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Date	

NO.1 INSITITUTE FOR IAS/IFoS EXAMINATIONS



MATHEMATICS CLASSROOM TEST 2020-21

Under the guidance of K. Venkanna

MATHEMATICS

PDE CLASS TEST

Date: 07 August-2020 Timing: 2:15 PM to 4:45 PM
Time: 03:00 Hours Maximum Marks: 250

INSTRUCTIONS

- 1. Write your details in the appropriate space provided on the right side.
- 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.
- 3. Candidates should attempt All Question.
- 4. 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.
- 5. Symbols/notations carry their usual meanings, unless otherwise indicated.
- 6. All answers must be written in blue/black ink only. Sketch pen, pencil or ink of any other colour should not be used.
- 7. All rough work should be done in the space provided and scored out finally.
- 8. The candidate should respect the instructions given by the invigilator.
- 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.

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Name
Mobile No.
Email.: (In Block Letter)
Test Centre
Medium
I have read all the instructions and shall
abide by them
Signature of the Candidate
3
I have verified the information filled by the
candidate above
Signature of the invigilator
Signature of the invigilator

INDEX TABLE

No.	PAGE NO.	MAX. MARKS	MARKS OBTAINED
(1)		16	
(2)		10	
(3)		18	
(4)		15	
(5)		13	
(6)		18	
(7)		16	
(8)		18	
(9)		18	
(10)		18	
(11)		18	
(12)		18	
(13)		18	
(14)		16	
(15)		20	

Total Marks



1.	(i)	Form a partial differential equation by eliminating the arbitrary function ϕ from
	(-)	$\phi(x + y + z, x^2 + y^2 - z^2) = 0$. What is the order of this partial differential equation?
	(ii)	Find the surface whose tangent planes cut off an intercept of constant length
	()	k from the axis of z. [6+10=16]
		[0 -0 -0]

