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CAMBRIDGE INSTITUTE OF TECHNOLOGY

K.R. PURAM, BENGALURU-560036

Department of Basic sciences

Program: B.E. ■ M.Tech. □ Specialization:

Second Internal Assessment - Even Semester 2018-19

Sub. Name: Advanced Calculus & Numerical Methods **Sub. Code**:18MAT21 **Semester**: II

Date: 13-05-2019 **Time**: 9:00 AM **Duration**: 90 Minutes **Max. Marks**: 30

Instructions: Answer any two full questions as indicated below

Sl. No.		QUESTIONS	COs	RBT levels	Marks
1.	a)	Find the partial differential equation given $\varphi(xy+z^2, x+y+z)=0$.	CO3	L1	04M
	b)	Determine the solution of $\frac{\partial^2 z}{\partial x \partial y}+9x^2y^2=\cos(2x-y)$ given $z=0$ when $y=0$ and $\frac{\partial z}{\partial y}=0$ when $x=0$.	CO3	L2	05M
	c)	Derive one dimensional wave equation $\frac{\partial^2 u}{\partial t^2}=c^2\frac{\partial^2 u}{\partial x^2}$.	CO3	L3	06M
		OR			
2.	a)	Find the partial differential equation given $2z=\frac{x^2}{a^2}+\frac{y^2}{b^2}$.	CO3	L1	04M
	b)	Determine the solution of $(x^2-y^2-z^2)p+(2xy)q=(2xz)$.	CO3	L2	05M
	c)	Derive the various possible solutions of one dimensional heat equation $\frac{\partial u}{\partial t}=c^2\frac{\partial^2 u}{\partial x^2}$.	CO3	L3	06M

3.	a)	Find the root of the equation $3x = \cos x + 1$ nearer to $x_0 = 0.6$ by Newton Raphson method. Perform two iterations.	CO5	L1	04M
	b)	Determine an interpolating polynomial using Newton's backward interpolation formula from the following data and hence find f (12.5).	CO5	L2	05M

X	10	11	12	13
f(x)	22	24	28	34

	c)	Use Simpson's $\left(\frac{3}{8}\right)^{th}$ rule to find the value of $\int_{0.2}^{1.4}(\sin x - \log x + e^x)dx$ taking 6 parts.	CO5	L3	06M

OR

4.	a)	Find the fourth root of 12 correct to three decimal places by using Regula Falsi method.	CO5	L1	04M
	b)	Determine f(4) by using divided difference formula given:	CO5	L2	05M

x	0	2	3	6
f(x)	-4	2	14	158

	c)	Apply Lagrange's Method to find an interpolating polynomial from the following table and hence find f(3).	CO5	L3	06M

x	0	1	2	5
f(x)	2	3	12	147

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