for which

$$F(t) = L^{-1}\left\{\frac{3}{s} - \frac{4e^{-s}}{s^2} + \frac{4e^{-3s}}{s^2}\right\}$$

[10]

5. (c) A uniform rod AB movable about a hinge at A, rests with the other end against a smooth vertical wall. If α be the inclination of the rod to the vertical, prove that the magnitude of the reaction of the hinge is

$$\frac{1}{2}w\sqrt{4 + \tan^2 \alpha}.$$

[10]

5. (d) Transform the function $f = \rho e_\rho + \rho e_\phi$ from cylindrical to cartesian system. [10]

5. (e) Show that $\mathbf{F} = (\sin y + z) \mathbf{i} + (x \cos y - z) \mathbf{j} + (x - y) \mathbf{k}$ is irrotational and find a function ϕ such that $\mathbf{F} = \nabla\phi$.

[10]

6. (a) (i) Determine the constant A such that the equation

$$\left(\frac{1}{x^2} + \frac{1}{y^2}\right)dx + \left(\frac{Ax+1}{y^3}\right)dy = 0 \text{ is exact and solve the resulting exact equation.}$$

- (ii) Find the value of n such that the curves $x^n + y^n = c_1$ are orthogonal trajectories of the family

$$y = \frac{x}{1 - c_2 x}.$$

[18]

6. (b) Find the length of an endless chain which will hang over a circular pulley of radius a so as to be in contact with the two thirds of the circumference of the pulley.

[17]

6. (c) Find the directional derivative of $\phi = x^2yz + 4xz^2$ at $(1, -2, -1)$ in the direction $2\mathbf{i} - \mathbf{j} - 2\mathbf{k}$. In which direction the directional derivative will be maximum and what is its magnitude. Also find a unit normal to the surface $x^2yz + 4xz^2 = 6$ at the point $(1, -2, -1)$, find the equation of tangent plane and normal at the point $(1, -2, -1)$. [15]

7. (a) (i) Solve $(d^4y/dx^4) + 6(d^3y/dx^3) + 11(d^2y/dx^2) + 6(dy/dx) = 20 e^{-2x} \sin x$.
(ii) Solve by the method of variation of parameters $x(dy/dx) - y = (x - 1)(d^2y/dx^2 - x + 1)$ [17]

7. (b) A light elastic string of natural length l is hung by one end and to the other end are tied successively particles of masses m_1 and m_2 . If t_1 and t_2 be the periods and c_1, c_2 the statical extensions corresponding to these two weights, prove that $g(t_1^2 - t_2^2) = 4\pi^2 (c_1 - c_2)$ [15]

7. (c) Let $F = 2xz \mathbf{i} - x \mathbf{j} + y^2 \mathbf{k}$. Evaluate $\iiint_V F dV$ where V is the region bounded by the surfaces $x = 0$, $y = 0$, $y = 6$, $z = x^2$, $z = 4$. [18]

8. (a) Solve $(D^2 + n^2) y = a \sin (nt + \alpha)$, if $y = Dy = 0$ when $t = 0$.

[15]

8. (b) A particle slides down the arc of a smooth cycloid whose axis is vertical and vertex lowest, starting at rest from the cusp. Prove that the time occupied in falling down the first half of the vertical height is equal to the time of falling down the second half. [15]

8. (c) Applying Stoke's theorem to prove that

$$\int_C (ydx + zdy + xdz) = -2\sqrt{2}\pi a^2, \text{ where } C \text{ is the curve given by } x^2 + y^2 + z^2 - 2ax - 2ay = 0, x + y = 2a \text{ and begins at the point } (2a, 0, 0) \text{ and goes at first below the } z\text{-plane.}$$

[20]






























































ROUGH SPACE

No.1 INSTITUTE FOR IAS/IFoS EXAMINATIONS



OUR ACHIEVEMENTS IN IFoS (FROM 2008 TO 2019)