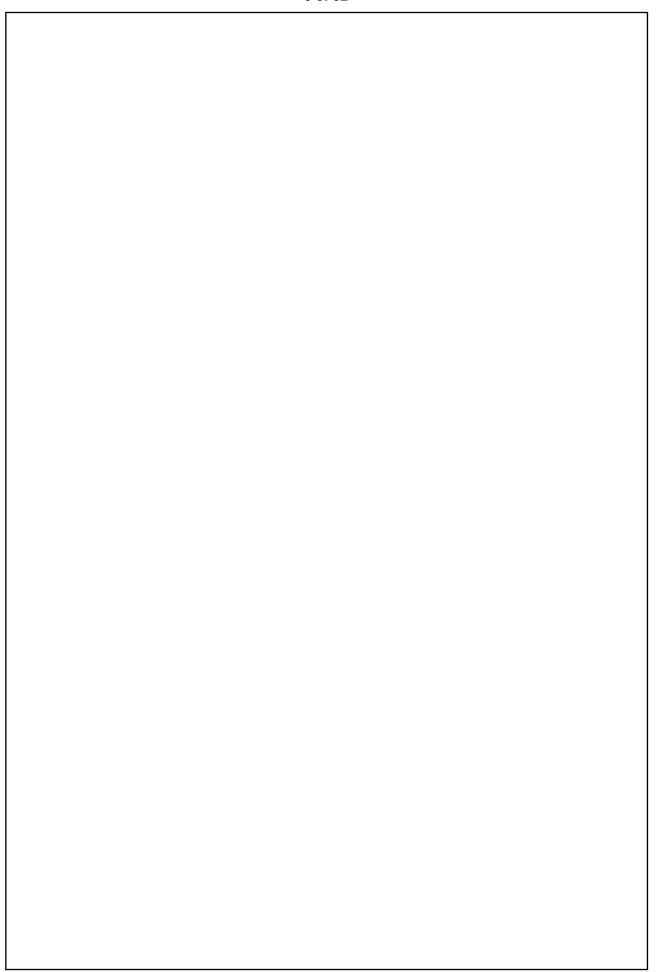


2.	Solve the following differential equation : $ (D^3 - 4D^2 \ D' + 5DD'^2 - 2D'^3) \ z = e^{y+2x} + (y+x)^{1/2}. $	[10]

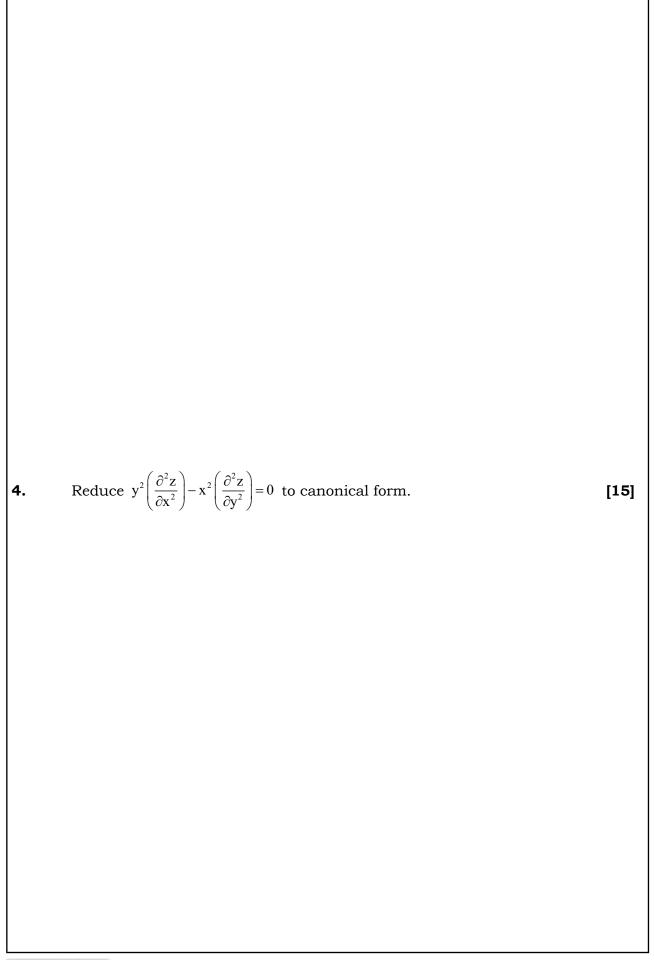


3.	(i) Find the complete integral of $(x + y)(p + q)^2 + (x - y)(p - q)^2 = 1$. (ii) Solve $(D^2 - DD' - 2D'^2 + 2D + 2D')z = e^{2x+3y} + xy + \sin(2x + y)$.	[18]

