

Code No: R13102





I B. Tech I Semester Supplementary Examinations, May - 2017 MATHEMATICS-I

(Common to All Branches)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)
2. Answering the question in Part-A is Compulsory
3. Answer any THREE Questions from Part-B

PART -A

1.	a)	Explain the method of solving Bernoulli equation.	(3M)
	b)	Solve $(D^4 + 2D^2n^2 + n^4)y = 0.$	(4M)
	c)	State and prove change of scale property of Laplace transforms.	(4M)
	d)	Verify the chain rule for Jacobians if $x = u$, $y = u \tan v$, $z = w$.	(4M)
	e)	Form the partial differential equation by eliminating the arbitrary function f from	(4M)
		$xy + yz + zx = f\left(\frac{z}{x+y}\right).$	
	f)	State all possible solutions of Laplace's equation.	(3M)
<u>PART –B</u>			
2.	a)	The number N of bacteria in a culture grows at a rate proportional to N . The value of N was initially 100 and increased to 332 in one hour. What was the value of N	(9M)
		after $1\frac{1}{2}$ hour?	
	b)	Solve $(x - y)dx - dy = 0, y(0) = 2$.	(7M)
		X	
3.		Solve $(D^2 - 4D + 4)y = x^2 \sin x + e^{2x} + 3$.	(16M)
		P	
4.	a)	Evaluate $L\left\{\int^{t} e^{-t} \cos t dt\right\}$	(6M)
	b)	Solve the differential equation using Laplace transforms	$(10\mathbf{M})$
	0)	$d^2 r$ dr	(101)
		$\frac{d^{2}x}{dt^{2}} + 3\frac{dx}{dt} + 2x = e^{-t}; x(0) = 0, x'(0) = 1.$	
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5.	a)	Find the minimum and maximum values of $\sin x + \sin y + \sin (x + y)$.	(9M)
	b)	If $u = \frac{1}{\sqrt{x^2 + y^2 + z^2}}$, $x^2 + y^2 + z^2 \neq 0$ then evaluate $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2}$.	(/M)
6	a)	Solve $a^2 y^2 = z(z - ny)$. Also, find the general solution of	(10 M)
0.	u)	Solve $q'y' = 2(2 - px)$. Also, find the general solution of $y^2 z p + x^2 z q = y^2 x$	(1011)
	b)	y 2p + x 2q - y x.	(6M)
	0)	Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$.	(0NI)
7.		An infinitely long plane uniform plate is bounded by two parallel edges and an end at right angles to them. The breadth is π ; this end is maintained at a temperature u_0 at all points and other edges are at zero temperature. Determine the temperature at any point of the plate in the steady-state	(16M)

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