OUR RANKERS AMONG TOP 10 IN IFoS

 RISHI KUMAR AIR-01 IFoS-2019	 PRATAP SINGH AIR-01 IFoS-2015	 PRATEEK JAIN AIR-03 IFoS-2016	 SIDDHARTHA GUPTA AIR-03 IFoS-2014	 VARUN GUNTUPALLI AIR-04 IFoS-2014	 TESHUANG GYALTSEN AIR-04 IFoS-2010	 KHATRI VISHAL D. AIR-05 IFoS-2019
 DESHAL DHAN AIR-05 IFoS-2017	 PARTH JAIN AIR-05 IFoS-2014	 HIMANSHU GUPTA AIR-05 IFoS-2011	 ASHISH REDDY M AIR-06 IFoS-2015	 ANUPAM SHUKLA AIR-07 IFoS-2012	 ANCHAL SRIVASTAVA AIR-09 IFoS-2018	 HARSHVARDHAN AIR-10 IFoS-2017
 UJJAYOSHI SINGH AIR-13 IFoS-2019	 VISHNU DAS AIR-16 IFoS-2010	 ANIL KUMAR AIR-20 IFoS-2019	 ANKUR KUMAR JAIN AIR-24 IFoS-2019	 PRATYUSH SAXENA AIR-30 IFoS-2019	 SIDDHARTH PRASAD AIR-38 IFoS-2019	 I. THARUN KUMAR AIR-83 IFoS-2019
 S. RISHI AIR-35 IFoS-2017	 SUNNY S. SHARMA AIR-36 IFoS-2017	 VISHU KUMAR AIR-40 IFoS-2017	 SACHIN GUPTA AIR-45 IFoS-2017	 ANKIT KUMAR AIR-51 IFoS-2017	 SIDDHARTH KUMAR AIR-58 IFoS-2017	 RISHI K. JAISWAL AIR-68 IFoS-2017
 PRATIK KUMAR AIR-80 IFoS-2017	 OMPRAKASH SINGH AIR-93 IFoS-2017	 HARSHIT AGGARWAL AIR-21 IFoS-2016	 PRAVESH SINGH AIR-22 IFoS-2016	 SUSHANT AIR-23 IFoS-2016	 JYOTI MAHESH AIR-30 IFoS-2016	
 ANKUR K. S. AIR-31 IFoS-2016	 ANKUR SINGH AIR-32 IFoS-2016	 RAJAT KUMAR AIR-35 IFoS-2016	 PRATIK AIR-36 IFoS-2016	 AMIT KUMAR AIR-48 IFoS-2016	 ANKUR SINGH AIR-57 IFoS-2016	 ANKUR KUMAR AIR-58 IFoS-2016
 SANGEETA MISHRA AIR-68 IFoS-2016	 PUNEET KUMAR AIR-98 IFoS-2016	 HIMANSHU P. AIR-108 IFoS-2016	 SIDDHARTH JAIN AIR-13 IFoS-2015	 ANKUR KUMAR AIR-15 IFoS-2015	 ANKUR KUMAR AIR-19 IFoS-2015	
 ANKUR KUMAR AIR-29 IFoS-2015	 SUNNY KUMAR AIR-30 IFoS-2015	 ANKUR KUMAR AIR-48 IFoS-2015	 ANKUR KUMAR AIR-62 IFoS-2015	 ANKUR KUMAR AIR-67 IFoS-2015	 ANKUR KUMAR AIR-72 IFoS-2015	 ANKUR KUMAR AIR-74 IFoS-2015
 ANKUR KUMAR AIR-78 IFoS-2015	 ANKUR KUMAR AIR-87 IFoS-2015	 ANKUR KUMAR AIR-93 IFoS-2015	 ANKUR KUMAR AIR-101 IFoS-2015	 ANKUR KUMAR AIR-13 IFoS-2014	 ANKUR KUMAR AIR-14 IFoS-2014	 ANKUR KUMAR AIR-18 IFoS-2014
 ANKUR KUMAR AIR-48 IFoS-2014	 ANKUR KUMAR AIR-57 IFoS-2014	 ANKUR KUMAR AIR-16 IFoS-2013	 ANKUR KUMAR AIR-29 IFoS-2013	 ANKUR KUMAR AIR-39 IFoS-2013	 ANKUR KUMAR AIR-72 IFoS-2013	 ANKUR KUMAR AIR-32 IFoS-2012
 ANKUR KUMAR AIR-48 IFoS-2012	 ANKUR KUMAR AIR-72 IFoS-2012	 ANKUR KUMAR AIR-11 IFoS-2011	 ANKUR KUMAR AIR-36 IFoS-2010	 ANKUR KUMAR AIR-80 IFoS-2010	 ANKUR KUMAR AIR-23 IFoS-2009	 ANKUR KUMAR UP-PCS 2011