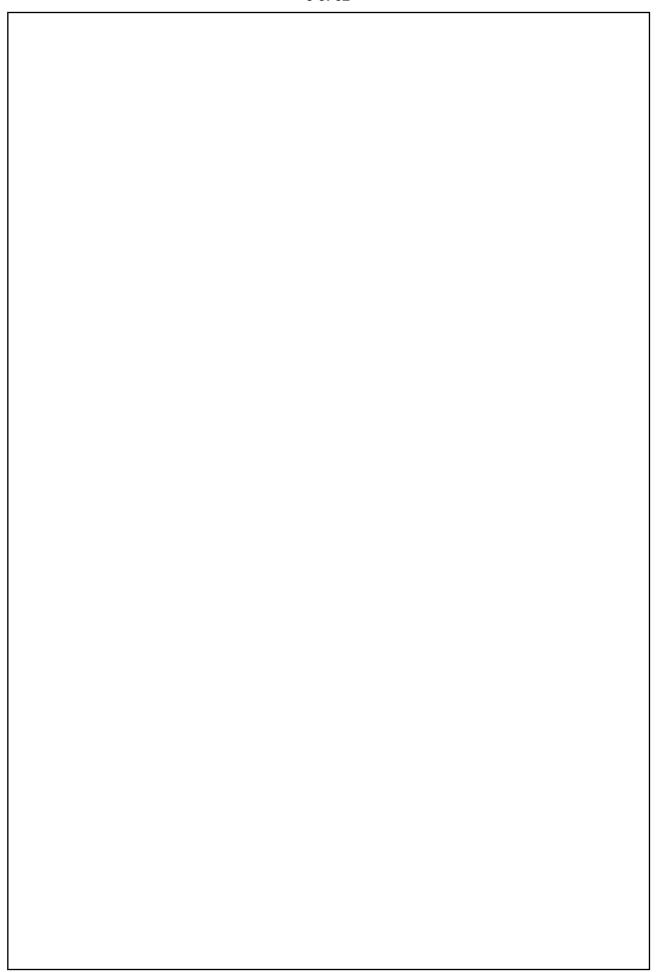












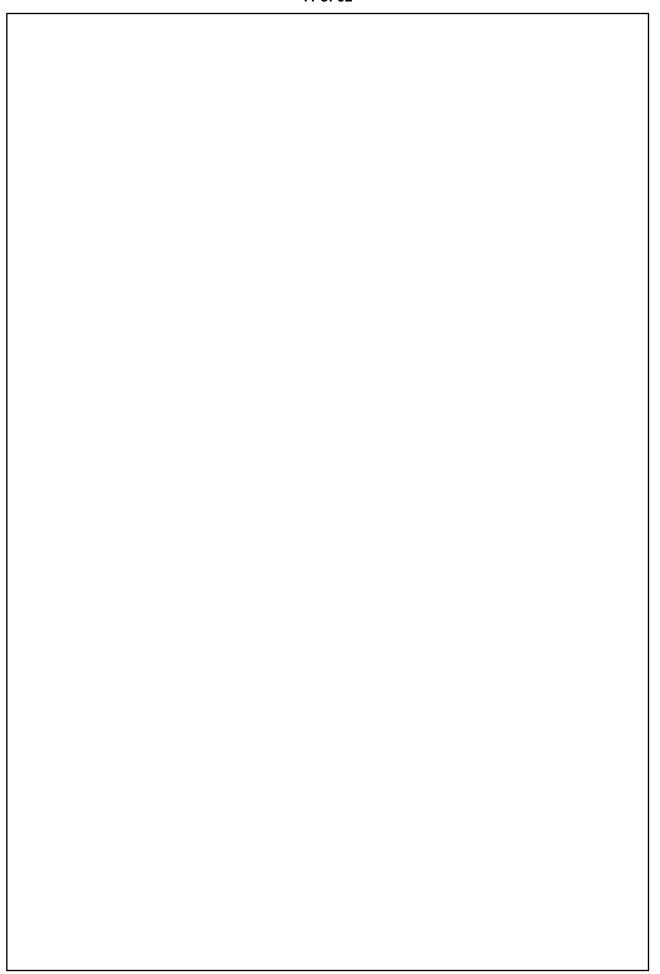


5.	Solve $(D^2 + DD' - 6D'^2)z = x^2 \sin(x + y)$.	[13]



6.	Obtain temperature distribution y(x, t) in a uniform bar of unit length whose one end is kept at 10°C and the other end is insulated. Further it is given that
	y(x,0) = 1 - x, 0 < x < 1. [18]

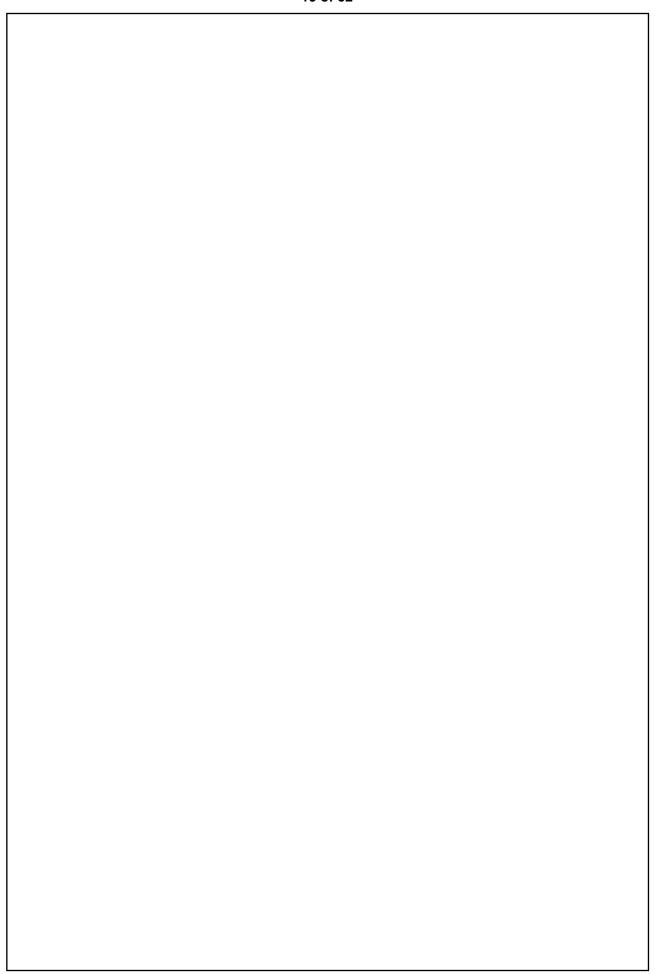






7.	A string is stretched and fastened to two points <i>l</i> apart, Motion is started by
•	
	displacing the string into the form $y = m(lx - x^2)$ from which it is released at time
	t = 0. find the displacement of any point on the string at a distance x from one
	end at time t. [16]





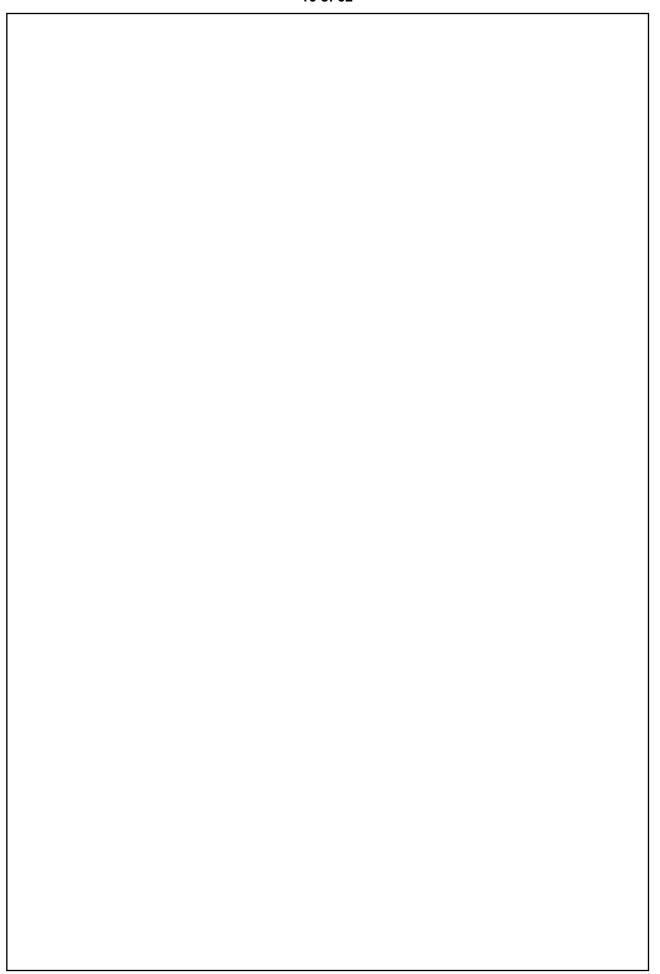


8.	(i) Solve $(x^2D^2-xyDD'-2y^2D'^2+xD-2yD')z=\log(y/x)-(1/2)$.
0.	(1) DOING (A D AYDD 2y D AD 2yD $ 2 - 10 \le (y / A) - (1 / 2)$.
	(ii) Find the integral surface of the partial differential equation $(x - y) p + (y - x - z)$
	$q = z$ through the circle $z = 1$, $x^2 + y^2 = 1$. [18]
	[-v]



9.	Find the steady state temperature distribution in a thin rectangular plate bounded
9.	Find the steady state temperature distribution in a thin rectangular plate bounded by the lines $x=0$, $x=a$, $y=0$, $y=b$. The edges $x=0$, $x=a$. $y=0$ are kept at temperature zero while the edge $y=b$ is kept at 100° C. [18]

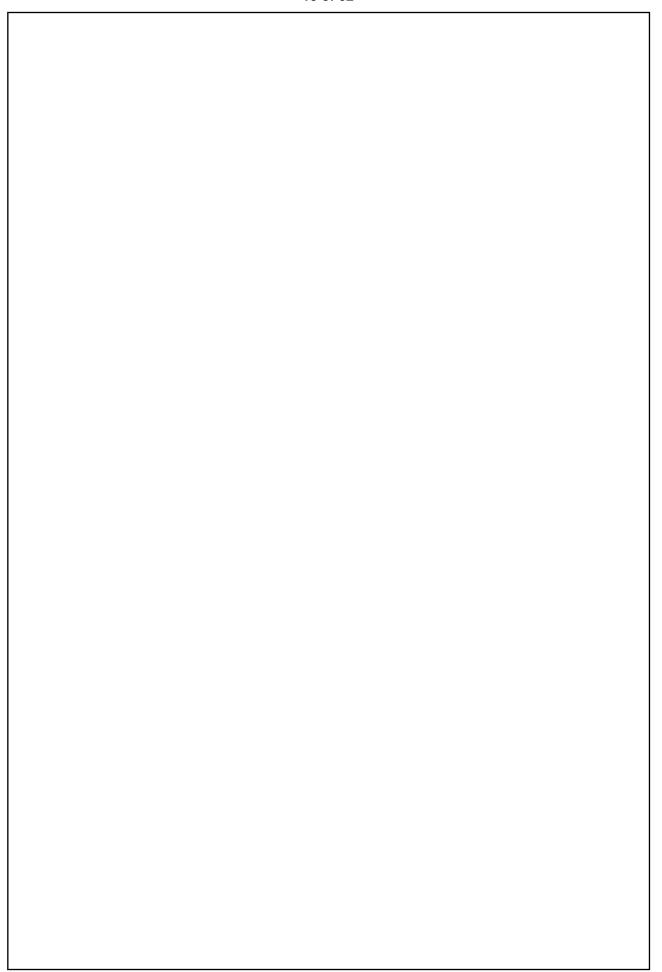






10.	 (i) Find a surface satisfying the equation D²z = 6x + 2 and touching z = x³ + y³ along its section by the plane x + y +1 = 0. (ii) Form partial differential equation by eliminating arbitrary functions f and g from z = f(x² - y) + g(x² + y). (iii) Solve y²p - xyq = x(z - 2y). [8+5+5=18]