ONLY IMS PROVIDES SCIENTIFIC & INNOVATIVE TEACHING
METHODOLOGIES FULLY REVISED STUDY MATERIALS AND FULLY REVISED TEST SERIES.

HEAD OFFICE: 25/8, Old Rajender Nagar, Delhi-60. BRANCH OFFICE: 105-106, Top Floor, Mukherjee Tower Mukherjee Nagar, Delhi-9

Ph.: 011-45629987, 9999197625 www.ims4maths.com e-Mail: ims4maths@gmail.com

Regional Office: H.No. 1-10-237, 2nd Floor, Room No. 202 R.K'S-Kancham's Blue Sapphire Ashok Nagar, Hyderabad-20. Ph.: 9652351152, 9652661152

OUR ACHIEVEMENTS IN IAS (FROM 2008 TO 2019)

 SANJAY K. KUMAR AIR-07 (2009)	 NISHI RANJAN AIR-23 (2015)	 SHASHANK GUPTA AIR-50 (2019)	 DIVYANSHU KUMAR AIR-60 (2019)	 RAJAT RAVI THAKUR AIR-77 (2019)	 HARSH CHANDRA AIR-96 (2019)	 Y. M. VARADACHARI AIR-98 (2019)	 M. SHASHANK RAVI AIR-106 (2019)	 S. SHASHANK AIR-108 (2019)	 HARSH CHANDRA AIR-110 (2019)	 A. K. KUMAR AIR-122 (2019)	 P. K. KUMAR AIR-123 (2019)	 SHASHANK PRASAD AIR-166 (2019)	 R. K. KUMAR AIR-168 (2019)	 A. K. KUMAR AIR-205 (2019)	 CHETAN KUMAR AIR-215 (2019)
 PREETI SINGH AIR-216 (2019)	 UTKARSH SINGH AIR-243 (2019)	 VINAY DEY AIR-304 (2019)	 ANURAG KUMAR AIR-345 (2019)	 SHASHANK CHANDRA AIR-376 (2019)	 ANSHU KUMAR AIR-423 (2019)	 ANSHU KUMAR AIR-424 (2019)	 R. ANAND AIR-494 (2019)	 ANSHU KUMAR AIR-604 (2019)	 ANSHU KUMAR AIR-616 (2019)	 ANSHU KUMAR AIR-634 (2019)	 ANSHU KUMAR AIR-712 (2019)	 ANSHU KUMAR AIR-01 (2018)	 ANSHU KUMAR AIR-07 (2018)	 ANSHU KUMAR AIR-10 (2018)	 ANSHU KUMAR AIR-68 (2018)
 MANISHA RANA AIR-67 (2018)	 ANSHU KUMAR AIR-73 (2018)	 ANSHU KUMAR AIR-80 (2018)	 ANSHU KUMAR AIR-81 (2018)	 ANSHU KUMAR AIR-110 (2018)	 ANSHU KUMAR AIR-114 (2018)	 ANSHU KUMAR AIR-124 (2018)	 ANSHU KUMAR AIR-158 (2018)	 ANSHU KUMAR AIR-192 (2018)	 ANSHU KUMAR AIR-193 (2018)	 ANSHU KUMAR AIR-206 (2018)	 ANSHU KUMAR AIR-215 (2018)	 ANSHU KUMAR AIR-348 (2018)	 ANSHU KUMAR AIR-349 (2018)	 ANSHU KUMAR AIR-353 (2018)	 ANSHU KUMAR AIR-366 (2018)