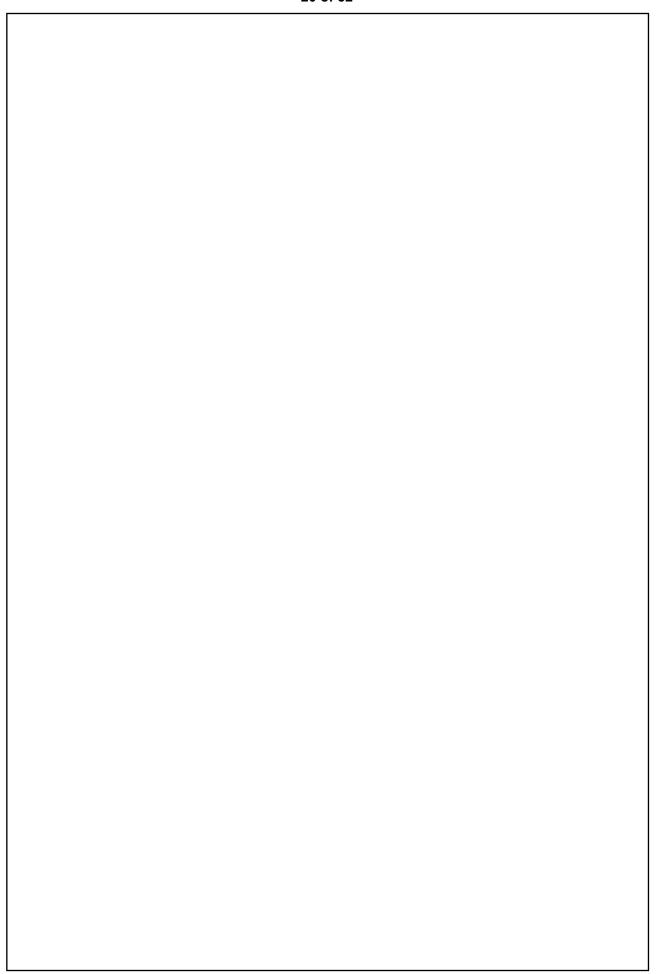






11.	Find the characteristic strips of the equation $xp + yq - pq = 0$ and then find the equation of the integral surface through the curvez = $x/2$, $y = 0$. [18]

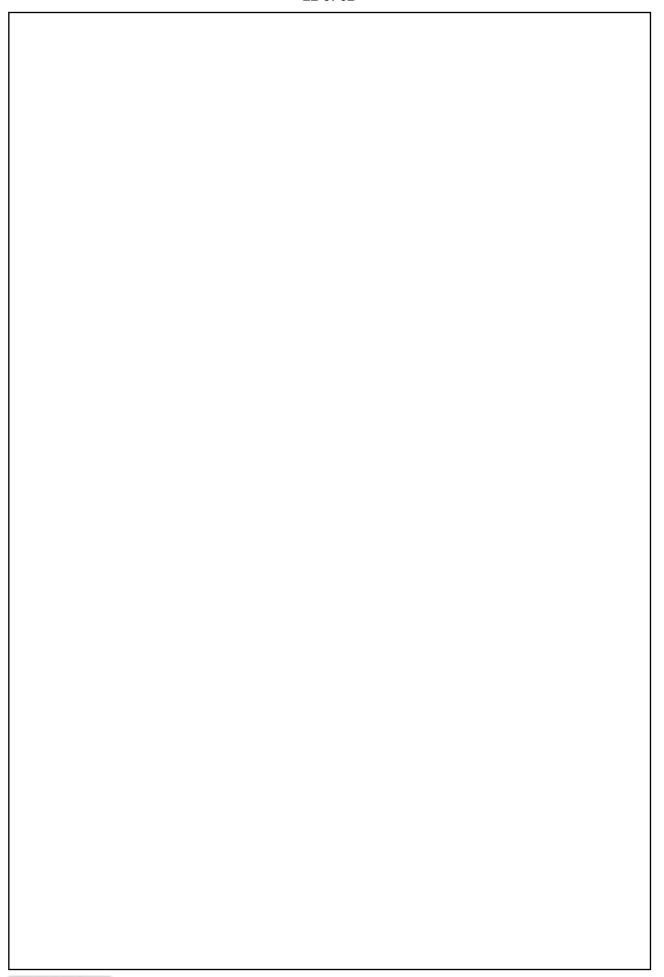




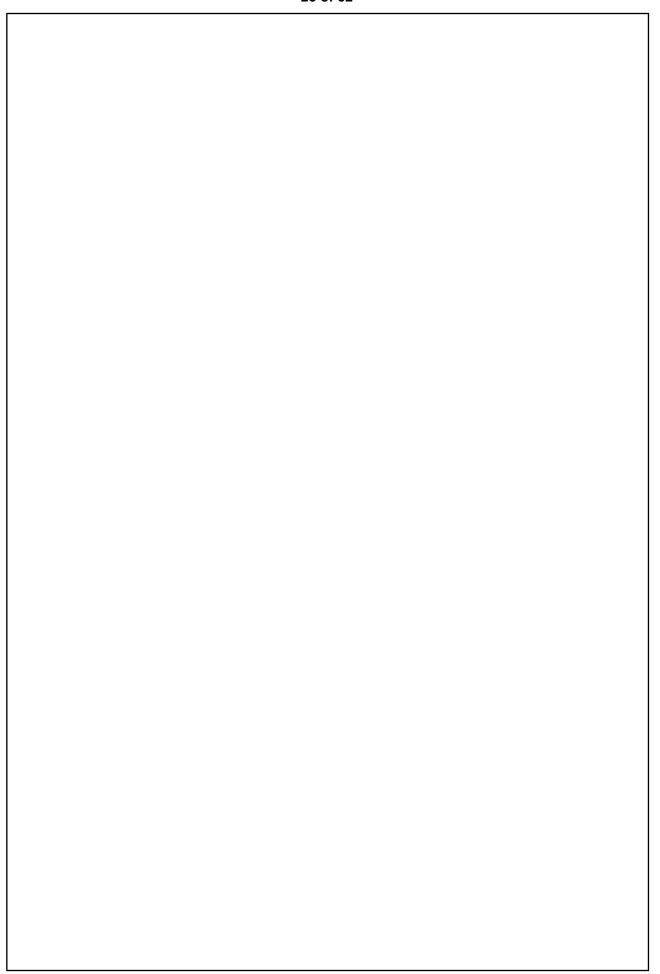


12.	(i) Find the family orthogonal to $\phi[z(x+y)^2,x^2-y^2]=0$. (ii) Reduce $y^2(\partial^2z/\partial x^2)+x^2$ ($\partial^2z/\partial y^2$) = 0 to canonical form	[2+12=18]









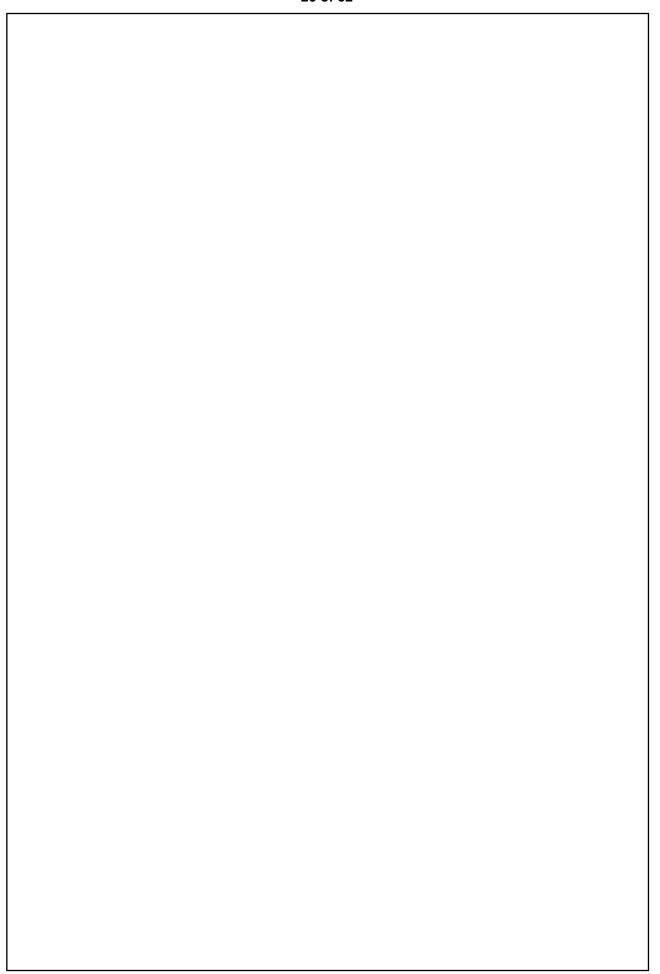


13. (i) Form the differential equation by eliminating a and b from $z =$	= (x	ζ ² +	· a)	(\mathbf{v}^2)	+ t	o).
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- (ii) Form a partial differential equation by eliminating the function ϕ from $lx + my + nz = \phi(x^2 + y^2 + z^2)$.
- (iii) Find the equation of the integral surface of the differential equation 2y(z-3)p + (2x-z)q = y(2x-3) which passes through the circle z = 0, $x^2 + y^2 = 2x$.