 C. V. KUMAR AIR-406 (2018)	 ANSHU KUMAR AIR-443 (2018)	 ANSHU KUMAR AIR-526 (2018)	 ANSHU KUMAR AIR-536 (2018)	 ANSHU KUMAR AIR-586 (2018)	 ANSHU KUMAR AIR-598 (2018)	 ANSHU KUMAR AIR-600 (2018)	 ANSHU KUMAR AIR-04 (2017)	 ANSHU KUMAR AIR-08 (2017)	 ANSHU KUMAR AIR-13 (2017)	 ANSHU KUMAR AIR-82 (2017)	 ANSHU KUMAR AIR-86 (2017)	 ANSHU KUMAR AIR-91 (2017)	 ANSHU KUMAR AIR-95 (2017)	 ANSHU KUMAR AIR-138 (2017)	 ANSHU KUMAR AIR-162 (2017)
 ANSHU KUMAR AIR-235 (2017)	 ANSHU KUMAR AIR-235 (2017)	 ANSHU KUMAR AIR-214 (2017)	 ANSHU KUMAR AIR-225 (2017)	 ANSHU KUMAR AIR-235 (2017)	 ANSHU KUMAR AIR-255 (2017)	 ANSHU KUMAR AIR-255 (2017)	 ANSHU KUMAR AIR-391 (2017)	 ANSHU KUMAR AIR-512 (2017)	 ANSHU KUMAR AIR-512 (2017)	 ANSHU KUMAR AIR-609 (2017)	 ANSHU KUMAR AIR-772 (2017)	 ANSHU KUMAR AIR-14 (2016)	 ANSHU KUMAR AIR-18 (2016)	 ANSHU KUMAR AIR-40 (2016)	 ANSHU KUMAR AIR-43 (2016)
 ANSHU KUMAR AIR-114 (2016)	 ANSHU KUMAR AIR-126 (2016)	 ANSHU KUMAR AIR-130 (2016)	 ANSHU KUMAR AIR-133 (2016)	 ANSHU KUMAR AIR-166 (2016)	 ANSHU KUMAR AIR-235 (2016)	 ANSHU KUMAR AIR-242 (2016)	 ANSHU KUMAR AIR-264 (2016)	 ANSHU KUMAR AIR-275 (2016)	 ANSHU KUMAR AIR-334 (2016)	 ANSHU KUMAR AIR-476 (2016)	 ANSHU KUMAR AIR-558 (2016)	 ANSHU KUMAR AIR-669 (2016)	 ANSHU KUMAR AIR-832 (2016)	 ANSHU KUMAR AIR-946 (2016)	 ANSHU KUMAR AIR-1075 (2016)
 ANSHU KUMAR AIR-08 (2015)	 ANSHU KUMAR AIR-12 (2015)	 ANSHU KUMAR AIR-13 (2015)	 ANSHU KUMAR AIR-15 (2015)	 ANSHU KUMAR AIR-65 (2015)	 ANSHU KUMAR AIR-118 (2015)	 ANSHU KUMAR AIR-155 (2015)	 ANSHU KUMAR AIR-183 (2015)	 ANSHU KUMAR AIR-194 (2015)	 ANSHU KUMAR AIR-197 (2015)	 ANSHU KUMAR AIR-198 (2015)	 ANSHU KUMAR AIR-251 (2015)	 ANSHU KUMAR AIR-334 (2015)	 ANSHU KUMAR AIR-335 (2015)	 ANSHU KUMAR AIR-492 (2015)	 ANSHU KUMAR AIR-500 (2015)