[5+5+8=18]





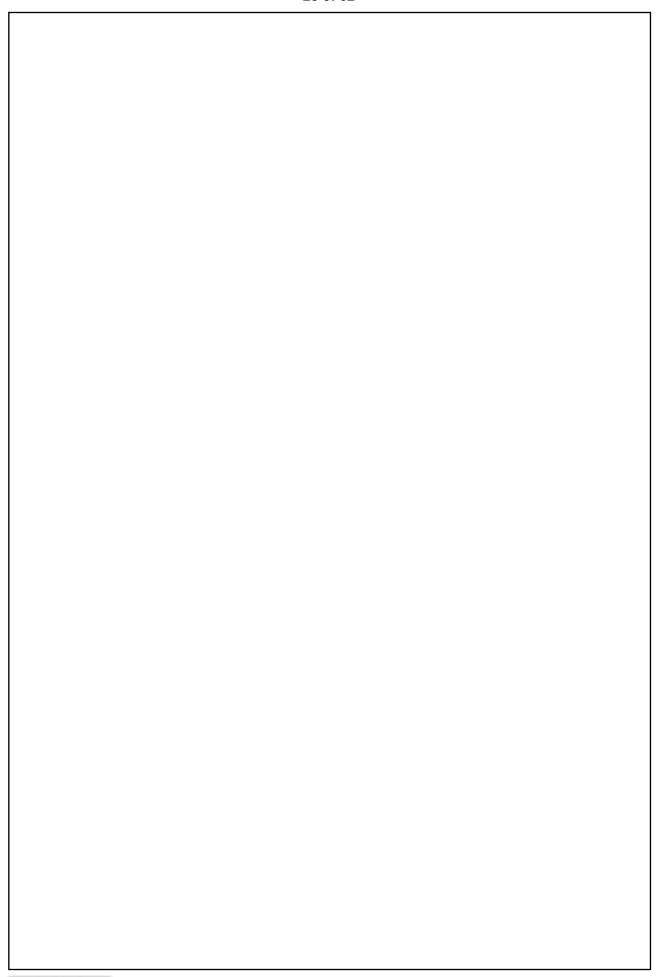


14.	(i) Solve $y^2(x - y)p + x^2(y - x)q = z(x^2 + y^2)$	
	(ii) Solve $(\partial^2 \mathbf{z}/\partial \mathbf{x}^2) - (\partial^2 \mathbf{z}/\partial \mathbf{y}^2) + (\partial \mathbf{z}/\partial \mathbf{x}) + 3(\partial \mathbf{z}/\partial \mathbf{y}) - 2\mathbf{z} = \mathbf{e}^{\mathbf{x}-\mathbf{y}} - \mathbf{x}^2\mathbf{y}$	[6+10=16]
		-