 ANSHU KUMAR AIR-605 (2015)	 ANSHU KUMAR AIR-645 (2015)	 ANSHU KUMAR AIR-699 (2015)	 ANSHU KUMAR AIR-843 (2015)	 ANSHU KUMAR AIR-1060 (2015)	 ANSHU KUMAR AIR-08 (2014)	 ANSHU KUMAR AIR-30 (2014)	 ANSHU KUMAR AIR-58 (2014)	 ANSHU KUMAR AIR-143 (2014)	 ANSHU KUMAR AIR-145 (2014)	 ANSHU KUMAR AIR-159 (2014)	 ANSHU KUMAR AIR-175 (2014)	 ANSHU KUMAR AIR-230 (2014)	 ANSHU KUMAR AIR-236 (2014)	 ANSHU KUMAR AIR-261 (2014)	 ANSHU KUMAR AIR-299 (2014)
 ANSHU KUMAR AIR-322 (2014)	 ANSHU KUMAR AIR-371 (2014)	 ANSHU KUMAR AIR-433 (2014)	 ANSHU KUMAR AIR-436 (2014)	 ANSHU KUMAR AIR-608 (2014)	 ANSHU KUMAR AIR-622 (2014)	 ANSHU KUMAR AIR-763 (2014)	 ANSHU KUMAR AIR-830 (2014)	 ANSHU KUMAR AIR-861 (2014)	 ANSHU KUMAR AIR-1150 (2014)	 ANSHU KUMAR AIR-78 (2013)	 ANSHU KUMAR AIR-81 (2013)	 ANSHU KUMAR AIR-111 (2013)	 ANSHU KUMAR AIR-318 (2013)	 ANSHU KUMAR AIR-333 (2013)	 ANSHU KUMAR AIR-350 (2013)
 ANSHU KUMAR AIR-399 (2013)	 ANSHU KUMAR AIR-547 (2013)	 ANSHU KUMAR AIR-552 (2013)	 ANSHU KUMAR AIR-562 (2013)	 ANSHU KUMAR AIR-1013 (2013)	 ANSHU KUMAR AIR-76 (2012)	 ANSHU KUMAR AIR-247 (2012)	 ANSHU KUMAR AIR-329 (2012)	 ANSHU KUMAR AIR-550 (2012)	 ANSHU KUMAR AIR-560 (2012)	 ANSHU KUMAR AIR-633 (2012)	 ANSHU KUMAR AIR-655 (2012)	 ANSHU KUMAR AIR-667 (2012)	 ANSHU KUMAR AIR-849 (2012)	 ANSHU KUMAR AIR-944 (2012)	 ANSHU KUMAR AIR-07 (2011)
 ANSHU KUMAR AIR-88 (2011)	 ANSHU KUMAR AIR-168 (2011)	 ANSHU KUMAR AIR-220 (2011)	 ANSHU KUMAR AIR-238 (2011)	 ANSHU KUMAR AIR-372 (2011)	 ANSHU KUMAR AIR-485 (2011)	 ANSHU KUMAR AIR-538 (2011)	 ANSHU KUMAR AIR-796 (2011)	 ANSHU KUMAR AIR-223 (2011)	 ANSHU KUMAR AIR-154 (2011)	 ANSHU KUMAR AIR-276 (2011)	 ANSHU KUMAR AIR-362 (2011)	 ANSHU KUMAR AIR-497 (2011)	 ANSHU KUMAR AIR-47 (2010)	 ANSHU KUMAR AIR-140 (2010)	 ANSHU KUMAR AIR-507 (2010)

HEAD OFFICE: 25/8, Old Rajender Nagar, Delhi-60. BRANCH OFFICE: 105-106, Top Floor, Mukherjee Tower Mukherjee Nagar, Delhi-9

Ph.: 011-45629987, 9999197625 www.ims4maths.com e-Mail: ims4maths@gmail.com

Regional Office: H.No. 1-10-237, 2nd Floor, Room No. 202 R.K'S-Kancham's Blue Sapphire Ashok Nagar, Hyderabad-20. Ph.: 9652351152, 9652661152