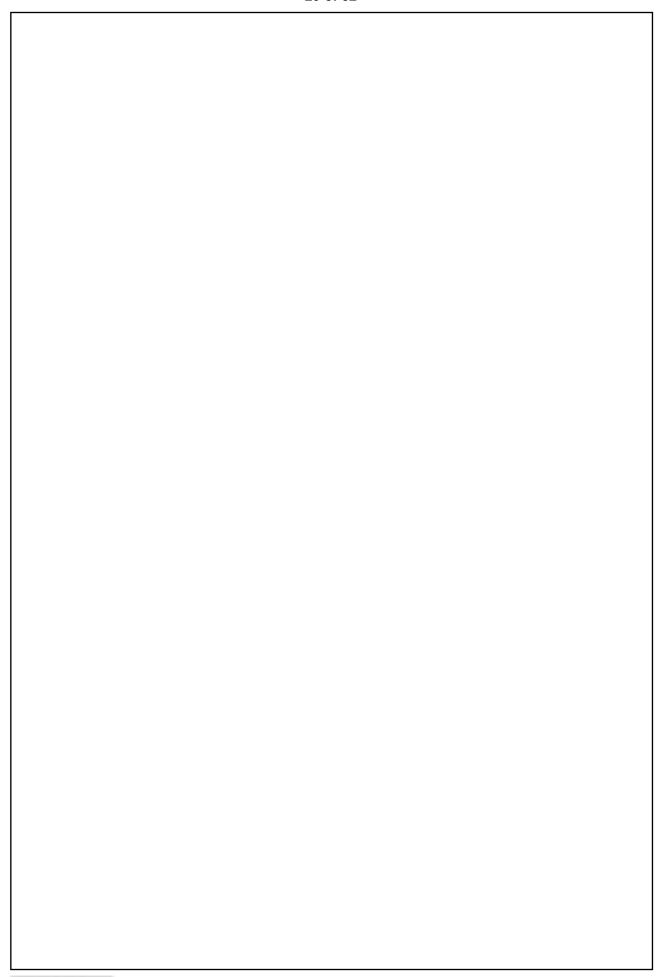


15.	A thin annulus occupies the region $0 < a \le r \le b, 0 \le \theta \le 2\pi$. The faces are
	insulated. Along the inner edge the temperature is maintained at 0°C, while along
	the outer edge the temperature is held at $T = K \cos \frac{\theta}{2}$, where K is a constant.
	Determine the temperature distribution in the annulus. [20]

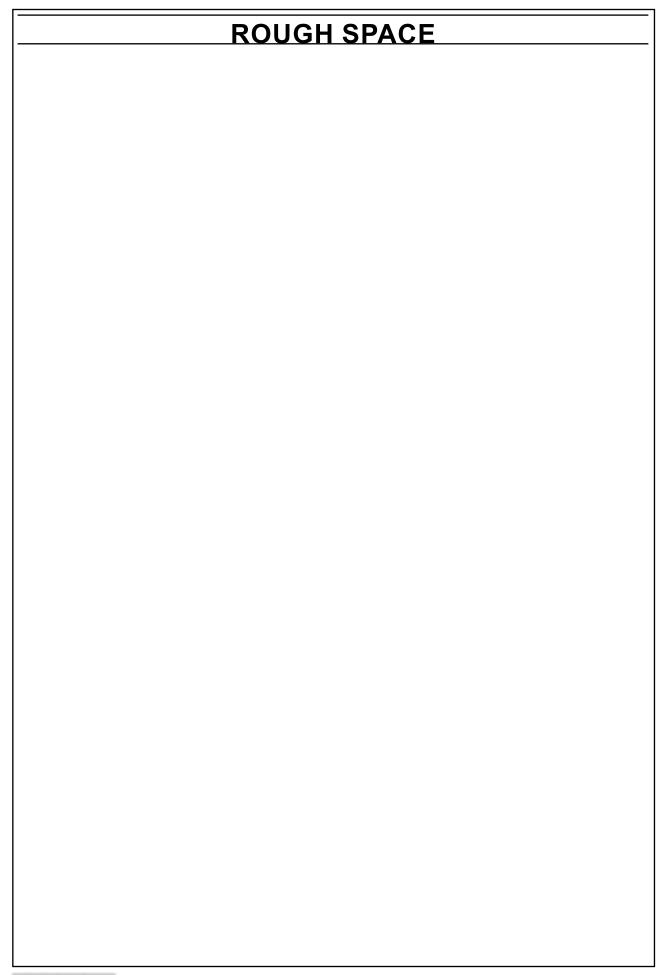














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OUR ACHIEVEMENTS IN IFoS (FROM 2008 TO 2018)

OUR RANKERS AMONG TOP 10 IN IFoS



PRATAP SINGE AIR-01



PARTH IAISWAL AIR-05



PRATEEK JAIN AIR-03



HIMANSHU GUPTA AIR-05 IFoS-2011



SIDHARTHA GUPTA AIR-03



ASHISH REDDY MV AIR-06



VARUN GUNTUPALLI AIR-04 IFoS-2014



ANUPAM SHUKLA AIR-07



TESWANG GYALTSON AIR-04 IFoS-2010



AANCHAL SRIVASTAVA **AIR-09**



DESHAL DAN AIR-05 IFoS-2017



HARSHVARDHAN AIR-10



CHINTAN DOBARIYA AIR-29 IFoS-2018 AIR-16



P.V.S. REDDY AIR-22 IFoS-2017



PRAKHAR GUPTA SUNNY K. SINGH AIR-24
IFOS-2017 IFOS-2017



SITANSHU PANDEY AIR-25 IFoS-2017



G. ROHITH AIR-35 IFoS-2017



AIR-36 IFoS-2017





AIR-45 IFoS-2017





PRINCE KUMAR DHARMYEER DAIRU
AIR-80 AIR-93
IFoS-2017 IFoS-2017



AIR-21 IFoS-2016



AIR22 IFoS-2016 AIR-23





























































































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INDIA'S No. 1 INSTITUTE FOR IAS/IFoS EXAMINATION

OUR ACHIEVEMENTS IN IAS (FROM 2008 TO 2018)























































































































































































































































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